DISCRETE SEMICONDUCTORS CATALOGUE 1989

Philips Components

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The preferred type range
Although Philips Components manufactures over 100 000 different products, only about a third of them regularly appears on the majority of customer orders.
This part of our total range is named the preferred type range.

A catalogue containing a guide to type numbers, catalogue numbers, selection and brief technical data for the preferred type range is published under the title 'Preferred type range catalogue 1989'.

Discrete semiconductors
To provide a compact, handy reference work, the Discrete semiconductors section of the 'Preferred type range catalogue 1989' is presented here as a separate publication. (The Integrated Circuits section of this catalogue is also published separately under the title 'Integrated circuits catalogue 1989'.)

CECC approved products
A list of products approved to the CECC (Cenelec Electronic Components Committee – harmonized system for electronic components of assessed quality) is included in this catalogue.

Status code
Within the preferred type range, status of products is indicated by code P (Preferred) or C (Common). Generally, these components can be supplied quickly.

Packaging quantities
With many products there is an indication of the packaging quantities; these units, or multiples of them, should be used when ordering.

The Philips Data Handbook System
For complete specifications of the components listed in this catalogue, please refer to the relevant volumes of the Philips Data Handbook System, which are indicated in the heading of each data page of this catalogue.

The Philips Data Handbook System comprises over sixty volumes, divided into six series as follows:

Integrated circuits
Discrete semiconductors
Display components
Passive components
Professional components
Materials

The contents of these series are listed in the section entitled Data Handbook System at the end of this catalogue.

If you cannot find the information you need in this catalogue or the appropriate data handbook, please consult your nearest Philips Components sales organization or industrial distributor (for addresses, see the back cover of this catalogue).

Please note that all dimensions given in tables and drawings are in mm, unless stated otherwise.

Discrete semiconductors

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Please note

The data appearing on pages S168 to S172 inclusive is incorrect. For correct information on these products please request a copy of publication no. 9398 353 30011 "Visible LEDs Product Survey" from your nearest Philips office listed on the back cover, or from the address below:

Philips Components Marketing Communications
Building BA, P.O. Box 218
5600 MD Eindhoven, The Netherlands
Attn.: Mr. A. van der Vlugt, Telex no. 35000 phtc nl

On most pages, directly underneath the title, reference is made to a 'Data Handbook'.
That Handbook is part of the Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials.
For this catalogue section the following Handbooks are of interest:

book	title
S1	Diodes Small–signal silicon diodes, voltage regulator diodes (< 1,5 W), voltage reference diodes, tuner diodes, rectifier diodes
S2a	Power diodes
S2b	Thyristors and triacs
S3	Small–signal transistors
S4a	Low–frequency power transistors and hybrid IC power modules
S4b	High–voltage and switching power transistors
S5	Small signal field–effect transistors
S6	RF power transistors and modules
S7	Surface mounted semiconductors
S8a	Light–emitting diodes
S8b	Devices for optoelectronics Optocouplers, photosensitive diodes and transistors, infrared light–emitting diodes and infrared sensitive devices, laser and fibre–optic components
S9	PowerMOS transistors
S10	Wideband transistors and wideband hybrid IC modules
S11	Microwave transistors
S13	Semiconductor sensors
S14	Liquid Crystal Displays and driver ICs for LCDs

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C_d	Diode capacitance
C_{rb}	Feedback capacitance (common base)
C_{rd}	Feedback capacitance (common drain)
C_{re}	Feedback capacitance (common emitter)
C_{rs}	Feedback capacitance (common source)
CMRR	Common mode rejection ratio
D^*	Detectivity
d_{im}	Intermodulation distortion
d_{cm}	Cross-modulation distortion
$E_{e\ tr}$	Irradiance to trigger a device
F	Noise figure
f	Frequency
f_{hfe}	Frequency at which h_{fe} is -3 dB
f_T	Transition frequency
$\Delta \frac{1}{g_{fs}}$	Difference in transfer impedance
$\Delta \frac{g_{os}}{g_{fs}}$	Difference in penetration factor
G_p	Power gain
GUM	Maximum unilateral power gain
h_{fe}	Small-signal current gain
h_{FE}	D.C. current gain
$\frac{\Delta I}{\Delta T}$	Equivalent differential current change with temperature
I_A	Anode current
dI_A/dT	Rate of rise of anode current
I_{ARM}	Repetitive peak anode current
I_B	D.C. (or average) base current
I_C	D.C. (or average) collector current
$I_{(CL)SM}$	Non-repetitive peak clamping current
I_{CM}	Peak value of I_C
I_D	Off-state current
I_{DSS}	Drain current (source short-circuited to gate)
I_{DSX}	Drain cut-off current (specified conditions)
I_e	Radiant intensity
I_F	Forward current (d.c. or average)
$I_{F(AV)}$	Total average forward current
I_{FM}	Peak forward current
I_{FRM}	Repetitive peak forward current
I_{FSM}	Non-repetitive peak forward current
I_{FWM}	Working peak forward current
I_{GSS}	Gate cut-off current (source short-circuited to drain)
I_{GT}	Gate-cathode current that will trigger all devices
I_H	Holding current
I_{ISM}	Non-repetitive peak input current
$I_{O(AV)}$	Average output current
I_{opt}	Output current at optimum operation
I_{ORM}	Repetitive peak output current
I_R	Reverse (cut-off) current
$I_{R(D)}$	Dark reverse current
I_{RRM}	Repetitive peak reverse current
I_{SDX}	Source cut-off current (specified conditions)
I_{SGO}	Source current (open drain)
I_T	On-state current
dI_T/dt	Rate of rise of on-state current
$I_{T(AV)}$	Average on-state current
I_{TRM}	Repetitive peak on-state current
$I_{T(RMS)}$	R.M.S. value of the on-state current
I_{TSM}	Non-repetitive peak on-state current
I_{TWM}	Working peak on-state current
I_v	Luminous intensity
I_Z	Working current (d.c. or average)
I_{ZM}	Peak working current
I_{ZRM}	Repetitive peak working current
I^2t	I squared t for fusing
N	Light sensitivity
P_D	Drive power
P.E.P.	Peak envelope power
P_L	Load power
P_o	Output power
P_{opt}	Optimum output power
P_{RRM}	Repetitive peak reverse power dissipation
P_{RSM}	Non-repetitive peak reverse power dissipation
P_S	Source power
P_{tot}	Total power dissipation
P_{ZRM}	Repetitive peak reverse power dissipation
P_{ZSM}	Non-repetitive peak reverse power dissipation
r_D	Diode series resistance
r_{diff}	Differential resistance
r_{do}	Initial dark resistance
r_{DSoff}	Drain-source resistance (off)
$r_{ds\ on}$	Drain-source resistance (on) at specified frequency
R_L	Load resistance
r_{io}	Initial illumination resistance
S_F, S_Z	Temperature coefficient of the working voltage
T_{amb}	Ambient temperature
T_c	Colour temperature
t_d	Forward conduction delay
t_f	Fall time
T_h	Heatsink temperature
T_j	Junction temperature
T_{mb}	Mounting base temperature
t_{off}	Turn-off time
t_{on}	Turn-on time
t_q	Circuit commutated turn-off time
t_r	Rise time
t_{rr}	Reverse recovery time
t_{tot}	Total recovery time
V_{AK}	Anode-cathode voltage
V_B	Supply voltage
V_{CBO}	Collector-base voltage (open emitter)
V_{CEO}	Collector-emitter voltage (open base)
V_{CER}	Collector-emitter voltage with a specified resistance between emitter and base
V_{CERM}	Peak value of V_{CER}
V_{CES}	Collector-emitter voltage (emitter to base)
V_{CESM}	Peak value of V_{CES}
V_{CEsat}	Collector-emitter saturation voltage
$V_{(CL)R}$	Output clamping voltage
dV_{com}/dt	Rate of rise of commutating voltage that will not trigger any device
V_D	Continuous off-state voltage
dV_D/dt	Rate of rise of off-state voltage
V_{DB}	Drain-substrate voltage
V_{DRM}	Repetitive peak off-state voltage
V_{DS}	Drain-source voltage
V_{DWM}	Crest working off-state voltage
V_F	Continuous forward voltage
V_{GA}	Anode gate-anode voltage
V_{GK}	Cathode gate-cathode voltage
ΔV_{GS}	Gate-source voltage difference
$\frac{d\Delta V_{GS}}{dT}$	Thermal drift of gate-source voltage difference
V_{GT}	Gate-cathode voltage that will trigger all devices
V_I	Input stand-off voltage (transient suppressors)
V_{IRM}	Repetitive peak input voltage
$V_{I(RMS)}$	R.M.S. value of the input voltage
V_{IWM}	Crest working input voltage
V_n	Equivalent noise voltage
V_O	Output voltage
$V_{(opt)}$	Output voltage at optimum operation
$V_{(P)GS}$	Gate-source cut-off voltage
V_R	Continuous reverse voltage; stand-off voltage
V_{RRM}	Repetitive peak reverse voltage
V_{RWM}	Crest working reverse voltage
V_{SB}	Source-substrate voltage
V_Z	Working voltage
ΔV	Equivalent differential voltage change with
ΔT	temperature
y_{fs}	Transfer admittance (common source)
η	Efficiency
α 50%	Beamwidth between half-intensity directions
λ_{peak}	Wavelength at peak spectral response or emission
ϕ_e	Radiant output power

Alphanumeric type number index

In this alphanumeric list we present all semiconductors mentioned in this catalogue. The second column is the code for the kind of product and the part of the Data Handbook System in which full information is given. The third column gives the page on which data can be found.

Key to product code:

FET Field-effect transistors
HIC Hybrid integrated circuits
I Infrared devices
LED Light-emitting diodes
LCD Liquid crystal displays
Mm Surface-mounting devices
Mw Microwave transistors
P Low-frequency power transistors and modules
PDT Photodiodes or transistors
Ph Photoconductive devices
PhC Photocouplers
PM Power MOS transistors
R Rectifier diodes
RFP R.F. power transistors and modules
RT Tripler
S Sensor devices
Saw Surface accoustic wave filters
SD Small-signal diodes
Sm Small-signal transistors
Sp Low-frequency switching power transistors
St Rectifier stacks
T Tuner diodes
Th Thyristors
ThM Thyristor modules
Tri Triacs
Vrf voltage reference diodes
Vrg Voltage regulator diodes
WBT Wideband transistors and modules

type	handbook reference	prod. code	cat. page
BA220	S1	SD	S1/5
BA221	S1	SD	S1
BA223	S1	T	S4
BA281	S1	SD	S4
BA314	S1	Vrg	S5
BA315	S1	Vrg	S5
BA316	S1	SD	S1
BA317	S1	SD	S1
BA318	S1	SD	S1
BA423	S1	T	S4
BA480	S1	T	S4
BA481	S1	T	S4
BA482	S1	T	S4
BA483	S1	T	S4
BA484	S1	T	S4
BA682	S1/S7	T/Mm	S148
BA683	S1/S7	T/Mm	S148
BAS11	S1	SD	S1
BAS15	S1	SD	S1
BAS16	S1/S7	SD/Mm	S147
BAS17*	S1/S7	Vrg/Mm	S148
BAS19	S1/S7	SD/Mm	S147
BAS20	S1/S7	SD/Mm	S147
BAS21	S1/S7	SD/Mm	S147
BAS28	S1/S7	SD/Mm	S147
BAS29	S1/S7	SD/Mm	S147
BAS31	S1/S7	SD/Mm	S147
BAS32	S1/S7	SD/Mm	S147
BAS35	S1/S7	SD/Mm	S147
BAS45	S1	SD	S2

type	handbook reference	prod. code	cat. page
BAS56	S1/S7	SD/Mm	S147
BAS85	S1/S7	SD/Mm	S147
BAT18	S1/S7	T/Mm	S148
BAT54	S1/S7	SD/Mm	S148
BAT74	S1/S7	SD/Mm	S148
BAT81	S1	T	S2
BAT82	S1	T	S2
BAT83	S1	T	S2
BAT85	S1	T	S2
BAT86	S1	T	S2
BAV10	S1	SD	S1
BAV18	S1	SD	S1
BAV19	S1	SD	S1
BAV20	S1	SD	S1
BAV21	S1	SD	S1
BAV23	S1/S7	SD/Mm	S146
BAV70	S1/S7	SD/Mm	S147
BAV99	S1/S7	SD/Mm	S147
BAV100	S1/S7	SD/Mm	S147
BAV101	S1/S7	SD/Mm	S147
BAV102	S1/S7	SD/Mm	S147
BAV103	S1/S7	SD/Mm	S147
BAV105	S1/S7	SD	S147
BAW56	S1/S7	SD/Mm	S147
BAW62	S1	SD	S1
BAX12	S1	SD	S1
BAX14	S1	SD	S1/5
BAX18	S1	SD	S1
BB112	S1	T	S3
BB119	S1	T	S3

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type	handbook reference	prod. code	cat. page
BB130	S1	T	S3
BB204B	S1	T	S3
BB212	S1	T	S3
BB215	S1/S7	SD/Mm	S147
BB219	S1/S7	SD/Mm	S147
BB405B	S1	T	S3
BB417	S1	T	S3
BB809	S1	T	S3
BB909A	S1	T	S3
BB909B	S1	T	S3
BBY31	S1/S7	T/Mm	S147
BBY39	S1/S7	T/Mm	S147
BBY40	S1/S7	T/Mm	S147
BBY42	S1/S7	T/Mm	S147
BC107	S3	Sm	S31
BC108	S3	Sm	S31
BC109	S3	Sm	S31
BC140	S3	Sm	S31
BC141	S3	Sm	S31
BC160	S3	Sm	S31
BC161	S3	Sm	S31
BC177	S3	Sm	S31
BC178	S3	Sm	S31
BC179	S3	Sm	S31
BC264A	S5	FET	S100
BC264B	S5	FET	S100
BC264C	S5	FET	S100
BC264D	S5	FET	S100
BC327;A	S3	Sm	S31
BC328	S3	Sm	S31
BC337;A	S3	Sm	S31
BC338	S3	Sm	S31
BC368	S3	Sm	S31
BC369	S3	Sm	S31
BC375	S3	Sm	S31
BC376	S3	Sm	S31
BC516	S3	Sm	S31/36
BC517	S3	Sm	S31/36
BC546	S3	Sm	S31
BC547	S3	Sm	S31
BC548	S3	Sm	S31
BC549	S3	Sm	S31
BC550	S3	Sm	S31
BC556	S3	Sm	S31
BC557	S3	Sm	S31
BC558	S3	Sm	S31
BC559	S3	Sm	S31
BC560	S3	Sm	S31
BC635	S3	Sm	S31
BC636	S3	Sm	S32
BC637	S3	Sm	S31
BC638	S3	Sm	S32
BC639	S3	Sm	S31
BC640	S3	Sm	S32
BC807	S7	Mm	S141
BC808	S7	Mm	S141
BC817	S7	Mm	S142
BC818	S7	Mm	S142
BC846	S7	Mm	S142
BC847	S7	Mm	S142
BC848	S7	Mm	S142
BC849	S7	Mm	S145
BC850	S7	Mm	S145
BC856	S7	Mm	S141
BC857	S7	Mm	S141
BC858	S7	Mm	S141
BC859	S7	Mm	S145
BC860	S7	Mm	S145
BC868	S7	Mm	S142
BC869	S7	Mm	S141
BCF29	S7	Mm	S145
BCF30	S7	Mm	S145
BCF32	S7	Mm	S145
BCF33	S7	Mm	S145
BCF70	S7	Mm	S145
BCF81	S7	Mm	S145
BCV26	S7	Mm	S141
BCV27	S7	Mm	S142
BCV61	S7	Mm	S142
BCV62	S7	Mm	S141
BCV63	S7	Mm	S141
BCV64	S7	Mm	S141
BCV65	S7	Mm	S141
BCV71	S7	Mm	S142
BCV72	S7	Mm	S142
BCW29	S7	Mm	S141
BCW30	S7	Mm	S141
BCW31	S7	Mm	S142
BCW32	S7	Mm	S142
BCW33	S7	Mm	S142

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type	handbook reference	prod. code	cat. page
BCW60*	S7	Mm	S142
BCW61*	S7	Mm	S141
BCW69	S7	Mm	S141
BCW70	S7	Mm	S141
BCW71	S7	Mm	S142
BCW72	S7	Mm	S142
BCW81	S7	Mm	S142
BCW89	S7	Mm	S141
BCX17	S7	Mm	S141
BCX18	S7	Mm	S141
BCX19	S7	Mm	S142
BCX20	S7	Mm	S142
BCX51	S7	Mm	S141
BCX52	S7	Mm	S141
BCX53	S7	Mm	S141
BCX54	S7	Mm	S142
BCX55	S7	Mm	S142
BCX56	S7	Mm	S142
BCX58	S3	Sm	S36
BCX59	S3	Sm	S36
BCX70*	S7	Mm	S142
BCX71*	S7	Mm	S141
BCX78	S3	Sm	S36
BCX79	S3	Sm	S36
BCY56	S3	Sm	S32
BCY57	S3	Sm	S32/36
BCY58*	S3	Sm	S32/36
BCY59*	S3	Sm	S32
BCY65	S3	Sm	S36
BCY70	S3	Sm	S32/36
BCY71	S3	Sm	S32/36
BCY72	S3	Sm	S32/36
BCY78*	S3	Sm	S32/36
BCY79	S3	Sm	S32/36
BCY87	S3	Sm	S32
BCY88	S3	Sm	S32
BCY89	S3	Sm	S32
BD131	S4a	P	S52
BD132	S4a	P	S52
BD135	S4a	P	S51
BD136	S4a	P	S51
BD137	S4a	P	S51
BD138	S4a	P	S51
BD139	S4a	P	S51
BD140	S4a	P	S51

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BD201	S4a	P	S53
BD202	S4a	P	S53
BD203	S4a	P	S53
BD204	S4a	P	S53
BD226	S4a	P	S51
BD227	S4a	P	S51
BD228	S4a	P	S51
BD229	S4a	P	S51
BD230	S4a	P	S51
BD231	S4a	P	S51
BD233	S4a	P	S51
BD234	S4a	P	S51
BD235	S4a	P	S51
BD236	S4a	P	S51
BD237	S4a	P	S51
BD238	S4a	P	S51
BD239	S4a	P	S52
BD239A	S4a	P	S52
BD239B	S4a	P	S52
BD239C	S4a	P	S52
BD240	S4a	P	S52
BD240A	S4a	P	S52
BD240B	S4a	P	S52
BD240C	S4a	P	S52
BD241	S4a	P	S52
BD241A	S4a	P	S52
BD241B	S4a	P	S52
BD241C	S4a	P	S52
BD242	S4a	P	S52
BD242A	S4a	P	S52
BD242B	S4a	P	S52
BD242C	S4a	P	S52
BD243	S4a	P	S53
BD243A	S4a	P	S53
BD243B	S4a	P	S53
BD243C	S4a	P	S53
BD244	S4a	P	S53
BD244A	S4a	P	S53
BD244B	S4a	P	S53
BD244C	S4a	P	S53
BD329	S4a	P	S52
BD330	S4a	P	S52
BD331;S	S4a	P	S49
BD332;S	S4a	P	S49
BD333;S	S4a	P	S49

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BD335;S	S4a	P	S49
BD336;S	S4a	P	S49
BD337;S	S4a	P	S49
BD338;S	S4a	P	S49
BD433	S4a	P	S52
BD434	S4a	P	S52
BD435	S4a	P	S52
BD436	S4a	P	S52
BD437	S4a	P	S52
BD438	S4a	P	S52
BD643	S4a	P	S49
BD644	S4a	P	S49
BD645	S4a	P	S49
BD646	S4a	P	S49
BD647	S4a	P	S49
BD648	S4a	P	S49
BD649	S4a	P	S49
BD650	S4a	P	S49
BD651	S4a	P	S49
BD652	S4a	P	S49
BD675	S4a	P	S49
BD676	S4a	P	S49
BD677	S4a	P	S49
BD678	S4a	P	S49
BD679	S4a	P	S49
BD680	S4a	P	S49
BD681	S4a	P	S49
BD682	S4a	P	S49
BD683	S4a	P	S49
BD684	S4a	P	S49
BD719	S4a	P	S53
BD720	S4a	P	S53
BD721	S4a	P	S53
BD722	S4a	P	S53
BD723	S4a	P	S53
BD724	S4a	P	S53
BD725	S4a	P	S53
BD726	S4a	P	S53
BD825	S4a	P	S51
BD826	S4a	P	S51
BD827	S4a	P	S51
BD828	S4a	P	S51
BD829	S4a	P	S51
BD830	S4a	P	S51
BD839	S4a	P	S51
BD840	S4a	P	S51
BD841	S4a	P	S51
BD842	S4a	P	S51
BD843	S4a	P	S51
BD844	S4a	P	S51
BD933	S4a	P	S52
BD934	S4a	P	S52
BD935	S4a	P	S52
BD936	S4a	P	S52
BD937	S4a	P	S52
BD938	S4a	P	S52
BD939	S4a	P	S52
BD940	S4a	P	S52
BD941	S4a	P	S52
BD942	S4a	P	S52
BD943	S4a	P	S52
BD944	S4a	P	S52
BD945	S4a	P	S52
BD946	S4a	P	S52
BD947	S4a	P	S52
BD948	S4a	P	S52
BD949	S4a	P	S52
BD950	S4a	P	S52
BD951	S4a	P	S52
BD952	S4a	P	S52
BD953	S4a	P	S52
BD954	S4a	P	S52
BD955	S4a	P	S52
BD956	S4a	P	S52
BDT29	S4a	P	S51
BDT29A	S4a	P	S51
BDT29B	S4a	P	S51
BDT29C	S4a	P	S51
BDT30	S4a	P	S51
BDT30A	S4a	P	S51
BDT30B	S4a	P	S51
BDT30C	S4a	P	S51
BDT31	S4a	P	S52
BDT31A	S4a	P	S52
BDT31B	S4a	P	S52
BDT31C	S4a	P	S52
BDT32	S4a	P	S52
BDT32A	S4a	P	S52
BDT32B	S4a	P	S52

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BDT32C	S4a	P	S52
BDT41	S4a	P	S52
BDT41A	S4a	P	S52
BDT41B	S4a	P	S52
BDT41C	S4a	P	S52
BDT42	S4a	P	S52
BDT42A	S4a	P	S52
BDT42B	S4a	P	S52
BDT42C	S4a	P	S52
BDT60	S4a	P	S49
BDT60A	S4a	P	S49
BDT60B	S4a	P	S49
BDT60C	S4a	P	S49
BDT61	S4a	P	S49
BDT61A	S4a	P	S49
BDT61B	S4a	P	S49
BDT61C	S4a	P	S49
BDT62	S4a	P	S49
BDT62A	S4a	P	S49
BDT62B	S4a	P	S49
BDT62C	S4a	P	S49
BDT63	S4a	P	S49
BDT63A	S4a	P	S49
BDT63B	S4a	P	S49
BDT63C	S4a	P	S49
BDT64	S4a	P	S50
BDT64A	S4a	P	S50
BDT64B	S4a	P	S50
BDT64C	S4a	P	S50
BDT65	S4a	P	S50
BDT65A	S4a	P	S50
BDT65B	S4a	P	S50
BDT65C	S4a	P	S50
BDT81	S4a	P	S53
BDT82	S4a	P	S53
BDT83	S4a	P	S53
BDT84	S4a	P	S53
BDT85	S4a	P	S53
BDT86	S4a	P	S53
BDT87	S4a	P	S53
BDT88	S4a	P	S53
BDT91	S4a	P	S53
BDT92	S4a	P	S53
BDT93	S4a	P	S53
BDT94	S4a	P	S53
BDT95	S4a	P	S53
BDT96	S4a	P	S53
BDV64	S4a	P	S50
BDV64A	S4a	P	S50
BDV64B	S4a	P	S50
BDV64C	S4a	P	S50
BDV65	S4a	P	S50
BDV65A	S4a	P	S50
BDV65B	S4a	P	S50
BDV65C	S4a	P	S50
BDV66A	S4a	P	S50
BDV66B	S4a	P	S50
BDV66C	S4a	P	S50
BDV66D	S4a	P	S50
BDV67A	S4a	P	S50
BDV67B	S4a	P	S50
BDV67C	S4a	P	S50
BDV67D	S4a	P	S50
BDV91	S4a	P	S53
BDV92	S4a	P	S53
BDV93	S4a	P	S53
BDV94	S4a	P	S53
BDV95	S4a	P	S53
BDV96	S4a	P	S53
BDX35	S4a	P	S52
BDX36	S4a	P	S52
BDX37	S4a	P	S52
BDX42	S4a	P	S49
BDX43	S4a	P	S49
BDX44	S4a	P	S49
BDX45	S4a	P	S49
BDX46	S4a	P	S49
BDX47	S4a	P	S49
BDX62	S4a	P	S49
BDX62A	S4a	P	S49
BDX62B	S4a	P	S49
BDX62C	S4a	P	S49
BDX63	S4a	P	S49
BDX63A	S4a	P	S49
BDX63B	S4a	P	S49
BDX63C	S4a	P	S49
BDX64	S4a	P	S50
BDX64A	S4a	P	S50
BDX64B	S4a	P	S50
BDX64C	S4a	P	S50

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type	handbook reference	prod. code	cat. page
BDX65	S4a	P	S50
BDX65A	S4a	P	S50
BDX65B	S4a	P	S50
BDX65C	S4a	P	S50
BDX66	S4a	P	S50
BDX66A	S4a	P	S50
BDX66B	S4a	P	S50
BDX66C	S4a	P	S50
BDX67	S4a	P	S50
BDX67A	S4a	P	S50
BDX67B	S4a	P	S50
BDX67C	S4a	P	S50
BDX68	S4a	P	S50
BDX68A	S4a	P	S50
BDX68B	S4a	P	S50
BDX68C	S4a	P	S50
BDX69	S4a	P	S50
BDX69A	S4a	P	S50
BDX69B	S4a	P	S50
BDX69C	S4a	P	S50
BDX77	S4a	P	S53
BDX78	S4a	P	S53
BDX91	S4a	P	S53
BDX92	S4a	P	S53
BDX93	S4a	P	S53
BDX94	S4a	P	S53
BDX95	S4a	P	S53
BDX96	S4a	P	S53
BDY90	S4a	P	S53
BDY91	S4a	P	S53
BDY92	S4a	P	S53
BF198	S3	Sm	S34
BF199	S3	Sm	S34
BF240	S3	Sm	S34
BF241	S3	Sm	S34
BF245A	S5	FET	S100
BF245B	S5	FET	S100
BF245C	S5	FET	S100
BF247A	S5	FET	S100
BF247B	S5	FET	S100
BF247C	S5	FET	S100
BF256A	S5	FET	S100
BF256B	S5	FET	S100
BF256C	S5	FET	S100
BF324	S3	Sm	S34
BF370	S3	Sm	S34
BF410A	S5	FET	S100
BF410B	S5	FET	S100
BF410C	S5	FET	S100
BF410D	S5	FET	S100
BF419	S4b	SP	S54
BF420	S3	Sm	S34
BF421	S3	Sm	S34
BF422	S3	Sm	S34
BF423	S3	Sm	S34
BF450	S3	Sm	S34
BF451	S3	Sm	S34
BF457	S4b	SP	S54
BF458	S4b	SP	S54
BF459	S4b	SP	S54
BF469	S4b	SP	S54
BF470	S4b	SP	S54
BF471	S4b	SP	S54
BF472	S4b	SP	S54
BF483	S3	Sm	S34
BF485	S3	Sm	S34
BF487	S3	Sm	S34
BF494	S3	Sm	S34
BF495	S3	Sm	S34
BF496	S3	Sm	S34
BF510	S5/S7	FET/Mm	S100/146
BF511	S5/S7	FET/Mm	S100/146
BF512	S5/S7	FET/Mm	S100/146
BF513	S5/S7	FET/Mm	S100/146
BF550	S7	Mm	S143
BF569	S7	Mm	S143
BF570	S7	Mm	S143
BF579	S7	Mm	S143
BF583	S4b	SP	S54
BF585	S4b	SP	S54
BF587	S4b	SP	S54
BF620	S7	Mm	S145
BF621	S7	Mm	S145
BF622	S7	Mm	S145
BF623	S7	Mm	S145
BF660	S7	Mm	S143
BF689K	S10	WBT	S122
BF763	S7/S10	Mm/WBT	S122
BF767	S7	Mm	S143
BF819	S4b	SP	S54

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type	handbook reference	prod. code	cat. page
BF820	S7	Mm	S145
BF821	S7	Mm	S145
BF822	S7	Mm	S145
BF823	S7	Mm	S145
BF824	S7	Mm	S143
BF840	S7	Mm	S143
BF841	S7	Mm	S143
BF857	S4b	SP	S54
BF858	S4b	SP	S54
BF859	S4b	SP	S54
BF869	S4b	SP	S54
BF870	S4b	SP	S54
BF871	S4b	SP	S54
BF872	S4b	SP	S54
BF926	S3	Sm	S34
BF936	S3	Sm	S34
BF939	S3	Sm	S34
BF960	S5	FET	S102
BF964	S5	FET	S102
BF964S	S5	FET	S102
BF966	S5	FET	S102
BF966S	S5	FET	S102
BF967	S3	Sm	S34
BF970	S3	Sm	S35
BF970A	S3	Sm	S35
BF979	S3	Sm	S35
BF980	S5	FET	S102
BF981	S5	FET	S102
BF982	S5	FET	S102
BF989	S5/S7	FET/Mm	S102/146
BF990;A	S5/S7	FET/Mm	S102/146
BF991	S5/S7	FET/Mm	S102/146
BF992	S5/S7	FET/Mm	S102/146
BF994	S5	FET	S102
BF994S	S5/S7	FET/Mm	S102/146
BF996	S5	FET	S102
BF996S	S5/S7	FET/Mm	S146
BF997	S5/S7	FET/Mm	S146
BFG17A	S10	WBT	S122
BFG23	S10	WBT	S121/122
BFG32	S10	WBT	S121/122
BFG33	S10	WBT	S122
BFG34	S10	WBT	S121/122
BFG35	S7	WBT/Mm	S121/122
BFG51	S10	WBT	S121/122
BFG54	S10	WBT	S121/122
BFG65	S10	WBT	S121/122
BFG67	S10/S7	WBT/Mm	S121/143
BFG90A	S10	WBT	S121/122
BFG91A	S10	WBT	S121/122
BFG92A	S10	WBT	S121/122
BFG93A	S10	WBT	S121/122
BFG96	S10	WBT	S121/122
BFG97	S7	WBT/Mm	S121/122
BFG134	S10	WBT	S121/122
BFG135	S7	WBT/Mm	S121/122
BFG195	S10	WBT	S121/122
BFG197	S10	WBT	S122
BFG198	S7	WBT/Mm	S121/122
BFP24	S8b	PhC	S164
BFP31	S8b	PhC	S164
BFP90A	S10	WBT	S121/122
BFP91A	S10	WBT	S121/122
BFP96	S10	WBT	S121/122
BFQ12	S5	FET	S106
BFQ13	S5	FET	S106
BFQ14	S5	FET	S106
BFQ15	S5	FET	S106
BFQ16	S5	FET	S106
BFQ17	S10/S7	WBT/Mm	S122/143
BFQ18A	S10/S7	WBT/Mm	S121/143
BFQ19	S10/S7	WBT/Mm	S121/143
BFQ22S	S10	WBT	S121/122
BFQ23	S10	WBT	S121/122
BFQ23C	S10	WBT	S121/122
BFQ24	S10	WBT	S121/122
BFQ32	S10	WBT	S122
BFQ32C	S10	WBT	S121/122
BFQ32M	S10	WBT	S121/122
BFQ32S	S10	WBT	S121/122
BFQ33C	S10	WBT	S122
BFQ34	S10	WBT	S113/121
BFQ34T	S10	WBT	S121/122
BFQ42	S10	WBT	S109
BFQ43	S6	RFP	S109
BFQ43S	S6	RFP	S109
BFQ51	S10	WBT	S121/122
BFQ51C	S10	WBT	S121/122
BFQ52	S10	WBT	S121/122
BFQ53	S10	WBT	S121/122

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type	handbook reference	prod. code	cat. page
BFQ54	S10	WBT	S121/122
BFQ54T	S10	WBT	S121/122
BFQ63	S10	WBT	S121/122
BFQ65	S10	WBT	S121/122
BFQ66	S10	WBT	S122
BFQ67	S10/S7	WBT/Mm	S121/143
BFQ68	S10	WBT	S113/121
BFQ135	S10	WBT	S124
BFQ136	S10	WBT	S121/124
BFQ149	S10	WBT	S121/124
BFR29	S5	FET	S104
BFR30	S5/S7	FET/Mm	S100/146
BFR31	S5/S7	FET/Mm	S100/146
BFR53	S10/S7	WBT/Mm	S124/143
BFR54	S3	Sm	S35
BFR64	S10	WBT	S124
BFR65	S10	WBT	S124
BFR84	S5	FET	S102
BFR90	S10	WBT	S124
BFR90A	S10	WBT	S121/124
BFR91	S10	WBT	S124
BFR91A	S10	WBT	S121/124
BFR92	S10/S7	WBT/Mm	S124/143
BFR92A	S10/S7	WBT/Mm	S121/143
BFR93	S10/S7	WBT/Mm	S124/143
BFR93A	S10/S7	WBT/Mm	S121/143
BFR94	S10	WBT	S124
BFR95	S10	WBT	S124
BFR96	S10	WBT	S124
BFR96S	S10	WBT	S113/121
BFR101A;B	S5/S7	FET/Mm	S100/146
BFR106	S10	WBT	S121/124
BFR134	S10	WBT	S121/124
BFS17	S10/S7	WBT/Mm	S124/143
BFS17A	S10	WBT/Mm	S124/143
BFS18	S7	Mm	S143
BFS19	S7	Mm	S143
BFS20	S7	Mm	S143
BFS21	S5	FET	S106
BFS21A	S5	FET	S106
BFS22A	S6	RFP	S109
BFS23A	S6	RFP	S109
BFT24	S10	WBT	S122/124
BFT25	S10/S7	WBT/Mm	S121/143
BFT44	S3	Sm	S36
BFT45	S3	Sm	S36
BFT46	S5/S7	FET/Mm	S100/146
BFT92	S10/S7	WBT/Mm	S121/143
BFT93	S10/S7	WBT/Mm	S121/143
BFW10	S5	FET	S100
BFW11	S5	FET	S100
BFW12	S5	FET	S100
BFW13	S5	FET	S100
BFW16A	S10	WBT	S124
BFW17A	S10	WBT	S124
BFW30	S10	WBT	S124
BFW61	S5	FET	S100
BFW92	S10	WBT	S124
BFW92A	S10	WBT	S124
BFW93	S10	WBT	S124
BFX34	S3	Sm	S36
BFX89	S10	WBT	S124
BFY50	S3	Sm	S36
BFY51	S3	Sm	S36
BFY52	S3	Sm	S36
BFY55	S3	Sm	S36
BFY90	S10	WBT	S124
BG2000	S1	RT	S24
BG2097*	S1	RT	S24
BGD102	S10	WBM	S128
BGD102E	S10	WBM	S128
BGD104	S10	WBM	S128
BGD104E	S10	WBM	S128
BGD502	S10	WBM	S130
BGD504	S10	WBM	S130
BGX885	S10	WBM	S130
BGY22	S6	RFP	S110
BGY23	S6	RFP	S110
BGY32	S6	RFP	S110
BGY33	S6	RFP	S110
BGY35	S6	RFP	S110
BGY36	S6	RFP	S110
BGY40A	S6	RFP	S110
BGY40B	S6	RFP	S110
BGY41A	S6	RFP	S110
BGY41B	S6	RFP	S110
BGY43	S6	RFP	S110
BGY45A	S6	RFP	S110
BGY45B	S6	RFP	S110
BGY45C	S6	RFP	S110

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type	handbook reference	prod. code	cat. page
BGY46A	S6	RFP	S110
BGY46B	S6	RFP	S110
BGY46D	S6	RFP	S110
BGY47*	S6	RFP	S110
BGY48*	S6	RFP	S110
BGY49A	S6	RFP	S110
BGY49B	S6	RFP	S110
BGY50	S10	WBM	S126
BGY51	S10	WBM	S126
BGY52	S10	WBM	S126
BGY53	S10	WBM	S126
BGY54	S10	WBM	S126
BGY55	S10	WBM	S126
BGY56	S10	WBM	S126
BGY57	S10	WBM	S126
BGY58	S10	WBM	S126
BGY58A	S10	WBM	S126
BGY59	S10	WBM	S126
BGY60	S10	WBM	S126
BGY61	S10	WBM	S130
BGY65	S10	WBM	S130
BGY67	S10	WBM	S130
BGY67A	S10	WBM	S130
BGY80	S10	WBM	S128
BGY81	S10	WBM	S128
BGY84	S10	WBM	S128
BGY84A	S10	WBM	S128
BGY84H	S10	WBM	S128
BGY85	S10	WBM	S128
BGY85A	S10	WBM	S128
BGY85H	S10	WBM	S128
BGY86	S10	WBM	S128
BGY87	S10	WBM	S128
BGY88	S10	WBM	S128
BGY90A	S6	RFP	S110
BGY90B	S6	RFP	S110
BGY91A	S6	RFP	S110
BGY91B	S6	RFP	S110
BGY93*	S6	RFP	S110
BGY94*	S6	RFP	S110
BGY95A	S6	RFP	S110
BGY95B	S6	RFP	S110
BGY96A	S6	RFP	S110
BGY96B	S6	RFP	S110
BGY110A	S6	RFP	S110
BGY110B	S6	RFP	S110
BGY580	S10	WBM	S128
BGY581	S10	WBM	S128
BGY584	S10	WBM	S128
BGY584A	S10	WBM	S128
BGY585	S10	WBM	S128
BGY585A	S10	WBM	S128
BGY586	S10	WBM	S128
BGY587	S10	WBM	S128
BGY588	S10	WBM	S128
BLF146	S6	RFP/FET	S107
BLF242	S6	RFP/FET	S109
BLF244	S6	RFP/FET	S109
BLF245	S6	RFP/FET	S109
BLT90/SL	S6	RFP	S112
BLT91/SL	S6	RFP	S112
BLT92/SL	S6	RFP	S112
BLU20/12	S6	RFP	S111
BLU30/12	S6	RFP	S111
BLU45/12	S6	RFP	S111
BLU50	S6	RFP	S111
BLU51	S6	RFP	S111
BLU52	S6	RFP	S111
BLU53	S6	RFP	S111
BLU60/12	S6	RFP	S111
BLU97	S6	RFP	S111
BLU98	S6	RFP	S112
BLU99	S6	RFP	S111/112
BLV10	S6	RFP	S108/109
BLV11	S6	RFP	S107/109
BLV20	S6	RFP	S108/109
BLV21	S6	RFP	S107/112
BLV25	S6	RFP	S112
BLV30	S6	RFP	S113
BLV31	S6	RFP	S113
BLV32F	S6	RFP	S113
BLV33	S6	RFP	S113
BLV33F	S6	RFP	S113
BLV36	S6	RFP	S113
BLV37	S6	RFP	S113
BLV38	S6	RFP	S113
BLV45/12	S6	RFP	S109
BLV57	S6	RFP	S113
BLV59	S6	RFP	S113
BLV75/12	S6	RFP	S109

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BLV80/28	S6	RFP	S109
BLV90	S6	RFP	S112
BLV90/SL	S6	RFP	S112
BLV91	S6	RFP	S112
BLV91/SL	S6	RFP	S112
BLV92	S6	RFP	S112
BLV93	S6	RFP	S112
BLV94	S6	RFP	S112
BLV95	S6	RFP	S112
BLV97	S6	RFP	S112
BLV98	S6	RFP	S112
BLV99	S6	RFP	S112
BLW29	S6	RFP	S109
BLW31	S6	RFP	S109
BLW32	S6	RFP	S113
BLW33	S6	RFP	S113
BLW34	S6	RFP	S113
BLW50F	S6	RFP	S107/108
BLW60	S6	RFP	S107/109
BLW60C	S6	RFP	S107/109
BLW76	S6	RFP	S107/109
BLW77	S6	RFP	S107/109
BLW78	S6	RFP	S107/112
BLW79	S6	RFP	S111
BLW80	S6	RFP	S111
BLW81	S6	RFP	S111
BLW83	S6	RFP	S107/108
BLW84	S6	RFP	S109
BLW85	S6	RFP	S107/109
BLW86	S6	RFP	S107/112
BLW87	S6	RFP	S107/109
BLW89	S6	RFP	S111
BLW90	S6	RFP	S111/112
BLW91	S6	RFP	S111
BLW95	S6	RFP	S107/109
BLW96	S6	RFP	S107/109
BLW97	S6	RFP	S107
BLW98	S6	RFP	S113
BLW99	S6	RFP	S107
BLX13	S6	RFP	S107/108
BLX13C	S6	RFP	S107/108
BLX14	S6	RFP	S107
BLX15	S6	RFP	S107/109
BLX39	S6	RFP	S107/112
BLX65	S6	RFP	S111
BLX65E	S6	RFP	S111
BLX67	S6	RFP	S111
BLX68	S6	RFP	S111
BLX69A	S6	RFP	S111
BLX91A	S6	RFP	S111
BLX91CB	S6	RFP	S118
BLX92A	S6	RFP	S111
BLX93A	S6	RFP	S111
BLX94A	S6	RFP	S111
BLX94C	S6	RFP	S111
BLX95	S6	RFP	S111
BLX96	S6	RFP	S118
BLX97	S6	RFP	S118
BLX98	S6	RFP	S118
BLY87A	S6	RFP	S108/109
BLY87C	S6	RFP	S108/109
BLY88A	S6	RFP	S107/109
BLY88C	S6	RFP	S107/109
BLY89A	S6	RFP	S107/109
BLY89C	S6	RFP	S107/109
BLY90	S6	RFP	S109
BLY91A	S6	RFP	S108/109
BLY91C	S6	RFP	S108/109
BLY92A	S6	RFP	S107/109
BLY92C	S6	RFP	S107/109
BLY93A	S6	RFP	S109
BLY93C	S6	RFP	S109
BLY94	S6	RFP	S109
BPW22A*	S8a/b	PDT	S165
BPW50	S8a/b	PDT	S165
BR100	S2b	Th	S30
BRY39	S2a	Th/Sm	S30/40
BRY56	S3	Sm	S40
BRY61	S7	Mm	S146
BRY62	S7	Mm	S146
BS107;A	S5	FET	S105
BS170	S5	FET	S105
BS250	S5	FET	S105
BSD10	S5	FET	S104
BSD12	S5	FET	S104
BSD20	S5/S7	FET/Mm	S104/146
BSD22	S5/S7	FET/Mm	S104/146
BSD212	S5	FET	S104
BSD213	S5	FET	S104
BSD214	S5	FET	S104

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BSD215	S5	FET	S104
BSJ174	S5	FET	S101
BSJ175	S5	FET	S101
BSJ176	S5	FET	S101
BSJ177	S5	FET	S101
BSN254A	S5	FET	S105
BSP204A	S5	FET	S105
BSP254A	S5	FET	S105
BSP304A	S5	FET	S105
BSR12	S7	Mm	S144
BSR13	S7	Mm	S144
BSR14	S7	Mm	S144
BSR15	S7	Mm	S144
BSR16	S7	Mm	S144
BSR17	S7	Mm	S144
BSR17A	S7	Mm	S144
BSR18	S7	Mm	S144
BSR18A	S7	Mm	S144
BSR19	S7	Mm	S144
BSR19A	S7	Mm	S144
BSR20	S7	Mm	S144
BSR20A	S7	Mm	S144
BSR30	S7	Mm	S144
BSR31	S7	Mm	S144
BSR32	S7	Mm	S144
BSR33	S7	Mm	S144
BSR40	S7	Mm	S144
BSR41	S7	Mm	S144
BSR42	S7	Mm	S144
BSR43	S7	Mm	S144
BSR50	S3	Sm	S36
BSR51	S3	Sm	S36
BSR52	S3	Sm	S36
BSR56	S5/S7	FET/Mm	S103/146
BSR57	S5/S7	FET/Mm	S103/146
BSR58	S5/S7	FET/Mm	S103/146
BSR60	S3	Sm	S36
BSR61	S3	Sm	S36
BSR62	S3	Sm	S36
BSR174	S5/S7	FET/Mm	S101/146
BSR175	S5/S7	FET/Mm	S101/146
BSR176	S5/S7	FET/Mm	S101/146
BSR177	S5/S7	FET/Mm	S101/146
BSS38	S3	Sm	S36
BSS50	S3	Sm	S36
BSS51	S3	Sm	S36
BSS52	S3	Sm	S36
BSS60	S3	Sm	S37
BSS61	S3	Sm	S37
BSS62	S3	Sm	S37
BSS63	S7	Mm	S144
BSS64	S7	Mm	S144
BSS68	S3	Sm	S37
BSS83	S5/S7	FET/Mm	S104/146
BSS87	S5	FET	S105
BSS89	S5	FET	S105
BSS91	S5	FET	S105
BSS92	S5	FET	S105
BSS192	S5	FET	S105
BST15	S7	Mm	S145
BST16	S7	Mm	S145
BST39	S7	Mm	S145
BST40	S7	Mm	S145
BST50	S7	Mm	S144
BST51	S7	Mm	S144
BST52	S7	Mm	S144
BST60	S7	Mm	S144
BST61	S7	Mm	S144
BST62	S7	Mm	S144
BST70A	S5	FET	S105
BST72A	S5	FET	S105
BST74A	S5	FET	S105
BST76A	S5	FET	S105
BST80	S5/S7	FET/Mm	S105/146
BST82	S5/S7	FET/Mm	S105/146
BST84	S5/S7	FET/Mm	S105/146
BST86	S5/S7	FET/Mm	S105/146
BST100	S5	FET	S105
BST110	S5	FET	S105
BST120	S5/S7	FET/Mm	S105/146
BST122	S5/S7	FET/Mm	S105/146
BSV15*	S3	Sm	S37
BSV16*	S3	Sm	S37
BSV17	S3	Sm	S37
BSV52	S7	Mm	S144
BSV64	S3	Sm	S37
BSV78	S5	FET	S103
BSV79	S5	FET	S103
BSV80	S5	FET	S103
BSV81	S5	FET	S104

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type	handbook reference	prod. code	cat. page
BSW66A	S3	Sm	S37
BSW67A	S3	Sm	S37
BSW68A	S3	Sm	S37
BSX20	S3	Sm	S37
BSX45*	S3	Sm	S37
BSX46*	S3	Sm	S37
BSX47	S3	Sm	S37
BSX59	S3	Sm	S37
BSX60	S3	Sm	S37
BSX61	S3	Sm	S37
BT134*	S2b	Tri	S25/29
BT136*	S2b	Tri	S25/29
BT137*	S2b	Tri	S25/29
BT138*	S2b	Tri	S25/29
BT139*	S2b	Tri	S25/29
BT145*	S2b	Tri	S25/27
BT148*	S2b	Th	S25/26
BT150	S2b	Th	S25/26
BT151*	S2b	Th	S25/26
BT152*	S2b	Th	S25/27
BT157*	S2b	Th	S25/28
BT169*	S2b	Th	S25/26
BTA140*	S2b	Th	S25/29
BTR59*	S2b	Th	S25/28
BTS59*	S2b	Th	S25/28
BTV58*	S2b	Th	S25/28
BTW38*	S2b	Th	S25/26
BTW40*	S2b	Th	S25/27
BTW42*	S2b	Th	S25/26
BTW43G*	S2b	Tri	S25/29
BTW43H*	S2b	Tri	S25/29
BTW45*	S2b	Th	S25/27
BTW58*	S2b	Th	S25/28
BTY79*	S2b	Th	S25/26
BTY91*	S2b	Th	S25/27
BU304F	S4b	SP	S55
BU305F	S4b	SP	S55
BU306	S4b	SP	S56
BU306F	S4b	SP	S56
BU406	S4b	SP	S53
BU407	S4b	SP	S53
BU505;D	S4b	SP	S54
BU506	S4b	SP	S55
BU506D	S4b	SP	S55
BU506DF	S4b	SP	S55
BU506F	S4b	SP	S55
BU508	S4b	SP	S56
BU508A	S4b	SP	S56
BU508AF	S4b	SP	S56
BU508D	S4b	SP	S56
BU508DF	S4b	SP	S56
BU705	S4b	SP	S54
BU706	S4b	SP	S55
BU706D	S4b	SP	S55
BU706DF	S4b	SP	S55
BU706F	S4b	SP	S55
BU724A	S4b	SP	S54
BU806;A	S4b	SP	S49
BU807	S4b	SP	S49
BU808	S4b	SP	S57
BU826;A	S4b	SP	S55
BU903	S4b	SP	S55
BU903F	S4b	SP	S55
BUK426*	S9	PM	S58
BUK427*	S9	PM	S58
BUK436*	S9	PM	S58
BUK437*	S9	PM	S58
BUK442*	S9	PM	S59
BUK443*	S9	PM	S59
BUK444*	S9	PM	S59
BUK445*	S9	PM	S59
BUK446*	S9	PM	S59
BUK452*	S9	PM	S60
BUK453*	S9	PM	S60
BUK454*	S9	PM	S60
BUK456*	S9	PM	S60
BUK457*	S9	PM	S60
BUK462*	S9	PM	S61
BUK463*	S9	PM	S61
BUK464*	S9	PM	S61
BUK542*	S9	PM	S61
BUK543*	S9	PM	S61
BUK545*	S9	PM	S61
BUK552*	S9	PM	S62
BUK553*	S9	PM	S62
BUK554*	S9	PM	S62
BUK555*	S9	PM	S62
BUK562*	S9	PM	S62
BUK563*	S9	PM	S62
BUK564*	S9	PM	S62

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type	handbook reference	prod. code	cat. page
BUK627*	S9	PM	S63
BUK637*	S9	PM	S63
BUK655*	S9	PM	S63
BUK657*	S9	PM	S63
BUP23B	S4b	SP	S57
BUP23C	S4b	SP	S57
BUS11;A	S4b	SP	S55
BUS12;A	S4b	SP	S56
BUS13;A	S4b	SP	S57
BUS14;A	S4b	SP	S57
BUS22	S4b	SP	S56
BUS23	S4b	SP	S57
BUS24*	S4b	SP	S57
BUT11;A	S4b	SP	S55
BUT11F;AF	S4b	SP	S55
BUT12;A	S4b	SP	S56
BUT18;A	S4b	SP	S55
BUT18F;AF	S4b	SP	S55
BUV26;A*	S4b	SP	S53
BUV27;A*	S4b	SP	S53
BUV28;A	S4b	SP	S56
BUV28F;AF	S4b	SP	S56
BUV89	S4b	SP	S56
BUV90	S4b	SP	S57
BUV98(V);A	S4b	SP	S57
BUV298(V);A	S4b	SP	S57
BUW11;A	S4b	SP	S55
BUW11F;AF	S4b	SP	S55
BUW12;A	S4b	SP	S56
BUW12F;AF	S4b	SP	S56
BUW13;A	S4b	SP	S57
BUW13F;AF	S4b	SP	S57
BUW84	S4b	SP	S54
BUW85	S4b	SP	S54
BUX46;A	S4b	SP	S55
BUX47;A	S4b	SP	S56
BUX48;A	S4b	SP	S57
BUX79	S4b	SP	S54
BUX84	S4b	SP	S54
BUX85	S4b	SP	S54
BUX86	S4b	SP	S54
BUX87	S4b	SP	S54
BUX88	S4b	SP	S57
BUX98;A	S4b	SP	S57
BUX99	S4b	SP	S54

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BUY89	S4b	SP	S55
BY228	S1	R	S9/23
BY229*	S2a	R	S9/19
BY229F*	S2a	R	S19
BY249*	S2a	R	S9/22
BY328	S1	SD	S9/23
BY329*	S2a	R	S9/19
BY359*	S2a	R	S9/19
BY438	S1	R	S9
BY448	S1	R	S9/23
BY458	S1	R	S9/23
BY505	S1	R	S10/24
BY509	S1	R	S10/24
BY527	S1	R	S9/20
BY584	S1	R	S10/24
BY588	S1	R	S9/23
BY609	S1	R	S10/24
BY610	S1	R	S10/24
BY614	S1	R	S10/24
BY619	S1	R	S10/24
BY620	S1	R	S10/24
BY627	S1	R	S9/20
BY705	S1	R	S10/24
BY706	S1	R	S10/24
BY707	S1	R	S10/24
BY708	S1	R	S10/24
BY709	S1	R	S10/24
BY710	S1	R	S10/24
BY711	S1	R	S10/24
BY712	S1	R	S10/24
BY713	S1	R	S10/24
BY714	S1	R	S10/24
BY715	S1	R	S10/24
BY716	S1	R	S10/24
BY717	S1	R	S10/24
BY718	S1	R	S10/24
BY719	S1	R	S10/24
BY720	S1	R	S10/24
BY721	S1	R	S10/24
BY722	S1	R	S10/24
BY723	S1	R	S10/24
BY724	S1	R	S10/24
BYD11*	S1	R	S9/20
BYD13*	S1	R	S9/20
BYD14*	S1	R	S9/20

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PHILIPS

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type	handbook reference	prod. code	cat. page
BYD17*	S1/S7	R/Mm	S9/149
BYD31*	S1	R	S8/17
BYD33*	S1	R	S8/17
BYD34*	S1	R	S8/17
BYD37*	S1/S7	R/Mm	S8/149
BYD73*	S1	R	S8/12
BYD74*	S1	R	S8/12
BYD77*	S1/S7	R/Mm	S8/149
BYM26*	S1	R	S8/12
BYM36*	S1	R	S8/13
BYM56*	S1	R	S9/21
BYP20*	S2a	R	S8
BYP21*	S2a	R	S8/16
BYP22*	S2a	R	S8/16
BYQ28*	S2a	R	S8/13
BYR29*	S2a	R	S8/14
BYR735	S2a	R	S7/11
BYR740	S2a	R	S7/11
BYR745	S2a	R	S7/11
BYR1035	S2a	R	S7/11
BYR1040	S2a	R	S7/11
BYR1045	S2a	R	S7/11
BYR1535CT	S2a	R	S7/11
BYR1540CT	S2a	R	S7/11
BYR1545CT	S2a	R	S7/11
BYR1635	S2a	R	S7/11
BYR1640	S2a	R	S7/11
BYR1645	S2a	R	S7/11
BYR2035CT	S2a	R	S7/11
BYR2040CT	S2a	R	S7/11
BYR2045CT	S2a	R	S7/11
BYR3035CT	S2a	R	S7/11
BYR3040CT	S2a	R	S7/11
BYR3045CT	S2a	R	S7/11
BYT28*	S2a	R	S8/14
BYT79*	S2a	R	S8/14
BYT230PIV	S1	R	S8/16
BYV24*	S2a	R	S9/19
BYV26*	S1/S2a	R	S8/12
BYV27*	S1/S2a	R	S8/12
BYV28*	S1/S2a	R	S8/13
BYV29*	S2a	R	S8/14
BYV30*	S2a	R	S8/14
BYV31*	S2a	R	S8/15
BYV32*	S2a	R	S8/14
BYV34*	S2a	R	S8/14
BYV36*	S1	R	S8/12
BYV42*	S2a	R	S8/15
BYV44*	S2a	R	S8/15
BYV54V*	S1	R	S8/16
BYV72*	S2a	R	S8/15
BYV74*	S2a	R	S8/15
BYV79*	S2a	R	S8/14
BYV92*	S2a	R	S8/15
BYV95*	S1	R	S8/17
BYV96*	S1	R	S8/17
BYV117*	S2a	R	S7/11
BYV120*	S2a	R	S7/11
BYV121*	S2a	R	S7/11
BYV133*	S2a	R	S7/11
BYV143*	S2a	R	S7/11
BYW29*	S2a	R	S8/14
BYW30*	S2a	R	S8/14
BYW31*	S2a	R	S8/15
BYW54	S1	R	S9/20
BYW55	S1	R	S9/20
BYW56	S1	R	S9/20
BYW92*	S2a	R	S8/15
BYW93*	S2a	R	S8/15
BYW95*	S1	R	S8/17
BYW96*	S1	R	S8/17
BYX10G	S1	R	S9/23
BYX25*	S2a	R	S9/21
BYX30*	S2a	R	S8/18
BYX38*	S2a	R	S9/22
BYX39*	S2a	R	S9/21
BYX42*	S2a	R	S9/22
BYX46*	S2a	R	S8/18
BYX50*	S2a	R	S8/17
BYX52*	S2a	R	S9/22
BYX56*	S2a	R	S9/21
BYX90G	S1	R	S10/24
BYX96*	S2a	R	S9/22
BYX97*	S2a	R	S9/22
BYX98*	S2a	R	S9/22
BYX99*	S2a	R	S9/22
BZD23*	S1	Vrg	S6
BZD27*	S1/S7	Vrg/Mm	S6/147
BZT03*	S1	Vrg	S6
BZV10	S1	Vrf	S5

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type	handbook reference	prod. code	cat. page
BZV11	S1	Vrf	S5
BZV12	S1	Vrf	S5
BZV13	S1	Vrf	S5
BZV14	S1	Vrf	S5
BZV37	S1	Vrg	S6
BZV46	S1	Vrf	S5
BZV49*	S1/S7	Vrg/Mm	S148
BZV55*	S7	Mm	S148
BZV85*	S1	Vrg	S6
BZW03*	S1	Vrg	S6
BZW14	S1	Vrg	S6
BZX55*	S1	Vrg	S6
BZX79*	S1	Vrg	S6
BZX84*	S1/S7	Vrg/Mm	S148
CFX16*	S11	M	S202
CFX17*	S11	M	S202
CFX22	S11	M	S202
CFX30	S11	M	S202
CFX31	S11	M	S202
CFX32	S11	M	S202
CFX33*	S11	M	S202
CNG35	S8b	PhC	S177
CNG36	S8b	PhC	S177
CNG82	S8b	PhC	S178
CNG83	S8b	PhC	S178
CNR36	S8b	PhC	S179
CNW82	S8b	PhC	S179
CNW83	S8b	PhC	S179
CNX21	S8b	PhC	S177
CNX35	S8b	PhC	S174
CNX35U	S8b	PhC	S173
CNX36	S8b	PhC	S174
CNX36U	S8b	PhC	S173
CNX38	S8b	PhC	S174
CNX38U	S8b	PhC	S173
CNX39	S8b	PhC	S174
CNX39U	S8b	PhC	S173
CNX48	S8b	PhC	S174
CNX48U	S8b	PhC	S173
CNX62	S8b	PhC	S177
CNX62A	S8b	PhC	S179
CNX71	S8b	PhC	S177
CNX72	S8b	PhC	S177
CNX72A	S8b	PhC	S179
CNX82	S8b	PhC	S177
CNX82A	S8b	PhC	S179
CNX83	S8b	PhC	S177
CNX83A	S8b	PhC	S179
CNY17–1	S8b	PhC	S176
CNY17–2	S8b	PhC	S176
CNY17–3	S8b	PhC	S176
CNY57	S8b	PhC	S174
CNY57A	S8b	PhC	S174
CNY57AU	S8b	PhC	S173
CNY57U	S8b	PhC	S173
CQF22/D31	S8b	PhC	S162
CQF23/D21	S8b	PhC	S162
CQF24	S8b	PhC	S164
CQF25A/D21	S8b	PhC	S162
CQF26H/D27	S8b	PhC	S162
CQF27A/D21	S8b	PhC	S162
CQF40	S8b	PhC	S162
CQF41	S8b	PhC	S162
CQF42	S8b	PhC	S164
CQF45	S8b	PhC	S164
CQF46	S8b	PhC	S164
CQF47	S8b	PhC	S164
CQF48	S8b	PhC	S164
CQF50	S8b	PhC	S162
CQF51	S8b	PhC	S162
CQF52	S8b	PhC	S162
CQF53	S8b	PhC	S162
CQF55	S8b	PhC	S162
CQF56	S8b	PhC	S162
CQF58	S8b	PhC	S162
CQF60	S8b	PhC	S162
CQF61	S8b	PhC	S162
CQL20	S8b	Ph	S158
CQL21	S8b	Ph	S158
CQL30	S8b	Ph	S160
CQL60A	S8b	Ph	S158
CQL61A	S8b	Ph	S158
CQL62A	S8b	Ph	S158
CQL63A	S8b	Ph	S158
CQL70A	S8b	Ph	S160
CQL71A	S8b	Ph	S160
CQL72A	S8b	Ph	S160
CQL73	S8b	Ph	S160
CQL75	S8b	Ph	S160
CQW58A*	S8a	I	S166/

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CQW89A*	S8a	I	S166
CQW89B	S8a	I	S169
CQY58A*	S8a	I	S166
CQY89A*	S8a	I	S166
CQY89F*	S8a	I	S166/172
CQY90A	S8a	I	S166
ESM3045A(V)	S4b	SP	S57
ESM3045D(V)	S4b	SP	S57
ESM4045A(V)	S4b	SP	S57
ESM4045D(V)	S4b	SP	S57
ESM5045D(V)	S4b	SP	S57
ESM6045A(V)	S4b	SP	S57
ESM6045D(V)	S4b	SP	S57
H11A1	S8b	PhC	S174
H11A2	S8b	PhC	S174
H11A3	S8b	PhC	S174
H11A4	S8b	PhC	S174
H11A5	S8b	PhC	S174
H11B1	S8b	PhC	S176
H11B2	S8b	PhC	S176
H11B3	S8b	PhC	S176
H11B255	S8b	PhC	S176
KMZ10A*	S13	SEN	S206
KMZ10B	S13	SEN	S206
KMZ10C	S13	SEN	S206
KP100A*	S13	SEN	S206
KP101A*	S13	SEN	S206
KPZ20G	S13	SEN	S206
KPZ21G;GE	S13	SEN	S206
KTY81–100*	S13	SEN	S204
KTY81–200*	S13	SEN	S204
KTY83–100*	S13	SEN	S204
KTY84–100*	S13	SEN	S205
KTY85–100*	S13	SEN	S205
KTY86–205	S13	SEN	S205
KTY87–205	S13	SEN	S205
LAE4001R	S11	M	S196
LAE4002S	S11	M	S196
LAE6000Q	S11	M	S196
LBE2003S	S11	M	S196
LBE2009S	S11	M	S196
LBG402*	S14	LCD	S184
LBG403*	S14	LCD	S184
LCE2003S	S11	M	S196
LCE2009S	S11	M	S196
LP–1471–B	S14	LCD	S184
LTA141*	S14	LCD	S182
LTA142U–12	S14	LCD	S182
LTA331*	S14	LCD	S182
LTA332*	S14	LCD	S182
LTA341*	S14	LCD	S182
LTA342*	S14	LCD	S182
LTA343*	S14	LCD	S182
LTD101R–11	S14	LCD	S182
LTD132R–11	S14	LCD	S182
LTD133F–21	S14	LCD	S182
LTD201R–11	S14	LCD	S182
LTD202*	S14	LCD	S182
LTD203*	S14	LCD	S182
LTD211*	S14	LCD	S182
LTD221*	S14	LCD	S182
LTD222*	S14	LCD	S182
LTD224R–11	S14	LCD	S182
LTD225R–11	S14	LCD	S182
LTD226*	S14	LCD	S182
LTD227*	S14	LCD	S183
LTD228R–11	S14	LCD	S183
LTD229*	S14	LCD	S183
LTD231R–11	S14	LCD	S183
LTD232R–11	S14	LCD	S183
LTD233R–11	S14	LCD	S183
LTD234R–11	S14	LCD	S183
LTD241*	S14	LCD	S183
LTD242*	S14	LCD	S183
LTD261*	S14	LCD	S183
LTD262*	S14	LCD	S183
LTD263*	S14	LCD	S183
LTD264*	S14	LCD	S183
LTD321R–12	S14	LCD	S183
LTD351R–11	S14	LCD	S183
LTE21009R	S11	M	S196
LTE21015R	S11	M	S196
LTE21025R	S11	M	S196
LTE4002S	S11	M	S196
LTE42005S	S11	M	S196
LTE42008R	S11	M	S196
LTE42012R	S11	M	S196
LTG201R–10	S14	LCD	S184
LTM233R–10	S14	LCD	S184
LTN111*	S14	LCD	S184

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type	handbook reference	prod. code	cat. page
LTN211*	S14	LCD	S184
LTN242*	S14	LCD	S184
LUE2003S	S11	M	S196
LUE2009S	S11	M	S196
LV1721E50R	S11	M	S197
LV2024E45R	S11	M	S197
LV2327E40R	S11	M	S197
LV2931E50S	S11	M	S197
LVE21050R	S11	M	S196
LWE2015R	S11	M	S196
LWE2025R	S11	M	S196
LZ1418E100R	S11	M	S197
MCT2	S8b	PhC	S174
MCT26	S8b	PhC	S175
MJE13004	S4b	SP	S55
MJE13005	S4b	SP	S55
MJE13006	S4b	SP	S56
MJE13007	S4b	SP	S56
MJE13008	S4b	SP	S57
MJE13009	S4b	SP	S57
MPS6513	S3	Sm	S32
MPS6514	S3	Sm	S32
MPS6515	S3	Sm	S32
MPS6517	S3	Sm	S32
MPS6518	S3	Sm	S32
MPS6519	S3	Sm	S32
MPS6520	S3	Sm	S32
MPS6521	S3	Sm	S32
MPS6522	S3	Sm	S32
MPS6523	S3	Sm	S32
MPSA05	S3	Sm	S32
MPSA06	S3	Sm	S32
MPSA13	S3	Sm	S37
MPSA14	S3	Sm	S37
MPSA42	S3	Sm	S35/37
MPSA43	S3	Sm	S35/37
MPSA55	S3	Sm	S32
MPSA56	S3	Sm	S32
MPSA63	S3	Sm	S37
MPSA64	S3	Sm	S37
MPSA92	S3	Sm	S35/37
MPSA93	S3	Sm	S35/37
MRB11080Y	S11	M	S201
MRB11175Y	S11	M	S201
MRB11350Y	S11	M	S201
MRB11900Y	S11	M	S201
OF945*	S8b	Ph	S160
OM286;M	S13	SEN	S135
OM287;M	S13	SEN	S135
OM320	S10	WBM	S134
OM321	S10	WBM	S134
OM322	S10	WBM	S134
OM323	S10	WBM	S134
OM323A	S10	WBM	S134
OM335	S10	WBM	S134
OM336	S10	WBM	S134
OM337	S10	WBM	S134
OM337A	S10	WBM	S134
OM339	S10	WBM	S134
OM345	S10	WBM	S134
OM350	S10	WBM	S134
OM360	S10	WBM	S134
OM361	S10	WBM	S134
OM370	S10	WBM	S134
OM386B	S13	SEN	S136
OM386M	S13	SEN	S137
OM387B	S13	SEN	S136
OM387M	S13	SEN	S137
OM388B	S13	SEN	S138
OM389B	S13	SEN	S138
OM390	S13	SEN	S139
OM391	S13	SEN	S139
OM931	S4a	P	S133
OM961	S4a	P	S133
OM991	S4a	P	S133
OM2045	S10	WBM	S134
OM2050	S10	WBM	S134
OM2060	S10	WBM	S134
OM2061	S10	WBM	S134
OM2070	S10	WBM	S134
P2105	S8b	I	S167
PH2222;A	S3	Sm	S38
PH2369	S3	Sm	S38
PH2907	S3	Sm	S38
PH2907A	S3	Sm	S38
PH5415	S3	Sm	S38
PH5416	S3	Sm	S38
PH6659	S5	FET	S105
PH6660	S5	FET	S105
PH6661	S5	FET	S105

series

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type	handbook reference	prod. code	cat. page
PH13002	S4b	SP	S54
PH13003	S4b	SP	S54
PLED–G313N*	S8a	LED	S168
PLED–G314N*	S8a	LED	S168
PLED–GR14P*	S8a	LED	S171
PLED–GR14R*	S8a	LED	S171
PLED–GR14T*	S8a	LED	S171
PLED–H313A*	S8a	LED	S168/170
PLED–H314A*	S8a	LED	S168/170
PLED–H511C*	S8a	LED	S169/170
PLED–H514B*	S8a	LED	S169/170
PLED–H544KL*	S8a	LED	S169
PLED–H544LL*	S8a	LED	S169
PLED–HR14E*	S8a	LED	S172
PLED–HR14F*	S8a	LED	S172
PLED–HR14G*	S8a	LED	S172
PLED–HR44DL*	S8a	LED	S172
PLED–O313N*	S8a	LED	S168
PLED–O314N*	S8a	LED	S168
PLED–OR14P*	S8a	LED	S171
PLED–OR14R*	S8a	LED	S171
PLED–OR14T*	S8a	LED	S171
PLED–P313N*	S8a	LED	S168
PLED–P314N*	S8a	LED	S168
PLED–PR14P*	S8a	LED	S171
PLED–PR14R*	S8a	LED	S171
PLED–PR14T*	S8a	LED	S171
PLED–T512B*	S8a	LED	S169
PLED–TR12E*	S8a	LED	S172
PLED–TR12F*	S8a	LED	S172
PLED–TR12G*	S8a	LED	S172
PLED–TR42DL*	S8a	LED	S172
PLED–Y313N*	S8a	LED	S168
PLED–Y314N*	S8a	LED	S168
PLED–YR14P*	S8a	LED	S171
PLED–YR14R*	S8a	LED	S171
PLED–YR14T*	S8a	LED	S171
PMBF4391	S5/S7	FET/Mm	S103/146
PMBF4392	S5/S7	FET/Mm	S103/146
PMBF4393	S5/S7	FET/Mm	S103/146
PMBT2222	S7	Mm	S144
PMBT2222A	S7	Mm	S144
PMBT2907	S7	Mm	S144
PMBT2907A	S7	Mm	S144
PMBT3903	S7	Mm	S144
PMBT3904	S7	Mm	S144
PMBT3906	S7	Mm	S144
PMBT6428	S7	Mm	S142
PMBT6429	S7	Mm	S142
PMBTA05	S7	Mm	S142
PMBTA06	S7	Mm	S142
PMBTA13	S7	Mm	S142
PMBTA14	S7	Mm	S142
PMBTA42	S7	Mm	S145
PMBTA43	S7	Mm	S145
PMBTA55	S7	Mm	S141
PMBTA56	S7	Mm	S141
PMBTA63	S7	Mm	S141
PMBTA64	S7	Mm	S141
PMBTA92	S7	Mm	S145
PMBTA93	S7	Mm	S145
PMLL5225B to **PMLL5267B**	S1/S7	SD	S6
PN2222	S3	Sm	S38
PN2222A	S3	Sm	S38
PN2369	S3	Sm	S38
PN2369A	S3	Sm	S38
PN2907	S3	Sm	S38
PN2907A	S3	Sm	S38
PN3439	S3	Sm	S38
PN3440	S3	Sm	S38
PN5415	S3	Sm	S38
PN5416	S3	Sm	S38
PO40	S8b	PhC	S179
PO44	S8b	PhC	S179
PO44A	S8b	PhC	S179
PPC5001T	S11	M	S199
PQC5001T	S11	M	S199
PTB23001X	S11	M	S198
PTB23003X	S11	M	S198
PTB23005X	S11	M	S198
PTB32001X	S11	M	S198
PTB32003X	S11	M	S198
PTB32005X	S11	M	S198
PTB42001X	S11	M	S198
PTB42002X	S11	M	S198
PTB42003X	S11	M	S198
PVB42004X	S11	M	S198
PZ1418B15U	S11	M	S198

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type	handbook reference	prod. code	cat. page
PZ1418B30U	S11	M	S198
PZ1721B12U	S11	M	S198
PZ1721B25U	S11	M	S198
PZ2024B10U	S11	M	S198
PZ2024B20U	S11	M	S198
PZ2327B15U	S11	M	S198
PZB16035U	S11	M	S198
PZB16040U	S11	M	S198
RPY100	S8b	I	S167
RPY101	S8b	I	S167
RPY102	S8b	I	S167
RPY103	S8b	I	S167
RPY107	S8b	I	S167
RPY109	S8b	I	S167
RV2833B5X	S11	M	S200
RV3135B5X	S11	M	S200
RX1011B250Y	S11	M	S201
RX1011B350Y	S11	M	S201
RX1214B150W	S11	M	S200
RX1214B300Y	S11	M	S200
RX3034470W	S11	M	S200
RXB12350Y	S11	M	S201
RZ1214B35Y	S11	M	S200
RZ1214B65Y	S11	M	S200
RZ1214B125Y	S11	M	S200
RZ2731B45W	S11	M	S200
RZ2731B60W	S11	M	S200
RZ2731B90W	S11	M	S200
RZ2833B15W	S11	M	S200
RZ2833B30W	S11	M	S200
RZ2833B45W	S11	M	S200
RZ2833B60W	S11	M	S200
RZ3135B15W	S11	M	S200
RZ3135B30W	S11	M	S200
RZ3135B40W	S11	M	S200
RZ3135B50W	S11	M	S200
RZB12050Y	S11	M	S201
RZB12100Y	S11	M	S201
RZB12250Y	S11	M	S201
SL5505S	S8b	PhC	S179
TIP29*	S4a	P	S51
TIP30*	S4a	P	S51
TIP31*	S4a	P	S52
TIP32*	S4a	P	S52
TIP33*	S4a	P	S53
TIP34*	S4a	P	S53
TIP47	S4b	P	S54
TIP48	S4b	P	S54
TIP49	S4b	P	S54
TIP50	S4b	P	S54
TIP110	S4a	P	S49
TIP111	S4a	P	S49
TIP112	S4a	P	S49
TIP115	S4a	P	S49
TIP116	S4a	P	S49
TIP117	S4a	P	S49
TIP120	S4a	P	S49
TIP121	S4a	P	S49
TIP122	S4a	P	S49
TIP125	S4a	P	S49
TIP126	S4a	P	S49
TIP127	S4a	P	S49
TIP130	S4a	P	S49
TIP131	S4a	P	S49
TIP132	S4a	P	S49
TIP135	S4a	P	S49
TIP136	S4a	P	S49
TIP137	S4a	P	S49
TIP140	S4a	P	S49
TIP141	S4a	P	S49
TIP142	S4a	P	S49
TIP145	S4a	P	S49
TIP146	S4a	P	S49
TIP147	S4a	P	S49
TIP2955	S4a	P	S53
TIP3055	S4a	P	S53
1N821	S1	Vrf	S5
1N823	S1	Vrf	S5
1N825	S1	Vrf	S5
1N827	S1	Vrf	S5
1N829	S1	Vrf	S5
1N914	S1	SD	S1
1N916	S1	SD	S1
1N3879	S2a	R	S8/17
1N3880	S2a	R	S8/17
1N3881	S2a	R	S8/17
1N3882	S2a	R	S8/17
1N3883	S2a	R	S8/17
1N3889	S2a	R	S8/17
1N3890	S2a	R	S8/17

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type	handbook reference	prod. code	cat. page
1N3891	S2a	R	S8/17
1N3892	S2a	R	S8/17
1N3893	S2a	R	S17
1N3909	S2a	R	S8/18
1N3910	S2a	R	S8/18
1N3911	S2a	R	S8/18
1N3912	S2a	R	S8/18
1N3913	S2a	R	S8/18
1N4001ID–	S1	R	S9/20
1N4007ID			
1N4007ID	S1	R	S9/20
1N4148	S1	SD	S1
1N4150	S1	SD	S1
1N4151	S1	SD	S1
1N4153	S1	SD	S1
1N4446	S1	SD	S1
1N4448	S1	SD	S1
1N4531	S1	SD	S1
1N4532	S1	SD	S1
1N4933	S1	R	S8/17
1N4934	S1	R	S8/17
1N4935	S1	R	S8/17
1N4936	S1	R	S8/17
1N4937	S1	R	S8/17
1N5059	S1	R	S9/20
1N5060	S1	R	S9/20
1N5061	S1	R	S9/20
1N5062	S1	R	S9/20
1N5225B–	S1	R	S6
1N5267B			
1N5267B	S1	R	S6
2N918	S10	WBT	S124
2N930	S3	Sm	S33
2N1613	S3	Sm	S38
2N1711	S3	Sm	S38
2N1893	S3	Sm	S38
2N2219	S3	Sm	S38
2N2219A	S3	Sm	S38
2N2222	S3	Sm	S38
2N2222A	S3	Sm	S38
2N2297	S3	Sm	S38
2N2369	S3	Sm	S38
2N2369A	S3	Sm	S38
2N2484	S3	Sm	S33
2N2904	S3	Sm	S38
2N2904A	S3	Sm	S38
2N2905	S3	Sm	S38
2N2905A	S3	Sm	S38
2N2906	S3	Sm	S39
2N2906A	S3	Sm	S39
2N2907	S3	Sm	S39
2N2907A	S3	Sm	S39
2N3019	S3	Sm	S33/39
2N3020	S3	Sm	S39
2N3053	S3	Sm	S39
2N3375	S6	RFP	S119
2N3553	S6	RFP	S119
2N3632	S6	RFP	S119
2N3822	S5	FET	S100
2N3823	S5	FET	S100
2N3866	S6	RFP	S109/112
2N3903	S3	Sm	S39
2N3904	S3	Sm	S39
2N3905	S3	Sm	S39
2N3906	S3	Sm	S39
2N3924	S6	RFP	S119
2N3926	S6	RFP	S119
2N3927	S6	RFP	S119
2N3966	S5	FET	S103
2N4030	S3	Sm	S33/39
2N4031	S3	Sm	S33/39
2N4032	S3	Sm	S33/39
2N4033	S3	Sm	S33/39
2N4091	S5	FET	S103
2N4092	S5	FET	S103
2N4093	S5	FET	S103
2N4123	S3	Sm	S33
2N4124	S3	Sm	S33
2N4125	S3	Sm	S33
2N4126	S3	Sm	S33
2N4391	S5	FET	S103
2N4392	S5	FET	S103
2N4393	S5	FET	S103
2N4400	S3	Sm	S33
2N4401	S3	Sm	S33
2N4402	S3	Sm	S33
2N4403	S3	Sm	S33
2N4427	S6	RFP	S109
2N4856	S5	FET	S103
2N4857	S5	FET	S103

* series

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type	handbook reference	prod. code	cat. page
2N4858	S5	FET	S103
2N4859	S5	FET	S103
2N4860	S5	FET	S103
2N4861	S5	FET	S103
2N5086	S3	Sm	S33
2N5087	S3	Sm	S33
2N5088	S3	Sm	S33
2N5089	S3	Sm	S33
2N5400	S3	Sm	S33/39
2N5401	S3	Sm	S33/39
2N5415	S3	Sm	S39
2N5416	S3	Sm	S39
2N5550	S3	Sm	S33/39
2N5551	S3	Sm	S33/39
2N6659	S5	FET	S105
2N6660	S5	FET	S105
2N6661	S5	FET	S105
4N25A	S8b	PhC	S174
4N26	S8b	PhC	S174
4N27	S8b	PhC	S174
4N28	S8b	PhC	S174
4N29	S8b	PhC	S176
4N30	S8b	PhC	S176
4N31	S8b	PhC	S176
4N32	S8b	PhC	S176
4N33	S8b	PhC	S176
4N35	S8b	PhC	S174
4N36	S8b	PhC	S174
4N37	S8b	PhC	S174
4N38	S8b	PhC	S175
4N38A	S8b	PhC	S175
56201d	S4b	A	S203
56201j	S4b	A	S203
56245	S3/S10	A	S203
56246	S3/S10	A	S203
56261a	S4b	A	S203
56264a;b	S2a/b	A	S203
56295*	S2a/b	A	S203
56326	S4b	A	S203
56339	S4b	A	S203
56352	S4b	A	S203
56353	S4b	A	S203
56354	S4b	A	S203
56359b	S2/S4	A	S203
56359c	S2/S4	A	S203
56359d	S2/S4	A	S203
56360a	S2/S4	A	S203
56363	S2/S4	A	S203
56364	S2/S4	A	S203
56367	S2/S4	A	S203
56368a	S2/S4	A	S203
56368b	S2/S4	A	S203
56369	S2/S4	A	S203
56378	S2/S4	A	S203
56379	S2/S4	A	S203
56387a,b	S4b	A	S203
6N135	S8b	PhC	S179
6N136	S8b	PhC	S179

* series

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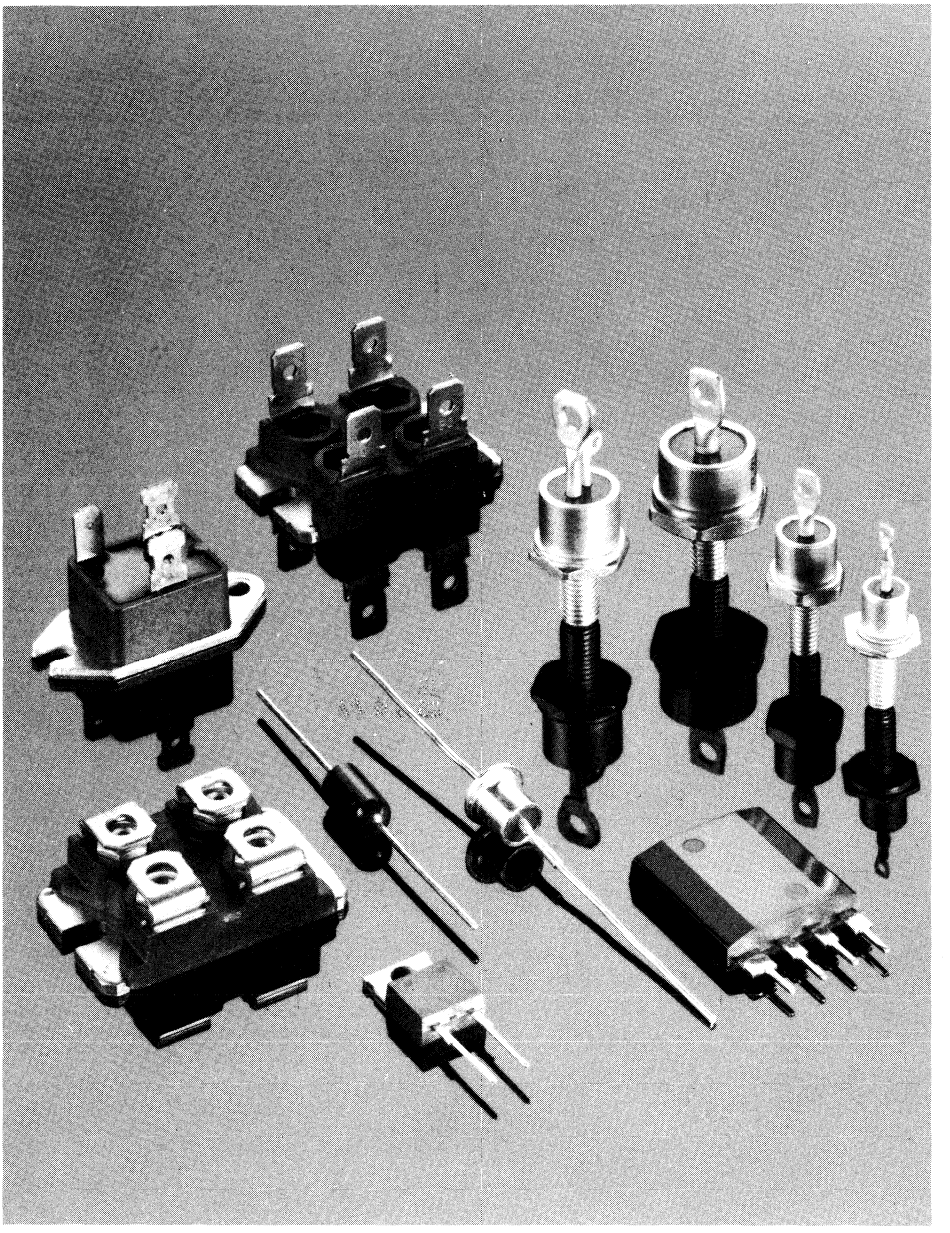

PHILIPS

General purpose and high speed switching diodes

For detailed information on these and other types see Data Handbook S1

- robust diodes in a hermetic encapsulation
- fast switching and low, stable leakage current
- CECC–approved types available
- titanium–silver crystal metallization for a reliable electrical connection between crystal and dumet studs
- thermally–matched crystal, studs and glass encapsulation for constant contact pressure over a wide temperature range.
- reliable: 10 FITs (Failures In Time Standard) i.e. a failure rate of 10 x 10^{-9}/h at T_j < 100 °C

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type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	at V_R V	and f MHz	V_F V	at I_F mA
BA316	P	DO–35	10	100	4	2	0	1	1.1	100
BA220	P	DO–35	10	200	4	2.5	0	1	0.95	100
BAX14	P	DO–35	20	500	50	35	0	1	1	300
BA317	P	DO–35	30	100	4	2	0	1	1.1	100
BA221	C	DO–35	30	200	4	2.5	0	1	1.05	200
BAS15	P	DO–34	50	100	4	2	0	1	1.1	100
BA318	P	DO–35	50	100	4	2	0	1	1.1	100
1N4151	C	DO–35	50	200	4	2	0	1	1	50
1N4150	P	DO–35	50	300	6	2.5	0	1	1	200
BAV18	P	DO–35	50	250	50	5	0	1	1.25	200
1N4153	C	DO–35	50	200	4	2	0	1	0.88	20
BAV10	P	DO–35	60	300	6	2.5	0	1	1.25	500
BAX18	P	DO–35	75	500	50	35	0	1	1.5	300
BAW62	P	DO–35	75	200	4	2	0	1	1	100
1N4532	P	DO–34	75	200	2	2	0	1	1	10
1N4531	P	DO–34	75	200	4	4	0	1	1	10
1N4448	P	DO–35	75	200	4	4	0	1	1	100
1N4446	C	DO–35	75	200	4	4	0	1	1	20
1N4148	P	DO–35	75	200	4	4	0	1	1	10
1N916	C	DO–35	75	75	4	2	0	1	1	10
1N914	C	DO–35	75	75	4	4	0	1	1	10
BAX12*	P	DO–35	90	400	50	35	0	1	1.25	400
BAV19	P	DO–35	100	250	50	5	0	1	1.25	200
BAV20	P	DO–35	150	250	50	5	0	1	1.25	200
BAV21	P	DO–35	200	250	50	5	0	1	1.25	200
BAS11*	P	DO–35	300	350	1000	10	0	1	1.1	300

* avalanche type

N.B. All values are maximum ones unless stated otherwise

Schottky–Barrier switching and low–leakage diodes

For detailed information on these and other types see Data Handbook S1

- Schottky–Barrier diodes in hermetically sealed encapsulation
- Axial leaded miniature DO–34 housing
- BAT85 features a low V_F
- The low V_F of BAT81–83 allows very fast switching

Schottky–barrier switching diodes

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	at V_R V	and f MHz	V_F V	at I_F mA
BAT85	P	DO–34	30	200	5	10	1	1	0.32	1
BAT81	P	DO–34	40	30	1	1.6	1	1	0.41	1
BAT82	P	DO–34	50	30	1	1.6	1	1	0.41	1
BAT86	P	DO–34	50	200	4	8	1	1	0.38	1
BAT83	P	DO–34	60	30	1	1.6	1	1	0.41	1

Low–leakage diodes

type	status	case	V_R V	I_R* pF	at V_R V	C_d pF	at V_R V	and f MHz
BAS45	P	DO–34	125	1000	125	8	0	1
BAV45	C	TO–18	20	5	5	1.3	0	1

* T_j = 25°C

N.B. All values are maximum ones unless stated otherwise.

Variable capacitance diodes

For detailed information on these and other types see Data Handbook S1

- tuning–voltage/capacitance characteristics gives a minimum non–linear distortion
- low leakage current
- low easily–compensated temperature coefficient of capacitance
- low series resistance to prevent damping of tuned circuits
- matched sets available
- available on tape or in bulk

type	status	case	r_s max Ω	C_d min pF	C_d max pF	at V_R V	C_d ratio min	C_d ratio max	over tuning voltage range V_1 to V	over tuning voltage range V_2 V
BB417	C	DO–34	1.2	2.2	2.4	15	2	5	4	15
BB119	P	DO–35	1.5	15.3	19	10	1.3		4	10
BB204B*	P	TO–92	0.4		15	30	2.5	2.8	3	30
BB112**	C	SOD–69	1.5	17	29	8.5	18		1	8.5
BB130	C	SOD–69	2	12	21	28	23		1	28
BB212*	C	TO–92	2.5		22	8	22.5		0.5	8
BB809**	P	DO–34	0.8	4	5	28	8	10	1	28
BB909A**	P	DO–34	0.9	2.6	3	28	12	15	1	28
BB909B**	P	DO–34	0.9	2.8	3.2	28	12	15	1	28
BB405B**	P	DO–34	0.75	1.8	2.2	28	7.6		1	28

* double diode

** available in matched sets

N.B. All values are maximum ones unless stated otherwise

For detailed information on these and other types see Data Handbook S1

Band switching diodes

type	status	case	V_R V	I_F mA	C_d pF	at V_R V	and f MHz	r_D Ω	at I_F mA	and f MHz
BA223	P	DO–34	20	50	3.5	6	1	1.5	10	1
BA423	P	DO–34	20	50	2.5	3	1	1.2	10	1
BA482	P	DO–34	35	100	1.2	3	100	0.7	3	200
BA483	P	DO–34	35	100	1	3	100	1.2	3	200
BA484	P	DO–34	35	100	1.6	3	100	1.2	3	200

UHF mixer Schottky–Barrier diodes

type	status	case	V_R V	I_F mA	C_d pF	at V_R V	and f MHz	V_F mV	at I_F mA
BA480	C	DO–34	4	30	1.2	0.2	1	280	1
BA481	C	DO–34	4	30	1.1	0.2	1	450	1

FM detection diode

type	status	case	V_R V	I_F mA	C_d pF	at V_R V	and f MHz	V_F min V	V_F max mV	at I_F µA
BA281	C	DO–35	50	200	1.2	0	1	360	420	10

N.B. All values are maximum ones unless stated otherwise

Voltage reference diodes; stabistors

For detailed information on these and other types see Data Handbook S1

- Full range of temperature compensated voltage reference diodes, stabistors and voltage regulator diodes.

Voltage reference diodes

type	status	case	V_{ref} nom. V	at I_Z mA	$\|S_Z\|$ %/K	r_{diff} Ω	at I_Z mA
BZV10	C	DO–34	6.5	2	0.01	50	2
BZV11	C	DO–34	6.5	2	0.005	50	2
BZV12	C	DO–34	6.5	2	0.002	50	2
BZV13	C	DO–34	6.5	2	0.001	50	2
BZV14	–	DO–34	6.5	2	0.0005	50	2
1N821	C	DO–34	6.2	7.5	0.01	15	7.5
1N823	C	DO–34	6.2	7.5	0.005	15	7.5
1N825	C	DO–34	6.2	7.5	0.002	15	7.5
1N827	C	DO–34	6.2	7.5	0.001	15	7.5
1N829	–	DO–34	6.2	7.5	0.0005	15	7.5

Stabistors

type	status	case	typical V_F (V) at: I_F = 1 mA	I_F = 5 mA	I_F = 10 mA	V_R V_{RRM} V	I_{FRM} mA	S_F at I_F = 1 mA mV/K	r_{diff} at I_F = 10 mA Ω
BAX14	P	DO–35	0.55	0.62	0.65	40	2000	−2.2	6
BA220	C	DO–35	0.58	0.66	0.70	10	400	−2.2	7
BA315	P	DO–35	0.62	0.70	0.75	5	225	−2.1	7
BA314	P	DO–35	0.72	0.77	0.79	4	250	−1.8	6
BZV46–1V5	P	DO–35	1.35	1.45	1.50	4	120	−3.6*	20*
BZV46–2VO	P	DO–35	2.00	2.15	2.20	4	80	−5.6*	30*

* at I_F = 5 mA

N.B. All values are maximum ones unless stated otherwise.

Voltage regulator/transient suppressor diodes

For detailed information see Data Handbooks S1 and S2

Voltage regulator diodes

P_{tot} W at	T_{tp} °C	status	type	working voltage E24 series V	tolerance	P_{RSM} at T_j = 25 °C t_p = 100 µs square W	case
0.4	50	P	**BZV37**	6.5	5%	40	DO–34
0.5	50	C	**BZX55 series**	2.4 to 75	5%	40	DO–35
0.5	50	P	**BZX79 series**	2.4 to 75	5%	40	DO–35
0.5	50	C	**BZX79 series**	2.4 to 75	2%	40	DO–35
0.5	75	P	**PMLL5225B to PMLL5267B**	3.0 to 75	5%	–	SOD–80
0.5	75	P	**1N5225B to 1N5267B**	3.0 to 75	5%	–	DO–35
1.3	55	P	**BZV85 series**	3.6 to 75	5%	60	DO–41
2.5	105	P	**BZD27 series**	7V5 to 270	5%	300	SOD–87
2.5	25	P	**BZD23 series**	7V5 to 270	5%	300	SOD–81
3.25	25	P	**BZT03 series**	7.5 to 500	5%	600	SOD–57
6	25	P	**BZW03 series**	7.5 to 500	5%	1000	SOD–64

Transient suppressor diodes

type	status	V_R (stand–off voltage) V	$V_{(CL)R}$ V at	I_{RSM} A	P_{RSM} W	case
BZW14	C	12	28	50*	–	SOD–64
BZT03 series	P	6.2 to 220	11.3 to 380	26.5 to 0.8**	300**	SOD–57
BZW03 series	P	6.2 to 220	11.3 to 380	44.2 to 1.3**	500**	SOD–64

* 6/320 m/s exponential; T_{amb} = 25–85°C

** pulse according to IEC60–2, section 6: 10/1000 m/s T_j = 25°C prior to the pulse

For detailed information on these and other types see Data Handbook S1 and S2

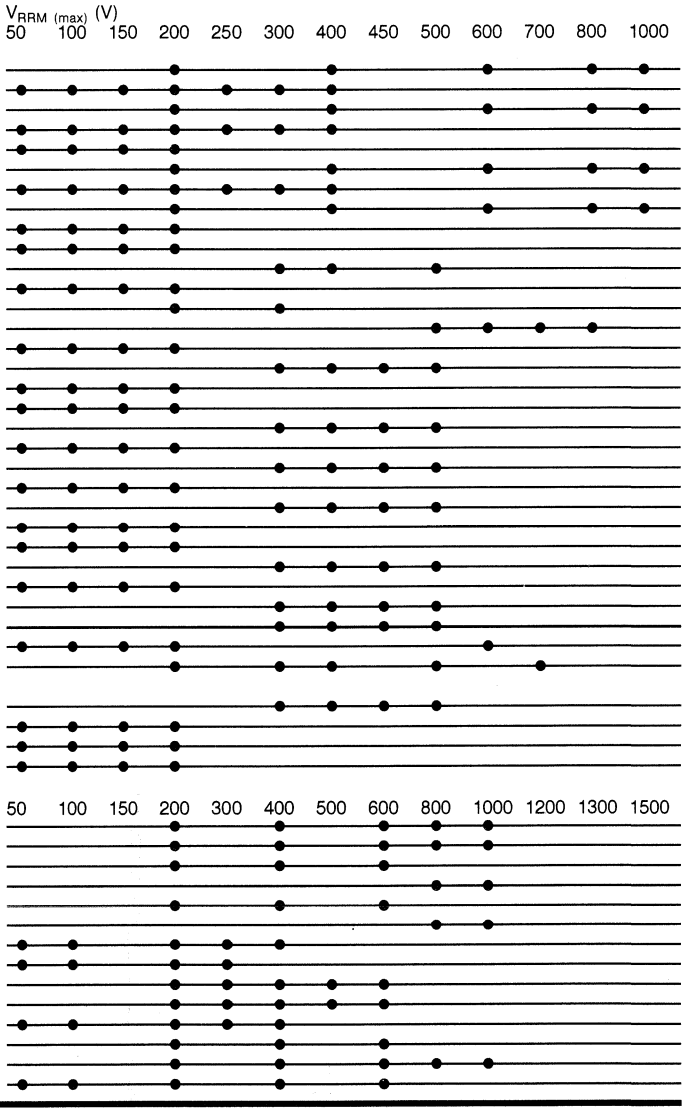
S

Schottky–Barrier

$I_{F\ (AV)\ max}$ A	$V_{RRM\ (max)}$ (V) 35	40	45
2 x 5	**BYV117–35**	**BYV117–40**	**BYV117–45**
2 x 10	**BYV133–35**	**BYV133–40**	**BYV133–45**
15	**BYV120–35**	**BYV120–40**	**BYV120–45**
2 x 15	**BYV143–35**	**BYV143–40**	**BYV143–45**
30	**BYV121–35**	**BYV121–40**	**BYV121–45**

Ultra fast and very fast recovery types

For detailed information on these and other types see Data Handbooks S1 and S2



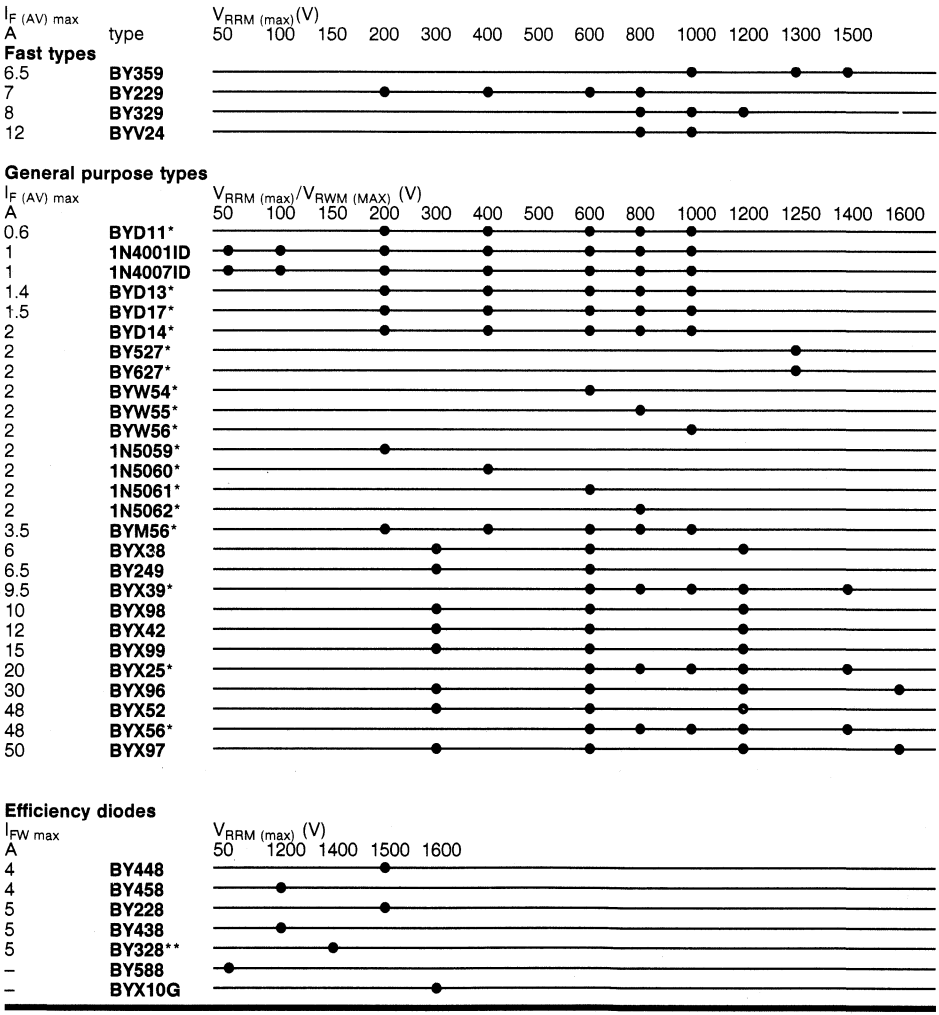
* epitaxial type

** monolithic dual rectifier diodes

PHILIPS

Fast general purpose and efficiency types

For detailed information on these and other types see Data Handbooks S1 and S2



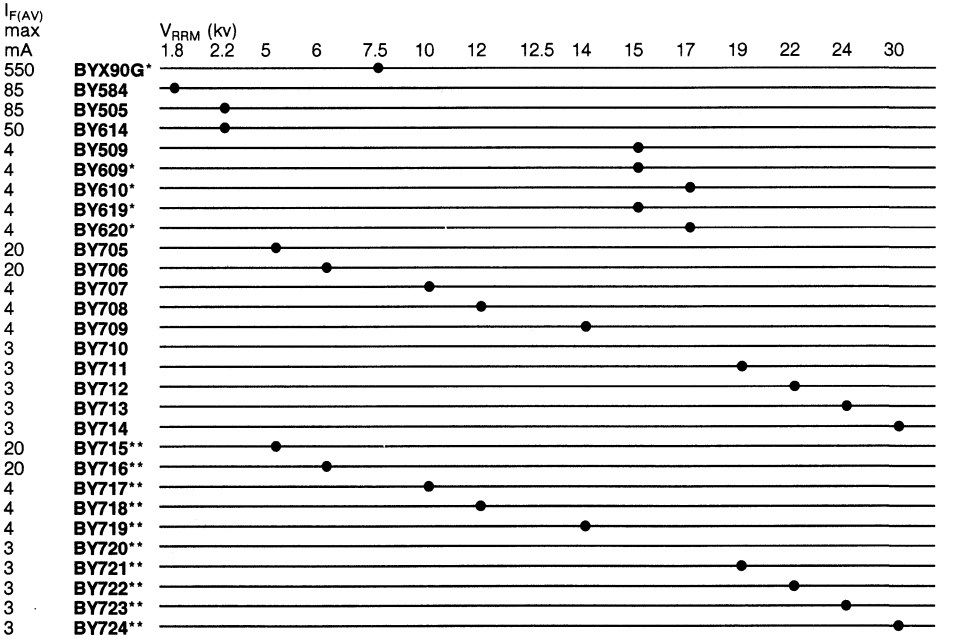
$I_{F\ (AV)\ max}$ A	type	$V_{RRM\ (max)}$ (V) 50 100 150 200 300 400 500 600 800 1000 1200 1300 1500
Fast types		
6.5	**BY359**	
7	**BY229**	
8	**BY329**	
12	**BYV24**	
General purpose types		
$I_{F\ (AV)\ max}$ A		$V_{RRM\ (max)}/V_{RWM\ (MAX)}$ (V) 50 100 150 200 300 400 500 600 800 1000 1200 1250 1400 1600
0.6	**BYD11***	
1	**1N4001ID**	
1	**1N4007ID**	
1.4	**BYD13***	
1.5	**BYD17***	
2	**BYD14***	
2	**BY527***	
2	**BY627***	
2	**BYW54***	
2	**BYW55***	
2	**BYW56***	
2	**1N5059***	
2	**1N5060***	
2	**1N5061***	
2	**1N5062***	
3.5	**BYM56***	
6	**BYX38**	
6.5	**BY249**	
9.5	**BYX39***	
10	**BYX98**	
12	**BYX42**	
15	**BYX99**	
20	**BYX25***	
30	**BYX96**	
48	**BYX52**	
48	**BYX56***	
50	**BYX97**	
Efficiency diodes		
$I_{FW\ max}$ A		$V_{RRM\ (max)}$ (V) 50 1200 1400 1500 1600
4	**BY448**	
4	**BY458**	
5	**BY228**	
5	**BY438**	
5	**BY328****	
–	**BY588**	
–	**BYX10G**	

* controlled avalanche type

** for 32 kHz scanning systems

For detailed information on these and other types see Data Handbooks S1 and S2

E.H.T. rectifiers
(see page S24)



* with avalanche characteristics
** meant for ⩾ 32 kHz TV scanning sytems

Voltage tripler units
(See page S24)

E.H.T. output: 1.7 mA; 27.5 kV
BG2000–641
BG2097–641/642

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings				characteristics	
				$I_{F(AV)}$ max A	V_{RRM} max V	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A^2s	C_d typ pF	$V_{F\,max}$ at I_F T_j = 100 °C V/A
BYV117	**–35**	P	SOT–82	8.5	35	100	50	200	0.6/5
	–40				40				
	–45				45				
BYV133	**–35**	P	TO–220AB	28	35	200	200	300	0.6/7*
	–40				40				
	–45				45				
BYV120	**–35**	P	DO–4	15	35	300	450	520	0.6/15*
	–40				40				
	–45				45				
BYV143	**–35**	P	TO–220AB	40	35	200	200	500	0.6/7*
	–40				40				
	–45				45				
BYV121	**–35**	P	DO–4	30	35	600	1800	1150	0.6/34*
	–40				40				
	–45				45				

* T_j = 150 °C

Ultra fast (epitaxial) types

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings				characteristics		
				$I_{F(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	t_{rr} max ns	$V_{F\,max}$ at I_F T_j = 25 °C V/A	I_{RRM} A
BYV26	**–A**	P	SOD–57	1	200	10	30	30	2.5/1	
	–B				400			30		
	–C				600			30		
	–D				800			75		
	–E				1000			75		
BYD73	**–A***	P	SOD–81	1.75	50	15	25	25	0.95/1	
	–B				100					
	–C				150					
	–D				200					
	–E	P	SOD–81	1.7	250	13	25	50	1.05/1	
	–F				300					
	–G				400					
BYV36	**–A**	P	SOD–57	1.6	200	10	30	100	1.35/1	
	–B			1.6	400			100	1.35/1	
	–C			1.6	600			100	1.35/1	
	–D			1.5	800	9		150	1.45/1	
	–E			1.5	1000	9		150	1.45/1	
BYV27	**– 50***	P	SOD–57	2	50	15	50	25	1.07/3	
	– 100				100					
	– 150				150					
	– 200				200					
BYD77	**–A***	P	SOD–87	2	50	15	25	25	0.95/1	
	–B			2	100					
	–C			2	150					
	–D			2	200					
	–E			1.85	250	13		50	1.05/1	
	–F			1.85	300					
	–G			1.85	400					
BYM26	**–A**	P	SOD–64	2.3	200	8	45	30	2.65/2	
	–B			2.3	400					
	–C			2.3	600					
	–D			2.3	800			75		
	–E			2.3	1000			75		
BYD74	**–A***	P	SOD–84	2.4	50	21	50	25	0.94/2	
	–B			2.4	100			25	0.94/2	
	–C			2.4	150			25	0.94/2	
	–D			2.4	200			25	0.94/2	
	–E			2.15	250			50	1.05/2	
	–F			2.15	300			50	1.05/2	
	–G			2.15	400			50	1.05/2	

* epitaxial type

data section continues next page

Ultra fast (epitaxial) types (cont.)

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings				characteristics		
				$I_{F\ (AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\ max}$; t = 10 ms A	t_{rr} max ns	$V_{F\ max}$ at I_F T_j = 25 °C V/A	I_{RRM} A
BYM36	**–A**	P	SOD–64	3	200	13	65	100	1.6/3	
	–B			3	400					
	–C			3	600					
	–D			2.9	800	11		150	1.78/3	
	–E			2.9	1000	11		150	1.78/3	
BYV28	**– 50***	P	SOD–64	3.5	50	25	90	30	1.1/5	
	– 100				100					
	– 150				150					
	– 200				200					
BYQ28	**– 50**	P	TO–220AB(3)	2 x 5	50	80	50	20	0.85/5	1.2
double	**– 100**				100					
	– 150				150					
	– 200				200					

* epitaxial type

data section continues next page

Ultra fast (epitaxial) types (cont.)

For detailed information on these and other types see Data Handbook S1 and S2

type	status	case	ratings						characteristics		
			$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A^2s	t_{rr} max ns	$V_{F\,max}$ at I_F T_j = 25 °C V/A	I_{RRM} A
BYT28 – 300	P	TO-220AB	2 x 5	300	300	80	50	12.5	50	1.05/5	3.0
double – 400				400	300						
– 450				450							
– 500				500	400						
BYR29 – 500	P	TO-220AC	8	500	400	130	60	18	75	1.3/10	6.0
– 600				600	500						
– 700				700							
– 800				800	600						
BYV29 – 300	P	TO-220AC	9	300	200	100	80	50	50	1.05/5	–
– 400				400	300						
– 500				500	400						
BYW29 – 50	P	TO-220AC	8	50	50	240	80	32	25	0.8/8	4.0
– 100				100	100						
– 150				150	150						
– 200				200	200						
BYV32 – 50	P	TO-220AB	2 x 10	50	50	300	150	112	25	0.85/5	2.0
double – 100				100	100						
– 150				150	150						
– 200				200	200						
BYV34 – 300	P	TO-220AB	2 x 10	300	200	240	120	12	50	0.93/10	5.0
double – 400				400	300						
– 450				450							
– 500				500	400						
BYV30 – 300	C	DO-4(1)	14	300	200	320	150	112	50	1.05/15	–
– 400		unified		400	300						
– 450		stud		450							
– 500				500	400						
BYW30 – 50	P	DO-4(1)	14	50	50	420	200	200	30	0.8/15	4.0
– 100		metric		100	100						
– 150		stud*		150	150						
– 200				200	200						
BYT79 – 300	P	TO-220AC	14	300	200	320	150	112	50	1.05/15	5.2
– 400				400	300						
– 450				450							
– 500				500	400						
BYV79 – 50	P	TO-220AC	14	50	50	420	180	160	30	0.85/10	4.0
– 100				100	100						
– 150				150	150						
– 200				200	200						

* unified stud available, add suffix **U** (e.g. **BYW30–50U**)

SOT-220 and SOT-93 versions are also available in F-pack versions

data section continues next page

Ultra fast (epitaxial) types (cont.)

For detailed information on these and other types see Data Handbook S1 and S2

type	status	case	ratings						characteristics		
			$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A^2s	t_{rr} max ns	$V_{F\,max}$ at I_F T_j = 25 °C V/A	I_{RRM} A
BYV42 – 50	P	TO-220AB(3)	2 x 15	50	50	400	200	–	35	0.85/10	2.4
double – 100				100	100						
– 150				150	150						
– 200				200	200						
BYV44 – 300	P	TO-220AB	2 x 15	300	200	320	150	112	50	1.05/15	5.2
double – 400				400	300						
– 450				450							
– 500				500	400						
BYV72 – 50	P	SOT-93	2 x 15	50	50	320	150	112	28	0.85/10	2.4
double – 100				100	100						
– 150				150	150						
– 200				200	200						
BYV74 – 300	P	SOT-93	2 x 15	300	200	320	130	84	50	1.05/15	5.2
double – 400				400	300						
– 450				450							
– 500				500	400						
BYV31 – 300	C	DO-4(2)	28	300	200	550	300	450	50	1.05/30	4.0
– 400		metric		400	300						
– 450		stud*		450	400						
– 500				500	400						
BYW31 – 50	C	DO-4(2)	28	50	50	550	320	500	40	0.8/30	4.0
– 100		metric		100	100						
– 150		stud*		150	150						
– 200				200	200						
BYV92 – 300	C	DO-5	40	300	–	–	500	–	100	1.4/100	–
– 400		unified		400							
– 450		stud		450							
– 500				500							
BYW92 – 50	C	DO-5	40	50	50	800	500	1250	40	0.8/35	4.5
– 100		metric		100	100						
– 150		stud*		150	150						
– 200				200	200						
BYW93 – 50	C	DO-5	60	50	50	1500	800	3200	45	0.8/50	6.0
– 100		metric		100	100						
– 150		stud*		150	150						
– 200				200	200						
– 200V				200	200						

* unified stud available, add suffix **U** (e.g. **BYV31–50U**)

S

Ultra fast (epitaxial) types (cont.)

For detailed information on these and other types see Data Handbook S1 and S2

			ratings						characteristics			
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A^2s	t_{rr} max ns	V_F max at T_j = 25 °C V	I_F A	I_{RRM} A
BYP21–50	P	TO–220AC	8	50	50	175	80	32	25	1.045	8	2
BYP21–100	P	TO–220AC	8	100	100	175	80	32	25	1.045	8	2
BYP21–150	P	TO–220AC	8	150	150	175	80	32	25	1.045	8	2
BYP21–200	P	TO–220AC	8	200	200	175	80	32	25	1.045	8	2
BYP22–50	P	TO–220AB		50	50	230	140	98	25	0.975	8	2
BYP22–100	P	TO–220AB		100	100	230	140	98	25	0.975	8	2
BYP22–150	P	TO–220AB		150	150	230	140	98	25	0.975	8	2
BYP22–200	P	TO–220AB		200	200	230	140	98	25	0.975	8	2
BYT230PIV–200	P	SOT–227B	30	200		800	500	610	50	1.5	30	
BYT230PIV–300	P	SOT–227B	30	300		800	500	610	50	1.5	30	
BYT230PIV–400	P	SOT–227B	30	400		800	500	610	50	1.5	30	
BYT230PIV–600	P	SOT–227B	30	600		375	200	200	55	1.9	30	
BYT230PIV–700	P	SOT–227B	30	700		375	200	200	55	1.9	30	
BYT230PIV–800	P	SOT–227B	30	800		375	200	200	55	1.9	30	
BYT230PIV–1000	P	SOT–227B	30	1000		375	200	200	70	1.9	30	
BYV54V–50	P	SOT–227B	100	50		1000	1000	3200	60	0.8	50	
BYV54V–100	P	SOT–227B	100	100		1000	1000	3200	60	0.8	50	
BYV54V–150	P	SOT–227B	100	150		1000	1000	3200	60	0.8	50	
BYV54V–200	P	SOT–227B	100	200		1000	1000	3200	60	0.8	50	

For detailed information on these and other types see Data Handbooks S1 and S2

			ratings						characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t T_j max; t = 10 ms A	A^2s	t_{rr} max ns	V_F max at T_j = 25 °C V	I_F A
BYD31-D*	P	SOD-91	0.5	200			10		250	1.6	1
BYD31-G*	P	SOD-91	0.5	400			10		250	1.6	1
BYD31-J*	P	SOD-91	0.5	600			10		250	1.6	1
BYD33-D*	P	SOD-81	1.3	200		7	20		250	1.3	1
BYD33-G*	P	SOD-81	1.3	400		7	20		250	1.3	1
BYD33-J*	P	SOD-81	1.3	600		7	20		250	1.3	1
BYD33-K*	P	SOD-81	1.3	800		7	20		300	1.3	1
BYD33-M*	P	SOD-81	1.3	1000		7	20		300	1.3	1
BYD34-D*	P	SOD-84	1.8	200		17	45		250	1.4	3
BYD34-G*	P	SOD-84	1.8	400		17	45		250	1.4	3
BYD34-J*	P	SOD-84	1.8	600		17	45		250	1.4	3
BYD34-K*	P	SOD-84	1.8	800		17	35		300	1.4	3
BYD34-M*	P	SOD-84	1.8	1000		17	35		300	1.4	3
BYD37-D*	P	SOD-87	1.5	200		12	20		250	1.3	1
BYD37-G*	P	SOD-87	1.5	400		12	20		250	1.3	1
BYD37-J*	P	SOD-87	1.5	600		12	20		250	1.3	1
BYD37-K*	P	SOD-87	1.5	800		12	20		300	1.3	1
BYD37-M*	P	SOD-87	1.5	1000		12	20		300	1.3	1
BYV95A*	P	SOD-57	1.5	200		10	35		250	1.6	3
BYV95B*	P	SOD-57	1.5	400		10	35		250	1.6	3
BYV95C*	P	SOD-57	1.5	600		10	35		250	1.6	3
BYV96-D*	P	SOD-57	1.5	800		10	35		300	1.6	3
BYV96-E*	P	SOD-57	1.5	1000		10	35		300	1.6	3
BYW95A	P	SOD-64	3	200		15	70		250	1.5	5
BYW95B	P	SOD-64	3	400		15	70		250	1.5	5
BYW95C	P	SOD-64	3	600		15	70		250	1.5	5
BYW96D	P	SOD-64	3	800		15	70		300	1.5	5
BYW96E	P	SOD-64	3	1000		15	70		300	1.5	5
BYX50-200	C	DO-4(1)	7	200	200	80	80	32	100	1.95	20
BYX50-300	C	DO-4(1)	7	300	300	80	80	32	100	1.95	20
1N3879	C	DO-4(1)	6	50	50	75	75	28	200	1.4	6
1N3880	C	DO-4(1)	6	100	100	75	75	28	200	1.4	6
1N3881	C	DO-4(1)	6	200	200	75	75	28	200	1.4	6
1N3882	C	DO-4(1)	6	300	300	75	75	28	200	1.4	6
1N3883	C	DO-4(1)	6	400	400	75	75	28	200	1.4	6
1N3889	C	DO-4(1)	12	50	50	140	140	100	200	1.4	12
1N3890	C	DO-4(1)	12	100	100	140	140	100	200	1.4	12
1N3891	C	DO-4(1)	12	200	200	140	140	100	200	1.4	12
1N3892	C	DO-4(1)	12	300	300	140	140	100	200	1.4	12
1N3893	C	DO-4(1)	12	400	400	140	140	100	200	1.4	12
1N4933	P	SOD-84	1.5	50			30		200	1.1	1
1N4934	P	SOD-84	1.5	100			30		200	1.1	1
1N4935	P	SOD-84	1.5	200			30		200	1.1	1
1N4936	P	SOD-84	1.5	400			30		200	1.1	1
1N4937	P	SOD-84	1.5	600			30		200	1.1	1

* avalanche types

PHILIPS

For detailed information on these and other types see Data Handbooks S1 and S2

type	st.	case	ratings						characteristics		
			$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t T_j max; t = 10 ms A	A^2s	t_{rr} max ns	V_F max at T_j = 25 °C V	I_F A
BYX30–200*	C	DO–4(1)	14		200	310	250	312	200	3.2	50
BYX30–200R*	C	DO–4(1)	14		200	310	250	312	200	3.2	50
BYX30–300*	C	DO–4(1)	14		300	310	250	312	200	3.2	50
BYX30–300R*	C	DO–4(1)	14		300	310	250	312	200	3.2	50
BYX30–400*	C	DO–4(1)	14		400	310	250	312	200	3.2	50
BYX30–400R*	C	DO–4(1)	14		400	310	250	312	200	3.2	50
BYX30–500*	C	DO–4(1)	14		500	310	250	312	200	3.2	50
BYX30–500R*	C	DO–4(1)	14		500	310	250	312	200	3.2	50
BYX30–600*	C	DO–4(1)	14		600	310	250	312	200	3.2	50
BYX30–600R*	C	DO–4(1)	14		600	310	250	312	200	3.2	50
BYX46–200*	C	DO–4(1)	22		200	400	300	450	200	2	50
BYX46–200R*	C	DO–4(1)	22		200	400	300	450	200	2	50
BYX46–300*	C	DO–4(1)	22		300	400	300	450	200	2	50
BYX46–300R*	C	DO–4(1)	22		300	400	300	450	200	2	50
BYX46–400*	C	DO–4(1)	22		400	400	300	450	200	2	50
BYX46–400R*	C	DO–4(1)	22		400	400	300	450	200	2	50
BYX46–500*	C	DO–4(1)	22		500	400	300	450	200	2	50
BYX46–500R*	C	DO–4(1)	22		500	400	300	450	200	2	50
BYX46–600*	C	DO–4(1)	22		600	400	300	450	200	2	50
BYX46–600R*	C	DO–4(1)	22		600	400	300	450	200	2	50
1N3909	C	DO–5(1)	30	50	50	125	275	375	200	1.4	30
1N3910	C	DO–5(1)	30	100	100	125	275	375	200	1.4	30
1N3911	C	DO–5(1)	30	200	200	125	275	375	200	1.4	30
1N3912	C	DO–5(1)	30	300	300	125	275	375	200	1.4	30
1N3913	C	DO–5(1)	30	400	400	125	275	375	200	1.4	30

* with avalanche characteristics

For detailed information on these and other types see Handbooks S1 and S2

			ratings						characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t T_j max; t = 10 ms A	A^2s	t_{rr} max ns	V_F max T_j = 25 °C V	at I_F A
BYV24-1000	C	DO-4(2)	12	1000	850	120	150	72	450	1.7	20
BYV24-1000R	C	DO-4(2)	12	1000	850	120	150	72	450	1.7	20
BYV24-800	C	DO-4(2)	12	800	650	120	150	72	450	1.7	20
BYV24-800R	C	DO-4(2)	12	800	650	120	150	72	450	1.7	20
BY229-200	P	TO-220AC	7	200	150	135	60	18	150	1.85	20
BY229-200R	P	TO-220AC	7	200	150	135	60	18	150	1.85	20
BY229-400	P	TO-220AC	7	400	300	135	60	18	150	1.85	20
BY229-400R	P	TO-220AC	7	400	300	135	60	18	150	1.85	20
BY229-600	P	TO-220AC	7	600	500	135	60	18	150	1.85	20
BY229-600R	P	TO-220AC	7	600	500	135	60	18	150	1.85	20
BY229-800	P	TO-220AC	7	800	600	135	60	18	150	1.85	20
BY229-800R	P	TO-220AC	7	800	600	135	60	18	150	1.85	20
BY229-1000	P	TO-220AC	7	1000	600	135	60	18	150	1.85	20
BY229-1000R	P	TO-220AC	7	1000	600	135	60	18	150	1.85	20
BY229F-200	P	SOT-186	7	200	150	135	60	18	150	1.85	20
BY229F-400	P	SOT-186	7	400	300	135	60	18	150	1.85	20
BY229F-600	P	SOT-186	7	600	500	135	60	18	150	1.85	20
BY229F-800	P	SOT-186	7	800	600	135	60	18	150	1.85	20
BY229F-1000	P	SOT-186	7	1000	600	135	60	18	150	1.85	20
BY329-800	P	TO-220AC	8	800	600	80	80	32	150	1.85	20
BY329-1000	P	TO-220AC	8	1000	800	80	80	32	150	1.85	20
BY329-1200	P	TO-220AC	8	1200	1000	80	80	32	150	1.85	20
BY359-1000	P	TO-220AC	6.5	1000	800	60	60		600	2.3	20
BY359-1300	P	TO-220AC	6.5	1300	1200	60	60		600	2.3	20
BY359-1500	P	TO-220AC	6.5	1500	1300	60	60		600	2.3	20

Controlled avalanche types (general purpose)

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings							
				$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	P_{RRM} and P_{RSM} t = 20 µs kW	kW	E_{RSM} mJ
BYD11	**–D**	P	SOD–91	0.6		200		10			
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
1N4001ID		P	SOD–81	1		50	10	20			
1N4002ID						100					
1N4003ID						200					
1N4004ID						400					
1N4005ID						600					
1N4006ID						800					
1N4007ID						1000					
BYD13	**–D**	P	SOD–81	1.4		200	5.5	20	–	–	7
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
BYD17	**–D**	P	SOD–87	1.5		200	5.5	20	–	–	7
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
BYD14	**–D**	P	SOD–84	2	–	200	20	50	–	–	40
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
BYW54		P	SOD–57	2		600	12	50	–	1	20
BYW55						800					
BYW56						1000					
BY527		C	SOD–57	2	1250	800	12	50	–	–	20
BY627		P	SOD–84	2	1250	800	20	50			40
1N5059		P	SOD–57	2		200	12	50	–	1	20
1N5060						400					
1N5061						600					
1N5062						800					

The 1N4..... series are not avalanche types

Controlled avalanche types (general purpose)

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings							
				$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	P_{RRM} and P_{RSM} t = 20 µs kW	kW	E_{RSM} mJ
BYM56	**–A**	P	SOD–64	3.5		200	20	80	–	1	20
	–B					400					
	–C					600					
	–D					800					
	–E					1000					
BYX39	**– 600(R)**	C	DO–4(1)	9.5		600	100	125	2*	4*	–
	– 800(R)		unified			800					
	–1000(R)		stud			1000					
	–1200(R)					1200					
	–1400(R)					1400					
BYX25	**– 600(R)**	C	DO–4(2)	20		600	440	360	3*	18*	–
	– 800(R)		unified			800					
	–1000(R)		stud			1000					
	–1200(R)					1200					
	–1400(R)					1400					
BYX56	**– 600(R)**	C	DO–5	48		600	450	800	6,5*	40*	–
	– 800(R)		unified			800					
	–1000(R)		stud			1000					
	–1200(R)					1200					
	–1400(R)					1400					

* t = 10 µs

(**R**) Reverse polarity types available, add suffix **R** to type number (e.g. **BYX39–600R**)

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings					characteristics
				$I_{F(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A^2s	$V_{F\,max}$ at I_F T_j = 25 °C V/A
BYX38	**– 300(R)**	C	DO–4(1)	6	300	50	50	13	1.7/20
	– 600(R)		unified		600				
	–1200(R)		stud		1200				
BY249	**– 300(R)**	P	TO–220AC	6.5	300	60	60	8	1.6/20
	– 600(R)				600				
BYX98	**– 300(R)**	C	DO–4(1)	10	300	75	75	28	1.7/20
	– 600(R)		unified		600				
	–1200(R)		stud		1200				
BYX42	**– 300(R)**	C	DO–4(1)	12	300	60	125	75	1.4/15
	– 600(R)		unified		600				
	–1200(R)		stud		1200				
BYX99	**– 300(R)**	C	DO–4(1)	15	300	180	180	162	1.55/50
	– 600(R)		unified		600				
	–1200(R)		stud		1200				
BYX96	**– 300(R)**	C	DO–4(3)	30	300	400	400	800	1.7/100
	– 600(R)		metric		600				
	–1200(R)		stud*		1200				
	–1600(R)				1600				
BYX52	**– 300(R)**	C	DO–5	48	300	450	800	3200	1.8/150
	– 600(R)		unified		600				
	–1200(R)		stud		1200				
BYX97	**– 300(R)**	C	DO–5	50	300	550	800	3200	1.45/150
	– 600(R)		metric		600				
	–1200(R)		stud		1200				
	–1600(R)				1600				

* For unified stud, add final letter **U** (e.g. **BYX96–300RU**)
SOT–220 and SOT–93 versions are also available in F–pack versions

(R) Reverse polarity types available, add suffix **R** to type number (e.g. **BYX38–300R**)

For detailed information on these and other types see Data Handbooks S1 and S2

Efficiency diodes

type	status	case	ratings			characteristics
			$I_{F(AV)}$* I_{FWM} A	V_{RRM} V	I_{FRM} A	t_{tot} max µs
BYX10G	P	SOD–57	1.2*	1600	5	–
BY588	P	SOD–57	1.5*	50	10	–
BY448	P	SOD–57	4	1500	8	20
BY458	P	SOD–57	4	1200	8	20
BY228	P	SOD–64	5	1500	10	20
BY438	P	SOD–64	5	1200	10	20
BY328	P	SOD–64	5	1400	6	13

* plastic module with heatsink face

For detailed information on these and other types see Data Handbooks S1 and S2

E.H.T. rectifiers

type	status	case	V_{RW} (kV)	V_{RRM} (kV)	$I_{F(AV)}$ (mA)	t_{rr} typ (µs)
BYX90G*	P	SOD-83	6	7.5	550	< 0.35
BY584	P	SOD-61	1.5	1.8	85	0.2
BY505	P	SOD-61	2	2.2	85	0.2
BY614	–	SOD-61	2	2.2	50	0.2
BY509	C	SOD-61	11.5	15	4	0.2
BY609*	P	SOD-61	12	15	4	0.2
BY610*	P	SOD-61	12	17	4	0.2
BY619*	P	SOD-61	12	15	4	0.2
BY620*	P	SOD-61	12	17	4	0.2
BY705	P	SOD-61	4	5	20	0.2
BY706	P	SOD-61	5	6	20	0.2
BY707	P	SOD-61	9	10	4	0.2
BY708	P	SOD-61	10	12	4	0.2
BY709	P	SOD-61	12	14	4	0.2
BY710	P	SOD-61	14	17	3	0.2
BY711	P	SOD-61	16	19	3	0.2
BY712	P	SOD-61	18	22	3	0.2
BY713	P	SOD-61	20	24	3	0.2
BY714	P	SOD-61	24	30	3	0.2
BY715	P	SOD-61	4	5	20	0.1
BY716	P	SOD-61	5	6	20	0.1
BY717	P	SOD-61	9	10	4	0.1
BY718	P	SOD-61	10	12	4	0.1
BY719	P	SOD-61	12	14	4	0.1
BY720	P	SOD-61	14	17	3	0.1
BY721	P	SOD-61	16	19	3	0.1
BY722	P	SOD-61	18	22	3	0.1
BY723	P	SOD-61	20	24	3	0.1
BY724	P	SOD-61	24	30	3	0.1

Voltage tripler units

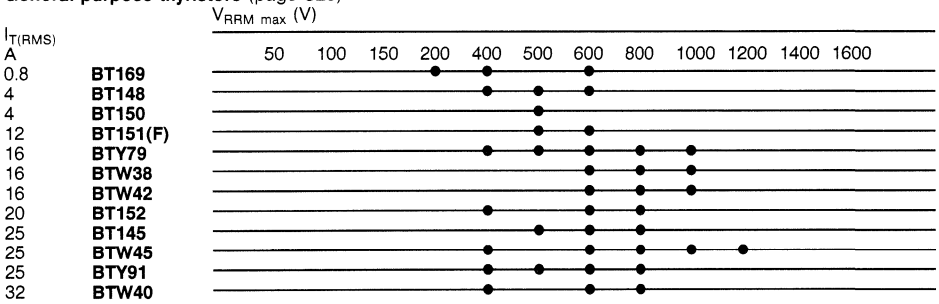
type		status	case sizes in mm	T_{amb} max °C	ratings: input $V_{i(p-p)}$ kV	ratings: output $V_{O(EHT)}$ kV	ratings: $I_{O(EHT)}$ mA	ratings: $I_{O(FOC)}$ µA
BG2000	**– 641**	C	24 x 52 x 51	65	10	27.5	1.7	400
BG2097	**– 641**	C	24 x 80 x 57	65	10	27.5	1.7	–
1)	**– 642**[2]							

* avalanche types
1) with intergrated bleeder resistor
2) with focus potentiometer

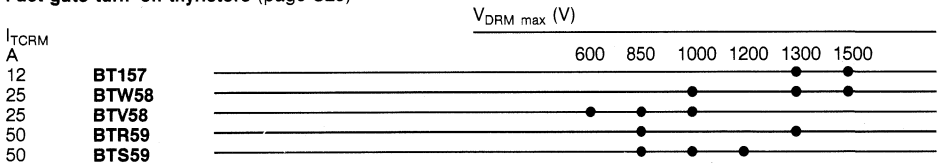
General purpose thyristors, triacs and bi-directional devices

For detailed information see Data Handbook S2

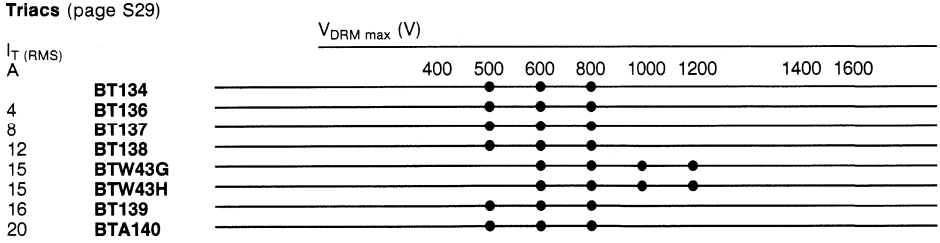
General purpose thyristors (page S26)



Fast gate turn-off thyristors (page S28)



Triacs (page S29)



Bi-directional devices (page S30)
Diac **BR100:** $V_{(BO)}$ = 28 to 36 V; I_{FRM} < 2 A. Thyristor tetrode **BRY39:** $V_{RRM\ max}$ = 70 V; $I_{T\ max}$ = 250 mA.

General purpose thyristors

For detailed information on these and other types see Data Handbook S2

Voltage range 200 to 1200 V
Current range 0.8 to 32 A

type	st.	case	ratings					characteristics		
			$I_{T(RMS)}$ A	$I_{T(AV)max}$ T_{mb} = 85 °C A	V_{RRM} max V	I_{TSM} max at T_j max t = 10 ms A	dI_T/dt max A/µs	dV_D/dt max at T_j max V/µs	V_{GT} min V_D = 6 V; T_j = 25 °C V	I_{GT} min at T_j max mA
BTW38-1000R	C	TO-64(2)	16	10	1000	150	50	200	1.5	50
BTW38-600R	C	TO-64(2)	16	10	600	150	50	200	1.5	50
BTW38-800R	C	TO-64(2)	16	10	800	150	50	200	1.5	50
BTW42-1000R	C	TO-64(2)	16	10	1000	150	50	500	1.5	50
BTW42-600R	C	TO-64(2)	16	10	600	150	50	500	1.5	50
BTW42-800R	C	TO-64(2)	16	10	800	150	50	500	1.5	50
BTY79-1000R	C	TO-64(1)	16	10	1000	150	50	200	1.5	30
BTY79-400R	C	TO-64(1)	16	10	400	150	50	200	1.5	30
BTY79-500R	C	TO-64(1)	16	10	500	150	50	200	1.5	30
BTY79-600R	C	TO-64(1)	16	10	600	150	50	200	1.5	30
BTY79-800R	C	TO-64(1)	16	10	800	150	50	200	1.5	30
BT148-400R	P	SOT-82	4	2.5	400	25	50	5	1.5	0.2
BT148-500R	P	SOT-82	4	2.5	500	25	50	5	1.5	0.2
BT148-600R	P	SOT-82	4	2.5	600	25	50	5	1.5	0.2
BT150	P	TO-220AB	4	2.5	500	25	50	5	1.5	200
BT151-500R	P	TO-220AB	12	7.5	500	100	50	200	1.5	15
BT151-650R	P	TO-220AB	12	7.5	650	100	50	200	1.5	15
BT151-800R	P	TO-220AB	12	7.5	800	100	50	200	1.5	15
BT169B-200	P	TO-92	0.8	0.5	200	8	30	100	0.8	0.2
BT169D-400	P	TO-92	0.8	0.5	400	8	30	100	0.8	0.2
BT169M-600	P	TO-92	0.8	0.5	600	8	30	100	0.8	0.2

For detailed information on these and other types see Data Handbook S2

type	st.	case	ratings					characteristics		
			$I_{T(RMS)}$ A	$I_{T(AV)max}$ T_{mb} = 85 °C A	V_{RRM} max V	I_{TSM} max at T_j max t = 10 ms A	dI_T/dt max A/µs	dV_D/dt max at T_j max V/µs	V_{GT} min V_D = 6 V; T_j = 25 °C V	I_{GT} min at T_j max mA
BTW40–400R	C	TO–48(2)	32	20	400	400	100	100	1.5	75
BTW40–400RU	C	TO–48(1)	32	20	400	400	100	100	1.5	75
BTW40–600R	C	TO–48(2)	32	20	600	400	100	100	1.5	75
BTW40–600RU	C	TO–48(1)	32	20	600	400	100	100	1.5	75
BTW40–800R	C	TO–48(2)	32	20	800	400	100	100	1.5	75
BTW40–800RU	C	TO–48(1)	32	20	800	400	100	100	1.5	75
BTW45–1000R	C	TO–48(2)	25	16	1000	300	100	200	1.5	75
BTW45–1000RU	C	TO–48(1)	25	16	1000	300	100	200	1.5	75
BTW45–1200R	C	TO–48(2)	25	16	1200	300	100	200	1.5	75
BTW45–1200RU	C	TO–48(1)	25	16	1200	300	100	200	1.5	75
BTW45–400R	C	TO–48(2)	25	16	400	300	100	200	1.5	75
BTW45–400RU	C	TO–48(1)	25	16	400	300	100	200	1.5	75
BTW45–600R	C	TO–48(2)	25	16	600	300	100	200	1.5	75
BTW45–600RU	C	TO–48(1)	25	16	600	300	100	200	1.5	75
BTW45–800R	C	TO–48(2)	25	16	800	300	100	200	1.5	75
BTW45–800RU	C	TO–48(1)	25	16	800	300	100	200	1.5	75
BTY91–400R	C	TO–48(1)	25	14	400	200	20	200	3	40
BTY91–500R	C	TO–48(1)	25	14	500	200	20	200	3	40
BTY91–600R	C	TO–48(1)	25	14	600	200	20	200	3	40
BTY91–800R	C	TO–48(1)	25	14	800	200	20	200	3	40
BT145–500R	P	TO–220AB	25	16	500	300	200	200	1.5	35
BT145–600R	P	TO–220AB	25	16	600	300	200	200	1.5	35
BT145–800R	P	TO–220AB	25	16	800	300	200	200	1.5	35
BT152–400R	P	TO–220AB	20	13	400	200	200	200	1.5	32
BT152–600R	P	TO–220AB	20	13	600	200	200	200	1.5	32
BT152–800R	P	TO–220AB	20	13	800	200	200	200	1.5	32

TO–220AB versions are also available in F–pack

Reverse polarity (anode to stud) **R**

Fast gate turn-off thyristors

For detailed information on these and other types see Data Handbook S2

Voltage range 800 to 1500 V
Controllable current range 12 to 120 A

type	st	case	$I_{T(AV)}$ max A	I_{TCRM} max controllable anode current A	I_{TSM} max T_{mb} = 120 °C; T = 10 ms A	V_{DRM} max V/µs	dV_D/dt max V/µs	V_{GT} min V	I_{GT} min mA	t_f* max µs
BTR59–1300R	P	SOT–93	10	50	100	1300	10000	1.5	500	0.25
BTR59–800R	P	SOT–93	10	50	100	800	10000	1.5	500	0.25
BTS59–1000R	P	SOT–93	15	50	100	1000	10000	1.5	300	0.25
BTS59–1200R	P	SOT–93	15	50	100	1200	10000	1.5	300	0.25
BTS59–850R	P	SOT–93	15	50	100	850	10000	1.5	300	0.25
BTV58–1000R	P	TO–220AB	10	25	75	1000	10000	1.5	200	0.25
BTV58–600R	P	TO–220AB	10	25	75	600	10000	1.5	200	0.25
BTV58–850R	P	TO–220AB	10	25	75	850	10000	1.5	200	0.25
BTW58–1000R	P	TO–220AB	6.5	25	50	1000	10000	1.5	200	0.25
BTW58–1300R	P	TO–220AB	6.5	25	50	1300	10000	1.5	200	0.25
BTW58–1500R	P	TO–220AB	6.5	25	50	1500	10000	1.5	200	0.25
BT157–1300R	P	TO–220AB	3.2	12	20	1300	10000	1.5	200	0.2
BT157–1500R	P	TO–220AB	3.2	12	20	1500	10000	1.5	200	0.25

* when switching off 0.2 x $I_{TCRMmax}$; $-V_{GG}$ = 10 V; L_G = 0.8 µH, T_{mb} = 25 °C.

TO–220AB and SOT–93 versions are also available in F–pack

For detailed information on these and other types see Data Handbook S2

Voltage range 500 to 1200 V
Current range 4 to 20 A

High quality triacs for motor control, furnace control, heating, light dimming, contactor drive, static switching, etc. They have a high surge capability and excellent high commutating characteristics.

type*	suffix = V_{DRM} max	st.	case	ratings					characteristics				
									dV_D/dt max at $T_{j\ max}$				
				$I_{T(RMS)}$ A	I_{TRM} A	I_{TSM} and I^2t $T_{j\ max}$; 10 ms A	A^2s	dI_T/dt A/µs	normal commutating at: V/µs	V/µs	dI_T/dt A/ms	V_{GT} min V	I_{GT} min mA
BT134	**– 500R**	P	SOT–82	2.5	25	25	4	10	100	10	2.5	1.5	35
	– 600R												
	– 800R												
BT136	**– 500**	P	TO–220AB	4	25	25	–	10	100	10	1.8	1.5	35*
	– 600												
	– 800												
BT137	**– 500**	P	TO–220AB	8	55	55	15	20	100	10	3.6	1.5	35*
	– 600												
	– 800												
BT138	**– 500**	P	TO–220AB	12	90	90	40	30	100	10	5.4	1.5	35*
	– 600												
	– 800												
BT139	**– 500**	P	TO–220AB	16	130	130	65	30	100	10	7.2	1.5	35*
	– 600												
	– 800												
BTW43G	**– 600**	C	TO–64	15	50	120	72	50	200	10	5	2.5	100
	– 800												
	–1000												
	–1200												
BTW43H	**– 600**	C	TO–64	15	50	120	72	50	200	10	12	2.5	100
	– 800												
	–1000												
	–1200												
BTA140	**– 500**	P	TO–220AB	20	200	200	90	30	100	10	9.0	1.5	35
	– 600												
	– 800												

* variants with different gate sensitivities are available as follows:

Suffix to type no.	$I_{GT\ min}$
G	50 mA
F	25 mA
E	10 mA
D	5 mA

TO–220AB versions are also available in F–pack

For detailed information on these and other types see Data Handbook S2

Bi–directional devices
status = P

type			
Diac BR100	breakover voltage repetitive peak current breakback voltage	$V_{(BO)}$ I_{FRM} V_O	28 to 36 V max 2 A min 5 V

type	case			
BRY39 thyristors tetrode	TO–72(3)	$V_D = V_R$ I_{TSM} at T_j max t = 10 µs I_T dI_T/dt	max 70 V max 3 A max 250 mA max 20 A/µs	characteristics at T_j = 25 °C V_{GKT} > 0.5 V I_{GKT} > 1 µA $-V_{GAT}$ > 1 V $-I_{GAT}$ > 100 µA

Transistors for audio and general-purpose applications

For detailed information on these and other types see Data Handbook S3

Voltage range 20 to 80 V
Current range 500 to 1000 mA
D.C. current gain h_{FE} 40 to 800

			ratings				characteristics				
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	F typ dB
BC107	NPN	TO-18	45	100	300	25	110	450	2	300	2
BC108	NPN	TO-18	20	100	300	25	110	800	2	300	2
BC109	NPN	TO-18	20	100	300	25	200	800	2	300	1.2
BC140	NPN	TO-39(1)	40	1000	3700	45*	63	250	100		
BC141	NPN	TO-39(1)	60	1000	3700	45*	63	250	100		
BC160	PNP	TO-39(1)	40	1000	3700	45*	63	250	100		
BC161	PNP	TO-39(1)	60	1000	3700	45*	63	250	100		
BC177	PNP	TO-18	45	100	300	25				150	
BC178	PNP	TO-18	25	100	300	25				150	
BC179	PNP	TO-18	20	100	300	25				150	
BC327	PNP	TO-92VAR	45	500	800	25	100	600	100	100	
BC327A	PNP	TO-92VAR	60	500	800	25	100	400	100	100	
BC328	PNP	TO-92VAR	25	500	800	25	100	600	100	100	
BC337	NPN	TO-92VAR	45	500	800	25	100	600	100	200	
BC337A	NPN	TO-92VAR	60	500	800	25	100	400	100	200	
BC338	NPN	TO-92VAR	25	500	800	25	100	600	100	200	
BC368	NPN	TO-92VAR	20	1000	800	25	85	375	500	60	
BC369	PNP	TO-92VAR	20	1000	800	25	85	375	500	60	
BC375	NPN	TO-92VAR	20	1000	800	25	60	340	150	150	
BC376	PNP	TO-92VAR	20	1000	800	25	60	340	150	150	
BC516	PNP	TO-92VAR	30	400	625	25	30000		20	220	
BC517	NPN	TO-92VAR	30	400	625	25	30000		20	220	
BC546	NPN	TO-92VAR	65	100	500	25	110	450	2	300	2
BC547	NPN	TO-92VAR	45	100	500	25	110	800	2	300	2
BC548	NPN	TO-92VAR	30	100	500	25	110	800	2	300	2
BC549	NPN	TO-92VAR	30	100	500	25	200	800	2	300	1.2
BC550	NPN	TO-92VAR	45	100	500	25	200	800	2	300	1
BC556	PNP	TO-92VAR	65	100	500	25	75	475	2	200	2
BC557	PNP	TO-92VAR	45	100	500	25	75	800	2	200	2
BC558	PNP	TO-92VAR	30	100	500	25	75	800	2	200	2
BC559	PNP	TO-92VAR	30	100	500	25	125	800	2	200	1
BC560	PNP	TO-92VAR	45	100	500	25	125	800	2	200	1
BC635	NPN	TO-92VAR	45	1000	1000	25	40	250	150	130	
BC637	NPN	TO-92VAR	60	1000	1000	25	40	250	150	130	
BC639	NPN	TO-92VAR	80	1000	1000	25	40	250	150	130	

* T_{case}

Transistors for audio and general–purpose applications (cont.)

For detailed information on these and other types see Data Handbook S3

type	pol	case	ratings				characteristics				
			V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	F typ dB
BC636	PNP	TO–92VAR	45	1000	1000	25	40	250	150	50	
BC638	PNP	TO–92VAR	60	1000	1000	25	40	250	150	50	
BC640	PNP	TO–92VAR	80	1000	1000	25	40	250	150	50	
BCY56	NPN	TO–18	45	100	300	25	100	450	2	85	1.5
BCY57	NPN	TO–18	20	100	300	25	200	800	2	100	1.5
BCY58VII	NPN	TO–18	32	200	330	45*	120	220	2		2
BCY58VIII	NPN	TO–18	32	200	330	45*	180	310	2		2
BCY58IX	NPN	TO–18	32	200	330	45*	250	460	2		2
BCY58X	NPN	TO–18	32	200	330	45*	380	630	2		2
BCY59VII	NPN	TO–18	45	200	330	45*	120	220	2		2
BCY59VIII	NPN	TO–18	45	200	330	45*	180	310	2		2
BCY59IX	NPN	TO–18	45	200	330	45*	250	460	2		2
BCY59X	NPN	TO–18	45	200	330	45*	380	630	2		2
BCY70	PNP	TO–18	40	200	350	25	100		10		2
BCY71	PNP	TO–18	45	200	350	25	100		10		
BCY72	PNP	TO–18	25	200	350	25	100		10		
BCY78	PNP	TO–18	32	200	345	45	380	630	2	180	2
BCY78X	PNP	TO–18	32	200	345	45				180	2
BCY79	PNP	TO–18	45	200	345	25	120	460	2	180	2
BCY87**	NPN	TO–71(1)	40		150	25	100	450	0.05		
BCY88**	NPN	TO–71(1)	40		150	25	100	450	0.05		
BCY89**	NPN	TO–71(1)	40		150	25	100	450	0.05		
MPS6513	NPN	TO–92	30	100	625	25	60		100		
MPS6514	NPN	TO–92	25	100	625	25	90		100		
MPS6515	NPN	TO–92	25	100	625	25	150		100		
MPS6517	PNP	TO–92	40	100	625	25	60		100		
MPS6518	PNP	TO–92	40	100	625	25	90		100		
MPS6519	PNP	TO–92	25	100	625	25	150		100		
MPS6520	NPN	TO–92	25	100	625	25	200	400	2		
MPS6521	NPN	TO–92	25	100	625	25	300	600	2		
MPS6522	PNP	TO–92	25	100	625	25	200	400	2		
MPS6523	PNP	TO–92	25	100	625	25	400	600	2		
MPSA05	NPN	TO–92	60	500	625	25	50		10		
MPSA06	NPN	TO–92	80	500	625	25	50		10		
MPSA55	PNP	TO–92	60	500	625	25	50		100		
MPSA56	PNP	TO–92	80	500	625	25	50		100		

* T_{case}

** Dual transistors for differential amplifiers

Transistors for audio and general–purpose applications (cont.)

For detailed information on these and other types see Data Handbook S3

type	pol	case	ratings				characteristics				
			V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	F typ dB
2N930	NPN	TO–18	45	30	300	25	100	300	10	80	2
2N2484	NPN	TO–18	60	50*	360	25	100	500	10	80	
2N3019	NPN	TO–39(1)	80	1000	800	25	100	300	150		
2N4030	PNP	TO–39(1)	60	1000	800	25	25		500		
2N4031	PNP	TO–39(1)	80	1000	800	25	25		500		
2N4032	PNP	TO–39(1)	60	1000	800	25	70		500		
2N4033	PNP	TO–39(1)	80	1000	800	25	70		500		
2N4123	NPN	TO–92	30	200	350	25	50	150	2		
2N4124	NPN	TO–92	25	200	350	25	120	360	2		
2N4125	PNP	TO–92	30	200	350	25	50	150	2		
2N4126	PNP	TO–92	25	200	350	25	120	360	2		
2N4400	NPN	TO–92	40	600	625	25	50	150	100		
2N4401	NPN	TO–92	40	600	625	25	100	300	100		
2N4402	PNP	TO–92	40	600	625	25	50	150	150		
2N4403	PNP	TO–92	40	600	625	25	100	300	150		
2N5086	PNP	TO–92	50	50	625	25	150		1		
2N5087	PNP	TO–92	50	50	625	25	250		1		
2N5088	NPN	TO–92	30	50	625	25	350		1		
2N5089	NPN	TO–92	25	50	625	25	450		1		
2N5400	PNP	TO–92	120	600	625	25	40		10		
2N5401	PNP	TO–92	150	600	625	25	60		10		
2N5550	NPN	TO–92	140	600	500	25	60		10		
2N5551	NPN	TO–92	160	600	500	25	80		10		

* I_{CM}

Transistors for h.f. applications

For detailed information on these and other types see Data Handbook S3

			ratings				characteristics							
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	C_{re} typ pF	f_T typ MHz	F typ dB	at f MHz
BF198	NPN	TO-92VAR	30	25	500	25				0.2	400	3	35
BF199	NPN	TO-92VAR	25	25	500	25				0.34	550		
BF240	NPN	TO-92VAR	40	25	250	45				0.34	380	1.5	0.002
BF241	NPN	TO-92VAR	40	25	250	45				0.34	350	2	0.002
BF324	PNP	TO-92VAR	30	25	250	45				0.1*	450	3	100
BF370	NPN	TO-92VAR	15	100	500	25	40		10	1.6		3	100
BF420	NPN	TO-92VAR		50	830	25	50		25				
BF421	PNP	TO-92VAR		50	830	25	50		25				
BF422	NPN	TO-92VAR	250	50	830	25	50		25				
BF423	PNP	TO-92VAR	250	50	830	25	50		25				
BF450	PNP	TO-92VAR	40	25	250	45				0.35	325	2	0.001
BF451	PNP	TO-92VAR	40	25	250	45				0.35	325	2	0.001
BF483	NPN	TO-92VAR	250	50	830	25	50		25				
BF485	NPN	TO-92VAR	300	50	830	25	50		25				
BF487	NPN	TO-92VAR	400	50	830	25	50		25				
BF494	NPN	TO-92VAR	20	30	300	75				0.85	260	4	100
BF495	NPN	TO-92VAR	30	30	300	75				0.85	200	4	100
BF496	NPN	TO-92VAR	20	20	300	75				0.8	550	2	100
BF926	PNP	TO-92VAR	20	25	250	45				0.5	350	5	200
BF936	PNP	TO-92VAR	20	25	250	45	25		1	0.9	350	5	200
BF939	PNP	TO-92VAR	25	20	225	55				0.7	750	2.5	200
BF967	PNP	SOT-37	30	20	160	55	15		3	0.45	900	4	800

* C_{br}

For detailed information on these and other types see Data Handbook S3

S

			ratings				characteristics						
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	C_{re} typ pF	f_T typ MHz	F typ dB	at f MHz
BF970	PNP	SOT–37	35	30	160	55	25		3	0.475	900	4.7	800
BF970A	PNP	SOT–37	35	30	160	55	25		3	0.475	900	4.7	800
BF979	PNP	SOT–37	20	30*	140	55	20		10	0.65	1350	4.5	800
BFR54	NPN	TO–92VAR	15	500*	500	25	40		10		500		
MPSA42	NPN	TO–92	300	500	625	25	40		30				
MPSA43	NPN	TO–92	200	500	625	25	40		30				
MPSA92	PNP	TO–92	300	500	625	25	25		30				
MPSA93	PNP	TO–92	200	500	625	25	25		30				

* I_{CM}

Transistors for switching applications

For detailed information on these and other types see Data Handbook S3

type	pol*	case	ratings				characteristics					remarks
			V_{CEO} V	I_C mA	P_{tot} at mW	T_{amb} °C	h_{FE} (h_{fe}) at I_C min–max mA		f_T typ MHz	t_{off} max at ns	I_C mA	
BC516	P	TO–92	30	400	625	25	> 30000	20	220			darlingtons
BC517	N	var										
BCX58	N	TO–92	32	200	450	25			> 125			
BCX59		var	45									
BCX78	P	TO–92	32	200	450	25			> 200			
BCX79		var	45									
BCY58	N	TO–18	32	200	330	45	80–1000		280	800	10	
BCY59			45									
BCY65	N	TO–18	60	200	330	45	200–330	2	⩾ 125	800	10	
BCY70	P	TO–18	40	200	350	25	> 100	10	450	420	10	
BCY71			45							–	–	BCY71:low–noise
BCY72			25							420	10	
BCY78	P	TO–18	32	200	345	45	80–1000	10	180	800	10	amplyfing and
BCY79			45									switching
BFT44	P	TO–39	300	500	5000	50**	50–150	10	70	125	500	
BFT45			250									
BFX34	N	TO–39	60	2000	5000	25**	40–150	2000	> 70	1200	5000	inverter and switching reg.
BFY50	N	TO–39	35	1000	5000	50**	typ 112		140			
BFY51			30				typ 123	150	160	360	150	general purpose
BFY52			20				typ 142		185			
BFY55	N	TO–39	35	1000	800	25	40–120	150	> 60			
BSR50	N	TO–92	45***	1000	800	25	> 2000	500		1500	500	darlingtons
BSR51		var	60***									
BSR52			80***									
BSR60	P	TO–92	45***	1000	800	25	> 2000	500		1500	500	darlingtons
BSR61		var	60***									
BSR62			80***									
BSS38	N	TO–92	100	100	500	25	> 20	4	> 60	1000	15	driver for numerical ind. tube
		var										
BSS50	N	TO–39	45***	1000	5000	25**	> 2000	500		1500	500	darlingtons
BSS51			60***									
BSS52			80***									

* polarity indication P = p–n–p
N = n–p–n

** T_{case}

*** V_{CER}

PHILIPS

Transistors for switching applications (cont.)

For detailed information on these and other types see Data Handbook S3

S

			ratings				characteristics						
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	t_{off} max ns	at f mA
BSS60	PNP	TO-39(1)		1000	800	25	2000		500		1500	
BSS61	PNP	TO-39(1)		1000	800	25	2000		500		1500	
BSS62	PNP	TO-39(1)		1000	800	25	2000		500		1500	
BSS68	PNP	TO-92VAR	100	100	500	25	30		25			
BSV15-10	PNP	TO-39(1)	40	1000	800	25	63	160	100			
BSV15-16	PNP	TO-39(1)	40	1000	800	25	100	250	100			
BSV16-10	PNP	TO-39(1)	60	1000	800	25	63	160	100			
BSV16-16	PNP	TO-39(1)	60	1000	800	25	100	250	100			
BSV17-10	PNP	TO-39(1)	80	1000	800	25	63	160	100			
BSV64	NPN	TO-39(1)	60	2000	5000	50*	40		2000	100		
BSW66A	NPN	TO-39(1)	100	1000	800	25	30		500	130	900	500
BSW67A	NPN	TO-39(1)	120	1000	800	25	30		500	130	900	500
BSW68A	NPN	TO-39(1)	150	1000	800	25	30		500	130	900	500
BSX20	NPN	TO-18	15		360	25	40	120	10	500		
BSX45-10	NPN	TO-39(1)	40	1000	6250	25*	63	160	100	50		
BSX45-16	NPN	TO-39(1)	40	1000	6250	25*	100	250	100	50		
BSX46-10	NPN	TO-39(1)	60	1000	6250	25*	63	160	100	50		
BSX46-16	NPN	TO-39(1)	60	1000	6250	25*	100	250	100	50		
BSX47-10	NPN	TO-39(1)	80	1000	6250	25*	63	160	100	50		
BSX59	NPN	TO-39(1)	45	1000	800	25	30	90	500			
BSX60	NPN	TO-39(1)	30	1000	800	25	30	90	500			
BSX61	NPN	TO-39(1)	45	1000	800	25	30	90	500			
MPSA13	NPN	TO-92		500	625	25	5000		10			
MPSA14	NPN	TO-92		500	625	25	10000		10			
MPSA42	NPN	TO-92	300	500	625	25	40		30			
MPSA43	NPN	TO-92	200	500	625	25	40		30			
MPSA63	PNP	TO-92		500	625	25	5000		10			
MPSA64	PNP	TO-92		500	625	25	10000		10			
MPSA92	PNP	TO-92	300	500	625	25	25		30			
MPSA93	PNP	TO-92	200	500	625	25	25		30			

* T_{case}

Transistors for switching applications (cont.)

For detailed information see Data Handbook S3

			ratings				characteristics					
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	t_{off} max ns	at I_C mA
PH2222	NPN	TO-92VAR	30	800	625	25	75		10		285	150
PH2222A	NPN	TO-92VAR	40	800	625	25	75		10		285	150
PH2369	NPN	TO-92VAR	15	600	500	25	40	120	10		18	10
PH2907	PNP	TO-92VAR	40	600	625	25	100	300	150		100	150
PH2907A	PNP	TO-92VAR	60	600	625	25	100	300	150		100	150
PH5415	PNP	TO-92VAR	200	1000	625	25	30	150	50			
PH5416	PNP	TO-92VAR	300	1000	625	25	30	120	50			
PN2222	NPN	TO-92	30	600	625	25	100	300	150		285	150
PN2222A	NPN	TO-92	40	600	625	25	100	300	150		285	150
PN2369	NPN	TO-92	15	600	625	25	40	120	10		18	10
PN2369A	NPN	TO-92	15	600	625	25	40	120	10		18	10
PN2907	PNP	TO-92	40	600	625	25	100	300	150		100	150
PN2907A	PNP	TO-92	60	600	625	25	100	300	150		100	150
PN3439	NPN	TO-92	350	1000	625	25	30		2			
PN3440	NPN	TO-92	250	1000	625	25	40		20			
PN5415	PNP	TO-92	200	1000	625	25	30	150	50			
PN5416	PNP	TO-92	300	1000	625	25	30	120	50			
2N1613	NPN	TO-39(1)			800	25	40	120	150			
2N1711	NPN	TO-39(1)			800	25	100	300	150			
2N1893	NPN	TO-39(1)	80	500	800	25	40	120	150			
2N2219	NPN	TO-39(1)	30	800	800	25	100	300	150		285	150
2N2219A	NPN	TO-39(1)	40	800	800	25	100	300	150		285	150
2N2222	NPN	TO-18	30	800	500	25	100	300	150		285	150
2N2222A	NPN	TO-18	40	800	500	25	100	300	150		285	150
2N2297	NPN	TO-39(1)	35	1000	800	25	40	120	150			
2N2369	NPN	TO-18	15		360	25	40	120	10		18	10
2N2369A	NPN	TO-18	15	200	360	25	40	120	10		18	10
2N2904	PNP	TO-39(1)	40	600	600	25	40	120	150		100	150
2N2904A	PNP	TO-39(1)	60	600	600	25	40	120	150		100	150
2N2905	PNP	TO-39(1)	40	600	600	25	100	300	150		100	150
2N2905A	PNP	TO-39(1)	60	600	600	25	100	300	150		100	150

Transistors for switching applications (cont.)

For detailed information see Data Handbook S3

			ratings				characteristics					
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	t_{off} max ns	at I_C mA
2N2906	PNP	TO–18	40	600	400	25	40	120	150		100	150
2N2906A	PNP	TO–18	60	600	400	25	40	120	150		100	150
2N2907	PNP	TO–18	40	600	400	25	100	300	150		100	150
2N2907A	PNP	TO–18	60	600	400	25	100	300	150		100	150
2N3019	NPN	TO–39(1)	80	1000	800	25	100	300	150			
2N3020	NPN	TO–39(1)	80	1000	800	25	40	120	150			
2N3053	NPN	TO–39(1)	40	700		50	250	150				
2N3903	NPN	TO–92	40	200	350	25	50	150	10		225	10
2N3904	NPN	TO–92	40	200	350	25	100	300	10		250	10
2N3905	PNP	TO–92	40	200	350	25	50	150	10		260	10
2N3906	PNP	TO–92	40	200	350	25	100	300	10		300	10
2N4030	PNP	TO–39(1)	60	1000	800	25	25		500		400	500
2N4031	PNP	TO–39(1)	80	1000	800	25	25		500		400	500
2N4032	PNP	TO–39(1)	60	1000	800	25	70		500		400	500
2N4033	PNP	TO–39(1)	80	1000	800	25	70		500		400	500
2N5400	PNP	TO–92	120	600	625	25	40		10			
2N5401	PNP	TO–92	150	600	625	25	60		10			
2N5415	PNP	TO–39(1)	200	1000	1000	50	30	150	50			
2N5416	PNP	TO–39(1)	300	1000	1000	50	30	120	50			
2N5550	NPN	TO–92	140	600	500	25	60		10			
2N5551	NPN	TO–92	160	600	500	25	80		10			

For detailed information on these and other types see Data Handbook S3, S4 and S10

Programmable unijunction transistors

		ratings				characteristics			
type	case	V_{GA} V	I_E mA	I_{ARM} mA	dI_A/dT A/µs	I_p max µA	I_V min µA	T_r max ns	remarks
BRY39	TO–72	70	175	2,5	20	5	25	80	characteristics measured
BRY56	TO–92 var						2		with R_G = 10 kΩ

Silicon controlled switches

		ratings					characteristics				
type	case	V_{CBO} V	I_E mA	I_{ERM} A	P_{tot} at mw	T_{amb} °C	V_{AK} max V	I_H max mA	t_{on} max µs	t_q max µs	remarks
BRY39		70							1,5	8	with R_G = 10 kΩ

Thyristor tetrode

		ratings				characteristics at T_j = 25°C					
type	case	I_T mA	I_{TRM} A	I_{TSM} A	dI_T/dt A/µs	V_{GKT} min V	I_{GKT} min µA	V_{GAT} min V	I_{GAT} min µA	t_q max µs	remarks
BRY39	TO–72	250	2.5	3	20	0.5	1	–1	–100	3	V_{RRMmax} = 70V

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BCF29	PNP	SOT–23	32	100
BCF30	PNP	SOT–23	32	100
BCF32	NPN	SOT–23	32	100
BCF33	NPN	SOT–23	32	100
BCF70	PNP	SOT–23	50	100
BCF81	NPN	SOT–23	45	100
BCV26	PNP	SOT–23	30	300
BCV27	NPN	SOT–23	30	300
BCV61	NPN	SOT–143	30	100
BCV62	PNP	SOT–143	30	100
BCV63	PNP	SOT–143	30	100
BCV64	PNP	SOT–143	30	100
BCV65	PNP	SOT–143	30	100
BCV71	NPN	SOT–23	60	100
BCV72	NPN	SOT–23	60	100
BCW29	PNP	SOT–23	32	100
BCW30	PNP	SOT–23	32	100
BCW31	NPN	SOT–23	32	100
BCW32	NPN	SOT–23	32	100
BCW33	NPN	SOT–23	32	100
BCW60A	NPN	SOT–23	32	200
BCW60B	NPN	SOT–23	32	200
BCW60C	NPN	SOT–23	32	200
BCW60D	NPN	SOT–23	32	200
BCW61A	PNP	SOT–23	32	200
BCW61B	PNP	SOT–23	32	200
BCW61C	PNP	SOT–23	32	200
BCW61D	PNP	SOT–23	32	200
BCW69	PNP	SOT–23	45	100
BCW70	PNP	SOT–23	45	100
BCW71	NPN	SOT–23	45	100
BCW72	NPN	SOT–23	45	100
BCW81	NPN	SOT–89	45	100
BCW89	PNP	SOT–23	60	100
BCX17	PNP	SOT–23	45	500
BCX18	PNP	SOT–23	25	500
BCX19	NPN	SOT–23	45	500
BCX20	NPN	SOT–23	25	500
BCX51	PNP	SOT–89	45	1000
BCX52	PNP	SOT–89	60	1000
BCX53	PNP	SOT–89	80	1000
BCX54	NPN	SOT–89	45	1000
BCX70G	NPN	SOT–23	45	200
BCX70H	NPN	SOT–23	45	200
BCX70J	NPN	SOT–23	45	200
BCX70K	NPN	SOT–23	45	200
BCX71G	PNP	SOT–23	45	200
BCX71H	PNP	SOT–23	45	200
BCX71J	PNP	SOT–23	45	200
BCX71K	PNP	SOT–23	45	200

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BCX78	PNP	TO-92	32	100
BCX79	PNP	TO-92	45	100
BCY56	NPN	TO-18	45	100
BCY57	NPN	TO-18	20	100
BCY58VII	NPN	TO-18	32	200
BCY58VIII	NPN	TO-18	32	200
BCY58IX	NPN	TO-18	32	200
BCY58X	NPN	TO-18	32	200
BCY59VII	NPN	TO-18	45	200
BCY59VIII	NPN	TO-18	45	200
BCY59IX	NPN	TO-18	45	200
BCY59X	NPN	TO-18	45	200
BCY65VII	NPN	TO-18	60	200
BCY65VIII	NPN	TO-18	60	200
BCY65IX	NPN	TO-18	60	200
BCY70	PNP	TO-18	40	200
BCY71	PNP	TO-18	45	200
BCY72	PNP	TO-18	25	200
BCY78	PNP	TO-18	32	200
BCY78X	PNP	TO-18	32	200
BCY79	PNP	TO-18	45	200
BCY87	NPN	TO-71(1)	40	
BCY88	NPN	TO-71(1)	40	
BCY89	NPN	TO-71(1)	40	
BC107	NPN	TO-18	45	100
BC108	NPN	TO-18	20	100
BC109	NPN	TO-18	20	100
BC140	NPN	TO-39(1)	40	1000
BC141	NPN	TO-39(1)	60	1000
BC160	PNP	TO-39(1)	40	1000
BC161	PNP	TO-39(1)	60	1000
BC177	PNP	TO-18	45	100
BC178	PNP	TO-18	25	100
BC179	PNP	TO-18	20	100
BC327	PNP	TO-92VAR	45	500
BC327A	PNP	TO-92VAR	60	500
BC328	PNP	TO-92VAR	25	500
BC337	NPN	TO-92VAR	45	500
BC337A	NPN	TO-92VAR	60	500
BC338	NPN	TO-92VAR	25	500
BC368	NPN	TO-92VAR	20	1000
BC369	PNP	TO-92VAR	20	1000
BC375	NPN	TO-92VAR	20	1000
BC376	PNP	TO-92VAR	20	1000
BC516	PNP	TO-92VAR	30	400
BC517	NPN	TO-92VAR	30	400
BC546	NPN	TO-92VAR	65	100
BC547	NPN	TO-92VAR	45	100
BC548	NPN	TO-92VAR	30	100
BC549	NPN	TO-92VAR	30	100
BC550	NPN	TO-92VAR	45	100
BC556	PNP	TO-92VAR	65	100

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BC557	PNP	TO-92VAR	45	100
BC558	PNP	TO-92VAR	30	100
BC559	PNP	TO-92VAR	30	100
BC560	PNP	TO-92VAR	45	100
BC635	NPN	TO-92VAR	45	1000
BC636	PNP	TO-92VAR	45	1000
BC637	NPN	TO-92VAR	60	1000
BC638	PNP	TO-92VAR	60	1000
BC639	NPN	TO-92VAR	80	1000
BC640	PNP	TO-92VAR	80	1000
BC807	PNP	SOT-23	45	500
BC808	PNP	SOT-23	25	500
BC817	NPN	SOT-23	45	500
BC818	NPN	SOT-23	25	500
BC846	NPN	SOT-23	65	100
BC847	NPN	SOT-23	45	100
BC848	NPN	SOT-23	30	100
BC849	NPN	SOT-23	30	100
BC850	NPN	SOT-23	45	100
BC856	PNP	SOT-23	65	100
BC857	PNP	SOT-23	45	100
BC858	PNP	SOT-23	30	100
BC859	PNP	SOT-23	30	100
BC860	PNP	SOT-23	45	100
BC868	NPN	SOT-23	20	1000
BC869	PNP	SOT-23	20	1000
BFR54	NPN	TO-92VAR	15	
BFS18	PNP	SOT-23	20	30000
BFS19	PNP	SOT-23	20	30000
BFS20	PNP	SOT-23	20	25000
BFT44	PNP	TO-39(1)	300	500
BFT45	PNP	TO-39(1)	250	500
BFX34	NPN	TO-39(1)	60	2000
BFY50	NPN	TO-39(1)	35	1000
BFY51	NPN	TO-39(1)	30	1000
BFY52	NPN	TO-39(1)	20	1000
BFY55	NPN	TO-39(1)	35	1000
BF198	NPN	TO-92VAR	30	25
BF199	NPN	TO-92VAR	25	25
BF240	NPN	TO-92VAR	40	25
BF241	NPN	TO-92VAR	40	25
BF324	PNP	TO-92VAR	30	25
BF370	NPN	TO-92VAR	15	100
BF420	NPN	TO-92VAR		50
BF421	PNP	TO-92VAR		50
BF422	NPN	TO-92VAR	250	50
BF423	PNP	TO-92VAR	250	50
BF450	PNP	TO-92VAR	40	25
BF451	PNP	TO-92VAR	40	25
BF483	NPN	TO-92VAR	250	50
BF485	NPN	TO-92VAR	300	50

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BF487	NPN	TO-92VAR	400	50
BF494	NPN	TO-92VAR	20	30
BF495	NPN	TO-92VAR	30	30
BF496	NPN	TO-92VAR	20	20
BF536	PNP	SOT-23	30	25000
BF550	PNP	SOT-23	40	25000
BF569	PNP	SOT-23	35	30000
BF570	PNP	SOT-23	15	100
BF579	PNP	SOT-23	20	25000
BF620	NPN	SOT-89		50
BF621	PNP	SOT-89		50
BF622	NPN	SOT-89	250	50
BF623	PNP	SOT-89	250	50
BF660	PNP	SOT-23	30	25000
BF767	PNP	SOT-23	30	20
BF820	NPN	SOT-23		50
BF821	PNP	SOT-23		50
BF822	NPN	SOT-23	250	50
BF823	PNP	SOT-23	250	50
BF824	PNP	SOT-23	30	25000
BF840	PNP	SOT-23	40	25000
BF841	PNP	SOT-23	40	25000
BF926	PNP	TO-92VAR	20	25
BF936	PNP	TO-92VAR	20	25
BF939	PNP	TO-92VAR	25	20
BF967	PNP	SOT-37	30	20
BF970	PNP	SOT-37	35	30
BF970A	PNP	SOT-37	35	30
BF979	PNP	SOT-37	20	
BSR12	PNP	SOT-23	15	100
BSR13	NPN	SOT-23	30	800
BSR14	NPN	SOT-23	40	800
BSR15	PNP	SOT-23	40	600
BSR16	PNP	SOT-23	60	600
BSR17	NPN	SOT-23	40	200
BSR17A	NPN	SOT-23	40	200
BSR18	PNP	SOT-23	40	200
BSR18A	PNP	SOT-23	40	200
BSR19	NPN	SOT-23	140	600
BSR19A	NPN	SOT-23	160	600
BSR20	PNP	SOT-23	120	600
BSR20A	PNP	SOT-23	150	600
BSR30	PNP	SOT-89	60	1000
BSR31	PNP	SOT-89	60	1000
BSR32	PNP	SOT-89	80	1000
BSR33	PNP	SOT-89	80	1000
BSR40	NPN	SOT-89	60	1000
BSR41	NPN	SOT-89	60	1000
BSR42	NPN	SOT-89	80	1000

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BSR43	NPN	SOT–89	80	1000
BSR50	NPN	TO–92VAR		1000
BSR51	NPN	TO–92VAR		1000
BSR52	NPN	TO–92VAR		1000
BSR60	PNP	TO–92VAR		1000
BSR61	PNP	TO–92VAR		1000
BSR62	PNP	TO–92VAR		1000
BSS38	NPN	TO–92VAR	100	100
BSS50	NPN	TO–39(1)		1000
BSS51	NPN	TO–39(1)		1000
BSS52	NPN	TO–39(1)		1000
BSS60	PNP	TO–39(1)		1000
BSS61	PNP	TO–39(1)		1000
BSS62	PNP	TO–39(1)		1000
BSS63	PNP	SOT–23	100	100
BSS64	NPN	SOT–23	80	100
BSS68	PNP	TO–92VAR	100	100
BST15	PNP	SOT–89	200	1000
BST16	PNP	SOT–89	300	1000
BST39	NPN	SOT–89	350	1000
BST40	NPN	SOT–89	250	100
BST50	NPN	SOT–89		500
BST51	NPN	SOT–89		500
BST52	NPN	SOT–89		500
BST60	PNP	SOT–89		500
BST61	PNP	SOT–89		500
BST62	PNP	SOT–89		500
BSV15–10	PNP	TO–39(1)	40	1000
BSV15–16	PNP	TO–39(1)	40	1000
BSV16–10	PNP	TO–39(1)	60	1000
BSV16–16	PNP	TO–39(1)	60	1000
BSV17–10	PNP	TO–39(1)	80	1000
BSV52	NPN	SOT–23	12	100
BSV64	NPN	TO–39(1)	60	2000
BSW66A	NPN	TO–39(1)	100	1000
BSW67A	NPN	TO–39(1)	120	1000
BSW68A	NPN	TO–39(1)	150	1000
BSX20	NPN	TO–18	15	
BSX45–10	NPN	TO–39(1)	40	1000
BSX45–16	NPN	TO–39(1)	40	1000
BSX46–10	NPN	TO–39(1)	60	1000
BSX46–16	NPN	TO–39(1)	60	1000
BSX47–10	NPN	TO–39(1)	80	1000
BSX59	NPN	TO–39(1)	45	1000
BSX60	NPN	TO–39(1)	30	1000
BSX61	NPN	TO–39(1)	45	1000
MPSA05	NPN	TO–92	60	500
MPSA06	NPN	TO–92	80	500
MPSA13	NPN	TO–92		500
MPSA14	NPN	TO–92		500
MPSA42	NPN	TO–92	300	500

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
MPSA43	NPN	TO-92	200	500
MPSA55	PNP	TO-92	60	500
MPSA56	PNP	TO-92	80	500
MPSA63	PNP	TO-92		500
MPSA64	PNP	TO-92		500
MPSA92	PNP	TO-92	300	500
MPSA93	PNP	TO-92	200	500
MPS6513	NPN	TO-92	30	100
MPS6514	NPN	TO-92	25	100
MPS6515	NPN	TO-92	25	100
MPS6517	PNP	TO-92	40	100
MPS6518	PNP	TO-92	40	100
MPS6519	PNP	TO-92	25	100
MPS6520	NPN	TO-92	25	100
MPS6521	NPN	TO-92	25	100
MPS6522	PNP	TO-92	25	100
MPS6523	PNP	TO-92	25	100
PH2222	NPN	TO-92VAR	30	800
PH2222A	NPN	TO-92VAR	40	800
PH2369	NPN	TO-92VAR	15	600
PH2907	PNP	TO-92VAR	40	600
PH2907A	PNP	TO-92VAR	60	600
PH5415	PNP	TO-92VAR	200	1000
PH5416	PNP	TO-92VAR	300	1000
PMBTA05	NPN	SOT-23	60	500
PMBTA06	NPN	SOT-23	80	500
PMBTA13	NPN	SOT-23		300
PMBTA14	NPN	SOT-23		300
PMBTA42	NPN	SOT-23	300	500
PMBTA43	NPN	SOT-23	200	500
PMBTA55	PNP	SOT-23	60	500
PMBTA56	PNP	SOT-23	80	500
PMBTA63	PNP	SOT-23		500
PMBTA64	PNP	SOT-23		500
PMBTA92	PNP	SOT-23	300	500
PMBTA93	PNP	SOT-23	200	500
PMBT2222	NPN	SOT-23	30	600
PMBT2222A	NPN	SOT-23	40	600
PMBT2907	PNP	SOT-23	40	600
PMBT2907A	PNP	SOT-23	60	600
PMBT3903	NPN	SOT-23	40	200
PMBT3904	NPN	SOT-23	40	200
PMBT3906	PNP	SOT-23	40	200
PMBT6428	NPN	SOT-23	50	200
PMBT6429	NPN	SOT-23	45	200
PN2222	NPN	TO-92	30	600
PN2222A	NPN	TO-92	40	600
PN2369	NPN	TO-92	15	600
PN2369A	NPN	TO-92	15	600
PN2907	PNP	TO-92	40	600

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
PN2907A	PNP	TO–92	60	600
PN3439	NPN	TO–92	350	1000
PN3440	NPN	TO–92	250	1000
PN5415	PNP	TO–92	200	1000
PN5416	PNP	TO–92	300	1000
PXT3904	NPN	SOT–89	40	200
PXT3906	PNP	SOT–89	40	200
2N1613	NPN	TO–39(1)		
2N1711	NPN	TO–39(1)		
2N1893	NPN	TO–39(1)	80	500
2N2219	NPN	TO–39(1)	30	800
2N2219A	NPN	TO–39(1)	40	800
2N2222	NPN	TO–18	30	800
2N2222A	NPN	TO–18	40	800
2N2297	NPN	TO–39(1)	35	1000
2N2369	NPN	TO–18	15	
2N2369A	NPN	TO–18	15	200
2N2483	NPN	TO–18	60	
2N2904	PNP	TO–39(1)	40	600
2N2904A	PNP	TO–39(1)	60	600
2N2905	PNP	TO–39(1)	40	600
2N2905A	PNP	TO–39(1)	60	600
2N2906	PNP	TO–18	40	600
2N2906A	PNP	TO–18	60	600
2N2907	PNP	TO–18	40	600
2N2907A	PNP	TO–18	60	600
2N3019	NPN	TO–39(1)	80	1000
2N3020	NPN	TO–39(1)	80	100
2N3053	NPN	TO–39(1)	40	700
2N3903	NPN	TO–92	40	200
2N3904	NPN	TO–92	40	200
2N3905	PNP	TO–92	40	200
2N3906	PNP	TO–92	40	200
2N4030	PNP	TO–39(1)	60	1000
2N4031	PNP	TO–39(1)	80	1000
2N4032	PNP	TO–39(1)	60	1000
2N4033	PNP	TO–39(1)	80	1000
2N4123	NPN	TO–92	30	200
2N4124	NPN	TO–92	25	200
2N4125	PNP	TO–92	30	200
2N4126	PNP	TO–92	25	200
2N4400	NPN	TO–92	40	600
2N4401	NPN	TO–92	40	600
2N4402	PNP	TO–92	40	600
2N4403	PNP	TO–92	40	600
2N5086	PNP	TO–92	50	50
2N5087	PNP	TO–92	50	50
2N5088	NPN	TO–92	30	50
2N5089	NPN	TO–92	25	50
2N5400	PNP	TO–92	120	600
2N5401	PNP	TO–92	150	600
2N5415	PNP	TO–39(1)	200	1000

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
2N5416	PNP	TO–39(1)	300	1000
2N5550	NPN	TO–92	140	600
2N5551	NPN	TO–92	160	600
2N929	NPN	TO–18(1)	45	30
2N930	NPN	TO–18	45	30

General-purpose Darlingtons

For detailed information on these and other types see Data Handbook S4a

Voltage range 45 to 200 V
Current range 1 to 25 A
D.C. current gain 500 to 1000

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
1	45	**BDX42**	**BDX45**	2000	TO–126
	60	**BDX43**	**BDX46**	2000	TO–126
	80	**BDX44**	**BDX47**	2000	TO–126
4	45	**BD675**	**BD676**	750	TO–126
	60	**BD677**	**BD678**	750	TO–126
	80	**BD679**	**BD680**	750	TO–126
	100	**BD681**	**BD682**	750	TO–126
	120	**BD683**	**BD684**	750	TO–126
	60	**BDT61**	**BDT60**	750	TO–220AB*
	80	**BDT61A**	**BDT60A**	750	TO–220AB*
	100	**BDT61B**	**BDT60B**	750	TO–220AB*
	120	**BDT61C**	**BDT60C**	750	TO–220AB*
	60	**TIP110**	**TIP115**	500	TO–220AB
	80	**TIP111**	**TIP116**	500	TO–220AB
	100	**TIP112**	**TIP117**	500	TO–220AB
5	60	**TIP120**	**TIP125**	1000	TO–220AB
	80	**TIP121**	**TIP126**	1000	TO–220AB
	100	**TIP122**	**TIP127**	1000	TO–220AB
6	60	**BD331(S)**	**BD332(S)**	750	SOT–82(SOT–195)
	80	**BD333(S)**	**BD334(S)**	750	SOT–82(SOT–195)
	100	**BD335(S)**	**BD336(S)**	750	SOT–82(SOT–195)
	120	**BD337(S)**	**BD338(S)**	750	SOT–82(SOT–195)
8	45	**BD643**	**BD644**	750	TO–220AB*
	60	**BD645**	**BD646**	750	TO–220AB*
	80	**BD647**	**BD648**	750	TO–220AB*
	100	**BD649**	**BD650**	750	TO–220AB*
	120	**BD651**	**BD652**	750	TO–220AB*
	60	**BDX63**	**BDX62**	1000	TO–3
	80	**BDX63A**	**BDX62A**	1000	TO–3
	100	**BDX63B**	**BDX62B**	1000	TO–3
	120	**BDX63C**	**BDX62C**	1000	TO–3
	200	**BU806**	–	–	TO–220AB*
	180	**BU806A**	–	–	TO–220AB*
	150	**BU807**	–	–	TO–220AB*
	60	**TIP130**	**TIP135**	1000	TO–220AB
	80	**TIP131**	**TIP136**	1000	TO–220AB
	100	**TIP132**	**TIP137**	1000	TO–220AB
10	60	**BDT63**	**BDT62**	1000	TO–220AB*
	80	**BDT63A**	**BDT62A**	1000	TO–220AB*
	100	**BDT63B**	**BDT62B**	1000	TO–220AB*
	120	**BDT63C**	**BDT62C**	1000	TO–220AB*
	60	**TIP140**	**TIP145**	1000	SOT–93
	80	**TIP141**	**TIP146**	1000	SOT–93
	100	**TIP142**	**TIP147**	1000	SOT–93

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

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General–purpose Darlingtons (cont.)

For detailed information on these and other types see Data Handbook S4a

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
12	60	**BDT65**	**BDT64**	1000	TO–220AB*
	80	**BDT65A**	**BDT64A**	1000	TO–220AB*
	100	**BDT65B**	**BDT64B**	1000	TO–220AB*
	120	**BDT65C**	**BDT64C**	1000	TO–220AB*
	60	**BDV65**	**BDV64**	1000	SOT–93*
	80	**BDV65A**	**BDV64A**	1000	SOT–93*
	100	**BDV65B**	**BDV64B**	1000	SOT–93*
	120	**BDV65C**	**BDV64C**	1000	SOT–93*
	60	**BDX65**	**BDX64**	1000	TO–3
	80	**BDX65A**	**BDX64A**	1000	TO–3
	100	**BDX65B**	**BDX64B**	1000	TO–3
	120	**BDX65C**	**BDX64C**	1000	TO–3
16	80	**BDV67A**	**BDV66A**	1000	SOT–93*
	100	**BDV67B**	**BDV66B**	1000	SOT–93*
	120	**BDV67C**	**BDV66C**	1000	SOT–93*
	150	**BDV67D**	**BDV66D**	1000	SOT–93*
	60	**BDX67**	**BDX66**	1000	TO–3
	80	**BDX67A**	**BDX66A**	1000	TO–3
	100	**BDX67B**	**BDX66B**	1000	TO–3
	120	**BDX67C**	**BDX66C**	1000	TO–3
25	60	**BDX69**	**BDX68**	1000	TO–3
	80	**BDX69A**	**BDX68A**	1000	TO–3
	100	**BDX69B**	**BDX68B**	1000	TO–3
	120	**BDX69C**	**BDX68C**	1000	TO–3

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

L.F. general-purpose power transistors

For detailed information on these and other types see Data Handbook S4a

Voltage range	20 to 150 V
Current range	1 to 15 A
D.C. current gain	15 to 475

S

I_C A	V_{CEO} V	N-P-N type	P-N-P type	h_{FE}	case
1	40	**BDT29**	**BDT30**	15	TO-220AB*
	60	**BDT29A**	**BDT30A**	15	TO-220AB*
	80	**BDT29B**	**BDT30B**	15	TO-220AB*
	100	**BDT29C**	**BDT30C**	15	TO-220AB*
	45	**BD825**	**BD826**	40	TO-202
	60	**BD827**	**BD828**	40	TO-202
	80	**BD829**	**BD830**	40	TO-202
	40	**TIP29**	**TIP30**	15	TO-220AB
	60	**TIP29A**	**TIP30A**	15	TO-220AB
	80	**TIP29B**	**TIP30B**	15	TO-220AB
	100	**TIP29C**	**TIP30C**	15	TO-220AB
	120	**TIP29D**	**TIP30D**	15	TO-220AB
1.5	45	**BD135**	**BD136**	40	TO-126
	60	**BD137**	**BD138**	40	TO-126
	80	**BD139**	**BD140**	40	TO-126
	45	**BD226**	**BD227**	40	TO-126
	60	**BD228**	**BD229**	40	TO-126
	80	**BD230**	**BD231**	40	TO-126
	45	**BD839**	**BD840**	40	TO-202
	60	**BD841**	**BD842**	40	TO-202
	80	**BD843**	**BD844**	40	TO-202
2	45	**BD233**	**BD234**	40	TO-126
	60	**BD235**	**BD236**	40	TO-126
	80	**BD237**	**BD238**	40	TO-126

* also available in F-pack SOT-186 or SOT-199: add suffix **F** to type number

L.F. general-purpose power transistors (cont.)

For detailed information on these and other types see Data Handbook S4a

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
3	45	**BD131**	**BD132**	40	TO–126
	45	**BD239**	**BD240**	15	TO–220AB
	60	**BD239A**	**BD240A**	15	TO–220AB
	80	**BD239B**	**BD240B**	15	TO–220AB
	100	**BD239C**	**BD240C**	15	TO–220AB
	20	**BD329**	**BD330**	85	TO–126
	45	**BD933**	**BD934**	40	TO–220AB*
	60	**BD935**	**BD936**	40	TO–220AB*
	80	**BD937**	**BD938**	40	TO–220AB*
	100	**BD939**	**BD940**	40	TO–220AB*
	120	**BD941**	**BD942**	40	TO–220AB*
	40	**BDT31**	**BDT32**	10	TO–220AB*
	60	**BDT31A**	**BDT32A**	10	TO–220AB*
	80	**BDT31B**	**BDT32B**	10	TO–220AB*
	100	**BDT31C**	**BDT32C**	10	TO–220AB*
	40	**TIP31**	**TIP32**	10	TO–220AB
	60	**TIP31A**	**TIP32A**	10	TO–220AB
	80	**TIP31B**	**TIP32B**	10	TO–220AB
	100	**TIP31C**	**TIP32C**	10	TO–220AB
	120	**TIP31D**	**TIP32D**	10	TO–220AB
4	22	**BD433**	**BD434**	85	TO–126
	32	**BD435**	**BD436**	85	TO–126
	45	**BD437**	**BD438**	85	TO–126
5	45	**BD241**	**BD242**	25	TO–220AB
	60	**BD241A**	**BD242A**	25	TO–220AB
	80	**BD241B**	**BD242B**	25	TO–220AB
	100	**BD241C**	**BD242C**	25	TO–220AB
	22	**BD943**	**BD944**	85	TO–220AB*
	32	**BD945**	**BD946**	85	TO–220AB*
	45	**BD947**	**BD948**	85	TO–220AB*
	60	**BD949**	**BD950**	40	TO–220AB*
	80	**BD951**	**BD952**	40	TO–220AB*
	100	**BD953**	**BD954**	40	TO–220AB*
	120	**BD955**	**BD956**	40	TO–220AB*
	60	**BDX35**		45	TO–126
	60**	**BDX36**		45	TO–126
	80	**BDX37**		45	TO–126
6	40	**BDT41**	**BDT42**	15	TO–220AB*
	60	**BDT41A**	**BDT42A**	15	TO–220AB*
	80	**BDT41B**	**BDT42B**	15	TO–220AB*
	100	**BDT41C**	**BDT42C**	15	TO–220AB*

* also available in F-pack SOT–186 or SOT–199: add suffix **F** to type number

** V_{CER}

L.F. general-purpose power transistors (cont.)

For detailed information on these and other types see Data Handbook S4a and S4b

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
7	60	**BD719**	**BD720**	20	TO–126
	80	**BD721**	**BD722**	20	TO–126
	100	**BD723**	**BD724**	20	TO–126
	120	**BD725**	**BD726**	20	SOT–32
	150	**BU407**	–	50	TO–220AB*
	200	**BU406**	–	50	TO–220AB*
8	45	**BD201**	**BD202**	30	TO–220AB*
	60	**BD203**	**BD204**	30	TO–220AB*
	80	**BDX77**	**BDX78**	30	TO–220AB*
	45	**BD243**	**BD244**	15	TO–220AB
	60	**BD243A**	**BD244A**	15	TO–220AB
	80	**BD243B**	**BD244B**	15	TO–220AB
	100	**BD243C**	**BD244C**	15	TO–220AB
	60	**BDX91**	**BDX92**	20	TO–3
	80	**BDX93**	**BDX94**	20	TO–3
	100	**BDX95**	**BDX96**	20	TO–3
10	60	**BDT91**	**BDT92**	20	TO–220AB*
	80	**BDT93**	**BDT94**	20	TO–220AB*
	100	**BDT95**	**BDT96**	20	TO–220AB*
	60	**BDV91**	**BDV92**	20	SOT–93
	80	**BDV93**	**BDV94**	20	SOT–93
	100	**BDV95**	**BDV96**	20	SOT–93
	60	**BDY92**	–	30	TO–3
	80	**BDY91**	–	30	TO–3
	100	**BDY90**	–	30	TO–3
	40	**TIP33**	**TIP34**	20	SOT–93
	60	**TIP33A**	**TIP34A**	20	SOT–93
	80	**TIP33B**	**TIP34B**	20	SOT–93
	100	**TIP33C**	**TIP34C**	20	SOT–93
12	120	**BUV27**	–	–	TO–220AB*
	150	**BUV27A**	–	–	TO–220AB*
14	90	**BUV26**	–	–	TO–220AB*
	100	**BUV26A**	–	–	TO–220AB*
15	60	**BDT81**	**BDT82**	50	TO–220AB*
	80	**BDT83**	**BDT84**	50	TO–220AB*
	100	**BDT85**	**BDT86**	50	TO–220AB*
	120	**BDT87**	**BDT88**	50	TO–220AB*
	60	**TIP3055**	**TIP2955**	20	SOT–93

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

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High voltage transistors

For detailed information on these and other types see Data Handbook S4b

Voltage range 90 to 700 V
Current range 0.05 to 30 A

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case	remarks
0.05	250	250	**BF469**	NPN	TO–126	
	250	250	**BF470**	PNP	TO–126	
	300	300	**BF471**	NPN	TO–126	
	300	300	**BF472**	PNP	TO–126	
	250	300	**BF583**	NPN	TO–202	
	300	350	**BF585**	NPN	TO–202	
	400	400	**BF587**	NPN	TO–202	
	250	250	**BF869**	NPN	TO–202	
	250	250	**BF870**	PNP	TO–202	
	300	300	**BF871**	NPN	TO–202	
	300	300	**BF872**	PNP	TO–202	
0.1	250	300	**BF419**	NPN	TO–126	
	160	160	**BF457**	NPN	TO–126	
	250	250	**BF458**	NPN	TO–126	
	300	300	**BF459**	NPN	TO–126	
	250	300	**BF819**	NPN	TO–202	
	160	160	**BF857**	NPN	TO–202	
	250	250	**BF858**	NPN	TO–202	
	300	300	**BF859**	NPN	TO–202	
0.3	375		**BU724A**	NPN	TO–126	Darlington
0.5	400	800	**BUX86**	NPN	TO–126	
	450	1000	**BUX87**	NPN	TO–126	
1	250	350	**TIP47**	NPN	TO–220	
	300	400	**TIP48**	NPN	TO–220	
	350	450	**TIP49**	NPN	TO–220	
	400	500	**TIP50**	NPN	TO–220	
1.5	300	730	**BUX99**	NPN	TO–126	
	300	600	**PH13002**	NPN	TO–126	
	400	700	**PH13003**	NPN	TO–126	
2	400	800	**BUW84**	NPN	SOT–82	
	450	1000	**BUW85**	NPN	SOT–82	
	375	500	**BUX79**	NPN	SOT–82	
	400	800	**BUX84**	NPN	TO–220*	
	450	1000	**BUX85**	NPN	TO–220*	
2.5	700	1500	**BU505**	NPN	TO–220	
	700	1500	**BU505D****	NPN	TO–220	
	700	1500	**BU705**	NPN	SOT–93*	

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number
** incl. efficiency diode. $V_F < 1.8$ V at $I_F = 2$A

High voltage transistors (cont.)

For detailed information on these and other types see Data Handbook S4b

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case	remarks
3.5	400		**BUX46**	NPN	TO–3	
	450		**BUX46A**	NPN	TO–3	
4	300		**BU304F**	NPN	SOT–186	
	400		**BU305F**	NPN	SOT–186	
	300		**MJE13004**	NPN	TO–220	
	400		**MJE13005**	NPN	TO–220	
5	400		**BUS11**	NPN	TO–3	
	450		**BUS11A**	NPN	TO–3	
	400		**BUT11**	NPN	TO–220AB	
	450		**BUT11A**	NPN	TO–220AB	
	450		**BUT11AF**	NPN	SOT–186	
	400		**BUT11F**	NPN	SOT–186	
	400		**BUW11**	NPN	SOT–93	
	450		**BUW11A**	NPN	SOT–93	
	450		**BUW11AF**	NPN	SOT–199	
	400		**BUW11F**	NPN	SOT–199	
	700	1500	**BU506**	NPN	TO–220	
	700	1500	**BU506D***	NPN	TO–220	
	700	1500	**BU506F**	NPN	SOT–186	
	700	1500	**BU506DF**	NPN	SOT–186	
	700	1500	**BU706**	NPN	SOT–93	
	700	1500	**BU706D***	NPN	SOT–93	
	700	1500	**BU706F**	NPN	SOT–199	
	700	1500	**BU706DF**	NPN	SOT–199	
			BU903		SOT–93	
			BU903F		SOT–199	
6	400	850	**BUT18**	NPN	TO–220	
	450	1000	**BUT18A**	NPN	TO–220	
	400	850	**BUT18F**	NPN	SOT–186	
	450	1000	**BUT18AF**	NPN	SOT–186	
	800		**BUY89**	NPN	TO–3	
	375		**BU826**	NPN	SOT–93	
	400		**BU826A**		SOT–93	Darlington

* incl. efficiency diode. $V_F < 1.8$ V at $I_F = 2$ A

High voltage transistors (cont.)

For detailed information on these and other types see Data Handbook S4b

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case
8	400		**BUS12**	NPN	TO-3
	450		**BUS12A**	NPN	TO-3
	300		**BUS22**	NPN	TO-3
	800		**BUV89**	NPN	SOT-93
	400		**BUW12**	NPN	SOT-93
	450		**BUW12A**	NPN	SOT-93
	450		**BUW12AF**	NPN	SOT-199
	400		**BUW12F**	NPN	SOT-199
	300		**BU306F**	NPN	SOT-186
	400		**BU307F**	NPN	SOT-186
	700		**BU508**	NPN	SOT-93
	700		**BU508A**	NPN	SOT-93
	700		**BU508AF**	NPN	SOT-199
	700		**BU508D***	NPN	SOT-93
	700		**BU508DF**	NPN	SOT-199
	300		**MJE13006**	NPN	TO-220
	400		**MJE13007**	NPN	TO-220
9	400		**BUX47**	NPN	TO-3
	450		**BUX47A**	NPN	TO-3
10	400		**BUT12**	NPN	TO-220
	450		**BUT12A**	NPN	TO-220
	200		**BUV28**	NPN	TO-220
	225		**BUV28A**	NPN	TO-220
	225		**BUV28AF**	NPN	SOT-186
	200		**BUV28F**	NPN	SOT-186

* incl. efficiency diode. $V_F < 2.2$ V at $I_F = 4$ A

High voltage transistors (cont.)

For detailed information on these and other types see Data Handbook S4b

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case	remarks
12	400		**BUV90**	NPN	SOT-93	Darlington
	800		**BUX88**	NPN	TO-3	
	700		**BU808**	NPN	TO-3	
	300		**MJE13008**	NPN	TO-220	
	400		**MJE13009**	NPN	TO-220	
15	400		**BUP23B**	NPN	SOT-93	
	450		**BUP23C**	NPN	SOT-93	
	400		**BUS13**	NPN	TO-3	
	450		**BUS13A**	NPN	TO-3	
	300		**BUS23**	NPN	TO-3	
	350		**BUS23A**	NPN	TO-3	
	400		**BUS23B**	NPN	TO-3	
	450		**BUS23C**	NPN	TO-3	
	400		**BUW13**	NPN	SOT-93	
	450		**BUW13A**	NPN	SOT-93	
	450		**BUW13AF**	NPN	SOT-199	
	400		**BUW13F**	NPN	SOT-199	
	400		**BUX48**	NPN	TO-3	
	450		**BUX48A**	NPN	TO-3	
24	450		**ESM3045AV**		SOT-227B	
	450		**ESM3045DV**		SOT-227B	
30	400		**BUS14**	NPN	TO-3	
	450		**BUS14A**	NPN	TO-3	
	400		**BUS24B**	NPN	TO-3	
	450		**BUS24C**	NPN	TO-3	
	450		**BUV98V**		SOT-227B	
	450		**BUV98AV**		SOT-227B	
	400		**BUX98**	NPN	TO-3	
	450		**BUX98A**	NPN	TO-3	
42	450		**ESM4045AV**		SOT-227B	
	450		**ESM4045DV**		SOT-227B	
60	450		**BUV298V**		SOT-227B	
	450		**BUV298AV**		SOT-227B	
	450		**ESM5045DV**		SOT-227B	
84	450		**ESM6045AV**		SOT-227B	
	450		**ESM6045DV**		SOT-227B	

* also available in F-pack SOT-199: add suffix **F** to type number

PHILIPS

For detailed information on these and other types see Data Handbook S9

MOSFET N-CHANNEL

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	SOT-199	50	0.028	29	**BUK426-50A**	30	45
MOSFET N	SOT-199	50	0.030	29	**BUK426-50B**	30	45
MOSFET N	SOT-199	100	0.057	15	**BUK426-100A**	20	45
MOSFET N	SOT-199	100	0.065	15	**BUK426-100B**	19	45
MOSFET N	SOT-199	200	0.16	10	**BUK426-200A**	11	45
MOSFET N	SOT-199	200	0.20	10	**BUK426-200B**	10	45
MOSFET N	SOT-199	800	3	1.5	**BUK426-800A**	2.4	45
MOSFET N	SOT-199	800	4	1.5	**BUK426-800B**	2.1	45
MOSFET N	SOT-199	1000	4	1.5	**BUK426-1000A**	2.1	45
MOSFET N	SOT-199	1000	5	1.5	**BUK426-1000B**	1.9	45
MOSFET N	SOT-199	400	0.4	6.5	**BUK427-400A**	6.9	45
MOSFET N	SOT-199	400	0.5	6.5	**BUK427-400B**	6.2	45
MOSFET N	SOT-199	450	0.6	6.5	**BUK427-450B**	5.6	45
MOSFET N	SOT-199	500	0.6	6.5	**BUK427-500B**	5.6	45
MOSFET N	SOT-199	500	0.8	6.5	**BUK427-500B**	4.8	45
MOSFET N	SOT-199	600	1	6.5	**BUK427-600A**	4.3	45
MOSFET N	SOT-199	600	1.2	6.5	**BUK427-600B**	3.9	45
MOSFET N	SOT-93	50	0.028	29	**BUK436-50A**	50	125
MOSFET N	SOT-93	50	0.033	29	**BUK436-50B**	46	125
MOSFET N	SOT-93	100	0.057	15	**BUK436-100A**	33	125
MOSFET N	SOT-93	100	0.065	15	**BUK436-100B**	31	125
MOSFET N	SOT-93	200	0.16	10	**BUK436-200A**	19	125
MOSFET N	SOT-93	200	0.20	10	**BUK436-200B**	17	125
MOSFET N	SOT-93	800	3	1.5	**BUK436-800A**	4	125
MOSFET N	SOT-93	800	4	1.5	**BUK436-800A**	3.5	125
MOSFET N	SOT-93	1000	4	1.5	**BUK436-1000A**	3.5	125
MOSFET N	SOT-93	1000	5	1.5	**BUK436-1000B**	3.1	125
MOSFET N	SOT-93	400	0.4	6.5	**BUK437-400A**	14	180
MOSFET N	SOT-93	400	0.5	6.5	**BUK437-400A**	12	180
MOSFET N	SOT-93	450	0.6	6.5	**BUK437-450B**	11	180
MOSFET N	SOT-93	500	0.6	6.5	**BUK437-500A**	11	180
MOSFET N	SOT-93	500	0.8	6.5	**BUK437-500B**	10	180
MOSFET N	SOT-93	600	0.8	6.5	**BUK437-600A**	10	180
MOSFET N	SOT-93	600	1	6.5	**BUK437-600B**	9	180

For detailed information on these and other types see Data Handbook S9

MOSFET N-CHANNEL (cont.)

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	SOT-186	50	0.13	8.5	**BUK442-50A**	10	22
MOSFET N	SOT-186	50	0.15	8.5	**BUK442-50B**	9.2	22
MOSFET N	SOT-186	60	0.13	8.5	**BUK442-60A**	10	22
MOSFET N	SOT-186	60	0.15	8.5	**BUK442-60B**	9.2	22
MOSFET N	SOT-186	100	0.25	5.5	**BUK442-100A**	6.6	22
MOSFET N	SOT-186	100	0.30	5.5	**BUK442-100B**	6.1	22
MOSFET N	SOT-186	50	0.08	9	**BUK443-50A**	13	25
MOSFET N	SOT-186	50	0.10	9	**BUK443-50B**	9	25
MOSFET N	SOT-186	100	0.16	5	**BUK443-100A**	9	25
MOSFET N	SOT-186	100	0.20	5	**BUK443-100B**	8	25
MOSFET N	SOT-186	200	0.40	3.5	**BUK444-200A**	5.3	25
MOSFET N	SOT-186	200	0.50	3.5	**BUK444-200B**	4.7	25
MOSFET N	SOT-186	400	1.50	1.5	**BUK444-400A**	2.7	25
MOSFET N	SOT-186	400	1.80	1.5	**BUK444-400B**	2.4	25
MOSFET N	SOT-186	450	2.30	1.2	**BUK444-450B**	2.1	25
MOSFET N	SOT-186	500	2.30	1.2	**BUK444-500A**	2.1	25
MOSFET N	SOT-186	500	2.80	1.2	**BUK444-500B**	1.9	25
MOSFET N	SOT-186	600	4	1.2	**BUK444-600A**	1.6	25
MOSFET N	SOT-186	600	4.5	1.2	**BUK444-600B**	1.5	25
MOSFET N	SOT-186	800	6	1	**BUK444-800A**	1.4	30
MOSFET N	SOT-186	800	8	1	**BUK444-800B**	1.2	30
MOSFET N	SOT-186	50	0.038	20	**BUK445-50A**	21	30
MOSFET N	SOT-186	50	0.045	20	**BUK445-50B**	20	30
MOSFET N	SOT-186	100	0.080	13	**BUK445-100A**	14	30
MOSFET N	SOT-186	100	0.10	13	**BUK445-100B**	12	30
MOSFET N	SOT-186	200	0.23	7	**BUK445-200A**	7.6	30
MOSFET N	SOT-186	200	0.28	7	**BUK445-200B**	7	30
MOSFET N	SOT-186	400	0.80	2.5	**BUK445-400A**	4	30
MOSFET N	SOT-186	400	1	2.5	**BUK445-400B**	3.8	30
MOSFET N	SOT-186	450	1.3	2.5	**BUK445-450B**	3.1	30
MOSFET N	SOT-186	500	1.3	2.5	**BUK445-500A**	3.1	30
MOSFET N	SOT-186	500	1.5	2.5	**BUK445-500B**	2.9	30
MOSFET N	SOT-186	600	1.6	2.5	**BUK445-600A**	2.8	30
MOSFET N	SOT-186	600	2	2.5	**BUK445-600B**	2.5	30
MOSFET N	SOT-186	800	3	1.5	**BUK446-800A**	2	30
MOSFET N	SOT-186	800	4	1.5	**BUK446-800B**	1.7	30
MOSFET N	SOT-186	1000	4	1.5	**BUK446-1000A**	1.7	30
MOSFET N	SOT-186	1000	5	1.5	**BUK446-1000B**	1.5	30

For detailed information on these and other types see Data Handbook S9

MOSFET N–CHANNEL (cont.)

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	TO–220AB	50	0.13	8.5	**BUK452–50A**	15	60
MOSFET N	TO–220AB	50	0.15	8.5	**BUK452–50B**	14	60
MOSFET N	TO–220AB	60	0.13	8.5	**BUK452–60A**	15	60
MOSFET N	TO–220AB	60	0.15	8.5	**BUK452–60B**	15	60
MOSFET N	TO–220AB	100	0.25	5.5	**BUK452–100A**	11	60
MOSFET N	TO–220AB	100	0.30	5.5	**BUK452–100B**	10	60
MOSFET N	TO–220AB	50	0.08	10	**BUK453–50A**	22	75
MOSFET N	TO–220AB	50	0.10	10	**BUK453–50B**	20	75
MOSFET N	TO–220AB	100	0.16	5	**BUK453–100A**	14	75
MOSFET N	TO–220AB	100	0.20	5	**BUK453–100B**	13	75
MOSFET N	TO–220AB	200	0.40	3.5	**BUK454–200A**	9.2	90
MOSFET N	TO–220AB	200	0.50	3.5	**BUK454–200B**	8.2	90
MOSFET N	TO–220AB	400	1.50	1.5	**BUK454–400A**	4.6	75
MOSFET N	TO–220AB	400	1.80	1.5	**BUK454–400B**	4.2	75
MOSFET N	TO–220AB	450	2.30	1.5	**BUK454–450B**	3.7	75
MOSFET N	TO–220AB	500	2.30	1.5	**BUK454–500A**	3.7	75
MOSFET N	TO–220AB	500	2.80	1.5	**BUK454–500B**	3.3	75
MOSFET N	TO–220AB	600	4	1.2	**BUK454–600A**	2.8	75
MOSFET N	TO–220AB	600	4.5	1.2	**BUK454–600B**	2.6	75
MOSFET N	TO–220AB	650	4	1.2	**BUK454–650A**	2.8	75
MOSFET N	TO–220AB	800	6	1	**BUK454–800A**	2.6	100
MOSFET N	TO–220AB	800	8	1	**BUK454–800B**	2.2	100
MOSFET N	TO–220AB	50	0.038	20	**BUK455–50A**	41	125
MOSFET N	TO–220AB	50	0.045	20	**BUK455–50B**	38	125
MOSFET N	TO–220AB	100	0.08	13	**BUK455–100A**	26	125
MOSFET N	TO–220AB	100	0.10	13	**BUK455–100B**	23	125
MOSFET N	TO–220AB	200	0.23	7	**BUK455–200A**	14	125
MOSFET N	TO–220AB	200	0.28	7	**BUK455–200B**	13	125
MOSFET N	TO–220AB	400	0.8	2.5	**BUK455–400A**	7.3	100
MOSFET N	TO–220AB	400	1	2.5	**BUK455–400B**	6.5	100
MOSFET N	TO–220AB	450	1.3	2.5	**BUK455–450B**	5.7	100
MOSFET N	TO–220AB	500	1.3	2.5	**BUK455–500A**	5.7	100
MOSFET N	TO–220AB	500	1.5	2.5	**BUK455–500B**	5.3	100
MOSFET N	TO–220AB	600	2	2.5	**BUK455–600A**	4.5	100
MOSFET N	TO–220AB	600	2.5	2.5	**BUK455–600B**	4	100
MOSFET N	TO–220AB	50	0.028	29	**BUK456–50A**	52	150
MOSFET N	TO–220AB	50	0.030	29	**BUK456–50B**	51	150
MOSFET N	TO–220AB	100	0.057	15	**BUK456–100A**	34	150
MOSFET N	TO–220AB	100	0.065	15	**BUK456–100B**	32	150
MOSFET N	TO–220AB	200	0.16	10	**BUK456–200A**	19	150
MOSFET N	TO–220AB	200	0.20	10	**BUK456–200B**	17	150
MOSFET N	TO–220AB	800	3	1.5	**BUK456–800A**	4	125
MOSFET N	TO–220AB	800	4	1.5	**BUK456–800B**	3.5	125
MOSFET N	TO–220AB	1000	4	1.5	**BUK456–1000A**	3.5	125
MOSFET N	TO–220AB	1000	5	1.5	**BUK456–1000B**	3.1	125
MOSFET N	TO–220AB	400	0.4	6.5	**BUK457–400A**	13	150
MOSFET N	TO–220AB	400	0.5	6.5	**BUK457–400B**	11	150
MOSFET N	TO–220AB	450	0.6	6.5	**BUK457–450B**	10	150
MOSFET N	TO–220AB	500	0.6	6.5	**BUK457–500A**	10	150
MOSFET N	TO–220AB	500	0.8	6.5	**BUK457–500B**	9	150
MOSFET N	TO–220AB	600	0.8	6.5	**BUK457–600A**	9	150
MOSFET N	TO–220AB	600	1	6.5	**BUK457–600B**	8	150

For detailed information on these and other types see Data Handbook S9

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MOSFET N-CHANNEL (cont.)

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	SOT-82	50	0.13	8.5	**BUK462-50A**	15	60
MOSFET N	SOT-82	50	0.15	8.5	**BUK462-50B**	14	60
MOSFET N	SOT-82	60	0.13	8.5	**BUK462-60A**	15	60
MOSFET N	SOT-82	60	0.15	8.5	**BUK462-60B**	14	60
MOSFET N	SOT-82	100	0.25	5.5	**BUK462-100A**	11	60
MOSFET N	SOT-82	100	0.30	5.5	**BUK462-100B**	10	60
MOSFET N	SOT-82	50	0.08	10	**BUK463-50A**	22	75
MOSFET N	SOT-82	50	0.10	10	**BUK463-50B**	20	75
MOSFET N	SOT-82	100	0.16	5	**BUK463-100A**	14	75
MOSFET N	SOT-82	100	0.20	5	**BUK463-100B**	13	75
MOSFET N	SOT-82	200	0.40	3.5	**BUK464-200A**	9.1	75
MOSFET N	SOT-82	200	0.50	3.5	**BUK464-200B**	7.5	75
MOSFET N	SOT-82	400	1.50	1.5	**BUK464-400A**	4.2	62.5
MOSFET N	SOT-82	400	1.80	1.5	**BUK464-400B**	3.8	62.5
MOSFET N	SOT-82	450	2.30	1.5	**BUK464-450B**	3.4	62.5
MOSFET N	SOT-82	500	2.20	1.5	**BUK464-500A**	3.4	62.5
MOSFET N	SOT-82	500	2.60	1.5	**BUK464-500B**	3.2	62.5
MOSFET N	SOT-82	600	4	1.2	**BUK464-600A**	2.5	62.5
MOSFET N	SOT-82	600	4.5	1.2	**BUK464-600B**	2.4	62.5
MOSFET N	SOT-82	800	6	1	**BUK464-800A**	2.2	75
MOSFET N	SOT-82	800	8	1	**BUK464-800B**	1.9	75

For detailed information on these and other types see Data Handbook S9

L²FET

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
L²FET	SOT-186	50	0.15	8.5	**BUK542-50A**	9.2	22
L²FET	SOT-186	50	0.18	8.5	**BUK542-50B**	8.4	22
L²FET	SOT-186	60	0.15	8.5	**BUK542-60A**	9.2	22
L²FET	SOT-186	60	0.18	8.5	**BUK542-60B**	8.4	22
L²FET	SOT-186	100	0.28	5.5	**BUK542-100A**	6.3	22
L²FET	SOT-186	100	0.35	5.5	**BUK542-100B**	5.6	22
L²FET	SOT-186	50	0.085	10	**BUK543-50A**	13	25
L²FET	SOT-186	50	0.10	10	**BUK543-50B**	12	25
L²FET	SOT-186	100	0.18	5	**BUK543-100A**	8.3	25
L²FET	SOT-186	100	0.22	5	**BUK543-100B**	7.5	25
L²FET	SOT-186	50	0.042	20	**BUK545-50A**	20	30
L²FET	SOT-186	50	0.055	20	**BUK545-50B**	18	30
L²FET	SOT-186	100	0.085	13	**BUK545-100A**	13	30
L²FET	SOT-186	100	0.11	13	**BUK545-100B**	12	30
L²FET	SOT-186	200	0.23	7	**BUK545-200A**	7.6	30
L²FET	SOT-186	200	0.28	7	**BUK545-200A**	7	30
L²FET	TO-220AB	50	0.15	8.5	**BUK552-50A**	14	60
L²FET	TO-220AB	50	0.18	8.5	**BUK552-50B**	13	60
L²FET	TO-220AB	60	0.15	8.5	**BUK552-60A**	14	60
L²FET	TO-220AB	60	0.18	8.5	**BUK552-60B**	13	60
L²FET	TO-220AB	100	0.28	5.5	**BUK552-100A**	10	60
L²FET	TO-220AB	100	0.35	5.5	**BUK552-100B**	8.5	60
L²FET	TO-220AB	50	0.085	10	**BUK553-50A**	21	75
L²FET	TO-220AB	50	0.10	10	**BUK553-50B**	20	75
L²FET	TO-220AB	100	0.18	6.5	**BUK553-100A**	13	75
L²FET	TO-220AB	100	0.22	6.5	**BUK553-100A**	12	75
L²FET	TO-220AB	120	0.18	6.5	**BUK553-120A**	13	75
L²FET	TO-220AB	200	0.40	3.5	**BUK554-200A**	9.2	90
L²FET	TO-220AB	200	0.50	3.5	**BUK554-200B**	8.2	90
L²FET	TO-220AB	50	0.042	20	**BUK555-50A**	39	125
L²FET	TO-220AB	50	0.055	20	**BUK555-50B**	35	125
L²FET	TO-220AB	100	0.085	13	**BUK555-100A**	25	125
L²FET	TO-220AB	100	0.11	13	**BUK555-100B**	22	125
L²FET	TO-220AB	200	0.23	7	**BUK555-200A**	14	125
L²FET	TO-220AB	200	0.28	7	**BUK555-200B**	13	125
L²FET	SOT-82	50	0.15	8.5	**BUK562-50A**	14	60
L²FET	SOT-82	50	0.18	8.5	**BUK562-50B**	13	60
L²FET	SOT-82	60	0.15	8.5	**BUK562-60A**	14	60
L²FET	SOT-82	60	0.18	8.5	**BUK562-60B**	13	60
L²FET	SOT-82	100	0.28	5.5	**BUK562-100A**	10	60
L²FET	SOT-82	100	0.35	5.5	**BUK562-100B**	8.5	60
L²FET	SOT-82	50	0.085	10	**BUK563-50A**	21	75
L²FET	SOT-82	50	0.10	10	**BUK563-50B**	20	75
L²FET	SOT-82	100	0.18	5	**BUK563-100A**	13	75
L²FET	SOT-82	100	0.22	5	**BUK563-100B**	12	75
L²FET	SOT-82	200	0.40	3.5	**BUK564-200A**	9.1	75
L²FET	SOT-82	200	0.50	3.5	**BUK564-200B**	7.5	75

For detailed information on these and other types see Data Handbook S9

S

FREDFETS

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
FREDFET	SOT-199	400	0.5	6.5	**BUK627-400A**	6.9	45
FREDFET	SOT-199	400	0.6	6.5	**BUK627-400B**	6.2	45
FREDFET	SOT-199	450	0.65	6.5	**BUK627-450B**	5.6	45
FREDFET	SOT-199	500	0.65	6.5	**BUK627-500A**	5.6	45
FREDFET	SOT-199	500	0.80	6.5	**BUK627-500B**	4.8	45
FREDFET	SOT-199	600	1	6.5	**BUK627-600A**	4.3	45
FREDFET	SOT-199	600	1.20	6.5	**BUK627-600B**	3.9	4.5
FREDFET	SOT-93	400	0.50	6.5	**BUK637-400A**	14	180
FREDFET	SOT-93	400	0.60	6.5	**BUK637-400B**	12	180
FREDFET	SOT-93	450	0.65	6.5	**BUK637-450B**	11	180
FREDFET	SOT-93	500	0.65	6.5	**BUK637-500A**	11	180
FREDFET	SOT-93	500	0.80	6.5	**BUK637-500B**	10	180
FREDFET	SOT-93	500	0.80	6.5	**BUK637-500B**	10	180
FREDFET	SOT-93	600	1	6.5	**BUK637-600A**	9	180
FREDFET	SOT-93	600	1.2	6.5	**BUK637-600B**	7.8	180
FREDFET	TO-220AB	400	0.80	2.5	**BUK655-400A**	7.3	100
FREDFET	TO-220AB	400	1	2.5	**BUK655-400B**	6.5	100
FREDFET	TO-220AB	450	1.3	2.5	**BUK655-450B**	5.7	100
FREDFET	TO-220AB	500	1.3	2.5	**BUK655-500A**	5.7	100
FREDFET	TO-220AB	500	1.5	2.5	**BUK655-500B**	5.3	100
FREDFET	TO-220AB	600	2	2.5	**BUK655-600A**	4.5	100
FREDFET	TO-220AB	600	2.5	2.5	**BUK655-600B**	4	100
FREDFET	TO-220AB	400	0.5	6.5	**BUK657-400A**	13	150
FREDFET	TO-220AB	400	0.6	6.5	**BUK657-400B**	11	150
FREDFET	TO-220AB	450	0.65	6.5	**BUK657-450B**	10	150
FREDFET	TO-220AB	500	0.65	6.5	**BUK657-500A**	10	150
FREDFET	TO-220AB	500	0.80	6.5	**BUK657-500B**	9	150
FREDFET	TO-220AB	600	1	6.5	**BUK657-600A**	8	150
FREDFET	TO-220AB	600	1.2	6.5	**BUK657-600B**	7.1	150

For detailed information on these and other types see Data Handbook S4a

Voltage range	20 to 800 V
Current range	0.05 to 30 A
D.C. current gain	6 to 1500

Note: The following alphanumeric list for L.F. power transistors is presented as two facing pages of related data. Please read across both pages for ratings and characteristics referring to each type number.

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD131	NPN	TO–126	70		45	3	15	60
BD132	PNP	TO–126	45		45	3	15	60
BD135	NPN	TO–126	45		45	1.5	8	70
BD136	PNP	TO–126	45		45	1.5	8	70
BD137	NPN	TO–126	60		60	1.5	8	70
BD138	PNP	TO–126	60		60	1.5	8	70
BD139	NPN	TO–126	100		80	1.5	8	70
BD140	PNP	TO–126	100		80	1.5	8	70
BD201	NPN	TO–220	60		45	8	60	25
BD201F	NPN	SOT–186	60		45	8	28	25
BD202	PNP	TO–220	60		45	8	60	25
BD202F	PNP	SOT–186	60		45	8	28	25
BD203	NPN	TO–220	60		60	8	60	25
BD203F	NPN	SOT–186	60		60	8	28	25
BD204	PNP	TO–220	60		60	8	60	25
BD204F	PNP	SOT–186	60		60	8	28	25
BD226	NPN	TO–126	45		45	1.5	12.5	62
BD227	PNP	TO–126	45		45	1.5	12.5	62
BD228	NPN	TO–126	60		60	1.5	12.5	62
BD229	PNP	TO–126	60		60	1.5	12.5	62
BD230	NPN	TO–126	100		80	1.5	12.5	62
BD231	PNP	TO–126	100		80	1.5	12.5	62
BD233	NPN	TO–126	45		45	2	25	25
BD234	PNP	TO–126	45		45	2	25	25
BD235	NPN	TO–126	60		60	2	25	25
BD236	PNP	TO–126	60		60	2	25	25
BD237	NPN	TO–126	100		80	2	25	25
BD238	PNP	TO–126	100		80	2	25	25
BD239	NPN	TO–220AB	45		45	3	30	25
BD239A	NPN	TO–220AB	60		60	3	30	25
BD239B	NPN	TO–220AB	80		80	3	30	25
BD239C	NPN	TO–220AB	100		100	3	30	25
BD240	PNP	TO–220AB	45		45	3	30	25
BD240A	PNP	TO–220AB	60		60	3	30	25
BD240B	PNP	TO–220AB	80		80	3	30	25
BD240C	PNP	TO–220AB	100		100	3	30	25

For detailed information on these and other types see Data Handbook S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
40					0.7	2	200	**BD131**
40					0.7	2	200	**BD132**
40	250	0.15		250	0.5	0.5	5	**BD135**
40	250	0.15		75	0.5	0.5	5	**BD136**
40	250	0.15		250	0.5	0.5	5	**BD137**
40	250	0.15		75	0.5	0.5	5	**BD138**
40	250	0.15		250	0.5	0.5	5	**BD139**
40	250	0.15		75	0.5	0.5	5	**BD140**
30			0.025		1	3	300	**BD201**
30			0.025		1	3	300	**BD201F**
30			0.025		1	3	300	**BD202**
30			0.025		1	3	300	**BD202F**
30			0.025		1	3	300	**BD203**
30			0.025		1	3	300	**BD203F**
30			0.025		1	3	300	**BD204**
30			0.025		1	3	300	**BD204F**
40	250	0.15		125	0.8	1	100	**BD226**
40	250	0.15		50	0.8	1	100	**BD227**
40	250	0.15		125	0.8	1	100	**BD228**
40	250	0.15		50	0.8	1	100	**BD229**
40	250	0.15		125	0.8	1	100	**BD230**
40	250	0.15		50	0.8	1	100	**BD231**
40	250	0.15			0.6	1	100	**BD233**
40	250	0.15			0.6	1	100	**BD234**
40	250	0.15			0.6	1	100	**BD235**
40	250	0.15			0.6	1	100	**BD236**
40	250	0.15			0.6	1	100	**BD237**
40	250	0.15			0.6	1	100	**BD238**
15					0.6	1	200	**BD239**
15					0.6	1	200	**BD239A**
15					0.6	1	200	**BD239B**
15					0.6	1	200	**BD239C**
15					0.6	1	200	**BD240**
15					0.6	1	200	**BD240A**
15					0.6	1	200	**BD240B**
15					0.6	1	200	**BD240C**

For detailed information on these and other types see Data Handbook S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD241	NPN	TO–220AB	45		45	5	40	25
BD241A	NPN	TO–220AB	60		60	5	40	25
BD241B	NPN	TO–220AB	80		80	5	40	25
BD241C	NPN	TO–220AB	100		100	5	40	25
BD242	PNP	TO–220AB	45		45	5	40	25
BD242A	PNP	TO–220AB	60		60	5	40	25
BD242B	PNP	TO–220AB	80		80	5	40	25
BD242C	PNP	TO–220AB	100		100	5	40	25
BD243	NPN	TO–220AB	45		45	8	65	25
BD243A	NPN	TO–220AB	60		60	8	65	25
BD243B	NPN	TO–220AB	80		80	8	65	25
BD243C	NPN	TO–220AB	100		100	8	65	25
BD244	PNP	TO–220AB	45		45	8	65	25
BD244A	PNP	TO–220AB	60		60	8	65	25
BD244B	PNP	TO–220AB	80		80	8	65	25
BD244C	PNP	TO–220AB	100		100	8	65	25
BD329	NPN	TO–126	32		20	3	15	45
BD330	PNP	TO–126	32		20	3	15	45
BD331*	NPN	SOT–82	60		60	6	60	25
BD332*	PNP	SOT–82	60		60	6	60	25
BD333*	NPN	SOT–82	80		80	6	60	25
BD334*	PNP	SOT–82	80		80	6	60	25
BD335*	NPN	SOT–82	100		100	6	60	25

* Also available in SOT–194 (SMD version of SOT–82): add suffix **S** to type number

For detailed information on these and other types see Data Handbook S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
25					1.2	3	600	**BD241**
25					1.2	3	600	**BD241A**
25					1.2	3	600	**BD241B**
25					1.2	3	600	**BD241C**
25					1.2	3	600	**BD242**
25					1.2	3	600	**BD242A**
25					1.2	3	600	**BD242B**
25					1.2	3	600	**BD242C**
15					1.5	6	1000	**BD243**
15					1.5	6	1000	**BD243A**
15					1.5	6	1000	**BD243B**
15					1.5	6	1000	**BD243C**
15					1.5	6	1000	**BD244**
15					1.5	6	1000	**BD244A**
15					1.5	6	1000	**BD244B**
15					1.5	6	1000	**BD244C**
85	375	0.5		130	0.5	2	200	**BD329**
85	375	0.5		100	0.5	2	200	**BD330**
750			0.06	7	2	3	12	**BD331**
750			0.06	7	2	3	12	**BD332**
750			0.06	7	2	3	12	**BD333**
750			0.06	7	2	3	12	**BD334**
750			0.06	7	2	3	12	**BD335**

For detailed information on these and other types see Data Handbook S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD336	PNP	SOT-82	100		100	6	60	25
BD337	NPN	SOT-82	120		120	6	60	25
BD338	PNP	SOT-82	120		120	6	60	25
BD433	NPN	TO-126	22		22	4	36	25
BD434	PNP	TO-126	22		22	4	36	25
BD435	NPN	TO-126	32		32	4	36	25
BD436	PNP	TO-126	32		32	4	36	25
BD437	NPN	TO-126	45		45	4	36	25
BD438	PNP	TO-126	45		45	4	36	25
BD643	NPN	TO-220AB	60		45	8	62.5	25
BD643F	NPN	SOT-186	60		45	8	28	25
BD644	PNP	TO-220AB	45		45	8	62.5	25
BD644F	PNP	SOT-186	45		45	8	28	25
BD645	NPN	TO-220AB	80		60	8	62.5	25
BD645F	NPN	SOT-186	80		60	8	28	25
BD646	PNP	TO-220AB	60		60	8	62.5	25
BD646F	PNP	SOT-186	60		60	8	28	25
BD647	NPN	TO-220AB	100		80	8	62.5	25
BD647F	NPN	SOT-186	100		80	8	28	25
BD648	PNP	TO-220AB	80		80	8	62.5	25
BD648F	PNP	SOT-186	80		80	8	28	25
BD649	NPN	TO-220AB	120		100	8	62.5	25
BD649F	NPN	SOT-186	120		100	8	28	25
BD650	PNP	TO-220AB	100		100	8	62.5	25
BD650F	PNP	SOT-186	100		100	8	28	25
BD651	NPN	TO-220AB	140		120	8	62.5	25
BD651F	NPN	SOT-186	140		120	8	62.5	25
BD652	PNP	TO-220AB	120		120	8	62.5	25
BD652F	PNP	SOT-186	120		120	8	28	25

For detailed information on these and other types see Data Handbook S4a

S

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
750			0.06	7	2	3	12	**BD336**
750			0.06	7	2	3	12	**BD337**
750			0.06	7	2	3	12	**BD338**
85	475	0.5			0.5	2	200	**BD433**
85	475	0.5			0.5	2	200	**BD434**
85	475	0.5			0.5	2	200	**BD435**
85	475	0.5			0.5	2	200	**BD436**
85	375	0.5			0.7	3	300	**BD437**
85	375	0.5			0.7	3	300	**BD438**
750			0.05		2	3	12	**BD643**
750			0.05		2	3	12	**BD643F**
750			0.1		2	3	12	**BD644**
750			0.1		2	3	12	**BD644F**
750			0.05		2	3	12	**BD645**
750			0.05		2	3	12	**BD645F**
750			0.1		2	3	12	**BD646**
750			0.1		2	3	12	**BD646F**
750			0.05		2	3	12	**BD647**
750			0.05		2	3	12	**BD647F**
750			0.1		2	3	12	**BD648**
750			0.1		2	3	12	**BD648F**
750			0.05		2	3	12	**BD649**
750			0.05		2	3	12	**BD649F**
750			0.1		2	3	12	**BD650**
750			0.1		2	3	12	**BD650F**
750			0.05		2	3	12	**BD651**
750			0.05		2	3	12	**BD651F**
750			0.1		2	3	12	**BD652**
750			0.1		2	3	12	**BD652F**

For detailed information on these and other types see Data Handbook S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD675	NPN	TO-126	60		45	4	40	25
BD676	PNP	TO-126	45		45	4	40	25
BD677	NPN	TO-126	80		60	4	40	25
BD678	PNP	TO-126	60		60	4	40	25
BD679	NPN	TO-126	100		80	4	40	25
BD680	PNP	TO-126	80		80	4	40	25
BD681	NPN	TO-126	120		100	4	40	25
BD682	PNP	TO-126	100		100	4	40	25
BD683	NPN	TO-126	140		120	4	40	25
BD684	PNP	TO-126	120		120	4	40	25
BD719	NPN	TO-126	60		60	7	36	25
BD720	PNP	TO-126	60		60	7	36	25
BD721	NPN	TO-126	80		80	7	36	25
BD722	PNP	TO-126	80		80	7	36	25
BD723	NPN	TO-126	100		100	7	36	25
BD724	PNP	TO-126	100		100	7	36	25
BD725	NPN	TO-126	120		120	7	36	25
BD726	PNP	TO-126	120		120	7	36	25
BD825	NPN	TO-202	45		45	1	8	50
BD826	PNP	TO-202	45		45	1	8	50
BD827	NPN	TO-202	60		60	1	8	50
BD828	PNP	TO-202	60		60	1	8	50
BD829	NPN	TO-202	100		80	1	8	50
BD830	PNP	TO-202	100		80	1	8	50
BD839	NPN	TO-202	45		45	1.5	10	25
BD840	PNP	TO-202	45		45	1.5	10	25
BD841	NPN	TO-202	60		60	1.5	10	25
BD842	PNP	TO-202	60		60	1.5	10	25
BD843	NPN	TO-202	100		80	1.5	10	25
BD844	PNP	TO-202	100		80	1,5	10	25

For detailed information on these and other types see Data Handbook S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
750				7	2.5	1.5	6	**BD675**
750				7	2.5	1.5	6	**BD676**
750				7	2.5	1.5	6	**BD677**
750				7	2.5	1.5	6	**BD678**
750				7	2.5	1.5	6	**BD679**
750				7	2.5	1.5	6	**BD680**
750				7	2.5	1.5	6	**BD681**
750				7	2.5	1.5	6	**BD682**
750				7	2.5	1.5	6	**BD683**
750				7	2.5	1.5	6	**BD684**
20				3	1	2.0	0.2	**BD719**
20				3	1	2.0	0.2	**BD720**
20				3	1	2.0	0.2	**BD721**
20				3	1	2.0	0.2	**BD722**
20				3	1	2.0	0.2	**BD723**
20				3	1	2.0	0.2	**BD724**
20				3	1	2.0	0.2	**BD725**
20				3	1	2.0	0.2	**BD726**
40	250	0.15		250	0.5	0.5	50	**BD825**
40	250	0.15		75	0.5	0.5	50	**BD826**
40	250	0.15		250	0.5	0.5	50	**BD827**
40	250	0.15		75	0.5	0.5	50	**BD828**
40	250	0.15		250	0.5	0.5	50	**BD829**
40	250	0.15		75	0.5	0.5	50	**BD830**
40	250	0.15		125	0.8	1.0	100	**BD839**
40	250	0.15		50	0.8	1.0	100	**BD840**
40	250	0.15		125	0.8	1.0	100	**BD841**
40	250	0.15		50	0.8	1.0	100	**BD842**
40	250	0.15		125	0.8	1.0	100	**BD843**
40	250	0.15		50	0.8	1.0	100	**BD844**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD933	NPN	TO-220AB	45		45	3	30	25
BD933F	NPN	SOT-186	45		45	3	19	25
BD934	PNP	TO-220AB	45		45	3	30	25
BD934F	PNP	SOT-186	45		45	3	19	25
BD935	NPN	TO-220AB	60		60	3	30	25
BD935F	NPN	SOT-186	60		60	3	19	25
BD936	PNP	TO-220AB	60		60	3	30	25
BD936F	PNP	SOT-186	60		60	3	19	25
BD937	NPN	TO-220AB	100		80	3	30	25
BD937F	NPN	SOT-186	100		80	3	19	25
BD938	PNP	TO-220AB	100		80	3	30	25
BD938F	PNP	SOT-186	100		80	3	19	25
BD939	NPN	TO-220AB	120		100	3	30	25
BD939F	NPN	SOT-186	120		100	3	19	25
BD940	PNP	TO-220AB	120		100	3	30	25
BD940F	PNP	SOT-186	120		100	3	19	25
BD941	NPN	TO-220AB	140		120	3	30	25
BD941F	NPN	SOT-186	140		120	3	19	25

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
40	250	0.15		3	0.6	1	100	**BD933**
40	250	0.15		3	0.6	1	100	**BD933F**
40	250	0.15		3	0.6	1	100	**BD934**
40	250	0.15		3	0.6	1	100	**BD934F**
40	250	0.15		3	0.6	1	100	**BD935**
40	250	0.15		3	0.6	1	100	**BD935F**
40	250	0.15		3	0.6	1	100	**BD936**
40	250	0.15		3	0.6	1	100	**BD936F**
40	250	0.15		3	0.6	1	100	**BD937**
40	250	0.15		3	0.6	1	100	**BD937F**
40	250	0.15		3	0.6	1	100	**BD938**
40	250	0.15		3	0.6	1	100	**BD938F**
40	250	0.15		3	0.6	1	100	**BD939**
40	250	0.15		3	0.6	1	100	**BD939F**
40	250	0.15		3	0.6	1	100	**BD940**
40	250	0.15		3	0.6	1	100	**BD940F**
40	250	0.15		3	0.6	1	100	**BD941**
40	250	0.15		3	0.6	1	100	**BD941F**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD942	PNP	TO-220AB	140		120	3	30	25
BD942F	PNP	SOT-186	140		120	3	19	25
BD943	NPN	TO-220AB	22		22	5	40	25
BD943F	NPN	SOT-186	22		22	5	22	25
BD944	PNP	TO-220AB	22		22	5	40	25
BD944F	PNP	SOT-186	22		22	5	22	25
BD945	NPN	TO-220AB	32		32	5	40	25
BD945F	NPN	SOT-186	32		32	5	22	25
BD946	PNP	TO-220AB	32		32	5	40	25
BD946F	PNP	SOT-186	32		32	5	22	25
BD947	NPN	TO-220AB	45		45	5	40	25
BD947F	NPN	SOT-186	45		45	5	22	25
BD948	PNP	TO-220AB	45		45	5	40	25
BD948F	PNP	SOT-186	45		45	5	22	25
BD949	NPN	TO-220AB	60		60	5	40	25
BD949F	NPN	SOT-186	60		60	5	22	25
BD950	PNP	TO-220AB	60		60	5	40	25
BD950F	PNP	SOT-186	60		60	5	22	25
BD951	NPN	TO-220AB	80		80	5	40	25
BD951F	NPN	SOT-186	80		80	5	22	25
BD952	PNP	TO-220AB	80		80	5	40	25
BD952F	PNP	SOT-186	80		80	5	22	25
BD953	NPN	TO-220AB	100		100	5	40	25
BD953F	NPN	SOT-186	100		100	5	22	25
BD954	PNP	TO-220AB	100		100	5	40	25
BD954F	PNP	SOT-186	100		100	5	22	25
BD955	NPN	TO-220AB	120		120	5	40	25
BD955F	NPN	SOT-186	120		120	5	22	25
BD956	PNP	TO-220AB	120		120	5	40	25
BD956F	PNP	SOT-186	120		120	5	22	25

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
40	250	0.15		3	0.6	1	100	**BD942**
40	250	0.15		3	0.6	1	100	**BD942F**
85	475	0.5		3	0.5	2	200	**BD943**
85	475	0.5		3	0.5	2	200	**BD943F**
85	475	0.5		3	0.5	2	200	**BD944**
85	475	0.5		3	0.5	2	200	**BD944F**
85	475	0.5		3	0.5	2	200	**BD945**
85	475	0.5		3	0.5	2	200	**BD945F**
85	475	0.5		3	0.5	2	200	**BD946**
85	475	0.5		3	0.5	2	200	**BD946F**
85	475	0.5		3	0.5	2	200	**BD947**
85	475	0.5		3	0.5	2	200	**BD947F**
85	475	0.5		3	0.5	2	200	**BD948**
85	475	0.5		3	0.5	2	200	**BD948F**
40				3	1	2	200	**BD949**
40				3	1	2	200	**BD949F**
40				3	1	2	200	**BD950**
40				3	1	2	200	**BD950F**
40				3	1	2	200	**BD951**
40				3	1	2	200	**BD951F**
40				3	1	2	200	**BD952**
40				3	1	2	200	**BD952F**
40				3	1	2	200	**BD953**
40				3	1	2	200	**BD953F**
40				3	1	2	200	**BD954**
40				3	1	2	200	**BD954F**
40				3	1	2	200	**BD955**
40				3	1	2	200	**BD955F**
40				3	1	2	200	**BD956**
40				3	1	2	200	**BD956F**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT29	NPN	TO-220AB	40		40	1	30	25
BDT29A	NPN	TO-220AB	60		60	1	30	25
BDT29AF	NPN	SOT-186	60		60	1	19	25
BDT29B	NPN	TO-220AB	80		80	1	30	25
BDT29BF	NPN	SOT-186	80		80	1	19	25
BDT29C	NPN	TO-220AB	100		100	1	30	25
BDT29CF	NPN	SOT-186	100		100	1	19	25
BDT29F	NPN	SOT-186	40		40	1	19	25
BDT30	PNP	TO-220AB	40		40	1	30	25
BDT30A	PNP	TO-220AB	60		60	1	30	25
BDT30AF	PNP	SOT-186	60		60	1	19	25
BDT30B	PNP	TO-220AB	80		80	1	30	25
BDT30BF	PNP	SOT-186	80		80	1	19	25
BDT30C	PNP	TO-220AB	100		100	1	30	25
BDT30CF	PNP	SOT-186	100		100	1	19	25
BDT30F	PNP	SOT-186	40		40	1	19	25
BDT31	NPN	TO-220AB	40		40	3	40	25
BDT31A	NPN	TO-220AB	60		60	3	40	25
BDT31AF	NPN	SOT-186	60		60	3	19	25
BDT31B	NPN	TO-220AB	80		80	3	40	25
BDT31BF	NPN	SOT-186	80		80	3	19	25
BDT31C	NPN	TO-220AB	100		100	3	40	25
BDT31CF	NPN	SOT-186	100		100	3	19	25
BDT31F	NPN	SOT-186	40		40	3	19	25
BDT32	PNP	TO-220AB	40		40	3	40	25
BDT32A	PNP	TO-220AB	60		60	3	40	25
BDT32AF	PNP	SOT-186	60		60	3	19	25
BDT32B	PNP	TO-220AB	80		80	3	40	25
BDT32BF	PNP	SOT-186	80		80	3	19	25
BDT32C	PNP	TO-220AB	100		100	3	40	25
BDT32CF	PNP	SOT-186	100		100	3	19	25
BDT32F	PNP	SOT-186	40		40	3	19	25
BDT41	NPN	TO-220AB	40		40	6	65	25
BDT41A	NPN	TO-220AB	60		60	6	65	25
BDT41AF	NPN	SOT-186	60		60	6	28	25
BDT41B	NPN	TO-220AB	80		80	6	65	25
BDT41BF	NPN	SOT-186	80		80	6	28	25
BDT41C	NPN	TO-220AB	100		100	6	65	25
BDT41CF	NPN	SOT-186	100		100	6	28	25
BDT41F	NPN	SOT-186	40		40	6	28	25
BDT42	PNP	TO-220AB	40		40	6	65	25
BDT42A	PNP	TO-220AB	60		60	6	65	25
BDT42AF	PNP	SOT-186	60		60	6	28	25
BDT42B	PNP	TO-220AB	80		80	6	65	25
BDT42BF	PNP	SOT-186	80		80	6	28	25
BDT42C	PNP	TO-220AB	100		100	6	65	25
BDT42CF	PNP	SOT-186	100		100	6	28	25
BDT42F	PNP	SOT-186	40		40	6	28	25

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
15	75	1			0.7	1	125	**BDT29**
15	75	1			0.7	1	125	**BDT29A**
15	75	1			0.7	1	125	**BDT29AF**
15	75	1			0.7	1	125	**BDT29B**
15	75	1			0.7	1	125	**BDT29BF**
15	75	1			0.7	1	125	**BDT29C**
15	75	1			0.7	1	125	**BDT29CF**
15	75	1			0.7	1	125	**BDT29F**
15	75	1			0.7	1	125	**BDT30**
15	75	1			0.7	1	125	**BDT30A**
15	75	1			0.7	1	125	**BDT30AF**
15	75	1			0.7	1	125	**BDT30B**
15	75	1			0.7	1	125	**BDT30BF**
15	75	1			0.7	1	125	**BDT30C**
15	75	1			0.7	1	125	**BDT30CF**
15	75	1			0.7	1	125	**BDT30F**
10	50	3			1.2	3	375	**BDT31**
10	50	3			1.2	3	375	**BDT31A**
10	50	3			1.2	3	375	**BDT31AF**
10	50	3			1.2	3	375	**BDT31B**
10	50	3			1.2	3	375	**BDT31BF**
10	50	3			1.2	3	375	**BDT31C**
10	50	3			1.2	3	375	**BDT31CF**
10	50	3			1.2	3	375	**BDT31F**
10	50	3			1.2	3	375	**BDT32**
10	50	3			1.2	3	375	**BDT32A**
10	50	3			1.2	3	375	**BDT32AF**
10	50	3			1.2	3	375	**BDT32B**
10	50	3			1.2	3	375	**BDT32BF**
10	50	3			1.2	3	375	**BDT32C**
10	50	3			1.2	3	375	**BDT32CF**
10	50	3			1.2	3	375	**BDT32F**
15	75	3			1.5	6	600	**BDT41**
15	75	3			1.5	6	600	**BDT41A**
15	75	3			1.5	6	600	**BDT41AF**
15	75	3			1.5	6	600	**BDT41B**
15	75	3			1.5	6	600	**BDT41BF**
15	75	3			1.5	6	600	**BDT41C**
15	75	3			1.5	6	600	**BDT41CF**
15	75	3			1.5	6	600	**BDT41F**
15	75	3			1.5	6	600	**BDT42**
15	75	3			1.5	6	600	**BDT42A**
15	75	3			1.5	6	600	**BDT42AF**
15	75	3			1.5	6	600	**BDT42B**
15	75	3			1.5	6	600	**BDT42BF**
15	75	3			1.5	6	600	**BDT42C**
15	75	3			1.5	6	600	**BDT42CF**
15	75	3			1.5	6	600	**BDT42F**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT60	PNP	TO–220AB	60		60	4	50	25
BDT60A	PNP	TO–220AB	80		80	4	50	25
BDT60AF	PNP	SOT–186	80		80	4	25	25
BDT60B	PNP	TO–220AB	100		100	4	50	25
BDT60BF	PNP	SOT–186	100		100	4	25	25
BDT60C	PNP	TO–220AB	120		120	4	50	25
BDT60CF	PNP	SOT–186	120		120	4	25	25
BDT60F	PNP	SOT–186	60		60	4	25	25
BDT61	NPN	TO–220AB	60		60	4	50	25
BDT61A	NPN	TO–220AB	80		80	4	50	25
BDT61AF	NPN	SOT–186	80		80	4	25	25
BDT61B	NPN	TO–220AB	100		100	4	50	25
BDT61BF	NPN	SOT–186	100		100	4	25	25
BDT61C	NPN	TO–220AB	120		120	4	50	25
BDT61CF	NPN	SOT–186	120		120	4	25	25
BDT61F	NPN	SOT–186	60		60	4	25	25
BDT62	PNP	TO–220AB	60		60	10	90	25
BDT62A	PNP	TO–220AB	80		80	10	90	25
BDT62AF	PNP	SOT–186	80		80	10	32	25
BDT62B	PNP	TO–220AB	100		100	10	90	25
BDT62BF	PNP	SOT–186	100		100	10	32	25
BDT62C	PNP	TO–220AB	120		120	10	90	25
BDT62CF	PNP	SOT–186	120		120	10	32	25
BDT62F	PNP	SOT–186	60		60	10	32	25
BDT63	NPN	TO–220AB	60		60	10	90	25
BDT63A	NPN	TO–220AB	80		80	10	90	25
BDT63AF	NPN	SOT–186	80		80	10	32	25
BDT63B	NPN	TO–220AB	100		100	10	90	25
BDT63BF	NPN	SOT–186	100		100	10	32	25
BDT63C	NPN	TO–220AB	120		120	10	90	25
BDT63CF	NPN	SOT–186	120		120	10	32	25
BDT63F	NPN	SOT–186	60		60	10	32	25

For detailed information on these and other types see Data Handbooks S4a

S

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
750					2.5	1.5	6	**BDT60**
750					2.5	1.5	6	**BDT60A**
750					2.5	1.5	6	**BDT60AF**
750					2.5	1.5	6	**BDT60B**
750					2.5	1.5	6	**BDT60BF**
750					2.5	1.5	6	**BDT60C**
750					2.5	1.5	6	**BDT60CF**
750					2.5	1.5	6	**BDT60F**
750			0.025		2.5	1.5	6	**BDT61**
750			0.025		2.5	1.5	6	**BDT61A**
750			0.025		2.5	1.5	6	**BDT61AF**
750			0.025		2.5	1.5	6	**BDT61B**
750			0.025		2.5	1.5	6	**BDT61BF**
750			0.025		2.5	1.5	6	**BDT61C**
750			0.025		2.5	1.5	6	**BDT61CF**
750			0.025		2.5	1.5	6	**BDT61F**
1000			0.1		2	3	12	**BDT62**
1000			0.1		2	3	12	**BDT62A**
1000			0.1		2	3	12	**BDT62AF**
1000			0.1		2	3	12	**BDT62B**
1000			0.1		2	3	12	**BDT62BF**
1000			0.1		2	3	12	**BDT62C**
1000			0.1		2	3	12	**BDT62CF**
1000			0.1		2	3	12	**BDT62F**
1000			0.05		2	3	12	**BDT63**
1000			0.05		2	3	12	**BDT63A**
1000			0.05		2	3	12	**BDT63AF**
1000			0.05		2	3	12	**BDT63B**
1000			0.05		2	3	12	**BDT63BF**
1000			0.05		2	3	12	**BDT63C**
1000			0.05		2	3	12	**BDT63CF**
1000			0.05		2	3	12	**BDT63F**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT64	PNP	TO-220AB	60		60	12	125	25
BDT64A	PNP	TO-220AB	80		80	12	125	25
BDT64AF	PNP	SOT-186	80		80	12	36	25
BDT64B	PNP	TO-220AB	100		100	12	125	25
BDT64BF	PNP	SOT-186	100		100	12	36	25
BDT64C	PNP	TO-220AB	120		120	12	125	25
BDT64CF	PNP	SOT-186	120		120	12	36	25
BDT64F	PNP	SOT-186	60		60	12	36	25
BDT65	NPN	TO-220AB	60		60	12	125	25
BDT65A	NPN	TO-220AB	80		80	12	125	25
BDT65AF	NPN	SOT-186	80		80	12	36	25
BDT65B	NPN	TO-220AB	100		100	12	125	25
BDT65BF	NPN	SOT-186	100		100	12	36	25
BDT65C	NPN	TO-220AB	120		120	12	125	25
BDT65CF	NPN	SOT-186	120		120	12	36	25
BDT65F	NPN	SOT-186	60		60	12	36	25
BDT81	NPN	TO-220AB	60		60	15	125	25
BDT81F	NPN	SOT-186	60		60	15	36	25
BDT82	PNP	TO-220AB	60		60	15	125	25
BDT82F	PNP	SOT-186	60		60	15	36	25
BDT83	NPN	TO-220AB	80		80	15	125	25
BDT83F	NPN	SOT-186	80		80	15	36	25
BDT84	PNP	TO-220AB	80		80	15	125	25
BDT84F	PNP	SOT-186	80		80	15	36	25
BDT85	NPN	TO-220AB	100		100	15	125	25
BDT85AF	NPN	SOT-186	100		100	15	36	25
BDT85F	NPN	SOT-186	100		100	15	36	25

For detailed information on these and other types see Data Handbooks S4a

S

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000					2	5	20	**BDT64**
1000					2	5	20	**BDT64A**
1000					2	5	20	**BDT64AF**
1000					2	5	20	**BDT64B**
1000					2	5	20	**BDT64BF**
1000					2	5	20	**BDT64C**
1000					2	5	20	**BDT64CF**
1000					2	5	20	**BDT64F**
1000					2	5	20	**BDT65**
1000					2	5	20	**BDT65A**
1000					2	5	20	**BDT65AF**
1000					2	5	20	**BDT65B**
1000					2	5	20	**BDT65BF**
1000					2	5	20	**BDT65C**
1000					2	5	20	**BDT65CF**
1000					2	5	20	**BDT65F**
50				10	1	5	500	**BDT81**
50				10	1	5	500	**BDT81F**
50				20	1	5	500	**BDT82**
50				10	1	5	500	**BDT82F**
50				10	1	5	500	**BDT83**
50				10	1	5	500	**BDT83F**
50				20	1	5	500	**BDT84**
50				10	1	5	500	**BDT84F**
50				10	1	5	500	**BDT85**
50				10	1	5	50	**BDT85AF**
50				10	1	5	500	**BDT85F**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT86	PNP	TO–220AB	100		100	15	125	25
BDT86AF	PNP	SOT–186	100		100	15	36	25
BDT86F	PNP	SOT–186	100		100	15	36	25
BDT87	NPN	TO–220AB	120		120	15	125	25
BDT87AF	NPN	SOT–186	120		120	15	36	25
BDT87F	NPN	SOT–186	120		120	15	36	25
BDT88	PNP	TO–220AB	120		120	15	125	25
BDT88AF	PNP	SOT–186	120		120	15	36	25
BDT88F	PNP	SOT–186	120		120	15	36	25
BDT91	NPN	TO–220AB	60		60	10	90	25
BDT91F	NPN	SOT–186	60		60	10	32	25
BDT92	PNP	TO–220AB	60		60	10	90	25
BDT92F	PNP	SOT–186	60		60	10	32	25
BDT93	NPN	TO–220AB	80		80	10	90	25
BDT93F	NPN	SOT–186	80		80	10	32	25
BDT94	PNP	TO–220AB	80		80	10	90	25
BDT94F	PNP	SOT–186	80		80	10	32	25
BDT95	NPN	TO–220AB	100		100	10	90	25
BDT95F	NPN	SOT–186	100		100	10	32	25
BDT96	PNP	TO–220AB	100		100	10	90	25
BDT96F	PNP	SOT–186	100		100	10	32	25
BDV64	PNP	SOT–93*	60		60	12	125	25
BDV64A	PNP	SOT–93*	80		80	12	125	25
BDV64B	PNP	SOT–93*	100		100	12	125	25
BDV64C	PNP	SOT–93*	120		120	12	125	25
BDV65	NPN	SOT–93*	60		60	12	125	25
BDV65A	NPN	SOT–93*	80		80	12	125	25
BDV65B	NPN	SOT–93*	100		100	12	125	25
BDV65C	NPN	SOT–93*	120		120	12	125	25

* Also available in F–pack SOT–199: add suffix **F** to type number

For detailed information on these and other types see Data Handbooks S4a

S

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
50				20	1	5	500	**BDT86**
50				10	1	5	50	**BDT86AF**
50				10	1	5	500	**BDT86F**
50				10	1	5	500	**BDT87**
50				10	1	5	50	**BDT87AF**
50				10	1	5	500	**BDT87F**
50				20	1	5	500	**BDT88**
50				10	1	5	50	**BDT88AF**
50				10	1	5	500	**BDT88F**
20	200	4		4	1	4	400	**BDT91**
20	200	4		4	1	4	400	**BDT91F**
20	200	4		4	1	4	400	**BDT92**
20	200	4		4	1	4	400	**BDT92F**
20	200	4		4	1	4	400	**BDT93**
20	200	4		4	1	4	400	**BDT93F**
20	200	4		4	1	4	400	**BDT94**
20	200	4		4	1	4	400	**BDT94F**
20	200	4		4	1	4	400	**BDT95**
20	200	4		4	1	4	400	**BDT95F**
20	200	4		4	1	4	400	**BDT96**
20	200	4		4	1	4	400	**BDT96F**
1000			0.1		2	5	20	**BDV64**
1000			0.1		2	5	20	**BDV64A**
1000			0.1		2	5	20	**BDV64B**
1000			0.1		2	5	20	**BDV64C**
1000			0.07		2	5	20	**BDV65**
1000			0.07		2	5	20	**BDV65A**
1000			0.07		2	5	20	**BDV65B**
1000			0.07		2	5	20	**BDV65C**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDV66A	PNP	SOT-93*	100		80	16	175	25
BDV66B	PNP	SOT-93*	120		100	16	175	25
BDV66C	PNP	SOT-93*	140		120	16	175	25
BDV66D	PNP	SOT-93*	160		150	16	175	25
BDV67A	NPN	SOT-93*	100		80	16	200	25
BDV67B	NPN	SOT-93*	120		100	16	200	25
BDV67C	NPN	SOT-93*	140		120	16	200	25
BDV67D	NPN	SOT-93*	160		150	16	200	25
BDV91	NPN	SOT-93	60		60	10	100	25
BDV92	PNP	SOT-93	60		60	10	100	25
BDV93	NPN	SOT-93	80		80	10	100	25
BDV94	PNP	SOT-93	80		80	10	100	25
BDV95	NPN	SOT-93	100		100	10	100	25
BDV96	PNP	SOT-93	100		100	10	100	25
BDX35	NPN	TO-126	100		60	5	15	75
BDX36	NPN	TO-126	120		60	5	15	75
BDX37	NPN	TO-126	120		80	5	15	75
BDX42	NPN	TO-126	60			1	5	100
BDX43	NPN	TO-126	80			1	5	100
BDX44	NPN	TO-126	100			1	5	100
BDX45	PNP	TO-126	60			1	5	100
BDX46	PNP	TO-126	80			1	5	100
BDX47	PNP	TO-126	100			1	5	100
BDX62	PNP	TO-3	60		60	8	90	25
BDX62A	PNP	TO-3	80		80	8	90	25
BDX62B	PNP	TO-3	100		100	8	90	25
BDX62C	PNP	TO-3	120		120	8	90	25
BDX63	NPN	TO-3	80		60	8	90	25
BDX63A	NPN	TO-3	100		80	8	90	25
BDX63B	NPN	TO-3	120		100	8	90	25
BDX63C	NPN	TO-3	140		120	8	90	25

* Also available in F-pack SOT-199: add suffix **F** to type number

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000			0.06		2	10	40	**BDV66A**
1000			0.06		2	10	40	**BDV66B**
1000			0.06		2	10	40	**BDV66C**
1000			0.06		2	10	40	**BDV66D**
1000			0.06		2	10	40	**BDV67A**
1000			0.06		2	10	40	**BDV67B**
1000			0.06		2	10	40	**BDV67C**
1000			0.06		2	10	40	**BDV67D**
20					1	4	400	**BDV91**
20					1	4	400	**BDV92**
20					1	4	400	**BDV93**
20					1	4	400	**BDV94**
20					1	4	400	**BDV95**
20					1	4	400	**BDV96**
45	450	0.5		100	0.9	5	500	**BDX35**
45	450	0.5		100	0.7	5	500	**BDX36**
45	450	0.5		100	0.9	5	500	**BDX37**
2000					1.6	1	4	**BDX42**
2000					1.6	1	1	**BDX43**
2000					1.3	0.5	0.5	**BDX44**
2000					1.6	1	4	**BDX45**
2000					1.6	1	1	**BDX46**
2000					1.3	0.5	0.5	**BDX47**
1000			0.1		2	3	12	**BDX62**
1000			0.1		2	3	12	**BDX62A**
1000			0.1		2	3	12	**BDX62B**
1000			0.1		2	3	12	**BDX62C**
1000			0.1		2	3	12	**BDX63**
1000			0.1		2	3	12	**BDX63A**
1000			0.1		2	3	12	**BDX63B**
1000			0.1		2	3	12	**BDX63C**

For detailed information on these and other types see Data Handbooks S4a and S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDX64	PNP	TO–3	60		60	12	117	25
BDX64A	PNP	TO–3	80		80	12	117	25
BDX64B	PNP	TO–3	100		100	12	117	25
BDX64C	PNP	TO–3	120		120	12	117	25
BDX65	NPN	TO–3	80		60	12	117	25
BDX65A	NPN	TO–3	100		80	12	117	25
BDX65B	NPN	TO–3	120		100	12	117	25
BDX65C	NPN	TO–3	140		120	12	117	25
BDX66	PNP	TO–3	60		60	16	150	25
BDX66A	PNP	TO–3	80		80	16	150	25
BDX66B	PNP	TO–3	100		100	16	150	25
BDX66C	PNP	TO–3	120		120	16	150	25
BDX67	NPN	TO–3	80		60	16	150	25
BDX67A	NPN	TO–3	100		80	16	150	25
BDX67B	NPN	TO–3	120		100	16	150	25
BDX67C	NPN	TO–3	140		120	16	150	25
BDX68	PNP	TO–3	60		60	25	200	25
BDX68A	PNP	TO–3	80		80	25	200	25
BDX68B	PNP	TO–3	100		100	25	200	25
BDX68C	PNP	TO–3	120		120	25	200	25
BDX69	NPN	TO–3	80		60	25	200	25
BDX69A	NPN	TO–3	100		80	25	200	25
BDX69B	NPN	TO–3	120		100	25	200	25
BDX69C	NPN	TO–3	140		120	25	200	25
BDX77	NPN	TO–220	100		80	8	60	25
BDX77F	NPN	SOT–186	100		80	8	28	25
BDX78	PNP	TO–220	80		80	8	60	25
BDX78F	PNP	SOT–186	80		80	8	28	25
BDX91	NPN	TO–3	60		60	8	90	25
BDX92	PNP	TO–3	60		60	8	90	25
BDX93	NPN	TO–3	80		80	8	90	25
BDX94	PNP	TO–3	80		80	8	90	25
BDX95	NPN	TO–3	100		100	8	90	25
BDX96	PNP	TO–3	100		100	8	90	25
BDY90	NPN	TO–3	120		100	10	40	70
BDY91	NPN	TO–3	100		80	10	40	70
BDY92	NPN	TO–3	80		60	10	40	70

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000			0.08		2	5	20	**BDX64**
1000			0.08		2	5	20	**BDX64A**
1000			0.08		2	5	20	**BDX64B**
1000			0.08		2	5	20	**BDX64C**
1000			0.05		2	5	20	**BDX65**
1000			0.05		2	5	20	**BDX65A**
1000			0.05		2	5	20	**BDX65B**
1000			0.05		2	5	20	**BDX65C**
1000			0.06		2	10	40	**BDX66**
1000			0.06		2	10	40	**BDX66A**
1000			0.06		2	10	40	**BDX66B**
1000			0.06		2	10	40	**BDX66C**
1000			0.05		2	10	40	**BDX67**
1000			0.05		2	10	40	**BDX67A**
1000			0.05		2	10	40	**BDX67B**
1000			0.05		2	10	40	**BDX67C**
1000			0.06		2	20	80	**BDX68**
1000			0.06		2	20	80	**BDX68A**
1000			0.06		2	20	80	**BDX68B**
1000			0.06		2	20	80	**BDX68C**
1000			0.05		2	20	80	**BDX69**
1000			0.05		2	20	80	**BDX69A**
1000			0.05		2	20	80	**BDX69B**
1000			0.05		2	20	80	**BDX69C**
30					1	3	300	**BDX77**
30					1	3	300	**BDX77F**
30					1	3	300	**BDX78**
30					1	3	300	**BDX78F**
20					0.8	3	300	**BDX91**
20					0.8	3	300	**BDX92**
20					0.8	3	300	**BDX93**
20					0.8	3	300	**BDX94**
20					0.8	3	300	**BDX95**
20					0.8	3	300	**BDX96**
30	120	5		70	1	10	1000	**BDY90**
30	120	5		70	1	10	1000	**BDY91**
30	120	5		70	1	10	1000	**BDY92**

For detailed information on these and other types see Data Handbooks S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BU304F	NPN	SOT-186		600	300	4	18	25
BU305F	NPN	SOT-186		700	400	4	18	25
BU306F	NPN	SOT-186		600	300	8	18	25
BU307F	NPN	SOT-186		700	400	8	18	25
BU406	NPN	TO-220		400	200	7	60	25
BU406F	NPN	SOT-186		400	200	7	18	25
BU407	NPN	TO-220		330	150	7	60	25
BU407F	NPN	SOT-186		330	150	7	18	25
BU505	NPN	TO-220		1500	700	2.5	75	25
BU505D*	NPN	TO-220		1500	700	2.5	75	25
BU506	NPN	TO-220		1500	700	5	100	25
BU506D*	NPN	TO-220		1500	700	5	100	25
BU508	NPN	SOT-93		1500	700	8	125	
BU508A	NPN	SOT-93		1500	700	8	125	
BU508AF	NPN	SOT-199		1500	700	8	125	
BU508D*	NPN	SOT-93		1500	700	8	125	
BU508DF*	NPN	SOT-199		1500	700	8	125	

* incl. efficiency diode

For detailed information on these and other types see Data Handbooks S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
8	40	2	0.9		0.6	2	500	**BU304F**
8	40	2	0.9		0.6	2	500	**BU305F**
8	40	5	0.7		1.5	5	1000	**BU306F**
8	40	5	0.7		1.5	5	1000	**BU307F**
50			0.75		1	5	500	**BU406**
			0.75		1	5	500	**BU406F**
50			0.75		1	5	500	**BU407**
			0.75		1	5	500	**BU407F**
2.2		2			5	2	900	**BU505**
2.2		2			5	2	900	**BU505D**
					5	3	1330	**BU506**
					5	3	1330	**BU506D**
					5	4.5	2000	**BU508**
				7	1	4.5	2000	**BU508A**
				7	1	4.5	2000	**BU508AF**
				7	1	4.5	2000	**BU508D**
					1	4.5	2000	**BU508DF**

For detailed information on these and other types see Data Handbooks S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BU705	NPN	SOT-93		1500	700	2.5	75	25
BU705F	NPN	SOT-199		1500	700	2.5		
BU706	NPN	SOT-93		1500	700	5	100	25
BU706D*	NPN	SOT-93		1500	700	5	100	25
BU724	NPN	SOT-82		650	375	2	1.5	25
BU724A	NPN	SOT-82		850	400	2	1.5	25
BU806	NPN	TO-220AB	400		200	8	60	25
BU806A	NPN	TO-220AB	400		180	8	60	25
BU806AF	NPN	SOT-186	400		180	8	28	25
BU806F	NPN	SOT-186	400		200	8	28	25
BU807	NPN	TO-220AB	330		150	8	60	25
BU807F	NPN	SOT-186	330		150	8	28	25
BU826	NPN	SOT-93		800	375	6	125	25
BU826A		SOT-93		900	400	6	115	
BUS11	NPN	TO-3		850	400	5	100	25
BUS11A	NPN	TO-3		1000	450	5	100	25
BUS12	NPN	TO-3		850	400	8	125	25
BUS12A	NPN	TO-3		1000	450	8	125	25
BUS13	NPN	TO-3		850	400	15	175	25
BUS13A	NPN	TO-3		1000	450	15	175	25
BUS14	NPN	TO-3		850	400	30	250	25
BUS14A	NPN	TO-3		1000	450	30	250	25

* incl. efficiency diode

For detailed information on these and other types see Data Handbooks S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
2.2		2		7	5	2	900	**BU705**
2.2		2		7	5	2	900	**BU705F**
					5	3	1330	**BU706**
					5	3	1330	**BU706D**
			1.5		5	0.4	1	**BU724**
			1.5		3	0.3	1	**BU724A**
					1.5	5	50	**BU806**
					1.5	5	50	**BU806A**
					1.5	5	50	**BU806AF**
					1.5	5	50	**BU806F**
					1.5	5	50	**BU807**
				7	1.5	5	50	**BU807F**
			0.6		2	2.5	55	**BU826**
			0.6		2	2.5	55	**BU826A**
			0.8		1.5	3	600	**BUS11**
			0.8		1.5	2.5	500	**BUS11A**
			0.8		1.5	6	1200	**BUS12**
			0.8		1.5	5	1000	**BUS12A**
			0.8		1.5	10	2000	**BUS13**
			0.8		1.5	8	1600	**BUS13A**
			0.8		1.5	20	4000	**BUS14**
			0.8		1.5	16	3200	**BUS14A**

For detailed information on these and other types see Data Handbooks S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BUS22	NPN	TO-3		550	300	8	125	25
BUT11	NPN	TO-220AB		850	400	5	100	25
BUT11A	NPN	TO-220AB		1000	450	5	100	25
BUT11AF	NPN	SOT-186		1000	450	5	20	
BUT11F	NPN	SOT-186		850	400	5	20	
BUT12	NPN	TO-220		850	400	10	125	25
BUT12A	NPN	TO-220		1000	450	10	125	25
BUT18	NPN	TO-220		850	400	6	110	25
BUT18A	NPN	TO-220		1000	450	6	125	25
BUT18AF	NPN	SOT-186		850	400	6	110	25
BUT18F	NPN	SOT-186		850	400	6	125	25
BUV26	NPN	TO-220		180	90	14	65	25
BUV26A	NPN	TO-220		200	100	14	65	25
BUV26AF	NPN	SOT-186		200	100	14	65	25
BUV26F	NPN	SOT-186		180	90	14	65	25
BUV27	NPN	TO-220		240	120	12	65	25
BUV27A	NPN	TO-220		300	150	12	65	25
BUV27AF	NPN	SOT-186		300	150	12	65	25
BUV27F	NPN	SOT-186		240	120	12	65	25
BUV28	NPN	TO-220		400	200	10	65	25
BUV28A	NPN	TO-220		450	225	10	65	25
BUV28AF	NPN	SOT-186		450	225	10	65	25
BUV28F	NPN	SOT-186		400	200	10	65	25
BUV89	NPN	SOT-93		1200	800	8	125	25
BUV90	NPN	SOT-93		650	400	12	125	25
BUV98V		SOT-227B		850	450	30	150	25
BUV98AV		SOT-227B		1000	450	30	150	25
BUV298V		SOT-227B		850	450	60	250	25
BUV298AV		SOT-227B		1000	450	60	250	25
BUW11	NPN	SOT-93		850	400	5	100	25
BUW11A	NPN	SOT-93		1000	450	5	100	25
BUW11AF	NPN	SOT-199		1000	450	5	100	25
BUW11F	NPN	SOT-199		850	400	5	100	25
BUW12	NPN	SOT-93		850	400	8	125	25
BUW12A	NPN	SOT-93		1000	450	8	125	25
BUW12AF	NPN	SOT-199		1000	450	8	125	25
BUW12F	NPN	SOT-199		850	400	8	125	25

(1) the value of P_{tot} will differ for the F pack versions; refer to data handbook S4b

For detailed information on these and other types see Data Handbooks S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
10		6						**BUS22**
30		1	0.8		1.5	3	600	**BUT11**
30		1	0.8		1.5	2.5	500	**BUT11A**
			0.8		1.5	2.5	500	**BUT11AF**
			0.8		1.5	3	600	**BUT11F**
			0.8		1.5	6	1200	**BUT12**
			0.8		1.5	5	1000	**BUT12A**
10		10			1.5	4	0.08	**BUT18**
10		10			1.5	4	0.08	**BUT18A**
10		10			1.5	4	0.08	**BUT18AF**
10		10			1.5	4	0.08	**BUT18F**
					1.5	12	1200	**BUV26**
					1	10	1000	**BUV26A**
					1	10	1000	**BUV26AF**
					1.5	12	1200	**BUV26F**
					1.5	12	1200	**BUV27**
					1	10	1000	**BUV27A**
					1	10	1000	**BUV27AF**
					1.5	12	1200	**BUV27F**
					1.5	6	600	**BUV28**
					1.5	4	400	**BUV28A**
					1.5	4	400	**BUV28AF**
					1.5	6	600	**BUV28F**
				7	1	4.5	2000	**BUV89**
				7	2	10	300	**BUV90**
			0.08		1.5	20	4000	**BUV98V**
			0.08		1.5	16	3200	**BUV98AV**
			0.4		1.2	40	8000	**BUV298V**
			0.4		1.2	32	6400	**BUV298AV**
			0.8		1.5	3	600	**BUW11**
			0.8		1.5	2.5	500	**BUW11A**
			0.8		1.5	2.5	500	**BUW11AF**
			0.8		1.5	3	600	**BUW11F**
			0.8		1.5	6	1200	**BUW12**
			0.8		1.5	5	1000	**BUW12A**
			0.8		1.5	5	1000	**BUW12AF**
			0.8		1.5	6	1200	**BUW12F**

For detailed information on these and other types see Data Handbooks S4a and S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BUW13	NPN	SOT-93		850	400	15	175	25
BUW13A	NPN	SOT-93		1000	450	15	175	25
BUW13AF	NPN	SOT-199		1000	450	15	175	25
BUW13F	NPN	SOT-199		850	400	15	175	25
BUW84	NPN	SOT-82		800	400	2	50	45
BUW85	NPN	SOT-82		1000	450	2	50	45
BUX46	NPN	TO-3			400	3.5	85	25
BUX46A	NPN	TO-3			450	3.5	85	25
BUX47	NPN	TO-3			400	9	125	25
BUX47A	NPN	TO-3			450	9	125	25
BUX48	NPN	TO-3		850	400	15	175	25
BUX48A	NPN	TO-3		1000	450	15	175	25
BUX84	NPN	TO-220		800	400	2	40	50
BUX84F	NPN	SOT-186		800	400	2	18	
BUX85	NPN	TO-220		1000	450	2	40	50
BUX85F	NPN	SOT-186		1000	450	2	18	
BUX86	NPN	TO-126		800	400	0.5	20	60
BUX87	NPN	TO-126		1000	450	0.5	20	60
BUX88	NPN	TO-3		1200	800	12	160	25
BUX98	NPN	TO-3			400	30	250	25
BUX98A	NPN	TO-3			450	30	250	25
BUX99	NPN	TO-126		730	300	1.5	28	25
BUY89	NPN	TO-3		1500	800	6	80	60
ESM3045AV		SOT-227B		1000	450	24	125	25
ESM3045DV		SOT-227B		600	450	24	125	25
ESM4045AV		SOT-227B		1000	450	42	150	25
ESM4045DV		SOT-227B		600	450	42	150	25
ESM5045DV		SOT-227B		600	450	60	175	25
ESM6045AV		SOT-227B		1000	450	84	250	25
ESM6045DV		SOT-227B		600	450	84	250	25
MJE13004	NPN	TO-220		600	300	4	75	25
MJE13005	NPN	TO-220		700	400	4	75	25
MJE13006	NPN	TO-220		600	300	8	80	25
MJE13007	NPN	TO-220		700	400	8	80	25
MJE13008	NPN	TO-220		600	300	12	100	25
MJE13009	NPN	TO-220		700	400	12	100	25
PH13002	NPN	TO-126		600	300	1.5	28	25
PH13003	NPN	TO-126		700	400	1.5	28	25

(1) the value of P_{tot} will differ for the F-pack versions; refer to Handbook S4b

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
			0.8		1.5	10	2000	**BUW13**
			0.8		1.5	8	1600	**BUW13A**
			0.8		1.5	8	1800	**BUW13AF**
			0.8		1.5	10	2000	**BUW13F**
			1.4	20	0.8	0.3	30	**BUW84**
			1.4	20	0.8	0.3	30	**BUW85**
			0.8		1.5	3	600	**BUX46**
			0.8		1.5	2.5	500	**BUX46A**
			0.8		1.5	6	1200	**BUX47**
			0.8		1.5	5	1000	**BUX47A**
			0.8		1.5	10	2000	**BUX48**
			0.8		1.5	8	1600	**BUX48A**
			1.4	20	1	1	200	**BUX84**
			1.4	20	1	1	200	**BUX84F**
			1.4	20	1	1	200	**BUX85**
			1.4	20	1	1	200	**BUX85F**
			1.3	20	3	0.2	20	**BUX86**
			1.3	20	3	0.2	20	**BUX87**
				7	1	9	4000	**BUX88**
			0.8		1.5	20	4000	**BUX98**
			0.8		1.5	16	3200	**BUX98A**
16		0.05	0.8		2	0.2	20	**BUX99**
2.5		0.0045		7	1	4.5	2000	**BUY89**
			0.5		2	15	300	**ESM3045AV**
			0.5		2	15	300	**ESM3045DV**
			0.5		2	25	500	**ESM4045AV**
			0.5		2	25	500	**ESM4045DV**
			0.5		2	35	700	**ESM5045DV**
			0.5		2	50	1000	**ESM6045AV**
			0.5		2	50	1000	**ESM6045DV**
8	40	2	0.9		0.6	2	500	**MJE13004**
8	40	2	0.9		0.6	2	500	**MJE13005**
8	5		0.7		1.5	5	1000	**MJE13006**
8	40	5	0.7		1.5	5	1000	**MJE13007**
8	40	5	0.7		1.5	8	1600	**MJE13008**
8	40	5	0.7		1.5	8	1600	**MJE13009**
8	40	0.5		4	1	1	250	**PH13002**
8	40	0.5		4	1	1	250	**PH13003**

For detailed information on these and other types see Data Handbooks S4a and S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
TIP110	NPN	TO-220AB	60		60	4	50	25
TIP111	NPN	TO-220AB	80		80	4	50	25
TIP112	NPN	TO-220AB	100		100	4	50	25
TIP115	PNP	TO-220AB	60		60	4	50	25
TIP116	PNP	TO-220AB	80		80	4	50	25
TIP117	PNP	TO-220AB	100		100	4	50	25
TIP29	NPN	TO-220AB	80		40	1	30	25
TIP29A	NPN	TO-220AB	100		60	1	30	25
TIP29B	NPN	TO-220AB	120		80	1	30	25
TIP29C	NPN	TO-220AB	140		100	1	30	25
TIP29D	NPN	TO-220AB	160		120	1	30	25
TIP30	PNP	TO-220AB	80		40	1	30	25
TIP30A	PNP	TO-220AB	100		60	1	30	25
TIP30B	PNP	TO-220AB	120		80	1	30	25
TIP30C	PNP	TO-220AB	140		100	1	30	25
TIP30D	PNP	TO-220AB	160		120	1	30	25
TIP31	NPN	TO-220AB	80		40	3	40	25
TIP31A	NPN	TO-220AB	100		60	3	40	25
TIP31B	NPN	TO-220AB	120		80	3	40	25
TIP31C	NPN	TO-220AB	140		100	3	40	25
TIP31D	NPN	TO-220AB	160		120	3	40	25
TIP32	PNP	TO-220AB	80		40	3	40	25
TIP32A	PNP	TO-220AB	100		60	3	40	25
TIP32B	PNP	TO-220AB	120		80	3	40	25
TIP32C	PNP	TO-220AB	140		100	3	40	25
TIP32D	PNP	TO-220AB	160		120	3	40	25
TIP33	NPN	SOT-93	80		40	10	80	25
TIP33A	NPN	SOT-93	100		60	10	80	25
TIP33B	NPN	SOT-93	120		80	10	80	25
TIP33C	NPN	SOT-93	140		100	10	80	25
TIP34	PNP	SOT-93	80		40	10	80	25
TIP34A	PNP	SOT-93	100		60	10	80	25
TIP34B	PNP	SOT-93	120		80	10	80	25
TIP34C	PNP	SOT-93	140		100	10	80	25
TIP47	NPN	TO-220AB	350		250	1	40	25
TIP48	NPN	TO-220AB	400		300	1	40	25
TIP49	NPN	TO-220AB	450		350	1	40	25
TIP50	NPN	TO-220AB	500		400	1	40	25

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
500		2			2.5	2	8	**TIP110**
500		2			2.5	2	8	**TIP111**
500		2			2.5	2	8	**TIP112**
500		2			2.5	2	8	**TIP115**
500		2			2.5	2	8	**TIP116**
500		2			2.5	2	8	**TIP117**
15	75	1			0.7	1	125	**TIP29**
15	75	1			0.7	1	125	**TIP29A**
15	75	1			0.7	1	125	**TIP29B**
15	75	1			0.7	1	125	**TIP29C**
15	75	1			0.7	1	125	**TIP29D**
15	75	1			0.7	1	125	**TIP30**
15	75	1			0.7	1	125	**TIP30A**
15	75	1			0.7	1	125	**TIP30B**
15	75	1			0.7	1	125	**TIP30C**
15	75	1			0.7	1	125	**TIP30D**
10	50	3			1.2	3	375	**TIP31**
10	50	3			1.2	3	375	**TIP31A**
10	50	3			1.2	3	375	**TIP31B**
10	50	3			1.2	3	375	**TIP31C**
10	50	3			1.2	3	375	**TIP31D**
10	50	3			1.2	3	375	**TIP32**
10	50	3			1.2	3	375	**TIP32A**
10	50	3			1.2	3	375	**TIP32B**
10	50	3			1.2	3	375	**TIP32C**
10	50	3			1.2	3	375	**TIP32D**
20	100	3			1	3	300	**TIP33**
20	100	3			1	3	300	**TIP33A**
20	100	3			1	3	300	**TIP33B**
20	100	3			1	3	300	**TIP33C**
20	100	3			1	3	300	**TIP34**
20	100	3			1	3	300	**TIP34A**
20	100	3			1	3	300	**TIP34B**
20	100	3			1	3	300	**TIP34C**
30	150	0.3			1	1	200	**TIP47**
30	150	0.3			1	1	200	**TIP48**
30	150	0.3			1	1	200	**TIP49**
30	150	0.3			1	1	0.2	**TIP50**

For detailed information on these and other types see Data Handbooks S4a and S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
TIP120	NPN	TO-220AB	60		60	5	65	25
TIP121	NPN	TO-220AB	80		80	5	65	25
TIP122	NPN	TO-220AB	100		100	5	65	25
TIP125	PNP	TO-220AB	60		60	5	65	25
TIP126	PNP	TO-220AB	80		80	5	65	25
TIP127	PNP	TO-220AB	100		100	5	65	25
TIP130	NPN	TO-220AB	60		60	8	70	25
TIP131	NPN	TO-220AB	80		80	8	70	25
TIP132	NPN	TO-220AB	100		100	8	70	25
TIP135	PNP	TO-220AB	60		60	8	70	25
TIP136	PNP	TO-220AB	80		80	8	70	25
TIP137	PNP	TO-220AB	100		100	8	70	25
TIP140	NPN	SOT-93	60		60	10	125	25
TIP141	NPN	SOT-93	80		80	10	125	25
TIP142	NPN	SOT-93	100		100	10	125	25
TIP145	PNP	SOT-93	60		60	10	125	25
TIP146	PNP	SOT-93	80		80	10	125	25
TIP147	PNP	SOT-93	100		100	10	125	25
TIP2955	PNP	SOT-93	100		60	15	100	25
TIP2955T	PNP	TO-220AB	70		60	8	75	25
TIP3055	NPN	SOT-93	100		60	15	100	25
TIP3055T	NPN	TO-220AB	70		60	8	75	25

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000		3			2	3	12	**TIP120**
1000		3			2	3	12	**TIP121**
1000		3			2	3	12	**TIP122**
1000		3			2	3	12	**TIP125**
1000		3			2	3	12	**TIP126**
1000		3			2	3	12	**TIP127**
1000		4			2	4	16	**TIP130**
1000		4			2	4	16	**TIP131**
1000		4			2	4	16	**TIP132**
1000		4			2	4	16	**TIP135**
1000		4			2	4	16	**TIP136**
1000		4			2	4	16	**TIP137**
1000		5			2	5	10	**TIP140**
1000		5			2	5	10	**TIP141**
1000		5			2	5	10	**TIP142**
1000		5			2	5	10	**TIP145**
1000		5			2	5	10	**TIP146**
1000		5			2	5	10	**TIP147**
5		10			1.1	4	400	**TIP2955**
5		10			0.8	4	400	**TIP2955T**
5		10			1.1	4	400	**TIP3055**
5		10			0.8	4	400	**TIP3055T**

N–channel junction FETs for amplifiers

For detailed information on these and other types see Data Handbook S5

Voltage range 20 to 50 V

	ratings			characteristics							
type	$\pm V_{DS}$ V	P_{tot} mW	at T_{amb} °C	$-I_{GSS}$ max nA	I_{DSS} min mA	I_{DSS} max mA	$-V_{(P)GS}$ max V	$\lvert Y_{fs}\rvert$ min f = 1 kHz mA V	C_{rs} typ pF	F typ dB	case
BC264A	30	300	25	10	2	4.5		2.5	1.2	0.5	TO–92VAR
BC264B	30	300	25	10	3.5	6.5		3	1.2	0.5	TO–92VAR
BC264C	30	300	25	10	5	8		3.5	1.2	0.5	TO–92VAR
BC264D	30	300	25	10	7	12		4	1.2	0.5	TO–92VAR
BFR101A**	30	200	60	5	0.2	1.5	1	1.2			SOT–143
BFR101B**	30	200	60	5	1	5	2.5	2.5			SOT–143
BFR30**	25	250	65	0.2	4	10	5	1			SOT–23
BFR31**	25	250	65	0.2	1	5	2.5	1.5			SOT–23
BFT46**	25	250	65	0.2	0.2	1.5	1.2	1			SOT–23
BFW10	30	300	25	0.1	8	20	8	3.5	0.6	2.5*	TO–72(1)
BFW11	30	300	25	0.1	4	10	6	3	0.6	2.5*	TO–72(1)
BFW12	30	150	110	0.1	1	5	2.5	2			TO–72(1)
BFW13	30	150	110	0.1	0.2	1.5	1.2	1			TO–72(1)
BFW61	25	300	25	1	2	20	8	2			TO–72(1)
BF245A	30	300	75	5	2	6.5	8	3	1.1	1.5	TO–92VAR
BF245B	30	300	75	5	6	15	8	3	1.1	1.5	TO–92VAR
BF245C	30	300	75	5	12	25	8	3	1.1	1.5	TO–92VAR
BF247A	25	250	75	5	30	80	14.5	8	3.5		TO–92VAR
BF247B	25	250	75	5	60	140	14.5	8	3.5		TO–92VAR
BF247C	25	250	75	5	110	250	14.5	8	3.5		TO–92VAR
BF256A	30	300	75	5	3	7		4.5	0.7	7.5	TO–92VAR
BF256B	30	300	75	5	6	13		4.5	0.7	7.5	TO–92VAR
BF256C	30	300	75	5	11	18		4.5	0.7	7.5	TO–92VAR
BF410A	20***	300	75	10	0.7	3		2.5	0.3	1.5	TO–92VAR
BF410B	20***	300	75	10	2.5	7		4	0.3	1.5	TO–92VAR
BF410C	20***	300	75	10	6	12		6	0.3	1.5	TO–92VAR
BF410D	20***	300	75	10	10	18		7	0.3	1.5	TO–92VAR
BF510**	20	250	65	10	0.7	3		2.5	0.3	1.5	SOT–23
BF511**	20	250	65	10	2.5	7		4	0.3	1.5	SOT–23
BF512**	20	250	65	10	6	12		6	0.3	1.5	SOT–23
BF513**	20	250	65	10	10	18		7	0.3	1.5	SOT–23
2N3822	50	300	25	0.1	2	10	6	3		5*	TO–72(1)
2N3823	30	300	25	0.5	4	20	8	3.5		2.5*	TO–72(1)

* maximum value
** surface mounting devices; see page S146
*** asymmetrical

P–channel junction FETs for switching

For detailed information on these and other types see Data Handbook S5

Voltage range 30 V

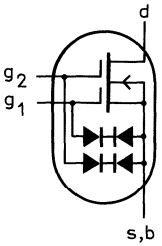
S

type	ratings			characteristics								case
	$\pm V_{DS}$	P_{tot} at	T_{amb}	I_{GSS} max	$-I_{DSS}$ min	$-I_{DSS}$ max	$V_{GS(off)}$ max	R_{DSon} max	C_{rs} typ	t_{on}	t_{off}	
	V	mW	°C	nA	mA	mA	V	Ω	pF	ns	ns	
BSJ174	30	400	25	1	20	135	10	85	4	7	15	TO–92
BSJ175	30	400	25	1	7	70	6	125	4	15	30	TO–92
BSJ176	30	400	25	1	2	35	4	250	4	35	35	TO–92
BSJ177	30	400	25	1	1.5	20	2.25	300	4	45	45	TO–92
BSR174*	30	300	50	1	20	135	10	85	4	7	15	SOT–23
BSR175*	30	300	50	1	7	70	6	125	4	15	30	SOT–23
BSR176*	30	300	50	1	2	35	4	250	4	35	35	SOT–23
BSR177*	30	300	50	1	1.5	20	2.25	300	4	45	45	SOT–23

* surface mounting devices; see page S146

Dual–gate n–channel MOS FETs

For detailed information on these and other types see Data Handbook S5

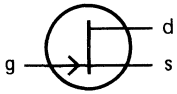


type*	ratings			characteristics						case
	V_{DS} V	P_{tot} at mW	T_{amb} °C	I_{DSS} mA	$-V_{(P)GS}$ $-V_{(P)G1-S}$ V	C_{ig1-s} f = 1 MHz pF (typ)	$\|y_{fs}\|$ f = 1 kHz min mS	F max dB	at freq. MHz	
BF960	20	225	75	2–20	<3.5	1.8	9.5	2.8***	800	SOT–103
BF964	20	225	75	2–20	<2.5	2.5	15	2.8	200	SOT–103
BF964S	20	225	75	4–20	<2.5	2.5	15	1.0***	200	SOT–103
BF966	20	225	75	2–20	<2.5	2.2	15	3.9	800	SOT–103
BF966S	20	225	75	4–20	<2.5	2.3	15	1.8***	800	SOT–103
BF980	18	225	75	–	<1.3	2.6	17	2.8***	800	SOT–103
BF981	20	225	75	4–25	<2.5	2.1	10	2.0	200	SOT–103
BF982	20	225	75	–	<1.3	4.0	20	1.2***	200	SOT–103
BF989**	20	200	60	2–20	<2.7	1.8	9.5	2.8***	800	SOT–143
BF990**	18	200	60	–	<1.3	3.0	17	2.8***	800	SOT–143
BF991**	20	200	60	4–25	<2.5	2.1	10	2.0	200	SOT–143
BF992**	20	200	60	–	<1.3	4.0	20	1.2***	200	SOT–143
BF994**	20	200	60	2–20	<2.5	2.5	15	2.8	200	SOT–143
BF994S**	20	300	25	4–20	<2.5	–	15	1.0***	200	SOT–143
BF996**	20	200	60	2–20	<2.5	2.2	15	3.9	800	SOT–143
BF996S**	20	300	25	4–20	<2.5	–	15	1.8***	800	SOT–143
BFR84	20	300	25	20–55	1.5–3.8	5.5	12	3.0	200	TO–72

* all types protected against excessive input voltage surges
** surface mounting devices; see page S146
*** typical

N–channel junction FETs for switching

For detailed information on these and other types see Data Handbook S5



Status = P

type	ratings			characteristics							case
	$\pm V_{DS}$ V	P_{tot} mW	at T_{amb} °C	$-I_{GSS}$ (I_{SGO}) max pA	I_{DSS} min mA	$-V_{(P)GS}$ max V	R_{DSon} max Ω	C_{rs} max pF	t_{on} max ns	t_{off} max ns	
BSR56*	40	250	65	1000	50	10	25	5	9	25	SOT–23
BSR57*	40	250	65	1000	20	6	40	5	10	50	SOT–23
BSR58*	40	250	65	1000	8	4	60	5	20	100	SOT–23
BSV78	40	350	25	250	50	11	25	5	10	10	TO–18
BSV79	40	350	25	250	20	7	40	5	18	16	TO–18
BSV80	40	350	25	250	10	5	60	5	30	32	TO–18
PMBF4391*	40	250	65	1000	50	10	30	3.5	15	20	SOT–23
PMBF4392*	40	250	65	1000	25	5	60	3.5	15	35	SOT–23
PMBF4393*	40	250	65	1000	5	3	100	3.5	15	50	SOT–23
2N3966	30	300	25	100	2	6	220	1.5	120	100	TO–72(1)
2N4091	40	1800	25		30	10	30	5	25	40	TO–18
2N4092	40	1800	25		15	7	50	5	35	60	TO–18
2N4093	40	1800	25		8	5	80	5	60	80	TO–18
2N4391	40	1800	25	100	50	10	30	3.5	15	20	TO–18
2N4392	40	1800	25	100	25	5	60	3.5	15	35	TO–18
2N4393	40	1800	25	100	5	3	100	3.5	15	50	TO–18
2N4856	40	360	25	250	50	10	25	8	9	25	TO–18
2N4857	40	360	25	250	20	6	40	8	10	50	TO–18
2N4858	40	360	25	250	8	4	60	8	20	100	TO–18
2N4859	30	360	25	250	50	10	25	8	9	25	TO–18
2N4860	30	360	25	250	20	6	40	8	10	50	TO–18
2N4861	30	360	25	250	8	4	60	8	20	100	TO–18

* surface mounting devices; see page S146

N–channel MOS FETs for switching

For detailed information on these and other types see Data Handbook S5

Voltage range 10 to 20 V

N–channel MOS FETs for switching
Status = P

type	ratings			characteristics							mode	case
	V_{DS} V	P_{tot} mW	at T_{amb} °C	$\pm I_{GSS}$ max nA	I_{DSX} I_{SDX} max nA	$r_{ds\ on}$ I_D = 1 mA max Ω	$-V_{(P)GS}$ max V	t_{on} typ ns	t_{off} typ ns	C_{rss} typ pF		
BFR29	15	200	25	0.01			4			<0.7	DEPL	TO–72
BSD10(2)	10	275	25		1	30	2	1	5	0.6	DEPL	TO–72(1)
BSD12(2)	20	275	25		1	30	2	1	5	0.6	DEPL	TO–72(1)
BSD20(2)**	10	230	25		1	30	2	1	5	0.6	DEPL	SOT–143
BSD212	10	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD213(2)	10	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD214	20	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD215(2)	20	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD22(2)**	20	230	25		1	30	2	1	5	0.6	DEPL	SOT–143
BSS83(2)	10	230	25		1	45*		1	5	0.6	ENH	SOT–143
BSV81	30	200	25	0.01	1	100				0.5	DEPL	TO–72

* I_D = 0.1 mA
** surface mounting devices; see page S146
(2) protection

P– and N–channel D–MOS FETs for switching

For detailed information on these and other types see Data Handbook S5

Voltage range 50 to 450 V

N–channel vertical D–MOS FETs for switching
Status = P

type	ratings				characteristics						case
	V_{DS} V	I_D mA	P_{tot} mW	at T_{amb} °C	$V_{GS(th)}$ min V	$V_{GS(th)}$ max V	C_{is} typ pF	R_{DSon} max Ω	t_{on} max ns	t_{off} max ns	
BST70A	80	500	1000	25	1.5	3.5	60	4	10	15	TO–92VAR
BST72A	80	300	850	25	1.5	3.5	15	10	10	10	TO–92VAR
BST74A	200	250	1000	25	0.8	2.8	70	12	10	25	TO–92VAR
BST76A	180	300	1000	25	0.7	2.4	65	10	10	15	TO–92VAR
BST80**	80	500	1000	25	1.5	3.5	60	4	10	15	SOT–89
BST82**	80	175	300	25	1.5	3.5	15	10	10	10	SOT–23
BST84**	200	250	1000	25	0.8	2.8	70	12	10	25	SOT–89
BST86**	180	300	1000	25	0.7	2.4	65	10	10	15	SOT–89
BS107	200	120	250	75	0.8	2.8	70	28	10	25	TO–92VAR
BS107A	200	120			0.8	2.8		28	10	15	TO–92VAR
BS170	60	500	830	25	0.8	3.0	25	5	10	10	TO–92VAR
PH6659	35	750	1000	25	0.8	2.0	50	5	10	10	TO–92VAR
PH6660	60	500	1000	25	0.8	2.0	50	5	10	10	TO–92VAR
PH6661	90	500	1000	25	0.8	2.0	50	5.3	10	10	TO–92VAR
2N6659	35	1400	6250	25*	0.8	2.0	50	5	10	10	TO–39(3)
2N6660	60	1100	6250	25*	0.8	2.0	50	5	10	10	TO–39(3)
2N6661	90	900	6250	25*	0.8	2.0	50	5.3	10	10	TO–39(3)
BSS89	200	300	1000	25	0.8	2.8	110	6	80	145	TO–92VAR
BSN254A	240	300	1000	25	0.8	2.0	65	6	5	10	TO–92
BSS87	200	300	1000	25	0.8	2.8	110	6	80	145	SOT–89
PMBF170	60	500	300	25	0.8	3.0	25	5	4	4	SOT–23
BSS91	200	300	1000	25	0.8	2.8	110	6	80	145	TO–18

P–channel vertical D–MOS FETs for switching
Status = P

type	ratings				characteristics					case
	$-V_{DS}$ V	$-I_D$ mA	P_{tot} mW	at T_{amb} °C	$V_{GS(th)}$ min V	$V_{GS(th)}$ max V	R_{DSon} max Ω	t_{on} max ns	t_{off} max ns	
BST100	60	300	1000	25	1.5	3.5	6	4	20	TO–92VAR
BST110	50	250	830	25	1.5	3.5	10	4	10	TO–92VAR
BST120**	60	300	1000	25	1.5	3.5	6	4	20	SOT–89
BST122**	50	250	1000	25	1.5	3.5	10	4	10	SOT–89
BS250	45	250	830	25	1	3.5	14	4	10	TO–92VAR
BSS92	200	150	1000	25	0.8	2.8	20	20	50	TO–92VAR
BSS192	200	150	1000	25	0.8	2.8	20	20	50	SOT–89
BSP254A	250	150	1000	25	0.8	2.8	15	20	50	TO–92VAR
BSP304A	300	150	1000	25	0.8	2.8	20	20	50	TO–92VAR
BSP204A	200	150	1000	25	0.8	2.8	10	20	50	TO–92VAR

* at T_{case}
** surface mounting devices; see page S146

Dual N–channel junction FETs for differential amplifiers

For detailed information on these and other types see Data Handbook S5

Note: BFQ..types: dual transistors in TO–71(1)
BFS..types: matched pairs in SOT–52

Status = P

	ratings			characteristics							
	individual transistor		total device	individual transistor			total device				
type	$\pm V_{DS}$ V	P_{tot} (T_{amb}) mW (°C)	P_{tot} (T_{amb}) mW (°C)	$-I_{GSS}$ max nA	I_{DSS} mA	$-V_{(P)GS}$ max V	$\lvert\Delta V_{GS}\rvert$ max mV	$\lvert\frac{d\Delta V_{GS}}{dT}\rvert$ max µV/K	$\lvert\Delta\frac{1}{gfs}\rvert$ max Ω	$\lvert\Delta\frac{gos}{gfs}\rvert$ max µV/V	CMRR min dB
BFQ12							10	10	12	30	90
BFQ13							10	20	12	30	90
BFQ14							15	20	12	30	90
BFQ15							20	40	20	30	90
BFQ16							50	50	30	100	80
BFS21	30	300 (25)	30 (100)	0.5	> 1	6	20	75	15	1000	60
BFS21A							10	40	7.5	500	66

For detailed information on these and other types see Data Handbook S6

Main r.f. power application areas with applicable transistors and modules, grouped according to voltage and (within each voltage group) arranged in order of increasing power.

Status = C

application	P_L (P.E.P) W	V_{CE} V	Gp dB	type	case
s.s.b. class-AB; f = 28 MHz d_3; d_5 < −30 dB	10	13.5	18	**BLY88A**	SOT-48/2
	10	13.5	18	**BLY88C**	SOT-120
	10	13.5	18	**BLV11**	SOT-123
	15	13.5	18	**BLY89A**	SOT-56
	15	13.5	18	**BLY89C**	SOT-120
	15	13.5	18	**BLW87**	SOT-123
	30	12.5	18	**BLW60**	SOT-56
	30	12.5	18	**BLW60C**	SOT-120
	30	12.5	18	**BLW85**	SOT-123
	80	12.5	12.5	**BLW99**	SOT-121
	10	28	20	**BLY92A**	SOT-48/2
	10	28	20	**BLY92C**	SOT-120
	10	28	20	**BLV21**	SOT-123
	25	28	18	**BLX13**	SOT-56
	25	28	18	**BLX13C**	SOT-120
	25	28	18	**BLW83**	SOT-123
	40	28	17	**BLX39**	SOT-120
	45	28	17	**BLW86**	SOT-123
	50	28	13	**BLX14**	SOT-55
	80			**BLF146**	SOT-121
	80	28	13	**BLW76**	SOT-121
	100	28	19	**BLW78**	SOT-121
	130	28	12	**BLW77**	SOT-121
	175	28	11.5	**BLW97**	SOT-121
	50	50	18	**BLW50F**	SOT-123
	150	50	14	**BLX15**	SOT-55
	160	50	14	**BLW95**	SOT-121
	200	50	13.5	**BLW96**	SOT-121

R.F. power transistors (cont.)

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L (P.E.P) W	V_{CE} V	Gp dB	type	case
s.s.b. class-A;	1	12	18	**BLY87A**	SOT-48/2
f = 28 MHz;	1	12	18	**BLY87C**	SOT-120
d_3; d_5 < −40 dB	1	12	10.5	**BLV10**	SOT-123
	2	12	18	**BLY88A**	SOT-48/2
	2	12	18	**BLY88C**	SOT-120
	2	12	7.5	**BLV11**	SOT-123
	6	12	18	**BLY89A**	SOT-56
	6	12	18	**BLY89C**	SOT-120
	6	12	18	**BLW87**	SOT-123
	1.3	26	20	**BLY91A**	SOT-48/2
	1.3	26	20	**BLY91C**	SOT-120
	1.3	26		**BLV20**	SOT-123
	2.5	26	20	**BLY92A**	SOT-48/2
	2.5	26	20	**BLY92C**	SOT-120
	2.5	26		**BLV21**	SOT-123
	8	26	18	**BLX13**	SOT-56
	8	26	20	**BLX13C**	SOT-120
	10	26	20	**BLW83**	SOT-123
	15	26	18	**BLX39**	SOT-120
	17	26	20	**BLW86**	SOT-123
	30	26	18	**BLW78**	SOT-121
	16	45	19.5	**BLW50F**	SOT-123
	50	40	19	**BLW96**	SOT-121

R.F. power transistors (cont.)

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_{CE} V	f MHz	Gp dB	type	case
v.h.f. 28 V–stations; class–B operation	1	28	175	15	**2N3866**	TO–39/1
	4	28	175		**BFS23A**	TO–39/1
	5		175	16	**BLF242**	SOT–123
	8	28	175	12	**BLY91A**	SOT–48/2
	8	28	175	12	**BLY91C**	SOT–120
	8	28	175	12	**BLV20**	SOT–123
	15	28	175	13	**BLF244**	SOT–123
	15	28	175	10	**BLY92A**	SOT–48/2
	15	28	175	10	**BLY92C**	SOT–120
	15	28	175	10	**BLV21**	SOT–123
	25	28	175	9	**BLY93A**	SOT–56
	25	28	175	9	**BLY93C**	SOT–120
	25	28	175	9	**BLW84**	SOT–123
	30		175	16	**BLF245**	SOT–123
	45	28	175	7.5	**BLX39**	SOT–120
	45	28	175	7.5	**BLW86**	SOT–123
	50	28	175	7	**BLY94**	SOT–55
	80	28	175	6.5	**BLV80/28**	SOT–121
	80	28	108	8	**BLW76**	SOT–121
	100	28	150	6	**BLW78**	SOT–121
	130	28	87.5	7.5	**BLW77**	SOT–121
	150	50	108	7.5	**BLX15**	SOT–55
	160	50	108	7	**BLW95**	SOT–121
	200	50	108	6.5	**BLW96**	SOT–121
v.h.f. mobile transmitters; class–B operation	1	12	175	10	**2N4427**	TO–39/1
	2	12.5	175	11	**BFQ42**	TO–39/1
	4	13.5	175	8	**BFS22A**	TO–39/1
	4	12.5	175	12	**BFQ43**	TO–39/3
	8	13.5	175	9	**BLY87A**	SOT–48/2
	8	13.5	175	12	**BLY87C**	SOT–120
	8	13.5	175	9	**BLV10**	SOT–123
	15	13.5	175	10	**BLW29**	SOT–120
	15	13.5	175	7.5	**BLY88A**	SOT–48/2
	15	13.5	175	7.5	**BLY88C**	SOT–120
	15	13.5	175	7.5	**BLV11**	SOT–123
	25	13.5	175	6	**BLY89A**	SOT–56
	25	13.5	175	6	**BLY89C**	SOT–120
	25	13.5	175	6	**BLW87**	SOT–123
	28	13.5	175	9	**BLW31**	SOT–120
	45	12.5	175	6.5	**BLV45/12**	SOT–119
	45	12.5	175	5	**BLW60**	SOT–56
	45	12.5	175	5	**BLW60C**	SOT–120
	45	12.5	175	4.5	**BLW85**	SOT–123
	50	12.5	175	5	**BLY90**	SOT–55
	75	12.5	175	6.5	**BLV75/12**	SOT–119

R.F. power modules

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_B V	f MHz	Gp dB	type	case
v.h.f. modules for mobile transmitters	2	9.6	68–88	17.5	**BGY93A**	SOT–182
	2	9.6	136–156	17.5	**BGY93B**	SOT–182
	2	9.6	148–174	17.5	**BGY93C**	SOT–182
	5	9.6	68–88	21.5	**BGY94A**	SOT–182
	5	9.6	132–156	21.5	**BGY94B**	SOT–182
	5	9.6	148–174	21.5	**BGY94C**	SOT–182
	13	12.5	148–174	19.4	**BGY43**	SOT–132B
	18	12.5	68–88	22.6	**BGY32**	SOT–132B
	18	12.5	80–108	22.6	**BGY33**	SOT–132B
	18	12.5	132–156	20.8	**BGY35**	SOT–132B
	18	12.5	148–174	20.8	**BGY36**	SOT–132B
	18	12.5	175–210	20.8	**BGY45C**	SOT–183
	29	12.5	68–88	23.0	**BGY45A**	SOT–183
	28	12.5	148–174	20.0	**BGY45B**	SOT–183
u.h.f. modules for mobile transmitters	1.4	9.6	400–440	15.0	**BGY46A**	SOT–181
	1.4	9.6	430–470	15.5	**BGY46B**	
	1.4	9.6	370–400	15.5	**BGY46D**	
	2	7.5	400–470	16.0	**BGY47A**	SOT–181
	3.2	9.6	400–470	18.0	**BGY47A**	SOT–181
	2	7.5	460–512	16.0	**BGY47F**	SOT–181
	3.2	9.6	460–512	18.0	**BGY47F**	SOT–181
	5	9.6	400–470	21.5	**BGY48A**	SOT–182
	5	9.6	430–470	21.5	**BGY48B**	SOT–182
	5	9.6	460–512	21.5	**BGY48C**	SOT–182
	2.5	13.5	380–512	17	**BGY22**	SOT–75A
	7	13.5	380–480	4.5	**BGY23**	SOT–75A
	7.5	12.5	400–440	18.8	**BGY40A**	SOT–132C
	7.5	12.5	400–470	18.8	**BGY40B**	SOT–132C
	13	12.5	400–440	19.4	**BGY41A**	SOT–132C
	13	12.5	440–470	19.4	**BGY41B**	SOT–132C
s.h.f modules for portable and mobile transmitters	2.5	7.5	824–849	21	**BGY95A**	SOT–200
	2.5	7.5	890–915	21	**BGY95B**	SOT–200
	2.5	9.6	824–849	21	**BGY96A**	SOT–200
	2.5	9.6	890–915	21	**BGY96B**	SOT–200
	6.0	12.5	806–890	15.7	**BGY90A**	SOT–179
	6.0	12.5	870–950	15.7	**BGY90B**	SOT–179
	1.2	6.0	824–849	30.8	**BGY110A**	SOT–246
	1.2	6.0	872–905	30.8	**BGY110B**	SOT–246
	6.0	12.5	806–890	23.0	**BGY91A**	SOT–233
	6.0	12.5	870–950	23.0	**BGY91B**	SOT–233
	20.0	12.5	400–440	21.2	**BGY49A**	SOT–132
	20.0	12.5	440–470	21.2	**BGY49B**	SOT–132

R.F. power transistors (cont.)

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_{CE} V	V_B V	f MHz	Gp dB	type	case
air communication class–B transmitters (225–400 MHz)	30	28	–	400	10	**BLU50**	SOT–161
	45	28	–	400	9	**BLU51**	SOT–161
	60	28	–	400	8	**BLU52**	SOT–161
	100	28	–	400	6	**BLU53**	SOT–161
u.h.f. base stations class–B operation	1	28	–	470	7	**2N3866**	TO–39/1
	1	28	–	470	11	**BLX91A**	SOT–48/1
	2	28	–	470	12	**BLW89**	SOT–122
	2.5	28	–	470	11	**BLX92A**	SOT–48/1
	4	28	–	470	11	**BLW90**	SOT–122
	7	28	–	470	8.5	**BLX93A**	SOT–48/1
	10	28	–	470	9	**BLW91**	SOT–122
	25	28	–	470	6	**BLX94A**	SOT–48
	25	28	–	470	6.5	**BLX94C**	SOT–122
	40	28	–	470	4.5	**BLX95**	SOT–56
u.h.f. mobile transmitters class–B operation	2	–	12.5	470	6	**BLX65**	TO–39/1
	2	–	12.5	470	9	**BLX65E**	TO–39/3
	2	–	12.5	470	9	**BLW79**	SOT–122
	2.5	–	12.5	470	8.5	**BLX67**	SOT–48/1
	4	–	12.5	470	8	**BLW80**	SOT–122
	5	–	12.5	470	10.5	**BLU99**	SOT–122
	7	–	12.5	470	11	**BLU97**	SOT–122
	7	–	12.5	470	5	**BLX68**	SOT–48/1
	10	–	12.5	470	6	**BLW81**	SOT–122
	20	12.5	12.5	470	7.8	**BLU20/12**	SOT–119
	20	–	13.5	470	4	**BLX69A**	SOT–48/2
	30	–	12.5	470	7.4	**BLU30/12**	SOT–119
	45	–	12.5	470	5.8	**BLU45/12**	SOT–119
	60	–	12.5	470	5.5	**BLU60/12**	SOT–119

R.F. power transistors (cont.)

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_{CE} V	f MHz	Gp dB	type	case
900 MHz base stations class-B operation	2	24	900	8	**BLV99**	SOT-172
	14	24	900	8.5	**BLV98**	SOT-171
	30	24	900	7	**BLV97**	SOT-171
900 MHz mobile transmitters class-B operation	0.5	12.5	900	9.5	**BLU98**	SOT-103
	0.75	7.5	900	8.5	**BLT90/SL**	SOT-172D
	1	12.5	900	7.5	**BLV90;SL**	SOT-172;D
	1.5	7.5	900	6	**BLT91/SL**	SOT-172D
	2	12.5	900	6.5	**BLV91;SL**	SOT-172;D
	3	7.5	900		**BLT92/SL**	SOT-122D
	4	12.5	900	5.5	**BLU99**	SOT-122
	4	12.5	900	7.5	**BLV92**	SOT-171
	8	12.5	900	6.5	**BLV93**	SOT-171
	12.5	12.5	900	6	**BLV94**	SOT-171
	25	12.5	900	5.5	**BLV95**	SOT-171
f.m. broadcast transmitters class-B operation	1	28	87.5–108	18	**2N3866**	TO-39/3
	4	28	87.5–108	20	**BLW90**	SOT-122
	15	28	87.5–108	15	**BLV21**	SOT-123
	45	28	87.5–108	11	**BLX39**	SOT-120
	45	28	87.5–108	11	**BLW86**	SOT-123
	100	28	87.5–108	8	**BLW78**	SOT-121
	175	28	87.5–108	10.5	**BLV25**	SOT-119

For detailed information on these and other types see Data Handbook S6

TV transposer types for application in band III, IV and V.
Status = C

application	$P_o$sync W	V_{CE} V	f MHz	Gp dB	d_{im} dB	type	case
TV transposer circuits; band III; class-A operation	1.5	25	225	20	−60	**BLV30**	SOT-122
	5	25	225	16.5	−58	**BLV31**	SOT-122
	10	25	225	16	−55	**BLV32F**	SOT-160
	16	25	225	13.5	−55	**BLV33F**	SOT-119
	19	25	225	9	−55	**BLV33**	SOT-147
TV transmitter circuits; band III; class-AB operation	85*	28	225	10.5	–	**BLV33F**	SOT-119
	90*	28	225	6.5	–	**BLV33**	SOT-147
	120*	28	225	10	–	**BLV36**	SOT-161
	225	35	225		−8.5	**BLV38**	SOT-179
TV transposer circuits; band IV-V; class-A operation			860			**BFR96S****	SOT-37
						BFQ34**	SOT-122
	0.5	25	860	11	−60	**BLW32**	SOT-122
	0.7		860		−60	**BFQ68****	SOT-122
	1.0	25	860	10	−60	**BLW33**	SOT-122
	1.8	25	860	9	−60	**BLW34**	SOT-122
	3.5	25	860	6.5	−60	**BLW98**	SOT-122
	6	25	860	8	−60	**BLV57**	SOT-161
TV transmitter circuits; band IV-V; class-AB operation	30*	25	860	7.0	–	**BLV59**	SOT-171
F.M. transmitter B.C. class B	250	28	108		−11	**BLV37**	SOT-179

* at 1 dB power gain compression.
** see also pages S124, S125 and Data Handbook 'Wideband transistors and hybrids (S10)'

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BFQ34	SOT-122					
BFQ42	TO-39/1	c.w.; class-B	13.5	175	2	> 11
			12.5	175	2	typ 10.5
BFQ43;S	TO-39/3	c.w.; class-B	13.5	175	4	> 12
			12.5	175	4	typ 12
BFQ68	SOT-122					
BFR96S	SOT-37					
BFS22A	TO-39/1	c.w.; class-B	13.5	175	4	> 8
			12.5	175	4	typ 8
BFS23A	TO-39/1	c.w.; class-B	28	175	4	> 10
BGY...	see Modules page S120					
BLF146	SOT-121	s.s.b.; class-AB	28	28	80	
BLF242	SOT-123	c.w.; class-B	28	175	5	> 16
BLF244	SOT-123	c.w.; class-B	28	175	15	> 16
BLF245	SOT-123	c.w.; class-B	28	175	30	> 16
BLT90/SL	SOT-172D	c.w.; class-B	7.5	900	0.75	> 8.5
BLT91/SL	SOT-172D	c.w.; class-B	7.5	900	1.5	> 6
BLT92/SL	SOT-122D	c.w.; class-B	7.5	900	3	
BLU20/12	SOT-119	c.w.; class-B	12.5	470	20	> 7.8
BLU30/12	SOT-119	c.w.; class-B	12.5	470	30	> 7.4
BLU45/12	SOT-119	c.w.; class-B	12.5	470	45	> 5.8
BLU50	SOT-161	c.w.; class-B	28	400	30	
BLU51	SOT-161	c.w.; class-B	28	400	45	
BLU52	SOT-161	c.w.; class-B	28	400	60	
BLU53	SOT-161	c.w.; class-C	28	400	100	
BLU60/12	SOT-119	c.w.; class-B	12.5	470	60	> 5.5
BLU97	SOT-122	c.w.; class-B	12.5	470	7	> 8.5
BLU98	SOT-103	c.w.; class-B	12.5	900	0.5–	> 8.0
BLU99	SOT-122	c.w.; class-B	12.5	470	5	> 10.5
			12.5	900	4	typ 7,0
BLV10	SOT-123	c.w.; class-B	13.5	175	8	> 9
			12.5	175	8	typ 10.5
		s.s.b.; class-A	12	28	1 (note 3)	18
BLV11	SOT-123	c.w.;class-B	13.5	175	15	> 8.0
			12.5	175	15	typ 7.5
		s.s.b.; class-A	12	28	2 (note 3)	18
		s.s.b.; class-AB	13.5	28	10 (note 4)	18
BLV20	SOT-123	c.w.; class-B	28	175	8	> 12
		s.s.b.; class-A	26	28	1.3-(note 3)	20
BLV21	SOT-123	c.w.; class-B	28	175	15	> 10
		s.s.b.; class-A	26	28	2.3-(note 3)	20
BLV25	SOT-119	c.w.; class-B narrow band	28	108	175	> 10

Notes
1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB
5. P.E.P.

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W		power gain dB	
BLV30	SOT–122	lin. ampl., class–A	25	225	1.5	(note 1)	>	18
			25	225	1.7	(note 1)	typ	20
BLV31	SOT–122	lin. ampl., class–A	25	225	5	(note 1)	>	15
			25	225	7	(note 1)	typ	16.5
BLV32F	SOT–160	lin. ampl., class–A	25	225	10	(note 2)	>	16
			25	225	12.5	(note 2)	typ	17.2
BLV33	SOT–147	lin. ampl., class–A	25	225	19	(note 2)	>	9
			25	225	26	(note 2)	typ	9.7
		lin. ampl., class–AB	28	225	90	(note 2)	typ	6.5
BLV33F	SOT–119	lin. ampl., class–A	25	225	16	(note 2)	>	13.5
			25	225	22	(note 2)	typ	14.8
		lin. ampl., class–AB	28	225	85	(note 2)	typ	10.5
BLV36	SOT–161	lin. ampl., class–AB	28	225	115		>	10
			28	225	115		typ	13.0
BLV37	SOT–179	F.M. b.c. transmitter class–B	28	108	250		>	11
BLV38	SOT–179	TV transmitter band III class–AB	35	225	225		>	8.5
BLV45/12	SOT–119	c.w.; class–B	12.5	175	45		>	6.5
BLV57	SOT–161	lin. ampl., class–A	25	860	6	(note 1)	>	8.0
			25	860	12 typ	(note 2)	typ	9
		c.w.; class–AB	25	860	38		typ	6.5
BLV59	SOT–161	lin. ampl., class–AB	25	860	30	(note 5)		7
BLV75/12	SOT–119	c.w.; class–B	12.5	175	75		>	6.5
BLV80/28	SOT–121	c.w.; class–B	28	175	80		>	6.5
BLV90	SOT–172	c.w.; class–B	12.5	900	1		>	7.5
BLV90/SL	SOT–172D	c.w.; class–B	12.5	900	1		>	7.5
BLV91	SOT–172	c.w.; class–B	12.5	900	2		>	6.5
BLV91/SL	SOT–172D	c.w.; class–B	12.5	900	2		>	6.5
BLV92	SOT–171	c.w.; class–B	12.5	900	4		>	7.5
BLV93	SOT–171	c.w.; class–B	12.5	900	8		>	6.5
BLV94	SOT–171	c.w.; class–B	12.5	900	12.5		>	6.0
BLV95	SOT–171	c.w.; class–B	12.5	900	22.5		>	5.5
BLV97	SOT–171	c.w.; class–B	24	900	30		>	7.0
BLV98	SOT–171	c.w.; class–B	24	900	14		>	8.5
BLV99	SOT–172	c.w.; class–B	24	900	2		>	8

Notes
1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB
5. at 1 dB compression

For detailed information on these and other types see Data Handbook S6

Status = C type	case	mode of operation	V_{CE} V	frequency MHz	output power W		power gain dB	
BLW29	SOT-120	c.w.; class-B	13.5	175	15		>	10
			12.5				typ	10.5
BLW31	SOT-120	c.w.; class-B	13.5	175	28		>	9
			12.5	175	28		typ	9.5
BLW32	SOT-122	lin. ampl., class-A	25	860	0.5	(note 1)	>	11
			25	860	0.63	(note 1)	typ	12.2
BLW33	SOT-122	lin. ampl., class-A	25	860	1.0	(note 1)	>	10
			25	860	1.15	(note 1)	typ	10.5
BLW34	SOT-122	lin. ampl., class-A	25	860	1.8	(note 1)	>	9
			25	860	2.15	(note 1)	typ	10.2
BLW50F	SOT-123	s.s.b.; class-A	45	1.6–28	0–16	(note 3)	>	19.5
		s.s.b.; class-AB	50	1.6–28	10–65	(note 4)	typ	18
BLW60	SOT-56	c.w.; class-B	12.5	175	45		>	5.0
		s.s.b.; class-AB	12.5	1.6–28	3–30	(note 4)	typ	19.5
BLW60C	SOT-120	c.w.; class-B	12.5	175	45		>	5
		s.s.b.; class-AB	12.5	1.6–28	3–30	(note 4)	typ	19.5
BLW76	SOT-121	s.s.b.; class-AB	28	1.6–28	8–80	(note 4)	>	13
		c.w.;class-B	28	108	80		typ	7.9
BLW77	SOT-121	s.s.b.; class-AB	28	1.6–28	15–130	(note 4)	>	12
		c.w.; class-B	28	87.5	130		typ	7.5
BLW78	SOT-121	c.w.; class-B	28	150	100		>	6
		s.s.b.; class-A	26	28	35	(note 3)	typ	19.5
		s.s.b.; class-AB	28	28	100	(note 4)	typ	19.0
BLW79	SOT-122	c.w.; class-B	12.5	470	2		>	9.0
			12.5	175	2		typ	13.5
BLW80	SOT-122	c.w.; class-B	12.5	470	4		>	8.0
			12.5	175	4		typ	15
BLW81	SOT-122	c.w.; class-B	12.5	470	10		>	6.0
			12.5	175	10		typ	13.5
BLW82	SOT-119	c.w.; class-B	12.5	470	30		>	5
			13.5	470	30		typ	5
BLW83	SOT-123	s.s.b.; class-A	26	1.6–28	0–10	(note 3)	>	20
		s.s.b.; class-AB	28	1.6–28	3–30	(note 4)	typ	21
BLW84	SOT-123	c.w.; class-B	28	175	25		>	9
BLW85	SOT-123	c.w.; class-AB	12.5	175	45		>	4.5
		s.s.b.; class-AB	12.5	1.6–28	3–30	(note 4)	typ	19.5
BLW86	SOT-123	c.w.; class-B	28	175	45		>	7.5
		s.s.b.; class-AB	28	1.6–28	5–47	(note 4)	typ	19
		s.s.b.; class-A	26	1.6–28	17	(note 3)	typ	22
		class-B	28	87.5–108	45		>	11

Notes

1. $P_{o\ sync}$ at $d_{im} < -60$ dB.
2. $P_{o\ sync}$ at $d_{im} < -55$ dB.
3. P.E.P. at $d_3 < -40$ dB.
4. P.E.P. at d_3 typ. -30 dB.

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W		power gain dB	
BLW87	SOT–123	c.w.; class–B	13.5	175	25		>	6
BLW89	SOT–122	c.w.; class–B	28	470	2		>	12
BLW90	SOT–122	c.w.; class–B	28	470	4		>	11
BLW91	SOT–122	c.w.; class–B	28	470	10		>	9
BLW95	SOT–121	s.s.b.; class–AB	50	1.6–28	20–160	(note 4)	>	14
BLW96	SOT–121	s.s.b.; class–AB	50	1.6–28	25–200	(note 4)	>	13.5
		c.w.; class–B	50	108	200		typ	6.5
		s.s.b.; class–A	40	28	50	(note 3)	typ	19
BLW97	SOT–121	s.s.b.; class–AB	28	1.6–28	175	(note 4)	>	11.5
BLW98	SOT–122	lin. ampl., class–A	25	860	3.5	(note 1)	>	6.5
			25	860	4.4	(note 1)	typ	7.0
BLW99	SOT–121	s.s.b.; class–AB	12.5	1.6–28	80	(note 4)	>	12.5
BLX13	SOT–56	s.s.b; class–A	26	28	0–8	(note 3)	>	18
		s.s.b.; class–AB	28	28	25	(note 4)	>	18
		c.w.; class–B	28	70	25		typ	17
BLX13C	SOT–120	s.s.b.; class–A	26	1.6–28	0.8	(note 3)	>	20
		s.s.b.; class–AB	28	1.6–28	3–25	(note 4)	typ	21
BLX14	SOT–55	s.s.b.; class–A	28	1.6–28	25	(note 3)	>	13
		s.s.b.; class–AB	28	1.6–28	7.5–50	(note 4)	>	13
		c.w.; class–B	28	70	50		>	7.5
		c.w.; class–B	28	30	50		typ	16
BLX15	SOT–55	s.s.b.; class–AB	50	1.6–28	20–150	(note 4)	>	14
		s.s.b.; class–A	40	1.6–28	30	(note 3)	>	14
		c.w.; class–B	50	70	150		>	10
		c.w.; class–B	50	108	150		typ	7.4
BLX39	SOT–120	c.w.; class–B	28	175	45		>	7.5
		s.s.b.; class–AB	28	1.6–28	5–42.5	(note 4)	typ	19
		s.s.b.; class–A	26	1.6–28	15	(note 3)	typ	20
BLX65	TO–39/1	c.w.; class–B	13.8	470	2		typ	7
			12.5	470	2		>	6
			12.5	175	2		typ	12
BLX65E	TO–39/3	c.w.; class–B	12.5	175	2		typ	16
			12.5	470	2		>	9
BLX67	SOT–48/1	c.w.; class–B	13.8	470	1.5		typ	10
			13.8	470	3.0		typ	9.3
			12.5	470	2.5		>	8.5
			12.5	175	3.0		typ	20

Notes

1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLX68	SOT-48/1	c.w.; class-B	13.8	470	7	> 5.4
			13.8	470	7.8	typ 5.9
			12.5	470	7.0	> 5.0
			12.5	175	7.2	typ 12.6
BLX69A	SOT-48/2	c.w.; class-B	13.5	470	20	> 4
			12.5	470	17	> 4
			12.5	175	17	typ 11
BLX91A	SOT-48/1	c.w.; class-B	24	470	0.85	typ 12.3
			28	470	1.0	> 11
			28	470	1.45	typ 12.6
			28	1000	1.4	typ 5.4
BLX91CB	SOT-48/3	video cathode driver	28	'V_{CESM} max. 65 V; C_c typ. 3 pF'		
BLX92A	SOT-48/1	c.w.; class-B	24	470	2.4	typ 10.8
			28	470	2.5	> 11
			28	470	3.0	typ 11.7
			28	1000	2.5	typ 5.5
BLX93A	SOT-48/1	c.w.; class-B	24	470	7.0	typ 8.5
			28	470	7.0	> 8.5
			28	470	8.0	typ 9.0
			28	1000	5.0	typ 5.2
BLX94A	SOT-48/2	c.w.; class-B	28	470	25	> 6
BLX94C	SOT-122	c.w.; class-B	28	470	25	> 6.5
BLX95	SOT-56	c.w.; class-B	28	470	40	< 4.5
			28	175	40	typ 11
BLX96	SOT-48/3	class-A	25	860	0.5 (note 1)	> 6
			25	860	0.6 (note 1)	typ 7
BLX97	SOT-48/3	class-A	25	860	1.0 (note 1)	> 5.5
			25	860	1.1 (note 1)	typ 6.5
BLX98	SOT-48/2	class-A	25	860	3.5 (note 1)	> 5.0
			25	860	4.0 (note 1)	typ 5.5

Notes
1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLY87A	SOT–48/2	c.w.; class–B	13.5 12.5	175 175	8 8	> 9 typ 9
BLY87C	SOT–120	c.w.; class–B	13.5 12.5	175 175	8 8	> 12 typ 11.5
BLY88A	SOT–48/2	c.w.; class–B	13.5 12.5	175 175	15 15	> 7.5 typ 7.5
BLY88C	SOT–120	c.w.; class–B	13.5 12.5	175 175	15 15	> 8.0 typ 7.5
BLY89A	SOT–56	c.w.; class–B	13.5	175	25	> 6
BLY89C	SOT–120	c.w.; class–B	13.5	175	25	> 6
BLY90	SOT–55	c.w.; class–B	12.5	175	50	> 5.0
BLY91A	SOT–48/2	c.w.; class–B	28	175	8	> 12
BLY91C	SOT–120	c.w.; class–B	28	175	8	> 12
BLY92A	SOT–48/2	c.w.; class–B	28	175	15	> 10
BLY92C	SOT–120	c.w.; class–B	28	175	15	> 10
BLY93A	SOT–56	c.w.; class–B	28	175	25	> 9
BLY93C	SOT–120	c.w.; class–B	28	175	25	> 9
BLY94	SOT–55	c.w.; class–B	28	175	50	> 7
2N3375	TO–60	c.w.; class–B	28 28	100 400	7.5 >3	> 8.8 > 4.8
2N3553	TO–39(1)	c.w.; class–B class–B	28 28	175 87.5–108	2.5 1	> 10 > 18
2N3632	TO–60	c.w.; class–B	28	175	>13.5	> 5.9
2N3866	TO–39/1	c.w.; class–B	28	400	1	> 10
2N3924	TO–39/1	c.w.; class–B	13.5	175	4	> 6
2N3926	TO–60	c.w.; class–B	13.5	175	7	> 5.4
2N3927	TO–60	c.w.; class–B	13.5	175	12	> 4.8
2N4427	TO–39/1	c.w.; class–B	12	175	1	> 10

For detailed information on these and other types see Data Handbook S6

Status = C

module type	case	mode of operation	$V_{S1,S2}$ V	frequency MHz	output power W	power gain dB
BGY22	SOT-75A	c.w.	13.5	380–512	> 2.5	17
BGY23	SOT-75A	c.w.	13.5	380–480	> 7.0	4.5
BGY32	SOT-132	c.w.	12.5	68–88	> 18	22.6
BGY33	SOT-132	c.w.	12.5	80–108	> 18	22.6
BGY35	SOT-132	c.w.	12.5	132–156	> 18	20.6
BGY36	SOT-132	c.w.	12.5	148–174	> 18	20.8
BGY40A	SOT-132	c.w.	12.5	400–440	> 7.5	18.8
BGY40B	SOT-132	c.w.	12.5	440–470	> 7.5	18.8
BGY41A	SOT-132	c.w.	12.5	400–440	> 13	19.4
BGY41B	SOT-132	c.w.	12.5	440–470	> 13	19.4
BGY43	SOT-132	c.w.	12.5	148–174	> 13	19.4
BGY45A	SOT-183	c.w.	12.5	68–88	> 29	20.0
BGY45B	SOT-183	c.w.	12.5	148–174	> 28	19.7
BGY45C	SOT-183	c.w.	12.5	170–210	> 18	23.5
BGY46A	SOT-181	c.w.	9.6	400–440	> 1.4	15.0
BGY46B	SOT-181	c.w.	9.6	430–470	> 1.4	15.0
BGY46D	SOT-181	c.w.	9.6	370–430	> 1.4	15.0
BGY47A	SOT-181	c.w.	7.5	400–470	> 2.0	18.0
BGY47A	SOT-181	c.w.	9.6	400–470	> 3.2	18.0
BGY47F	SOT-181	c.w.	7.6	460–512	> 2.0	16.0
BGY47F	SOT-181	c.w.	9.6	460–512	> 3.2	18.0
BGY48A	SOT-182	c.w.	9.6	400–440	> 5	21.0
BGY48B	SOT-182	c.w.	9.6	430–470	> 5	21.0
BGY48C	SOT-182	c.w.	9.6	460–512	> 5	21.0
BGY49A	SOT-132	c.w.	12.5	400–440	> 20.0	21.2
BGY49B	SOT-132	c.w.	12.5	440–470	> 20.0	21.2
BGY90A	SOT-179	c.w.	12.5	806–890	> 6.0	17.5
BGY90B	SOT-179	c.w.	12.5	870–950	> 6.0	17.5
BGY91A	SOT-233	c.w.	12.5	806–890	> 6.0	23.0
BGY91B	SOT-233	c.w.	12.5	870–850	> 6.0	23.0
BGY93A	SOT-182	c.w.	9.6	68–88	> 2.0	17.5
BGY93B	SOT-182	c.w.	9.6	136–156	> 2.0	17.5
BGY93C	SOT-182	c.w.	9.6	148–174	> 2.0	17.5
BGY94A	SOT-182	c.w.	9.6	68–88	> 5.0	17.5
BGY94B	SOT-182	c.w.	9.6	132–156	> 5.0	17.5
BGY94C	SOT-182	c.w.	9.6	148–174	> 5.0	17.5
BGY95A	SOT-200	c.w.	7.5	825–845	> 2.2	20.4
BGY95B	SOT-200	c.w.	7.5	890–915	> 2.2	20.4
BGY96A	SOT-200	c.w.	9.6	825–845	> 2.5	21.0
BGY96B	SOT-200	c.w.	9.6	890–915	> 2.5	21.0
BGY101A	SOT-246	c.w.	6.0	824–849	> 1.2	30.8
BGY101B	SOT-246	c.w.	6.0	872–905	> 1.2	30.8

For detailed information on these and other types see Data Handbook S10

The table gives the preferred npn transistors and their complements for wideband applications.
The sequence is the linear output voltage capability. The values for V_o, ITO and PL1 are typical.

f_T = 5 GHz

envelope	I_C (mA) V_{CE} (V)		14 10	30 8	70 10	80 10	90 10	120 15	240 15	600 18
	V_o (mV)		150	425	700	700	750	1200	1600	2500
	ITO (dBm)		27	36	40	–	43	45	47	52
	PL1 (dBm)		8	17	21	–	24	26	28	33
SOT-37	* **	BFT24	BFR90A BFQ51	BFR91A BFQ23	BFR96S BFQ32S		BFQ34T BFQ54T			
SOT-23	* **	BFT25	BFR92A BFT92	BFR93A BFT93	BFR106					
SOT-89	* **				BFQ19 BFQ149	BFQ18A				
SOT-122	* **							BFQ34 BFQ54	BFQ68	BFQ136
SOT-103	* **		BFG90A BFG51	BFG91A BFG23	BFG96 BFG32		BFG34 BFG54			
SOT-143	*		BFG92A	BFG93A						
SOT-173	* **		BFP90A BFQ51C	BFP91A BFQ23C	BFP96 BFQ32C					
SOT-223	*				BFG97		BFG35			
TO-72	* **		BFQ53 BFQ52	BFQ22S BFQ24	BFQ63 BFQ32M					

f_T = 7.5 GHz

envelope	I_C (mA) V_{CE} (V)		15 8	50 8	100 10	120 18
SOT-37	*		BFQ65		BFR134	
SOT-23	*		BFQ67			
SOT-103	*		BFG65	BFG195	BFG134	
SOT-143	*		BFG67	BFG197		
SOT-172	*					BFQ135
SOT-173	*		BFQ66			
SOT-223	*			BFG198	BFG135	

* polarity = NPN
** polarity = PNP

PHILIPS

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

type number	n–p–n or p–n–p	envelope	ratings V_{CEO} V	ratings I_C mA	ratings P_{tot} mW	characteristics f_T GHz	characteristics F at dB	characteristics f MHz
BF689K	n	TO–92	15	25	360	1.8	3.0	200
BF763	n	TO–92	15	25	500	1.8	5.0	800
BFG17A	n	SOT–143	15	25	300	2.8	2.5	800
BFG23	p	SOT–103	12	35	180	5.0	3.7	800
BFG32	p	SOT–103	15	75	700	4.5	4.3	800
BFG33	n	SOT–143	7	20	140	12	3	2000
BFG34	n	SOT–103	18	150	1000	3.7	2.3	800
BFG35	n	SOT–223	18	150	1000	4.0	2.3	800
BFG51	p	SOT–103	15	25	180	5.0	3.4	800
BFG54	p	SOT–103	18	150	1000	4.5	–	–
BFG65	n	SOT–103	10	50	300	7.5	3.0	2000
BFG67	n	SOT–143	10	50	300	7.5	3.0	2000
BFG90A	n	SOT–103	15	25	180	5.0	2.4	800
BFG91A	n	SOT–103	12	35	300	6.0	2.3	800
BFG92A	n	SOT–143	15	25	300	5.0	1.8	800
BFG93A	n	SOT–143	12	35	300	6.0	1.6	800
BFG96	n	SOT–103	15	150	700	5.0	3.7	800
BFG97	n	SOT–223	15	150	700	5.0	3.7	800
BFG134	n	SOT–103	18	150	1000	7.5	–	–
BFG135	n	SOT–103	10	150	1000	7.5	–	–
BFG195	n	SOT–103	10	100	500	7.5	1.9	800
BFG197	n	SOT–143	10	100	300	7.5	1.9	800
BFG198	n	SOT–223	10	100	300	7.5	4.0	2000
BFP90A	n	SOT–173	15	30	250	5.0	2.4	800
BFP91A	n	SOT–173	12	50	350	6.0	2.3	800
BFP96	n	SOT–173	15	100	500	5.0	2.5	800
BFQ17	n	SOT–89	25	150	1000	1.2	–	–
BFQ18A	n	SOT–89	15	150	1000	3.6	–	–
BFQ19	n	SOT–89	15	75	500	5.0	–	–
BFQ22S	n	TO–72	12	35	150	5.0	1.9	500
BFQ23	p	SOT–37	12	35	180	5.0	2.4	500
BFQ23C	p	SOT–173	12	50	350	5.0	3.7	800
BFQ24	p	TO–72	12	35	150	5.0	2.4	500
BFQ32	p	SOT–37	15	75	500	4.2	3.8	500
BFQ32C	p	SOT–173	15	100	500	4.5	4.2	800
BFQ32M	p	TO–72	15	75	250	4.5	2.3	500
BFQ32S	p	SOT–37	15	100	700	4.5	4.3	800
BFQ33C	n	SOT–173	7	20	140	12.0	3.0	2000
BFQ34	n	SOT–122	18	150	2250	3.9	8.0	500
BFQ34T	n	SOT–37	18	150	1000	3.7	–	–
BFQ51	p	SOT–37	15	25	180	5.0	2.4	800
BFQ51C	p	SOT–173	15	30	250	5.0	2.5	800
BFQ52	p	TO–72	15	25	150	5.0	2.7	500
BFQ53	n	TO–72	15	25	150	5.0	2.4	500
BFQ54	n	SOT–122	18	150	2250	4.5	–	–
BFQ54T	n	SOT–37	18	150	1000	4.5	–	–
BFQ63	n	TO–72	15	75	250	4.5	2.3	500
BFQ65	n	SOT–37	10	50	300	7.5	3.0	2000
BFQ66	n	SOT–173	10	50	350	7.5	3.0	2000
BFQ67	n	SOT–23	10	50	180	7.5	3.0	2000

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

G_{UM} at dB	f MHz	V_O* mV	PL1** dBm	ITO** dBm	I_C mA	V_{CE} V	type
16	200	–	–	–	–	–	**BF689K**
–	–	–	–	–	–	–	**BF763**
15.5	800	150	7	26	14	10	**BFG17A**
14.5	800	400	16	35	30	8	**BFG23**
13.5	800	500	18	37	70	10	**BFG32**
13	2000	–	–	–	–	–	**BFG33**
14.5	800	750	22	41	90	10	**BFG34**
–	–	–	–	–	–	–	**BFG35**
16.5	800	150	7	26	14	10	**BFG51**
–	–	–	–	–	–	–	**BFG54**
10.5	2000	–	–	–	–	–	**BFG65**
10	2000	–	–	–	–	–	**BFG67**
19	800	150	8	27	14	10	**BFG90A**
17.5	800	425	17	36	30	8	**BFG91A**
9.5	2000	–	–	–	–	–	**BFG92A**
9	2000	–	–	–	–	–	**BFG93A**
15	800	700	21	40	70	10	**BFG96**
–	–	–	–	–	–	–	**BFG97**
8	2000	–	–	–	100	10	**BFG134**
8	2000	–	–	–	100	10	**BFG135**
11	2000	–	–	–	–	–	**BFG195**
11	2000	–	–	–	–	–	**BFG197**
9	2000	–	–	–	50	8	**BFG198**
19.5	800	150	8	27	14	10	**BFP90A**
18.5	800	425	17	36	30	8	**BFP91A**
15	800	700	21	40	70	10	**BFP96**
6.5	800	–	–	–	–	–	**BFQ17**
–	–	700	21	40	80	10	**BFQ18A**
7.5	800	500	18	37	50	10	**BFQ19**
16	500	300	14	33	30	5	**BFQ22S**
16.5	500	300	14	33	30	5	**BFQ23**
15	800	400	16	35	30	8	**BFQ23C**
15	500	300	14	33	30	5	**BFQ24**
14	500	500	18	37	50	10	**BFQ32**
13	800	500	19	38	70	10	**BFQ32C**
11	500	–	–	–	–	–	**BFQ32M**
10	800	600	20	39	70	10	**BFQ32S**
13.3	2000	–	–	–	–	–	**BFQ33C**
16.3	500	1200	26	45	120	15	**BFQ34**
19.5	300	1000	24	43	100	10	**BFQ34T**
18	500	150	7	26	14	10	**BFQ51**
16.5	800	150	8	27	14	10	**BFQ51C**
17	500	150	7	26	14	10	**BFQ52**
18	500	150	7	26	14	10	**BFQ53**
16	500	900	–	–	–	–	**BFQ54**
18	300	200	–	–	–	–	**BFQ54T**
11.5	500	500	18	37	50	10	**BFQ63**
8	2000	–	–	–	–	–	**BFQ65**
11.5	2000	–	–	–	–	–	**BFQ66**
8	2000	–	–	–	–	–	**BFQ67**

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

PHILIPS

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

type number	n–p–n or p–n–p	envelope	ratings V_{CEO} V	I_C mA	P_{tot} mW	characteristics f_T GHz	F at dB	f MHz
BFQ68	n	SOT–122	18	300	4500	4,0	–	–
BFQ135	n	SOT–172	18	150	2250	7,5	–	–
BFQ136	n	SOT–122	18	600	9000	4,0	–	–
BFQ149	p	SOT–89	15	75	1000	4.5	3.8	500
BFR53	n	SOT–23	10	50	250	2,0	5,0	500
BFR64	n	SOT–48	25	200	3500	1,0	6,0	200
BFR65	n	SOT–48	25	400	5000	> 1.0	–	–
BFR90	n	SOT–37	15	25	180	5.0	2.4	500
BFR90A	n	SOT–37	15	25	180	5.0	2.4	800
BFR91	n	SOT–37	12	35	180	5.0	1.9	500
BFR91A	n	SOT–37	12	35	300	6.0	2.3	800
BFR92	n	SOT–23	15	25	200	5.0	2.4	500
BFR92A	n	SOT–23	15	25	200	5.0	2.4	800
BFR93	n	SOT–23	12	35	200	5.0	1.9	500
BFR93A	n	SOT–23	12	35	250	5.0	2.3	800
BFR94	n	SOT–48	25	150	3500	3.5	5.0	500
BFR95	n	TO–39	25	150	1500	3.5	9.0	200
BFR96	n	SOT–37	15	75	500	5.0	3.3	500
BFR96S	n	SOT–37	15	100	700	5.0	4.0	800
BFR106	n	SOT–23	15	100	350	4.0	3.6	800
BFR134	n	SOT–37	18	150	1000	7.5	–	–
BFS17	n	SOT–23	15	25	250	1.3	4.5	500
BFS17A	n	SOT–23	15	25	300	2.8	2.5	800
BFT24	n	SOT–37	5	2.5	30	2.3	3.8	500
BFT25	n	SOT–23	5	6.5	50	2.3	3.8	500
BFT92	p	SOT–23	15	25	200	5.0	2.7	500
BFT93	p	SOT–23	12	35	200	5.0	2.4	500
BFW16A	n	TO–39	25	150	1500	1.2	< 6.0	200
BFW17A	n	TO–39	25	150	1500	1.1	–	–
BFW30	n	TO–72	10	50	250	1.6	< 5.0	500
BFW92	n	SOT–37	15	25	190	1.6	4.0	500
BFW92A	n	SOT–37	15	25	200	2.8	2.5	800
BFW93	n	SOT–37	10	50	190	1.7	< 5.0	500
BFX89	n	TO–72	15	25	200	1.2	3.3	200
BFY90	n	TO–72	15	25	200	1.4	2.5	200
2N918	n	TO–72	15	50	200	< 0.9	< 6.0	60

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

G_{UM} at dB	f MHz	V_O* mV	PL1** dBm	ITO** dBm	I_C mA	V_{CE} V	type
13	800	1600	28	47	240	15	**BFQ68**
8	2000	–	–	–	–	–	**BFQ135**
12.5	800	2500	33	52	500	15	**BFQ136**
12	500	–	–	–	50	10	**BFQ149**
10.5	800	100	5	24	30	5	**BFR53**
–	–	–	–	–	–	–	**BFR64**
–	–	–	–	–	–	–	**BFR65**
19.5	500	150	7	26	14	10	**BFR90**
15	800	150	8	27	14	10	**BFR90A**
18	500	300	14	33	30	5	**BFR91**
14	800	425	17	36	30	8	**BFR91A**
18	500	150	7	26	14	10	**BFR92**
15	800	150	8	27	14	10	**BFR92A**
16.5	500	300	14	33	30	5	**BFR93**
14	800	425	16	35	30	8	**BFR93A**
13.5	500	700	21	40	90	20	**BFR94**
–	–	1000	24	43	80	18	**BFR95**
15.2	500	500	18	37	50	10	**BFR96**
11.5	800	700	21	40	70	10	**BFR96S**
11.5	800	250	–	–	30	6	**BFR106**
8	2000	–	–	–	–	–	**BFR134**
–	–	–	–	–	–	–	**BFS17**
13.5	800	150	7	26	14	10	**BFS17A**
17	500	–	–	–	–	–	**BFT24**
18	500	–	–	–	–	–	**BFT25**
18	500	150	7	26	14	10	**BFT92**
16.5	500	300	14	33	30	5	**BFT93**
–	–	–	–	–	–	–	**BFW16A**
–	–	–	–	–	–	–	**BFW17A**
–	–	100	5	24	30	6	**BFW30**
–	–	–	–	–	–	–	**BFW92**
13	800	150	7	26	14	10	**BFW92A**
10.5	800	100	5	24	30	5	**BFW93**
–	–	–	–	–	–	–	**BFX89**
–	–	–	–	–	–	–	**BFX90**
36	200	–	–	–	–	–	**2N918**

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

For detailed information on these and other types see Data Handbook S10

type	power gain dB at 50 MHz	slope (cable equivalent) dB*	max flatness dB*	min return loss (input/output) dB*	min output–voltage dBmV
40 to 300 (330) MHz frequency range					
					dBmV[5]
BGY50	12.5 ±0.4	0.2–0.8	±0.2	20	61
BGY51	12.5 ±0.4	0.2–0.8	±0.2	20	63,5
BGY52	16.4 ±0.4	0–1	±0.1	20	61
BGY53	16.4 ±0.4	0–1	±0.1	20	63,5
BGY54	17.0 ±0.4	0–1	±0.1	20	61
BGY55	17.0 ±0.4	0–1	±0.1	20	63,5
BGY56	22.0 ±0.6	0–1	±0.2	20	61,5
BGY57	22.0 ±0.6	0–1	±0.2	20	64
BGY58	33.0 ±1.0	0.5–1.5	±0.3	20	64
BGY58A[8]	34.0 ±1.0	0.5–1.5	±0.3	20	64
BGY59	38.5 ±1.0	0–1.5	±0.3	18	64
BGY60[7]	33.5 ±1.0	0.5–1.5	±0.3	18	64

For note see next page.

General remarks

Source & load impedance of all devices = 75 Ω

Characteristics of all devices specified at T_{mb} = 30 °C

For further information please consult the relevant data sheet.

Wideband modules for CATV (cont.)

For detailed information on these and other types see Data Handbook S10

2nd order beat		composite triple beat	cross-modulation	max noise figure	total d.c. current consumption		
dB	dB	dB	dB	dB*	mA[6]		type
40 to 300 (330) MHz frequency range (cont.)							
max	–	32 chs[4]	32 chs[4]		typ	max	
−71[2]	–	−65	−60	7.0	160	180	**BGY50**
−73[2]	–	−67	−65	8.0	200	220	**BGY51**
−71[2]	–	−65	−60	6.0	160	180	**BGY52**
−73[2]	–	−67	−65	7.0	200	220	**BGY53**
−71[2]	–	−65	−60	6.0	160	180	**BGY54**
−73[2]	–	−67	−65	7.0	200	220	**BGY55**
−64[1]	–	−64	−59	6.0	160	180	**BGY56**
−66[1]	–	−66	−62	7.0	200	220	**BGY57**
−68[1]	–	−67	−65	6.0	320	340	**BGY58**
−70[2]	–	−67	−65	6.0	320	340	**BGY58A[8]**
−68[1]	–	–	–	6.0	320	340	**BGY59**
−66[1]	–	−67	−65	6.0	320	340	**BGY60[7]**

Notes:

* over operating frequency range

1) V_o = 50 dBmV, f_p = 66 MHz, V_o = dBmV, f_q = 144 MHz; measured at $f_{(p+q)}$ = 210 MHZ
2) V_o = 50 dBmV: ch 2; V_o = 50 dBmV: ch 13; measured in ch R
3) V_o = 50 dBmV: ch G; V_o = 50 dBmV: ch N; measured in ch H14
4) V_o = 46 dBmV measured in ch W
5) intermodulation distortion = −60 dB (DIN 45004, para. 6.3: 3 tone)
   $V_p = V_o$; f_p = 287,25 MHz; $V_q = V_o - 6$dB;
   f_q = 294.25 MHz; $V_r = v_o - 6$dB; f_r = 296.25 MHz;
   measured at $f_{(p+q-r)}$ = 285.25 MHz
6) measured at 24 V d.c. supply
7) interstage amplifier module
8) BGY58A has operating frequency range from 40–330 MHz

Wideband modules for CATV (cont.)

For detailed information on these and other types see Data Handbook S10

type	status	power gain dB	slope (cable equivalent) dB[1]	max flatness dB[1]	min return loss (input/output) dB	min output-voltage dBmV	
40 to 450 MHz frequency range (high dynamic range)							
		at 50 MHz			dB[13]	dBmV[10]	
BGY80		12.5 ±0.4	0.2–1.5	±0.2	18	61.5	
BGY81		12.5 ±0.4	0.2–1.5	±0.2	18	64	
BGY84	C	17.0 ±0.4	0.3–1.5	±0.2	18	60	
BGY84A	C	18.4 ±0.4	0.3–1.5	±0.2	18	60	
BGY84H	C	14.5–16.3	4.7–5.5	±0.2	18	61.5	
BGY85	C	17.0 ±0.4	0.3–1.5	±0.2	18	62.5	
BGY85A	C	18.4 ±0.4	0.3–1.5	±0.2	18	62.5	
BGY85H	C	14.5–16.3	4.7–5.5	±0.2	18	62.5	
BGY86	C	22.0 ±0.5	0.2–1.5	±0.2	18	60.0	
BGY87	C	22.0 ±0.5	0.2–1.5	±0.2	18	62.5	
BGY88	C	34.5 ±1.0	0.5–2.5	±0.3	18	62	
Power doublers – 40 to 450 MHz frequency range							
		at 50 MHz			dB	dBmV[10]	
BGD102	C	18.5 ±0.5	0.5–2.5	±0.3	18	–	
BGD104	C	20.0 ±0.5	0.5–2.5	±0.3	18	–	
BGD102E	C	18.5 ±0.5	0.5–2.0	±0.3	18[13]	65	
BGD104E	C	20.0 ±0.5	0.5–2.0	±0.3	18[13]	64.5	
40 to 550 MHz frequency range							
		at 50 MHz			dB	dBmV[10]	
BGY580		12.5 ±0.4	0.5–2.0	±0.2	18	59	
BGY581		12.5 ±0.4	0.5–2.0	±0.3	18	61.5	
BGY584	–	17.2 ±0.5	0.5–2.0	±0.2	18	–	
BGY584A	C	18.2 ±0.5	0.5–2.0	±0.2	18[13]	59.0	
BGY585	–	17.2 ±0.5	0.5–2.0	±0.2	18	–	
BGY585A	C	18.2 ±0.5	0.5–2.0	±0.2	18[13]	61.5	
BGY586	C	22.0 ±0.5	0.5–2.0	±0.2	18	58.5	
BGY587	C	22.0 ±0.5	0.5–2.0	±0.2	18	61.0	
BGY588	–	34.5 ±1.0	0.5–2.5	±0.3	16	–	

For notes see page S132

Wideband modules for CATV (cont.)

For detailed information on these and other types see Data Handbook S10

2nd order beat		max composite triple beat	max cross-modulation	max noise figure	total d.c. current consumption[4]		max r.f. input voltage	
dB	dB	dB	dB	dB[1]	mA	mA	dBmV	type
40 to 450 MHz frequency range (high dynamic range) cont.								
typ[2]	max[3]	60 chs[5]	60 chs[6]		typ	max		
–	−72	−58	−59	8.0	180	200	65	**BGY80**
–	−74	−61	−62	9.0	220	240	65	**BGY81**
−80	−70	−55	−57	6.5	180	200	65	**BGY84**
−80	−72	−55	−58	6.5	180	200	65	**BGY84A**
–	−72	−59	−59	7.0	220	240	–	**BGY84H**
−80	−70	−58	−60	7.0	220	240	65	**BGY85**
−80	−72	−59	−61	7.0	220	240	65	**BGY85A**
	−72	−59	−61	7.0	220	240	–	**BGY85H**
	−68	−56	−55	6.0	180	200	60	**BGY86**
	−72	−60	−59	7.0	220	240	60	**BGY87**
−80	−70	−58	−59	6.0	320	340	55	**BGY88**
Power doublers – 40 to 450 MHz frequency range, cont.								
	max[3]	60 chs[5]	60 chs [6]		typ	max		
–	−73	−65	−67	7.0	415	435	65	**BGD102**
–	−73	−64	−66	7.0	415	435	65	**BGD104**
–	−73	−65	−67	7.0	415	435	65	**BGD102E**
–	−73	−64	−66	7.0	415	435	65	**BGD104E**
40 to 550 MHz frequncy range, cont.								
	max[14]	77 chs[15]	77 chs[16]		typ	max		
–	−70	−56	−59	8.0	180	200	–	**BGY580**
–	−72	−59	−62	9.0	220	240	–	**BGY581**
	−68	−56	−59	7.0	180	200	60	**BGY584**
–	−70	−56	−59	7.0	180	200	60	**BGY584A**
–	−70	−59	−62	8.0	220	240	60	**BGY585**
–	−72	−59	−62	8.0	210	240	60	**BGY585A**
–	−62	−53	−55	6.5	180	200	60	**BGY586**
–	−66	−57	−59	7.0	220	240	60	**BGY587**
–	−68	−57	−59	6.5	320	340	–	**BGY588**

For notes see page S132

Wideband modules for CATV (cont.)

For detailed information on these and other types see Data Handbook S10

type	status	power gain dB	slope (cable equivalent) dB[1]	max flatness dB[1]	min return loss (input/output) dB	min output–voltage dBmV	
Power doubler – 40 to 550 MHz frequency range							
		at 50 MHz			dB		
BGD502	C	18.5 ±0.5	0.2–2.2	±0.3	18[13]	64.0	
BGD504	C	20.0 ±0.5	0.2–2.0	±0.3	18	63.5	
40 to 860 MHz frequency range.							
		at 50 MHz			dB		
BGX885	–	17.0 ±0.5	0.2–1.2	±0.3	20	61.0	
Reverse amplifiers – 5 to 200 MHz frequency range							
		at 10 MHz			dB[1]	dBmV[11]	dBmV[12]
BGY61	C	13.0 ±0.5	−0.2 – +0.5	±0.2	20	67	64
BGY65	C	18.5 ±0.5	−0.2 – +0.5	±0.2	20	67	64
BGY67	C	22.0 ±0.5	−0.2 – +0.5	±0.2	20	67	64
BGY67A	C	24.0 ±0.5	−0.2 – +0.5	±0.2	20	67	64

For notes see page S132

For detailed information on these and other types see Data Handbook S10

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2nd order beat		max composite triple beat	max cross-modulation	max noise figure	total d.c. current consumption[4]		max r.f. input voltage	
dB	dB	dB	dB	dB[1]	mA	mA	dBmV	type
Power doubler – 40 to 550 MHz frequency range, cont.								
	max[14]	77 chs[15]	77 chs[16]		typ	max		
–	−73	−65	−68	8.0	415	435	60	**BGD502**
–	−70	−64	−67	8.0	415	435	60	**BGD504**
40 to 860 MHz frequency range.								
	max[14]	77 chs[15]	77 chs[16]		typ	max		
–	−53	–	–	8.0	220	240	60	**BGX885**
Reverse amplifiers – 5 to 200 MHz frequency range, cont.								
	max[8]	22 chs[7]	22 chs[9]		typ	max		
–	−72	−68	−61	7.0	200	230	67	**BGY61**
–	−72	−68	−61	5.5	200	230	65	**BGY65**
–	−67	−67	−60	5.5	200	230	63	**BGY67**
–	−67	−67	−59	5.5	200	230	63	**BGY67A**

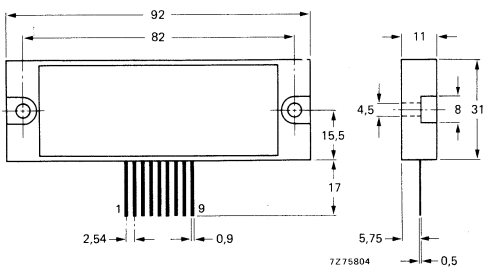
For notes see page S132.

For detailed information on these and other types see Data Handbook S10

General remarks
Source & load impedance of all devices = 75 Ω
Characteristics of power doubler specified at T_{mb} = 35 °C
Characteristics of other devices specified at T_{mb} = 30 °C
For further information please consult the relevant data sheet.

Notes:
1) over operating frequency range
2) V_o = 50 dBmV: ch 2; V_o = 50 dBmV: ch 13; measured in ch R
3) V_o = 46 dBmV; ch 2; V_o = 46 dBmV: ch H5; measured in ch H14
4) measured at 24 V d.c. supply
5) V_o = 46 dBmV measured in ch H22
6) V_o = 46 dBmV measured in channel 2
7) V_o = 50 dBmV measured in ch 7
8) V_o = 50 dBmV at 90 MHz; V_o = 50 dBmV at 100 MHz; measured at 190 MHz
9) V_o = 50 dBmV measured in channel 2
10) intermodulation –60dB; (DIN 45004, para. 6.3: 3 tone); $V_p = V_o$; f_p = 440.25 MHz; $V_q = V_o$ – 6dB; f_q = 447,25 MHz; $V_r = V_o$ – 6dB; f_r = 449.25 MHz; measured at f_{p+q-r} = 438.25 MHZ
11) as [10] but with f_p = 35,25 MHz; f_q = 42.25 MHz; f_r = 44.25; $f_{(p+q-r)}$ = 33.25 MHz
12) as [10] but with f_p = 187,25 MHz; f_q = 194.25 MHz; f_r = 196.25 MHz; $f_{p+q-r)}$ = 185.25 MHz
13) min. 20dB from 40–80 MHz; min. 19dB from 80–160 MHz; min. 18dB from 160–450 MHZ; (550 MHz)
14) V_o = 44 dBmV, ch 2; V_o = 44 dBmV, ch 18; measured in ch 27
15) measured in channel 27 with V_o = 44 dBmV
16) measured in channel 2 with V_o = 44 dBmV

For detailed information on these and other types see Data Handbook S4a



type	P_o at $d_{tot} < 0{,}2\%$ $R_L = 4\ \Omega$	$R_L = 8\ \Omega$	d_{tot} at $D_o = 1$ W; f = 1 kHz
OM931	> 30 W at ±23 V	> 30 W at ±26 V	typ. 0.02%
OM961	> 60 W at ±31 V	> 60 W at ±35 V	typ. 0.02%
OM991	> 120 W at ±45 V	> 120 W at ± 50 V	typ. 0.02%

For detailed information on these and other types see Data Handbook S10

Frequency range	40 to 860 MHz
Source and load (characteristic) imp.	75 Ω
Operating ambient temperature	−20 to +70 °C
Operating mounting–base temperature: (OM323; A and OM337; A)	−30 to +100 °C
Pinning (except OM322)	suitable for 0.1–inch grid
Finish	resin coated

Conversion table for 75 Ω impedance

dBμV	mV	dBm
92	39.8	−16.75
98	79.4	−10.75
103	141.3	−5.75
105	177.8	−3.75
112	398.1	+3.25
113	446.7	+4.25

Typical characteristics at V_B = 24 V ±10%

type	gain $\|sf\|^2$ dB	V_o(rms)* dBμV	supply current mA	noise figure dB	max VSWR typical values input	max VSWR typical values output	dimensions L mm	dimensions H mm
OM320	15.5	92	23	5.5	2.2	2.5	30	12
OM321	15.5	98	33	6	2.5	2	30	12
OM322	15	103	60	7	1.7	1.7	–	–
OM323; A**	15	113	100	9	1.9	2.3	30	18
OM335	27	98	35	5.5	1.9	3.2	30	18
OM336	22	105	65	7	1.4	1.6	30	19
OM337; A**	26	112	115	9.8	2.3	1.8	30	18
OM339	28	105	67	6	1.5	1.5	30	19

Improved design techniques for h.f. performance resulted in reduced dimensions of the 12 V range.

Typical characteristics at V_B = 12 V ±10%

OM345	12	99	11.5	5.5	2.0	1.4	14	8
OM350	18	100	18	6	1.5	1.9	19	9
OM360	23	105	55	7	1.3	1.5	27	9
OM361	28	105	50	6	1.5	1.7	27	9
OM370	28	112	105	7	2.3	1.9	27	22
OM2045	12	99	11.5	3.6	2.0	1.4	14	8
OM2050	18	100	18	5.2	1.5	1.9	19	9
OM2060	23	105	55	5.4	1.3	1.5	27	9
OM2061	28	105	50	4.4	1.5	1.7	27	9
0M2070	28	112	105	4.8	2.3	1.9	27	22

* Min. output voltage at −60 dB intermodulation distortion (DIN 45004, par. 6.3: 3–tone, f = 470 MHz).
** The OM323A and OM337A need an external collector coil and output capacitor, the OM323 and OM337 have these built–in.

Inductive proximity detectors

For detailed information on these and other types see Data Handbook S13

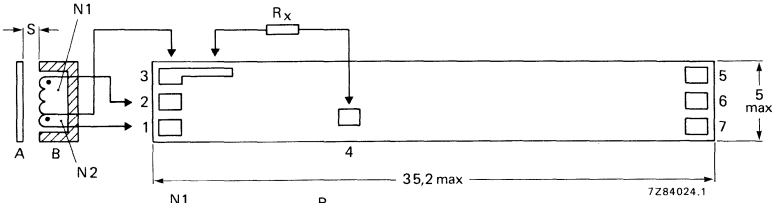
D.C. supply voltage range	4.5 to 30 V
Output current at V_B = 24 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 1 to 5 mm
Hysteresis in switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

Hybrid integrated circuits intended for inductive proximity detectors in tubular construction, especially the M8 hollow stud. The OM286 and OM286M are for positive and the OM287 and OM287M are for negative supply voltage. The circuit consists of an oscillator, a rectifier stage, a Schmitt trigger and an output stage.
The circuit performs a make function: when actuated the current flows trough the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

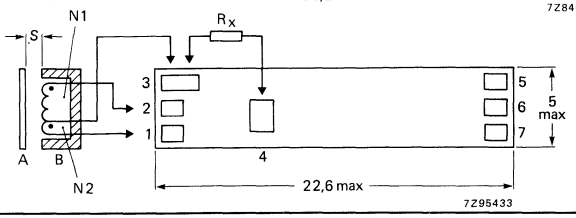
The output transistor is protected against transients from the inductive load by a voltage regulator diode. The circuit is protected against false polarity connection of the supply voltage.

The devices OM286/OM287 are thick-film circuits and the OM286M/OM287M are thin-film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil and a resistor (R_x), in a non-magnetic tube.

OM286/OM287



OM286M/OM287M



A = metal actuator
B = open potcore or potcore half with coil

Mechanical outline and connections. Note that the supply polarities to points 5 and 7 are given for the OM286 and OM286M; for OM287 and OM287M the polarities are point 5: $-V_B$ and point 7: $+V_B$.
S is the switching distance. The maximum height of the circuits including the substrate thickness is 1.7 mm.

type	supply voltage	technology
OM286	positive	thick film
OM286M	positive	thin film
OM287	negative	thick film
OM287M	negative	thin film

Inductive proximity detectors (cont.)

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 1 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

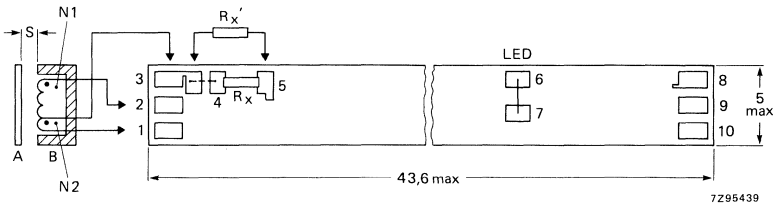
Hybrid integrated circuits intended for inductive proximity detectors in tubular construction, especially the M8 hollow stud. The OM386B is for positive supply voltage and the OM387B is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

Features

- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance, i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.



A = metal actuator
B = open potcore or potcore half with coil

Mechanical outline and connections. Note that the supply polarities to points 8 and 10 are given for the OM386; for OM387 the polarities are point 8: $-V_B$ and point 10: $+V_B$.
S is the switching distance. The maximum height of the circuits including the substrate thickness is 1.7 mm.

type	supply voltage
OM386B	positive
OM387B	negative

Inductive proximity detectors (cont.)

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 200 mA
Switching distance; depends on R_x and oscillator coil	typ. 1 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

Hybrid integrated circuits intended for inductive proximity detectors in tubular construction, especially the M8 hollow stud. The OM386M is for positive supply voltage and the OM387M is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

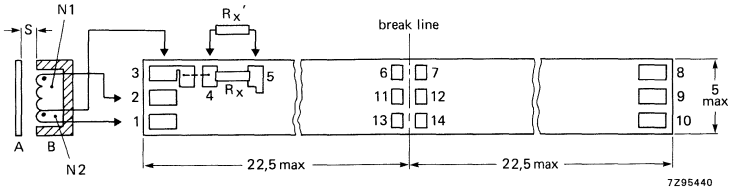
The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler. Compared to the types OM386B/OM387B the substrate length is drastically reduced.

S

Features

- extra small dimensions
- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.



Mechanical outline and connections. The supply polarities to points 8 and 10 are given for the OM386; for OM387 the polarities are point 8: $-V_B$ and point 10: $+V_B$. S is the switching distance. The thickness of assembled hybrid (two parts glued together back to back) is max. 3.8 mm.

type	supply voltage
OM386M	positive
OM387M	negative

Inductive proximity detectors (cont.)

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 2 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

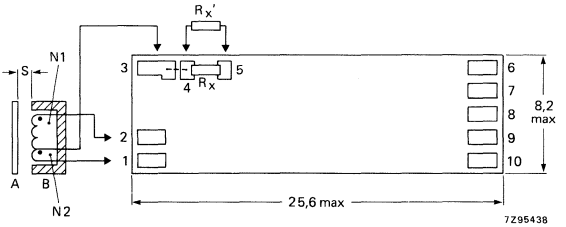
Hybrid integrated circuits intedended for inductive proximity detectors in tubular construction, especially the M12 hollow stud. The OM388B is for positive supply voltage and the OM389B is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

Features

- protection against short-circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin-film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non-magnetic tube.



A = metal actuator
B = open potcore or potcore half with coil

Mechanical outline and connections. Note that the supply polarities to points 5 and 7 are given for the OM286; for OM287 the polarities are point 5: $-V_B$ and point 7: $+V_B$.
S is the switching distance. The maximum height of the circuits including the substrate thickness is 1.7 mm.

type	supply voltage
OM388B	positive
OM389B	negative

Inductive proximity detectors (cont.)

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 2 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

Hybrid integrated circuits intedended for inductive proximity detectors in tubular construction, especially the M18 hollow stud. The OM390 is for positive supply voltage and the OM391 is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

S

Features

- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.

A = metal actuator
B = open potcore or potcore half with coil
S = the operating distance

type	supply voltage
OM390	positive
OM391	negative

Customized product capabilities

- Impartial advice for customers to choose between:
  pcb – Hybrid ICs – gate arrays or fully monolithic ICs
- Basic factory load guaranteed by standard catalogue hybrid modules
- Wide range of in–house surface mounted components and naked crystals
- Wide variety of application know–how
- Various factories with local or international approvals
  (e.g. CNET, CECC, AQUAP)
- Regular innovation of new technologies:
  High density with naked crystals
  Naked crystals in conformal coating
  Metallized via–holes
  Polyimide technology
  Full double–sided modules

Surface-mounting general purpose transistors

For detailed information on these and other types see Data Handbook S7

P-N-P type	case*	ratings				characteristics				
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	V_{CEsat} max V	at I_C/I_B mA	f_T typ MHz
BC807	SOT-23	45	45	500	310	100/600	100/1	0.70	500/50	100
BC808	SOT-23	25	25	500	310					
BC856	SOT-23	65	65	100	200	75/475	2/5	0.30	10/0.5	150
BC857	SOT-23	45	45	100	200	75/475	2/5	0.30	10/0.5	150
BC858	SOT-23	30	30	100	200	75/800	2/5	0.30	10/0.5	150
BC869	SOT-89	20	20	1000	1000	85/375	500/1	0.50	1000/100	60
BCV26	SOT-23	40	30	300	350	>20000	100/5	1.0	100/0.1	220
BCV62	SOT-143	30	30	100	200	100/800	2/5	0.65	100/5	150
BCV63	SOT-143	30	30	100	300	100/900	2/5	0.65	100/5	200
BCV64	SOT-143	30	30	100	300	100/900	2/5	0.30	100/0.5	200
BCV65	SOT-143	30	30	100	300	75/800	2/5	0.30	10/0.5	100
BCW29	SOT-23	32	32	100	350	120/260	2/5	0.30	10/0.5	150
BCW30	SOT-23	32	32	100	350	215/500	2/5	0.30	10/0.5	150
BCW61A	SOT-23	32	32	200	150	120/220	2/5	0.25	10/0.25	180
BCW61B	SOT-23					180/310				
BCW61C	SOT-23					250/460				
BCW61D	SOT-23					380/630				
BCW69	SOT-23	50	45	100	350	120/260	2/5	0.30	10/0.5	150
BCW70	SOT-23	50	45	100	350	120/500				
BCW89	SOT-23	80	60	100	350	120/260				
BCX17	SOT-23	50	45	500	425	100/600	100/1	0.62	500/50	100
BCX18	SOT-23	30	25	500	425					
BCX51	SOT-89	45	45	1000	1000	40/250	150/2	0.50	500/50	50
BCX52	SOT-89	60	60			40/160				
BCX53	SOT-89	100	80			40/160				
BCX71G	SOT-23	45	45	200	150	120/220	2/5	0.25	10/0.25	180
BCX71H	SOT-23	45	45	200	150	180/310	2/5	0.25	10/0.25	180
BCX71J	SOT-23					250/460				
BCX71K	SOT-23					380/630				
PMBTA55	SOT-23	60	60	500	300	50	10/1	0.25	100/10	50
PMBTA56	SOT-23	80	80	500	300	50	10/1	0.25	100/10	50
PMBTA63	SOT-23	30	30	500	300	5000	10/5	1.5	100/0.1	125
PMBTA64	SOT-23	30	30	500	300	10000	10/5	1.5	100/0.1	125

* Reverse-pinning types are available upon request for some SOT-23 encapsulated types

Surface–mounting general purpose transistors (cont.)

For detailed information on these and other types see Data Handbook S7

N–P–N type	case*	ratings				characteristics				
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	V_{CEsat} max	at I_C/I_B mA	f_T typ MHz
BC817	SOT–23	45	45	500	310	100/600	100/1	0.70	500/50	200
BC818	SOT–23	25	25	500	310					
BC846	SOT–23	65	65	100	200	220/800	2/5	0.25	10/0.5	300
BC847	SOT–23	45	45	100	200					
BC848	SOT–23	30	30	100	200					
BC868	SOT–89	20	20	1000	1000	85/375	500/1	0.50	1000/100	60
BCV27	SOT–23	40	30	300	350	> 20000	100/5	1.0	100/0.1	220
BCV61	SOT–143	30	30	100	200	100/800	2/5	0.60	100/5	300
BCV71	SOT–23	80	60	100	350	110/220	2/5	0.25	10/0.5	300
BCV72	SOT–23	80	60	100	350	200/450	2/5	0.25	10/0.5	300
BCW31	SOT–23	32	32	100	350	110/220	2/5	0.25	10/0.5	300
BCW32	SOT–23					200/450				
BCW33	SOT–23					420/800				
BCW60A	SOT–23	32	32	200	150	120/220	2/5	0.35	10/0.25	250
BCW60B	SOT–23	32	32	200	150	180/310	2/5	0.35	10/0.25	250
BCW60C	SOT–23					250/460				
BCW60D	SOT–23					380/630				
BCW71	SOT–23	50	45	100	350	110/220	2/5	0.25	10/0.5	300
BCW72	SOT–23					220/450				
BCW81	SOT–23	50	45	100	350	450/800	2/5	0.25	10/0.5	300
BCX19	SOT–23	50	45	500	425	100/600	100/1	0.62	500/50	200
BCX20	SOT–23	30	25							
BCX54	SOT–89	45	45	1000	1000	45/250	150/2	0.50	500/50	130
BCX55	SOT–89	60	60			40/160				
BCX56	SOT–89	100	80			40/160				
BCX70G	SOT–23	45	45	200	150	120/220	2/5	0.35	10/0.25	250
BCX70H	SOT–23					180/310				
BCX70J	SOT–23					250/460				
BCX70K	SOT–23	45	45	200	150	380/630	2/5	0.35	10/0.25	250
PMBT6428	SOT–23	60	50	200	350	250/600	–	0.2	10/0.5	300
PMBT6429	SOT–23	55	45	200	350	500/1250	–	0.2	10/0.5	300
PMBTA05	SOT–23	60	60	500	300	50	10/1	0.25	100/10	100
PMBTA06	SOT–23	80	80	500	300	50	10/1	0.25	100/10	100
PMBTA13	SOT–23	30	30	300	300	5000	10/5	1.5	100/0.1	125
PMBTA14	SOT–23	30	30	300	300	10000	10/5	1.5	100/0.1	125

* Reverse–pinning types are available upon request for some SOT–23 encapsulated types

Surface-mounting h.f. and wideband transistors

For detailed information on these and other types see Data Handbook S7 and S10

High frequency transistors

type	case*	ratings				characteristics					
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	F typ at dB	f MHz	f_T typ MHz	C_{re} typ pF
P-N-P											
BF550	SOT-23	40	40	25	200	50/–	1/10	2	0.1	325	0.5
BF569	SOT-23	40	35	30	200	25/–	3/10	4.5	800	900	0.33
BF579	SOT-23	20	20	25	150	20/–	10/10	4.5	800	1350	0.46
BF660	SOT-23	40	30	25	200	30/–	3/10	–	–	650	0.65
BF767	SOT-23	30	30	20	200	15/–	3/10	4	800	900	0.30
BF824	SOT-23	30	30	25	300	25/–	4/–	3	100	450	0.1
N-P-N											
BF570	SOT-23	40	15	100	300	>40	10/1	–	–	>490	1.6
BF840	SOT-23	40	40	25	300	70/220	1/10	1.5	0.2	300	0.27
BF841	SOT-23	40	40	25	300	40/125	1/10	2	0.2	300	0.27
BFS18	SOT-23	30	20	30	250	35/125	1/10	4	100	200	0.85
BFS19	SOT-23	30	20	30	250	65/225	1/10	4	100	260	0.85
BFS20	SOT-23	30	20	25	250	40/85	7/10	–	–	450	0.35

Wideband transistors

type	case*	ratings				characteristics					
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	d_{im} typ at dB	f MHz	f_T typ GHz	C_{re} typ pF
P-N-P											
BFT92	SOT-23	20	15	25	200	20/–	14/10	60	493.25	5	0.7
BFT93	SOT-23	15	12	35	200	20/–	30/5	60	493.25	5	1.0
N-P-N											
BFG67	SOT-143	20	10	50	300	60/100	15/5	2.5	2000	7500	0.5
BFQ17	SOT-89	40	25	150	1000	25/–	150/5		–	1.2	1.9
BFQ18A	SOT-89	25	15	150	1000	25/–	100/10	60	793.25	3.6	1.2
BFQ19	SOT-89	20	15	75	500	25/–	75/10		–	5.0	1.3
BFQ67	SOT-23	20	10	50	300	60/–	15/5			7.5	0.5
BFR53	SOT-23	18	10	50	250	25/–	50/5	60	217.0	2.0	0.9
BFR92	SOT-23	20	15	25	200	25/–	14/10	60	493.25	5.0	0.7
BFR92A	SOT-23	20	15	25	200	40/–	14/10	60	793.25	5.0	0.35
BFR93	SOT-23	15	12	35	200	25/–	30/5	60	493.25	5.0	0.8
BFR93A	SOT-23	15	12	35	250	40/–	30/5	60	793.25	5.0	0.6
BFS17	SOT-23	25	15	25	250	20/150	2/1	45	217	1.3	0.65
BFS17A	SOT-23	25	15	25	300	20/150	2/1	–	–	2.8	–
BFT25	SOT-23	8	5	2.5	50	20/–	1/1		–	2.3	0.45

* Reverse-pinning types are available upon request for some SOT-23 encapsulated types

PHILIPS

Surface-mounting switching transistors

For detailed information on these and other types see Data Handbook S7

type	case*	ratings				characteristics					
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	V_{CEsat} max V	at I_C/I_B mA/mA	t(max) on/off ns	at I_C/I_B mA
P-N-P											
BSR12	SOT-23	15	15	100	250	30/120	50/1	0.45	100/10	20/30	30/3
BSR15	SOT-23	60	40	600	425	100/300	150/10	1.6	500/50	45/100	150/15
BSR16	SOT-23	60	60	600	425	100/300	150/10	1.6	500/50	45/100	150/15
BSR18	SOT-23	40	40	200	250	50/150	10/1	0.40	50/5	70/250	10/1
BSR18A	SOT-23	40	40	200	250	100/300	10/1	0.4	50/5	70/300	10/1
BSR20	SOT-23	130	120	–	–	40/180	10/5	0.25	50/5	–	–
BSR20A	SOT-23	100	150	–	–	50/240	10/5	0.2	50/5	–	–
BSR30	SOT-89	70	60	1000	1000	40/120	100/5	0.5	500/50	500/650	100/5
BSR31	SOT-89	70	60	1000	1000	100/300	100/5	0.5	500/50	500/650	100/5
BSR32	SOT-89	90	80	1000	1000	40/120	100/5	0.5	500/50	500/650	100/5
BSR33	SOT-89	90	80	1000	1000	100/300	100/5	0.5	500/50	500/650	100/5
BSS63	SOT-23	110	100	100	350	30/–	25/1	0.25	25/2.5	–	–
BST60	SOT-89	60	45	500	1000	1000/–	150/10	1.3	500/0.5	400/1500	500/0.5
BST61	SOT-89	80	60	500	1000	1000/–	150/10	1.3	500/0.5	400/1500	500/0.5
BST62	SOT-89	100	80	500	1000	1000/–	150/10	1.3	500/0.5	400/1500	500/0.5
PMBT2907	SOT-23	60	40	600	350	30/–	500/10	0.4	150/15	45/100	150/15
PMBT2907A	SOT-23	60	60	600	350	30/–	500/10	0.4	150/15	45/100	150/15
PMBT3906	SOT-23	40	40	200	300	100/300	0.25	10/1			
PXT3906	SOT-89	40	40	200	1000	100/300	10/1	0.25	10/1	35/35	10/1
N-P-N											
BSR13	SOT-23	60	30	800	425	100/300	150/10	1.6	500/50	35/285	150/–
BSR14	SOT-23	75	40	800	425	100/300	150/10	1.0	500/50	35/285	150/–
BSR17	SOT-23	60	40	200	350	50/150	10/1	0.3	50/5	70/225	10/1
BSR17A	SOT-23	60	40	200	350	100/300	10/1	0.3	50/5	70/250	10/1
BSR19	SOT-23	160	140	600	300	60/250	10/5	0.25	50/5	–	–
BSR19A	SOT-23	180	160	600	300	80/250	10/5	0.2	50/5	–	–
BSR40	SOT-89	70	60	1000	1000	40/120	100/5	0.5	500/50	250/1000	100/5
BSR41	SOT-89	70	60	1000	1000	100/300	100/5	0.5	500/50	250/1000	100/5
BSR42	SOT-89	90	80	1000	1000	40/120	100/5	0.5	500/50	250/1000	100/5
BSR43	SOT-89	90	80	1000	1000	100/300	100/5	0.5	500/50	250/1000	100/5
BSS64	SOT-23	120	80	100	350	20/80	10/1	0.2	50/15	/1000	15/1
BSV52	SOT-23	20	12	100	250	40/120	10/1	0.2	50/5	12/18	10/3
BST50	SOT-89	60	45	500	1000	1000/–	150/10	1.3	500/50	400/1500	500/0.5
BST51	SOT-89	80	60	500	1000	1000/–	150/10	1.3	500/50	400/1500	500/0.5
BST52	SOT-89	100	80	500	1000	1000/–	150/10	1.3	500/50	400/1500	500/0.5
PMBT2222	SOT-23	60	30	600	350	100/300	150/10	0.4	150/15	35/285	150/–
PMBT2222A	SOT-23	75	40	600	350	100/300	150/10	0.3	150/15	35/285	150/–
PMBT3903	SOT-23	60	40	200	300	20/150	0.3	50/5	70/225		
PMBT3904	SOT-23	60	40	200	300	40/300	0.3	50/5	70/250		
PXT3904	SOT-89	60	40	200	1000	100/300	10/1	0.2	10/1	35/35	10/1

* Reverse-pinning types are available upon request for some SOT-23 encapsulated types

Surface–mounting general low noise and h.v. transistors

For detailed information on these and other types see Data Handbook S7

Low noise transistors (F < 4 dB at f = 1kHz; B = 200 Hz)

type	case	ratings				characteristics				
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max at	I_C/V_{CE} mA/V	V_{CEsat} max at V	I_C/I_B mA	f_T typ MHz
P–N–P										
BC859	SOT–23	30	30	100	200	125/800	2/5	0.3	10/0.5	150
BC860	SOT–23	45	45	100	200	125/800	2/5	0.3	10/0.5	150
BCF29	SOT–23	32	32	100	350	120/260	2/5	0.3	10/0.5	150
BCF30	SOT–23	32	32	100	350	215/500	2/5	0.3	10/0.5	150
BCF70	SOT–23	50	45	100	350	215/500	2/5	0.3	10/0.5	150
N–P–N										
BC849	SOT–23	30	30	100	200	450/800	2/5	0.25	10/0.5	300
BC850	SOT–23	45	45	100	200					
BCF32	SOT–23	32	32	100	350	200/450	2/5	0.25	10/0.5	300
BCF33	SOT–23	32	32	100	350	420/800	2/5	0.25	10/0.5	300
BCF81	SOT–23	50	45	100	350	420/800	2/5	0.25	10/0.5	300

High voltage transistors

type	case	ratings				characteristics				
		V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max at	I_C/V_{CE} mA/V	V_{CEsat} max at V	I_C/I_B mA	f_T min MHz
P–N–P										
BF621	SOT–89	300	–	20	1000	50/–	25/20	0.8	30/5	60
BF623	SOT–89	250	250	20	1000	50/–	25/20	0.8	30/5	60
BF821	SOT–23	300	–	50	310	50/–	25/20	0.8	30/5	60
BF823	SOT–23	250	250	50	310	50/–	25/20	0.8	30/5	60
BST15	SOT–89	200	200	1000	1000	30/150	50/10	2.5	50/5	15
BST16	SOT–89	350	300	1000	1000	30/120	50/10	2.0	50/5	15
PMBTA92	SOT–23	300	300	500	300	40/–	10/10	0.5	20/2	50
PMBTA93	SOT–23	200	200	500	300	40/–	10/10	0.5	20/2	50
N–P–N										
BF620	SOT–89	300	–	20	1000	50/–	25/20	0.6	30/5	60
BF622	SOT–89	250	250	20	1000	50/–	25/20	0.6	30/5	60
BF820	SOT–23	300	–	50	310	50/–	25/20	0.6	30/5	60
BF822	SOT–23	250	250	50	310	50/–	25/20	0.6	30/5	60
BST39	SOT–89	400	350	1000	1000	40/160	20/10	0.5	50/4	15
BST40	SOT–89	350	250	1000	1000	40/160	20/10	0.5	50/4	15
PMBTA42	SOT–23	300	300	500	310	40/–	30/10	0.5	20/2	50
PMBTA43	SOT–23	200	200	500	310	40/–	30/10	0.5	20/2	50

Surface–mounting FETs and trigger devices

For detailed information on these and other types see Data Handbook S7

For FET configurations see general data pages, beginning S100

P–and N–channel field effect transistors

type	case	FET type (see notes)	ratings				characteristics					
			$\pm V_{DS}$ V	$-V_{GSO}$ V	I_D mA	P_{tot} mW	$-I_{GSS}$ max nA	I_{DSS} min/max mA	$-V_{(P)GS}$ max V	$\|Y_{fs}\|$ min mS	C_{RS} max pF	V_n max µV
BF510	SOT–23	(1)	20	–	10	250	10	0.7/3.0	0.8	2.5	0,4	–
BF511	SOT–23	(1)	20	–	10	250	10	2.5/7.0	1.5	4	0.4	–
BF512	SOT–23	(1)	20	–	10	250	10	6/12	2.2	6	0.4	–
BF513	SOT–23	(1)	20	–	10	250	10	10/18	3	7	0.4	–
BF989	SOT–143	(2)	20	–	20	200	50	2/20	2.7	9.5	0.025	–
BF990A	SOT–143	(2)	18	–	30	200	25	–	1.3	17	0.025	–
BF991	SOT–143	(2)	20	–	20	200	50	4/25	2.5	10	0.020	–
BF992	SOT–143	(2)	20	–	40	200	25	–	1.3	20	0.04	–
BF994S	SOT–143	(2)	20	–	–	300	50	4/20	2.5	15	–	–
BF996S	SOT–143	(2)	20	–	–	300	50	4/20	2.5	15	–	–
BF997	SOT–143	(2)	20	–	30	300	10	2/20	2.5	15	0.025	–
BFR30	SOT–23	(1)	25	25	10	250	0.2	4/10	5	1	1.5	0.5
BFR31	SOT–23	(1)						1/5	2.5	1.5	–	–
BFR101A	SOT–143	(1)	30	30	10	200	5	0.2/1.5	1.0	1.2	–	–
BFR101B	SOT–143	(1)	30	30	10	200	5	1/5	2.5	2.5	–	–
BFT46	SOT–23	(1)	25	25	10	250	0.2	0.2/1.5	1.0	1.0	1.5	0.5
BSD20	SOT–143	(4)	10	–	50	230	1.0	–	2.0	–	0.6	–
BSD22	SOT–143	(4)	20	–	50	230	1.0	–	2.0	–	0.6	–
BSR56	SOT–23	(3)	40	40	–	250	1	50/–	10	–	5	–
BSR57	SOT–23	(3)						20/100	6	–	–	–
BSR174	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR175	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR176	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR177	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR58	SOT–23	(3)						8/8000	4	–	–	–
BSS83	SOT–143	(4)	10	–	50	230	10	–	2.0	–	0.6	–
BST80	SOT–89	(5)	80	–	–	1000	100	500	3.5	–	–	–
BST82	SOT–23	(5)	80	–	–	250	100	175	3.5	–	–	–
BST84	SOT–89	(5)	200	–	–	1000	100	300	3.5	–	–	–
BST86	SOT–89	(5)	180	–	–	1000	100	300	2.7	–	–	–
BST120	SOT–89	(6)	60	–	–	1000	100	–	–	–	–	–
BST122	SOT–89	(6)	50	–	–	1000	100	–	–	–	–	–
PMBF4391	SOT–23	(3)	40	–	–	250	1	50	10	–	3.5	–
PMBF4392	SOT–23	(3)	40	–	–	250	1	25	5	–	3.5	–
PMBF4393	SOT–23	(3)	40	–	–	250	1	5	3	–	3.5	–

Trigger devices

P–N–P–N type	case	V_{GA} max V	I_A max mA	I_P µA	I_V µA
BRY61	SOT–23	70	175	5/1	30/50
BRY62	SOT–143	70	175	–	–

(1) n–channel junction FETs
(2) dual–gate n–channel MOS FETs
(3) n–channel junction FETs for switching
(4) n–channel MOS–FETs for switching
(5) n–channel vertical D–MOS FETs for switching
(6) p–channel vertical D–MOS FETs for switching
(7) p–channel junction FETS for switching

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For detailed information on these and other types see Data Handbook S1 and S7

- four encapsulations – SOT-23, SOT-89, SOT-143 and SOD-80, all suitable for wave and reflow soldering.
- unimetal bonding of SOT-23 switching diodes for long life
- avalanche diodes – BAS29, BAS31 and BAS 35
- SOD-80 is a hermetically sealed glass encapsulation
- performance and reliability of all types comparable to that of axial leaded DO-34 and DO-35 diodes (the same crystals are used)

General-purpose diodes

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	nearest conventional	configuration
BAS19	P	SOT-23	100	200	50	5	BAV19	
BAS20	P	SOT-23	150	200	50	5	BAV20	
BAS21	P	SOT-23	200	200	50	5	BAV21	
BAV23	C	SOT-143	200	200	50	5	2 x BAV21	two separate diodes
BAV100	P	SOD-80	50	250	50	5	BAV18	
BAV101	P	SOD-80	100	250	50	5	BAV19	
BAV102	P	SOD-80	150	250	50	5	BAV20	
BAV103	P	SOD-80	200	250	50	5	BAV21	
BAV105	P	SOD-80	60	300	6	2.5		

Switching diodes

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	nearest conventional	configuration
BAS32	P	SOD-80	75	200	4	2	IN4148	
BAS16	P	SOT-23	75	250	6	2	BAW62	
BAS29*	C	SOT-23	90	250	50	35	BAX12	
BAS31*	C	SOT-23	90	200	50	35	2 x BAX12	series-connected double diode
BAS35*	C	SOT-23	90	200	50	35	2 x BAX12	common-anode double diode
BAS28	P	SOT-143	70	250	4	1.5	2 x BAX12	two separate diodes
BAS56	C	SOT-143	60	200	6	2.5	BAV10	two separate diodes
BAV70	P	SOT-23	70	250	6	1.5	2 x BAW62	common-cathode double diode
BAV99	P	SOT-23	70	250	6	1.5	2 x BAW62	series-connected double diode
BAW56	P	SOT-23	70	250	6	2	2 x BAW62	common-anode double diode

Variable capacitance tuning diodes

type	status	case	V_R V	r_D Ω	C_d pF at	V_R V and	f MHz	C_d ratio at	V	nearest conventional
BBY31	P	SOT-23	28	1.2	1.8–2.8	25	1	typ. 5	3/25	BB405
BBY39	P	SOT-23	30	1.2	1.8–2.0	28	1	>7.6	1/28	–
BBY40	P	SOT-23	28	0.6	4.3–6	25	1	>5	3/25	BB809
BBY42	P	SOT-23	32	–	24 typ	3	1	1–16	1/28	–
BB215**	C	SOD-80	28	0.63	1.8–2.2	28	1	>7.6	1/28	BB405B
BB219**	C	SOD-80	28	0.7	2.6–3.2	28	1	>12	1/28	BB909

* avalanche diode
** available in matched sets
N.B. all values are maximum ones unless stated otherwise.

Surface–mounting diodes (cont.)

For detailed information on these and other types see Data Handbook S1 and S7

Band switching diodes

type	status	case	V_R V	I_F mA	r_D Ω at	I_F mA and	f MHz	C_d pF at	V_R V and	f MHz	nearest conventional
BA682	P	SOD–80	35	100	0.7	3	200	1.25	3	1	BA482
BA683	P	SOD–80	35	100	1.2	3	200	1.2	3	1	BA483
BAT18	P	SOT–23	35	100	0.7	5	200	1	20	1	BA482

Schottky–Barrier diodes

type	status	case	V_R V	I_F mA	V_F mV at	I_F mA	C_d pF at	V_R V and	f MHz	nearest conventional
BAT17	P	SOT–23	4	30	450	1	1	0	1	BA481
BAT54	C	SOT–23	30	200	400	10	10	0	1	BAT85
BAT74	C	SOT–143	30	200	400	10	10	0	1	BAT85
BAS85	P									

Voltage regulator diodes

series	status	case	V_Z E24 series V	V_Z tolerance	P_{tot} mW	nearest conventional
BZD27	P	SOD–87	7.5 to 510	5%	2500	BZD23
BZV49	P	SOT–98	2.4 to 75	5%	1000	BZV85
BZV55	P	SOD–80	2.4 to 75	5%	500	BZX79
BZX84	P	SOT–23	2.4 to 75	5%	300	BZX79
BZX84	C	SOT–23	2.4 to 75	2%	300	BZX79

Low voltage stabistor

type	status	case	V_F mV at	I_F mA	I_{FRM} mA	C_d pF at	V_R V and	f MHz	nearest conventional
BAS17	P	SOT–23	610–690	0.1	250	140	0	1	BA314
			680–760	1.0			0	1	
			750–830	10			0	1	
			870–960	100			0	1	

For detailed information on these and other types see Data Handbook S1 and S7

Controlled avalanche rectifier diodes

type	st.	case	ratings							nearest conventional
			$I_{F\,(AV)}$ A	V_{RWM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	P_{RRM} and P_{RSM} t = 20 µs kW	kW	E_{RSM} mJ	
BYD17 **series**	P	SOD–87	1.5	200 to 800	5.5	20	–	–	7	BYD13

Very fast rectifier diodes

type	st.	case	ratings				characteristics		nearest conventional
			$I_{F\,(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	t_{rr} max ns	$V_{F\,max}$ at I_F T_j = 25 °C V/A	
BYD37 series	P	SOD–87	1.5	200 to 1000	7	20	250	1.3/1	BYD33

Ultra fast rectifier diodes

type	st.	case	ratings				characteristics		nearest conventional
			$I_{F\,(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	t_{rr} max ns	$V_{F\,max}$ at I_F T_j = 25 °C V/A	
BYD77 series	P	SOD–87	2	50 to 400	15 to 30	25	25 to 50	0.95/1 1.95/1	BYD73

N.B. All values are maximum ones unless stated otherwise.

Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT-23	SOT-89	SOT-143	SOD-80	marking type*	marking rev. type	device type	nearest conventional	comple-ment
BA682				●	red band		diode	BA482	
BA683				●	red & or.		diode	BA483	
BAS16	●				A6		diode	BAW62, 1N4148	
BAS17	●				A91		diode	BA314	
BAS19	●				A8		diode	BAV19	
BAS20	●				A81		diode	BAV20	
BAS21	●				A82		diode	BAV21	
BAS28			●		A61		diode	2 x 1N4148	
BAS29	●				L20		diode	BAX12	
BAS31	●				L21		diode	2 x BAX12	
BAS32				●	black band		diode	1N4148	
BAS35	●				L22		diode	2 x BAX12	
BAS56			●		L51		diode	2 x BAV10	
BAT17	●				A3		diode	BA480	
BAT18	●				A2		diode	BA482	
BAT54	●						diode	BAT85	
BAT74			●				diode	2 x BAT85	
BAV23			●		L30		diode	2 x BAV21	
BAV70	●				A4		diode	2 x BAW62, 1N4148	
BAV99	●				A7		diode	2 x BAW62, 1N4148	
BAV100				●	gr. & bl.		diode	BAV18	
BAV101				●	gr. & br.		diode	BAV19	
BAV102				●	gr. & red		diode	BAV20	
BAV103				●	gr. & or.		diode	BAV21	
BAW56	●				A1		diode	2 x BAW62, 1N4148	
BB215				●	white & gr.		diode	BB405B	
BB219				●	white		diode	BB909	
BBY31	●				S1		diode	BB405	
BBY40	●				S2		diode	BB809	
BBY42	●				–		diode	–	
BC807-16	●				5A	5AR	PNP	BC327-16	BC817-16
BC807-25	●				5B	5BR	PNP	BC327-25	BC817-25
BC807-40	●				5C	5CR	PNP	BC327-40	BC817-40
BC808-16	●				5E	5ER	PNP	BC328-16	BC818-16
BC808-25	●				5F	5FR	PNP	BC328-25	BC818-25
BC808-40	●				5G	5GR	PNP	BC328-40	BC818-40
BC817-16	●				6A	6AR	NPN	BC337-16	BC807-16
BC817-25	●				6B	6BR	NPN	BC337-25	BC807-25
BC817-40	●				6C	6CR	NPN	BC337-40	BC807-40
BC818-16	●				6E	6ER	NPN	BC328-16	BC808-16
BC818-25	●				6F	6FR	NPN	BC328-25	BC808-25
BC818-40	●				6G	6GR	NPN	BC328-40	BC808-40
BC846A	●				1A	1AR	NPN	BC546A	BC856A

* or. = orange; gr. = green; bl. = black; br. = brown.

Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT-23	SOT-89	SOT-143	SOD-80	marking type	marking rev. type	device type	nearest conventional	complement
BC846B	●				1B	1BR	NPN	BC546B	BC856B
BC847A	●				1E	1ER	NPN	BC547A, BC107A	BC857A
BC847B	●				1F	1FR	NPN	BC547B, BC107B	BC857B
BC847C	●				1G	1GR	NPN	BC547C	BC857C
BC848A	●				1J	1JR	NPN	BC548A, BC108A	BC858A
BC848B	●				1K	1KR	NPN	BC548B, BC108B	BC858B
BC848C	●				1L	1LR	NPN	BC548C, BC108C	BC858C
BC849B	●				2B	2BR	NPN	BC549B, BC109B	BC859B
BC849C	●				2C	2CR	NPN	BC549C, BC109C	BC859C
BC850B	●				2F	2FR	NPN	BC550B, BCY59	BC860B
BC850C	●				2G	2GR	NPN	BC550C, BCY59	BC860C
BC856A	●				3A	3AR	PNP	BC556A	BC846A
BC856B	●				3B	3BR	PNP	BC556B	BC846B
BC857A	●				3E	3ER	PNP	BC557A, BC177A	BC847A
BC857B	●				3F	3FR	PNP	BC557B, BC177B	BC847B
BC857C	●				3G	3GR	PNP	BC557C	BC847C
BC858A	●				3J	3JR	PNP	BC558A, BC178A	BC848A
BC858B	●				3K	3KR	PNP	BC558B, BC178B	BC848B
BC858C	●				3L	3LR	PNP	BC558C	BC848C
BC859A	●				4A	4AR	PNP	BC559A, BC179A, BCY78	
BC859B	●				4B	4BR	PNP	BC559B, BCY79	BC849B
BC859C	●				4C	4CR	PNP	BC559C, BCY79	BC849C
BC860A	●				4E	4ER	PNP	BC560A, BCY79	
BC860B	●				4F	4FR	PNP	BC560B, BCY79	BC850B
BC860C	●				4G	4GR	PNP	BC560C, BCY79	BC850C
BC868		●			CAC		NPN	BC368, BD329	BC869
BC869		●			CEC		PNP	BC369, BD330	BC868
BCF29	●				C7	C77	PNP	BC559A, BCY78, BC179	
BCF30	●				C8	C9	PNP	BC559B, BCY78	BCF32
BCF32	●				D7	D77	NPN	BC549B, BCY58, BC109	BCF30
BCF33	●				D8	D81	NPN	BC549C, BCY58	
BCF70	●				H7	H71	PNP	BC560B, BCY79	
BCF81	●				K9	K91	NPN	BC550C	
BCV26	●				FD	–	PNP	–	BCV27
BCV27	●				FF	–	NPN	–	BCV26
BCV61		●			D91		NPN	–	BCV62
BCV62		●			C91		PNP	–	BCV61
BCV63			●		D95	–	NPN	–	–
BCV64			●		C95	–	PNP	–	–
BCV65			●		97	–	PNP/NPN	–	–
BCV71	●				K7	K71	NPN	BC546A	
BCV72	●				K8	K81	NPN	BC546B	
BCW29	●				C1	C4	PNP	BC178A, BC558A	BCW31
BCW30	●				C2	C5	PNP	BC178B, BC558B	BCW32
BCW31	●				D1	D4	NPN	BC108A, BC548A	BCW29

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Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT-23	SOT-89	SOT-143	SOD-80	marking type	marking rev. type	device type	nearest conventional	complement
BCW32	●				D2	D5	NPN	BC108B, BC548B	BCW30
BCW33	●				D3	D6	NPN	BC108C, BC548C	
BCW60A	●				AA		NPN	BC548A	BCW61A
BCW60B	●				AB		NPN	BC548B	BCW61B
BCW60C	●				AC		NPN	BC548B	BCW61C
BCW60D	●				AD		NPN	BC548C	BCW61D
BCW61A	●				BA		PNP	BC558A	BCW60A
BCW61B	●				BB		PNP	BC558B	BCW60B
BCW61C	●				BC		PNP	BC558B	BCW60C
BCW61D	●				BD		PNP	BC558C	BCW60D
BCW69	●				H1	H4	PNP	BC557A	BCW71
BCW70	●				H2	H5	PNP	BC557B	BCW72
BCW71	●				K1	K4	NPN	BC547A	BCW69
BCW72	●				K2	K5	NPN	BC547B	BCW70
BCW81	●				K3	K31	NPN	BC547C	
BCW89	●				H3	H31	PNP	BC556A	
BCX17	●				T1	T4	PNP	BC327	BCX19
BCX18	●				T2	T5	PNP	BC328	BCX20
BCX19	●				U1	U4	NPN	BC337	BCX17
BCX20	●				U2	U5	NPN	BC338	BCX18
BCX51		●			AA		PNP	BC636, BD136	BCX54
BCX52		●			AE		PNP	BC638, BD138	BCX55
BCX53		●			AH		PNP	BC640, BD140	BCX56
BCX54		●			BA		NPN	BC635, BD135	BCX51
BCX55		●			BE		NPN	BC637, BD137	BCX52
BCX56		●			BH		NPN	BC639, BD139	BCX53
BCX70G	●				AG		NPN	BC107A, BC547A	BCX71G
BCX70H	●				AH		NPN	BC107B, BC547B	BCX71H
BCX70J	●				AJ		NPN	BC107B, BC547B	BCX71J
BCX70K	●				AK		NPN	BC107C, BC547C	BCX71K
BCX71G	●				BG		PNP	BC177A, BC557A	BCX70G
BCX71H	●				BH		PNP	BC177B, BC557B	BCX70H
BCX71J	●				BJ		PNP	BC177B, BC557B	BCX70J
BCX71K	●				BK		PNP	BC557C	BCX70K
BF510	●				S6		FET	BF410A	
BF511	●				S7		FET	BF410B	
BF512	●				S8		FET	BF410C	
BF513	●				S9		FET	BF410D	

Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT-23	SOT-89	SOT-143	SOD-80	marking type	marking rev. type	device type	nearest conventional	complement
BF550	●				G2	G5	PNP	BF450	
BF569	●				G6		PNP	BF970	
BF570	●				B26	–	NPN	BF370	
BF579	●				G7		PNP	BF979	
BF620		●			DC		NPN	BF420, BF471, BF871	BF621
BF621		●			DF		PNP	BF421, BF472, BF872	BF620
BF623		●			DB		PNP	BF423, BF470, BF870	
BF660	●				G8	G81	PNP	BF606A	
BF820	●				1V		NPN	BF420	BF821
BF821	●				1W		PNP	BF421	BF820
BF823	●				1Y		PNP	BF423	
BF824	●				F8		PNP	BF324	
BF840	●				F3		NPN	BF240	
BF841	●				F31		NPN	BF241	
BF989			●		M89		FET	BF960	
BF990A			●				FET	BF980A	
BF991			●		M91		FET	BF981	
BF992			●		M92		FET	BF982	
BF994			●		M94		FET	BF964	
BF994S			●		M93		FET	BF964S	
BF996			●		M96		FET	BF966	
BF996S			●		M95		FET	BF966S	
BF997			●		M83		FET	BF965	
BF998			●				FET	BF988	
BFG17A			●		E6		NPN	BFW92A	
BFG33			●		V6		NPN	BFQ33C	
BFG67			●		V3		NPN	BFG65	
BFG92A			●		P8		NPN	BFG90A	
BFG93A			●		R8		NPN	BFG91A	
BFG197			●		V5		NPN	BFG195	
BFQ17		●			FA		NPN	BFW16A	
BFQ18A		●			FF		NPN	BFQ34	
BFQ19		●			FB		NPN	BFR96	BFQ149
BFQ67		●			V2		NPN	BFQ65	
BFQ149	●				FG		PNP	BFQ32	BFQ19
BFR30	●				M1		FET	BFW11, BF245B	
BFR31	●				M2		FET	BFW12, BF245A	
BFR53	●				N1	N4	NPN	BFW30, BFW93	
BFR92	●				P1	P4	NPN	BFR90	BFT92
BFR92A	●				P2	P5	NPN	BFR90A	BFT92
BFR93	●				R1	R4	NPN	BFR91	BFT93
BFR93A	●				R2	R5	NPN	BFR91A	BFT93
BFR101A			●		M97		FET	–	
BFR101B			●		M98		FET	–	
BFS17	●				E1	E4	NPN	BFY90, BFW92	
BFS17A	●				E2	E5	NPN	BFW92A	
BFS18	●				F1	F4	NPN	BF185, BF495	
BFS19	●				F2	F5	NPN	BF184, BF494	

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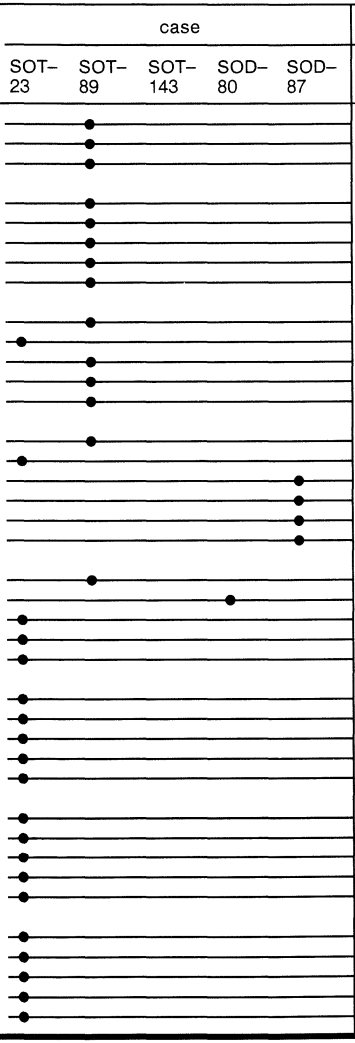
Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT-23	SOT-89	SOT-143	SOD-80	marking type	marking rev. type	device type	nearest conventional	comple-ment
BFS20	●				G1	G4	NPN	BF199	
BFT25	●				V1	V4	NPN	BFT24	
BFT46	●				M3		FET	BFW13, BF245	
BFT92	●				W1	W4	PNP	BFQ51; 52	BFR92
BFT93	●				X1	X4	PNP	BFQ23;24	BFR93
BRY61	●				A5		PNPN	BRY56	
BRY62	●				A51		PNPN	BRY56, BRY39	
BSD20			●		M31		FET	BSD10	
BSD22			●		M32		FET	BSD12	
BSR12	●				B5	B8	PNP	2N2894A	BSV52
BSR13	●				U7	U71	NPN	2N2222, PH2222	BSR15
BSR14	●				U8	U81	NPN	2N2222A, PH2222A	BSR16
BSR15	●				T7	T71	PNP	2N2907, PH2907	BSR13
BSR16	●				T8	T81	PNP	2N2907A, PH2907A	BSR14
BSR17	●				U9	U91	NPN	2N3903	BSR18
BSR17A	●				U92	U93	NPN	2N3904	BSR18A
BSR18	●				T9	T91	PNP	2N3905	BSR17
BSR18A	●				T92	T93	PNP	2N3906	BSR17A
BSR19	●				U35		NPN	2N5550	BSR20
BSR19A	●				U36		NPN	2N5551	BSR20A
BSR20	●				T35		PNP	2N5400	BSR19
BSR20A	●				T36		PNP	2N5401	BSR19A
BSR30		●			BR1		PNP	2N4030	BSR40
BSR31		●			BR2		PNP	2N4031	BSR41
BSR32		●			BR3		PNP	2N4032	BSR42
BSR33		●			BR4		PNP	2N4033	BSR43
BSR40		●			AR1		NPN	BSX46-6	BSR30
BSR41		●			AR2		NPN	BSX46-16	BSR31
BSR42		●			AR3		NPN	2N3020	BSR32
BSR43		●			AR4		NPN	2N3019	BSR33
BSR56	●				M4		FET	2N4856	
BSR57	●				M5		FET	2N4857	
BSR58	●				M6		FET	2N4858	
BSR174	●				LO	–	FET	BSJ174	–
BSR175	●				LP	–	FET	BSJ175	–
BSR176	●				LQ	–	FET	BSJ176	–
BSR177	●				LR	–	FET	BSJ177	–
BSS63	●				T3	T6	PNP	BSS68	BSS64
BSS64	●				U3	U6	NPN	BSS38	BSS63
BSS83			●		M74		FET	BSD213	

Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7



type number	case SOT-23	SOT-89	SOT-143	SOD-80	SOD-87	marking type	device type	nearest conventional	complement
BST15		●				BT1	PNP	2N5415	BST40
BST16		●				BT2	PNP	2N5416	BST39
BST50		●				AS1	NPN	BSR50, BSS50, BDX42	
BST51		●				AS2	NPN	BSR51, BSS51, BDX43	
BST52		●				AS3	NPN	BSR52, BSS52, BDX44	
BST60		●				BS1	PNP	BSR60, BSS60, BDX45	
BST61		●				BS2	PNP	BSR61, BSS61, BDX46	
BST62		●				BS3	PNP	BSR62, BSS62, BDX47	
BST80		●				KM	FET	BST70A	
BST82	●					OZ	FET	BST72A	
BST84		●				KN	FET	BST74A	
BST86		●				KQ	FET	BST76A	
BST120		●				LM	FET	BST100	
BST122		●				LN	FET	BST110, BS250	
BSV52	●					B2*	NPN	PH2369, BSX20	BSR12
BYD17					●		diode		
BYD77					●		diode		
BYD37					●		diode		
BZD27					●		diode		
BZV49		●				*	diode	BZV85	
BZV55				●			diode		
BZX84	●					*	diode	BZX79	
PBMF4391	●					M62	FET	2N4391, PH4391	
PBMF4392	●					M63	FET	2N4392, PH4392	
PBMF4393	●					M64	FET	2N4395, PH4395	
PBMT2222	●					P1B	NPN	2N2222	PMBT2907
PBMT2222A	●					P1P	NPN	2N2222A	..2907A
PBMT2907	●					P2B	PNP	2N2907	PMBT2222
PBMT2907A	●					P2F	PNP	2N2907A	..2222A
PMBT3903	●					P1Y	NPN	2N3903	PMBT3905
PMBT3904	●					P1A	NPN	2N3904	PMBT3905
PMBT3906	●					P2A	PNP	2N3906	PMBT3904
PMBT6428	●					P1K	NPN	2N6428	
PMBT6429	●					P1L	NPN	2N6429	
PMBTA05	●					P1H	NPN	MPSA05	PMBTA55
PMBTA06	●					P1G	NPN	MPSA06	PMBTA56
PMBTA13	●					P1M	NPN	MPSA13	PMBTA63
PMBTA14	●					P1N	NPN	MPSA14	PMBTA64
PMBTA42	●					P1D	NPN	MPSA42	PMBTA94

* Reverse type: B3

Surface-mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT-23	SOT-89	SOT-143	SOD-80	SOD-87	marking type	device type	nearest conventional	complement
PMBTA43	●					P1E	NPN	MPSA43	PMBTA93
PMBTA55	●					P2G	NPN	MPSA55	PMBTA05
PMBTA56	●					P2H	NPN	MPSA56	PMBTA06
PMBTA63	●					P2U	PNP	MPSA63	PMBTA13
PMBTA64	●					P2V	PNP	MPSA64	PMBTA14
PMBTA92	●					P2D	PNP	MPSA92	PMBTA42
PMBTA93	●					P2E	PNP	MPSA93	PMBTA43
PMLL5225B to PMLL5267B				●			diode	1N5225B to 1N5267B	
PXT3904	●					P1A	NPN	2N3904	PXT3906
PXT3906	●					P2A	PNP	2N3906	PXT3904

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type case device type nearest conventional type	BZV49 SOT–89 diode BZV85 series	BZX84 SOT–23 diode BZX79 series
type number suffix	mark	mark
C2V4	2Y4	Z11
C2V7	2Y7	Z12
C3V0	3Y0	Z13
C3V3	3Y3	Z14
C3V6	3Y6	Z15
C3V9	3Y9	Z16
C4V3	4Y3	Z17
C4V7	4Y7	Z1
C5V1	5Y1	Z2
C5V6	5Y6	Z3
C6V2	6Y2	Z4
C6V8	6Y8	Z5
C7V5	7Y5	Z6
C8V2	8Y2	Z7
C9V1	9Y1	Z8
C10	10Y	Z9
C11	11Y	Y1
C12	12Y	Y2
C13	13Y	Y3
C15	15Y	Y4
C16	16Y	Y5
C18	18Y	Y6
C20	20Y	Y7
C22	22Y	Y8
C24	24Y	Y9
C27	27Y	Y10
C30	30Y	Y11
C33	33Y	Y12
C36	36Y	Y13
C39	39Y	Y14
C43	43Y	Y15
C47	47Y	Y16
C51	51Y	Y17
C56	56Y	Y18
C62	62Y	Y19
C68	68Y	Y20
C75	75Y	Y21

For detailed information on these and other types see Data Handbook S8b

Currently available technologies:

- **Metallo–Organic Vapour Phase Epitaxy** (MOVPE); process in ternary (GaAlAs) and quaternary (InGaAsP/InP) compounds, combined with:

  - PB (Proton Bombarded) compounds) laser structure
    - gain guided, multi–longitudinal structure
    - extremely low sensitivity to optical feedback
    - choice of wavelengths (820 nm, 850 nm, 870 nm)

  - DCPBH (Double Channel Planar Buried Hetero) laser structure
    - high reliability, long life expectancy
    - stable operation over a wide temperature range
    - low sensitivity to optical feedback
    - designed for the 1.3 μm and 1.55 μm communications windows

  - ICC (Internal Current Confinement) quatenary surface emitting LED structure
    - high quantum efficiency
    - high reliability
    - good linearity

- **Liquid Phase Epitaxy** (LPE) process, mastered for high volume, low cost and reliability, combined with:

  - BTRS (Buried Twin Ridge Substrate) laser structure
    - index–guided
    - tailored to low cost mass production
    - life expectancy > 100 000 hours

Laser Diodes

- low/medium/high–powered gain guided semiconductor lasers
- low–cost, LPE index–guided lasers with BTRS

type	techn.	wave–length λ nm	optical power P_o mW	threshold current I_{th} mA	operating current I_{op} mA	operating voltage V_{op} V
CQL20	LPE	790	3	40	57	1.8
CQL21	LPE	790	3	40	50	1.8
CQL60A*	MOVPE	820	5	70	90	2.0
CQL63A*	MOVPE	820	5	70	90	2.0
CQL61A*	MOVPE	820	20	90	115	2.2
CQL62A*	MOVPE	820	40	100	140	2.2

All values typical at T = 25 °C

* Typical peak wavelengths of 850 and 875 nm are available

For detailed information on these and other types see Data Handbook S8b

Table continued from previous page

radiation angles		emission point accuracy					
parallel to junc. $\Theta_{\parallel}$ deg	perpen. to junc. $\Theta_{\perp}$ deg	angles $\Delta\phi_{\parallel}\Delta\phi_{\perp}$ deg	positio–nal hor/vert µm	differential efficiency mW/mA	polarity laser pin	type	techn.
12	35	2/3	50/30	0.35	positive	**CQL20**	LPE
12	35	2/3	50/30	0.35	positive	**CQL21**	LPE
35	40	2/3	50/30	0.40	negative	**CQL60A***	MOVPE
35	40	2/3	50/30	0.40	negative	**CQL63A***	MOVPE
21	27	2/3	50/30	0.70	negative	**CQL61A***	MOVPE
7	23	2/3	50/30	1.10	negative	**CQL62A***	MOVPE

All values typical at T = 25 °C

* Typical peak wavelengths of 850 and 875 nm are available

Collimator Pens

For detailed information on these and other types see Data Handbook S8b

The Philips range of collimated laser sources offers a host of unique features:

- a collimated laser beam with an optical power up to 20 mW
- a small (17 mm), rugged, low cost alternative to glass–tube lasers
- the high reliability of semiconductor lasers – life expectancy > 100 000 hours
- low power consumption –200 –500 mW for MOVPE lasers, 100 mW for BTRS lasers

Collimated laser applications include:

- barcode scanners
- target markers/range finders
- distance measuring equipment
- Digital Optical Recording (DOR)
- non–impact printers

type	techn.	wave–length λ nm	optical power P_o mW	threshold current I_{th} mA	operating current I_{op} mA	operating voltage V_{op} V	beam collimat. |col| deg	deviation optic./mech axes max. mrad
CQL30	LPE	790	2	40	60	1.8	0.3	10
CQL73	LPE	790	1	40	50	1.8	0.6	13
CQL70A*	MOVPE	820	2	70	90	2.0	0.3	10
CQL75	MOVPE	820	2	70	90	2.0	0.3	13
OF945**	MOVPE	820	3	70	90	2.0	0.2	10
OF945***	MOVPE	820	20	70	150	4.0	0.35	10
CQL71A*	MOVPE	820	10	90	115	2.2	0.30	10
CQL72A*	MOVPE	820	20	105	135	2.2	0.30	10

All values typical at T = 25°C, unless otherwise stated

* Typical peak wavelengths of 850 and 870 nm are available

** continuous wave

*** pulsed

For detailed information on these and other types see Data Handbook S8b

Table continued from previous page

polarity laser pin	dimensions		weight		
	diameter ∅	length l			
	mm	mm	g	type	tech.
negative	11	27	13	**CQL30**	MOVPE
positive	8	17	4	**CQL73**	MOVPE
negative	11	27	13	**CQL70A***	MOVPE
negative	8	17	4	**CQL75**	MOVPE
negative	11	27	13	**OF945****	MOVPE
negative	11	27	13	**OF945*****	MOVPE
negative	11	27	13	**CQL71A***	MOVPE
negative	11	27	13	**CQL72A***	MOVPE

All values typical at T = 25°C, unless otherwise stated

* Typical peak wavelengths of 850 and 870 nm are available

** continuous wave

*** pulsed

Laser diodes for fibre–optic communication

For detailed information on these and other types see Data Handbook S8b

Features:
- choice of wavelengths suitable to all three fibre–optic communication windows
- DCPBH structure for high reliability, good quality and low optical feedback sensitivity
- coaxial encapsulation for high coupling efficiency
- DIL–14 TE–cooled housing coupled to SM or MM fibre
- low inductance DIL–14 packagedesigned for operation up to 4 Gbits/s
- connectable laser receptacle produced in accordance with FC, SMA or DIN standards
- manufactured under tight process control and with high–stress burn–in

type	struct–ure	wave–length λ_p nm	optical power P_o mW	operating current I_{op} mA	operating voltage V_{op} V	differential efficiency mW/mA	encapsulation	fibre specification
CQF50	DCPBH	1300	2	35	1.5	0.1	1	MM
CQF51	DCPBH	1300	1.5	35	1.5	0.1	1	SM
CQF52	DCPBH	1300	0.3	30	1.5	0.02	1	SM
CQF53	DCPBH	1550	0.75	40	1.5	0.03	1	SM
CQF55	DCPBH	1300	2	50	1.5	0.1	2	MM
CQF56	DCPBH	1300	1.5	50	1.5	0.05	2	SM
CQF58	DCPBH	1550	1.75	60	1.5	0.01	2	SM
CQF60*	DCPBH	1300	1	50	1.5	0.1	2	SM
CQF61	DCPBH/DFB	1550	0.75	50	1.5	0.03	2	SM

type	beam guidance	laser diameter Ø mm	wavelength λ_p nm	optical power P_o mW	operating current I_{op} mA	operting voltage V_{op} V
CQF22/D31	index	9	790	2	50	1.8
CQF23/D21	index	5.6	790	2	50	1.8
CQF25A/D21	gain	5.6	820	2	100	2.0
CQF26H/D27	index	5.6	1300	0.2	50	1.5
CQF27A/D21	gain	9	820	2	100	2.0

1: Flanged coaxial, non–TE cooled
2: Dil–14 TE cooled
* Designed for high–bit rate operation up to 4 Gbits/s
** optional mountings: bulkhead; 4–hole flange; PC–board block

Laser diodes for fibre–optic communication (cont.)

For detailed information on these and other types see Data Handbook S8b

Table continued from previous page

differential efficiency	encapsulation			
mW/mA	receptacle mounting **	connectors standard	optional	type
0.2	4–hole flange	FC	SMA/DIN/ST	**CQF22/D31**
0.2	2–hole flange	FC	SMA/DIN/ST	**CQF23/D21**
0.2	2–hole flange	FC	SMA/DIN/ST	**CQF25A/D21**
0.01	2–hole flange	FC/SM	FC/PC	**CQF26H/D27**
0.2	2–hole flange	FC	SMA/DIN/ST	**CQF27A/D21**

** optional mountings: bulkhead; 4–hole flange; PC–board block

Laser diodes for fibre–optic communication (cont.)

For detailed information on these and other types see Data Handbook S8b

Features:
- GaAlAs ternary compound in SHJ and DHJ structure
- ICC (Internal Current Confinement) structure for 1.3 μm LED based on InGaAsP compounds
- high reliability
- TO–46 double lens, precision TO–46 microlens and TO–46 flat window encapsulation
- matching emitter/receiver components

type	wave–length λ nm	coupled optical power P_{out} at μW	I_f mA	bandwidth MHz	recommended fibre diameter μm	encapsulation
CQF24	850	20	100	40	200 core	TO–46 double lens
CQF40	850	20	100	50	100/140	TO–46 double lens
CQF41	850	30	100	50	100/140	TO–46 double lens
CQF42	850	20	100	60	50/125	TO–46 flat window
CQF45	1300	15	100	150	50/125	TO–46 microlens
CQF46	1300	25	100	50	50/125	TO–46 microlens
CQF47	1550	10	100	150	50/125	TO–46 flat window
CQF48	1550	20	100	50	50/125	TO–46 flat window

PIN–receiver diodes for fibre optic communication

type	sensitivity A/W	wavelength nm	dark current nA	encapsulation
BFP24	0.4	850	0.8	TO–46 double lens
BFP31	0.55	850	5.0	TO–46 flat window

For detailed information on these and other types see Data Handbook S8b
For smallest packing quantity (SPQ) see table, below

S

Photo transistors

type	status	λp nm	$\Delta\lambda$ nm	$\theta_{1/2}$ deg.	V_R or V_{CE} max V*	I_R or I_C max mA*	P_{tot} max mW	I_R I_C at E_e and V_R mA	mW/cm²	V	SPQ	case
BPW22A–1	P	800	400	20	50	25	100	1.5–8	1.0	5	1000	SOD–53F
BPW22A–2	C	800	400	20	50	25	100	5–25	1.0	5	1000	SOD–53F

Photo diode

type	status	λp nm	$\Delta\lambda$ nm	$\theta_{1/2}$ deg.	V_R or V_{CE} max V*	I_R or I_C max mA*	P_{tot} max mW	I_R I_C at E_e and V_R mA	mW/cm²	V	SPQ	case
BPW50	P	930	–	–	32	–	150	0.045	1.0	5	1000	SOD–67

* V_R & I_R with diodes, V_{CE} & I_C with transistors.

Infrared GaAs and GaAlAs LEDs

For detailed information on these and other types see Data Handbook S8b

Round, 3 mm diameter

package	type	λ_p typ. nm	I_F max. mA	I_{FRM} max. mA	V_R max. V	ϕ_e and typ. µW	I_e at mW/sr	I_F mA	$\theta_{1/2}$ typ. deg	t_r typ. ns	t_f typ. ns	crystal
SOD53F	**CQW58A–1**	830	60	1000*	5	1000	1 to 5	20	15	30	30	GaAlAs
	CQW58A–2	830	60	1000*	5	1000	> 3	20	15	30	30	GaAlAs
	CQY58A	930	50	200*	5	1000	> 2	20	20	3000	3000	GaAs
	CQY58A–1	930	50	200*	5	1000	1 to 5	20	20	3000	3000	GaAs
	CQY58A–2	930	50	200*	5	1000	> 2	20	20	3000	3000	GaAs

Round, 5 mm diameter

package	type	λ_p typ. nm	I_F max. mA	I_{FRM} max. mA	V_R max. V	ϕ_e and typ. µW	I_e at mW/sr	I_F mA	$\theta_{1/2}$ typ. deg	t_r typ. ns	t_f typ. ns	crystal
SOD63D2	**CQW89A**	830	130	2500*	5	8000	> 9	100	24	30	30	GaAlAs
	CQW89A–1	830	130	2500*	5	8000	> 12	100	24	30	30	GaAlAs
	CQW89A–2	830	130	2500*	5	8000	> 15	100	24	30	30	GaAlAs
SOD94	**CQW89B**	830	130	2500*	5	8000	> 20	100	12	30	30	GaAlAs
SOD63B2	**CQY89A**	930	130	1000**	5	10000	> 9	100	40	1000	1000	GaAs
	CQY89A–1	930	130	1000**	5	10000	> 12	100	40	1000	1000	GaAs
	CQY89A–2	930	130	1000**	5	10000	> 15	100	40	1000	1000	GaAs
FO–192	**CQY90A**	930	100	1000	5	21000	> 15	100	60	1000	1000	GaAs

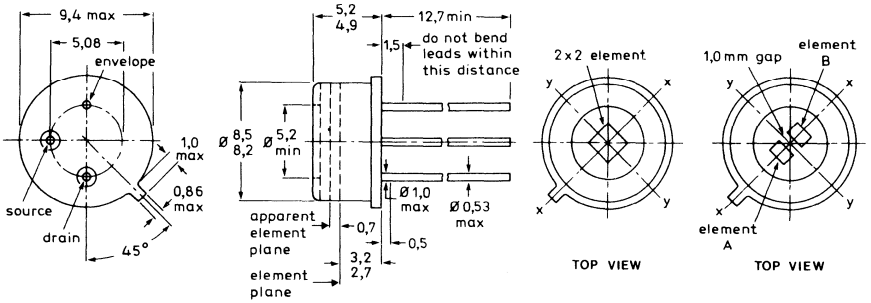
Rectangular with round end

package	type	λ_p typ. nm	I_F max. mA	I_{FRM} max. mA	V_R max. V	ϕ_e and typ. µW	I_e at mW/sr	I_F mA	$\theta_{1/2}$ typ. deg	t_r typ. ns	t_f typ. ns	crystal
SOD93	**CQY89F**	930	130	1000**	5	10000	> 9	100	30***	1000	1000	GaAs
	CQY89F–1	930	130	1000**	5	10000	> 12	100	30***	1000	1000	GaAs
	CQY89F–2	930	130	1000**	5	10000	> 15	100	30***	1000	1000	GaAs

* pulse width ≤ 10 µs; $\delta = 0.01$
** pulse width ≤ 50 µs; $\delta = 0.05$
*** beamwith = 30° in the plane of the leads and 25° perpendicular to that plane

For detailed information on these and other types see Data Handbook S8b

SOT–49H



The ceramic pyroelectric detector consists of an infrared sensitive element, a low–noise impedance–matching network, and an infrared window, all in a TO–5 encapsulation. The devices are rugged, low–cost components ideally suited for use in intruder detection systems, infrared radiometry and similar applications.

type	number of elements	element dimension mm	spectral response µm	responsivity typ V/W	N.E.P typ W/Hz½	case
RPY100	1	2 x 1	6 to 15	(10 µm, 10) 150	(10 µm, 10.1) 2.5×10^{-9}	SOT–49H
RPY101	1	2 x 1.5	6 to 15	(10 µm, 10) 150	(10 µm, 10.1) 3.8×10^{-9}	SOT–49H
RPY102	1	2 x 2	6 to 15	(10 µm, 10) 75	(10 µm, 10.1) 5×10^{-9}	SOT–49H
RPY103	2	2 x 1	6 to 15	(10 µm, 10) 150	(10 µm, 10.1) 2.2×10^{-9}	SOT–49H
RPY109	1	2 x 2	1 to 15	(500 K, 10) 65	(500 K, 10.1) 6×10^{-9}	SOT–49H
P2105	1	2 x 2	1 to 25	(500 K, 10) 90	(500 K, 10,1) $1{,}4 \times 10^{-9}$	SOT–49G

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: Ø5 = 1000.

Status:
P – all non-classified and middle classes
C – all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD53E	**PLED-H313A-6**	GaAlAs	hyper-red		60	2.2	10	red-clear	6
SOD53E	**PLED-H313A-4**	GaAlAs	hyper-red		60	2.2	10	red-clear	4
SOD53E	**PLED-H313A-7**	GaAlAs	hyper-red		60	2.2	10	red-clear	7
SOD53E	**PLED-H313A-5**	GaAlAs	hyper-red		60	2.2	10	red-clear	5
SOD53E	**PLED-H314A-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD53E	**CQW58A**	GaAlAs	infrared		15	1.5	20	red-diffused	
SOD53E	**PLED-H314A-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD53E	**PLED-H313A**	GaAlAs	hyper-red		60	2.2	10	red-clear	
SOD53E	**PLED-H314A-5**	GaAlAs	hyper-red		100	2.2	10	red-diffused	5
SOD53E	**PLED-H314A**	GaAlAs	hyper-red		100	2.2	10	red-diffused	
SOD53E	**PLED-H314A-6**	GaAlAs	hyper-red		100	2.2	10	red-diffused	6
SOD53E	**PLED-H313A-C**	GaAlAs	hyper-red		60	2.2	2	red-clear	
SOD53E	**PLED-H314A-B**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD53E	**PLED-H314A-C**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD82C	**PLED-G313N-5**	GaP	super-green		25	2.8	20	green-clear	5
SOD82C	**PLED-O313N-5**	GaAsP	orange		40	2.8	20	red-clear	5
SOD82C	**PLED-G313N-6**	GaP	super-green		25	2.8	20	green-clear	6
SOD82C	**PLED-O313N-6**	GaAsP	orange		40	2.8	20	red-clear	6
SOD82C	**PLED-G314N-4**	GaP	super-green		60	2.8	20	green-diffused	4
SOD82C	**PLED-O314N-4**	GaAsP	orange		70	2.8	20	red-diffused	4
SOD82C	**PLED-G314N-5**	GaP	super-green		60	2.8	20	green-diffused	5
SOD82C	**PLED-O314N-5**	GaAsP	orange		70	2.8	20	red-diffused	5
SOD82C	**PLED-P313N-3**	GaP(ZnO)	ultra-red		25	2.8	20	red-clear	3
SOD82C	**PLED-P313N-4**	GaP(ZnO)	ultra-red		25	2.8	20	red-clear	4
SOD82C	**PLED-P314N-2**	GaP(ZnO)	ultra-red		60	2.8	20	red-diffused	2
SOD82C	**PLED-P314N-3**	GaP(ZnO)	ultra-red		60	2.8	20	red-diffused	3
SOD82C	**PLED-Y313N-3**	GaAsP	yellow		25	2.8	20	yellow-clear	3
SOD82C	**PLED-Y313N-4**	GaAsP	yellow		25	2.8	20	yellow-clear	4
SOD82C	**PLED-Y314N-3**	GaAsP	yellow		60	2.8	20	yellow-diffused	3
SOD82C	**PLED-Y314N-4**	GaAsP	yellow		60	2.8	20	yellow-diffused	4
SOD82C	**PLED-G313N**	GaP	super-green		25	2.8	20	green-diffused	
SOD82C	**PLED-G314N**	GaP	super-green		60	2.8	20	green-diffused	
SOD82C	**PLED-0313N**		orange		40	2.8	20	red-clear	
SOD82C	**PLED-0314N**		orange		70	2.8	20	red-diffused	
SOD82C	**PLED-P313N**	GaP(ZnO)	ultra-red		25	2.8	20	red-clear	
SOD82C	**PLED-P314N**	GaP(ZnO)	ultra-red		60	2.8	20	red-diffused	
SOD82C	**PLED-Y313N**	GaAsP	yellow		25	2.8	20	yellow-clear	
SOD82C	**PLED-Y314N**	GaAsP	yellow		60	2.8	20	yellow-diffused	

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: Ø5 = 1000.

Status:
P – all non-classified and middle classes
C – all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD63A	**PLED-H514B-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD63A	**PLED-H514B-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD63A	**PLED-H514B-5**	GaAlAs	hyper-red		100	2.2	10	red-diffused	5
SOD63A	**PLED-H514B-6**	GaAlAs	hyper-red		100	2.2	10	red-diffused	6
SOD63A	**PLED-T512B-4X**	GaAlAs	hyper-red		70	2.2	10	colourless-diff	4
SOD63A	**PLED-H514B-B**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD63A	**CQW89B**	GaAlAs	infrared		12	1.7	100	blue-diffused	
SOD63A	**PLED-H514B**	GaAlAs	hyper-red		100	2.2	10	red-diffused	
SOD63A	**PLED-T512B**	GaAlAs	hyper-red		70	2.2	10	colourless-diff	
SOD63A	**PLED-H514B-C**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD63D	**PLED-H511C**	GaAlAs	hyper-red		20	2.2	10	clear	
SOD63D	**PLED-H511C-7**	GaAlAs	hyper-red		20	2.2	10	clear	7
SOD63D	**PLED-H511C-8**	GaAlAs	hyper-red		20	2.2	10	clear	8
SOD63D	**PLED-H511C-9**	GaAlAs	hyper-red		20	2.2	10	clear	9
SOD63D	**PLED-H511C-10**	GaAlAs	hyper-red		20	2.2	10	clear	10
SOD63D	**PLED-H511C-F**	GaAlAs	hyper-red		20	2.2	2	clear	
SOD63D	**PLED-H511C-G**	GaAlAs	hyper-red		20	2.2	2	clear	
SOD85AL	**PLED-H544KL-3**	GaAlAs	hyper-red		70	2.2	10	red-diffused	3
SOD85AL	**PLED-H544KL-4**	GaAlAs	hyper-red		70	2.2	10	red-diffused	4
SOD85AL	**PLED-H544KL-5**	GaAlAs	hyper-red		70	2.2	10	red-diffused	5
SOD85AL	**PLED-H544KL-6**	GaAlAs	hyper-red		70	2.2	10	red-diffused	6
SOD85AL	**PLED-H544KL**	GaAlAs	hyper-red		70	2.2	10	red-diffused	
SOD85BL	**PLED-H544LL**	GaAlAs	hyper-red		70	2.2	20	red-diffused	
SOD85BL	**PLED-H544LL-3**	GaAlAs	hyper-red		70	2.2	20	red-diffused	3
SOD85BL	**PLED-H544LL-4**	GaAlAs	hyper-red		70	2.2	20	red-diffused	4
SOD85BL	**PLED-H544LL-5**	GaAlAs	hyper-red		70	2.2	20	red-diffused	5
SOD85BL	**PLED-H544LL-6**	GaAlAs	hyper-red		70	2.2	20	red-diffused	6

Light-emitting diodes (cont.)

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: Ø3 = 1000

Status:
P – all non-classified and middle classes
C – all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD53E	**PLED-H313A-C**	GaAlAs	hyper-red		60	2.2	2	red-clear	
SOD53E	**PLED-H314A-B**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD53E	**PLED-H314A-C**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD53E	**PLED-H313A**	GaAlAs	hyper-red		60	2.2	10	red-clear	
SOD53E	**PLED-H314A**	GaAlAs	hyper-red		100	2.2	10	red-diffused	
SOD53E	**PLED-H313A-4**	GaAlAs	hyper-red		60	2.2	10	red-clear	4
SOD53E	**PLED-H313A-5**	GaAlAs	hyper-red		60	2.2	10	red-clear	5
SOD53E	**PLED-H313A-6**	GaAlAs	hyper-red		60	2.2	10	red-clear	6
SOD53E	**PLED-H313A-7**	GaAlAs	hyper-red		60	2.2	10	red-clear	7
SOD53E	**PLED-H314A-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD53E	**PLED-H314A-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD53E	**PLED-H314A-5**	GaAlAs	hyper-red		100	2.2	10	red-diffused	5
SOD53E	**PLED-H314A-6**	GaAlAs	hyper-red		100	2.2	10	red-diffused	6
SOD63A	**PLED-H514B-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD63A	**PLED-H514B-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD63A	**PLED-H514B-5**	GaAlAs	hyper-red		100	2.2	10	red-diffused	5
SOD63A	**PLED-H514B-6**	GaAlAs	hyper-red		100	2.2	10	red-diffused	6
SOD63A	**PLED-H514B-B**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD63A	**PLED-H514B**	GaAlAs	hyper-red		100	2.2	10	red-diffused	
SOD63A	**PLED-H514B-C**	GaAlAs	hyper-red		100	2.2	2	red-diffused	
SOD63D	**PLED-H511C**	GaAlAs	hyper-red		20	2.2	10	clear	
SOD63D	**PLED-H511C-7**	GaAlAs	hyper-red		20	2.2	10	clear	7
SOD63D	**PLED-H511C-8**	GaAlAs	hyper-red		20	2.2	10	clear	8
SOD63D	**PLED-H511C-9**	GaAlAs	hyper-red		20	2.2	10	clear	9
SOD63D	**PLED-H511C-10**	GaAlAs	hyper-red		20	2.2	10	clear	10
SOD63D	**PLED-H511C-F**	GaAlAs	hyper-red		20	2.2	2	clear	
SOD63D	**PLED-H511C-G**	GaAlAs	hyper-red		20	2.2	2	clear	

Light-emitting diodes (cont.)

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: ∅5 = 1000

Status:
P = all non-classified and middle classes
C = all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
	PLED-GR14R	GaP	super-green		110	2.8	10	green-diffused	
	PLED-OR14R		orange		120	2.8	10		
	PLED-PR14R		ultra-red		110	2.8			
	PLED-YR14R		yellow		110	2.8	10		
	PLED-GR14P		super-green		180	2.8			
	PLED-OR14P		orange		180	2.8			
	PLED-PR14P		ultra-red		180	2.8			
	PLED-YR14P		yellow		180	2.8			
	PLED-GR14T		super-green		130	2.8	10		
	PLED-OR14T		yellow		130	2.8	10	red-diffused	
	PLED-PR14T		ultra-red		130	2.8		red-diffused	
	PLED-YR14T		yellow		115	2.8	10	yellow-diffused	
	PLED-GR14R-1	GaP	super-green		110	2.8	10	green-diffused	1
	PLED-GR14R-2	GaP	super-green		110	2.8	10	green-diffused	2
	PLED-OR14R-1		orange		120	2.8	10	red-diffused	1
	PLED-OR14R-2		orange		120	2.8	10	red-diffused	2
	PLED-YR14R-1		yellow		110	2.8	10	yellow-diffused	1
	PLED-YR14R-2		yellow		110	2.8	10	yellow-diffused	2
	PLED-GR14T-1		super-green		130	2.8	10	green-diffused	1
	PLED-GR14T-2		super-green		130	2.8	10	green-diffused	2
	PLED-OR14T-1		orange		130	2.8	10	red-diffused	1
	PLED-OR14T-2		orange		130	2.8	10	red-diffused	2
	PLED-YR14T-1		yellow		115	2.8	10	yellow-diffused	1
	PLED-YR14T-2		yellow		115	2.8	10	yellow-diffused	2

Light-emitting diodes (cont.)

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: Ø5 = 1000

Status:
P = all non-classified and middle classes
C = all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD74L	**PLED-HR44DL**	GaAlAs	hyper-red		100	2.8	10	red-diffused	
SOD74L	**PLED-TR42DL**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	
SOD74L	**PLED-HR44DL-1**	GaAlAs	hyper-red		100	2.2	10	red-diffused	1
SOD74L	**PLED-HR44DL-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD74L	**PLED-HR44DL-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD74L	**PLED-TR42DL-2X**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	2
SOD75B	**PLED-HR14E-1**	GaAlAs	hyper-red		110	2.2	10	red-diffused	1
SOD75B	**PLED-HR14E-3**	GaAlAs	hyper-red		110	2.2	10	red-diffused	3
SOD75B	**PLED-HR14E-4**	GaAlAs	hyper-red		110	2.2	10	red-diffused	4
SOD75B	**PLED-HR14E**	GaAlAs	hyper-red		110	2.2	10	red-diffused	
SOD75B	**PLED-TR12E**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	
SOD75B	**PLED-TR12E-2X**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	2
SOD76A	**PLED-HR14F-1**	GaAlAs	hyper-red		100	2.2	10	red-diffused	1
SOD76A	**PLED-HR14F-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD76A	**PLED-HR14F-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD76A	**PLED-TR12F-2X**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	2
SOD76A	**CQY89F**		infrared					red-diffused	
SOD76A	**PLED-HR14F**	GaAlAs	hyper-red		100	2.2	10	red-diffused	
SOD76A	**PLED-TR12F**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	
SOD77A	**PLED-HR14G**	GaAlAs	hyper-red		100	2.2	10	red-diffused	
SOD77A	**PLED-TR12G**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	
SOD77A	**PLED-HR14G-1**	GaAlAs	hyper-red		100	2.2	10	red-diffused	1
SOD77A	**PLED-HR14G-3**	GaAlAs	hyper-red		100	2.2	10	red-diffused	3
SOD77A	**PLED-HR14G-4**	GaAlAs	hyper-red		100	2.2	10	red-diffused	4
SOD77A	**PLED-TR12G-2X**	GaAlAs	hyper-red		110	2.2	10	colourless-diff	2

For detailed information on these and other types see Data Handbook S8b
Standard types, UL recognised and VDE approved

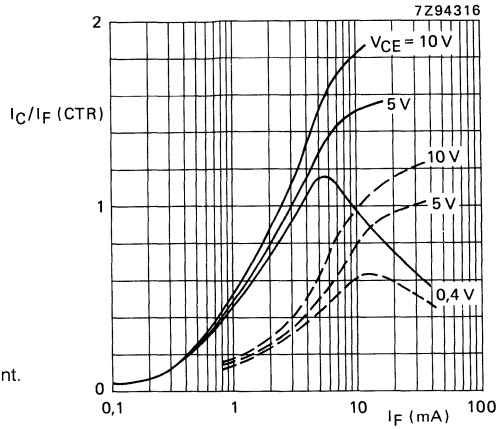


Fig.1 Current transfer ratio versus forward current.
Piece with a high I_C/I_F (CTR).
Piece with a low I_C/I_F (CTR).

S

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX39U	**SOT-90B**	0.6	1	30	4.4	5.5	4	P
CNX35U	**SOT-90B**	0.4	1.6	30	4.4	3	3	P
CNX36U	**SOT-90B**	0.8	2	30	4.4	8	6	P
CNY57AU	**SOT-90B**	0.4		30	4.4	5*	5*	P
CNY57U	**SOT-90B**	0.2	0.8	30	4.4	3	3	P

* I_C = 4 mA

High voltage transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 4 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 4 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX38U	**SOT-90B**	0.7	2.1	80	4.4	5	5	P

Darlington transistor output

type	case	C.T.R. I_F = 1 mA V_{CE} = 1 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_F = 10 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_F = 10 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX48U	**SOT-90B**	5	30	4.4	5	30	P

For detailed information on these and other types see Data Handbook S8b
Standard types

Transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX35	**SOT-90B**	0.4	1.6	30	4.4	3	3	P
CNX39	**SOT-90B**	0.6	1	30	4.4	5.5	4	P
CNX36	**SOT-90B**	0.8	2	30	4.4	8	6	P
CNY57	**SOT-90B**	0.2	0.8	30	4.4	3	3	P
CNY57A	**SOT-90B**	0.4		30	4.4	5*	5*	P

* I_C = 4 mA

High-voltage transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX38	**SOT-90B**	0.7	2.1	80	4.4	5	5	P

Darlington transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 10 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
CNX48	**SOT-90B**	6	30	4.4	5	30	P

* t_r, t_f
** I_F = 20 mA, R_{be} = 100 kΩ, R_L = 2kΩ

For detailed information on these and other types see Data Handbook S8b
Standard types, UL recognized or pending, VDE approved

S

Transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 10 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
4N25A	**SOT-90B**	0.2	30	2.8	3*	3*	P
4N26	**SOT-90B**	0.2	30	2.8	3*	3*	P
4N27	**SOT-90B**	0.1	30	2.8	3*	3*	P
4N28	**SOT-90B**	0.1	30	2.8	3*	3*	P
4N25	**SOT-90B**	0.2	30	2.8	3*	3*	P
4N35	**SOT-90B**	1.0	30	4.4	7	5	P
4N36	**SOT-90B**	1.0	30	2.8	7	5	P
4N37	**SOT-90B**	1.0	30	2.8	7	5	P
H11A1	**SOT-90B**	0.5	30	2.8	3*	3*	P
H11A2	**SOT-90B**	0.2	30	2.8	3*	3*	P
H11A3	**SOT-90B**	0.2	30	2.8	3*	3*	P
H11A4	**SOT-90B**	0.1	30	2.8	3*	3*	P
H11A5	**SOT-90B**	0.3	30	2.8	3*	3*	P
MCT2	**SOT-90B**	0.2	30	4.4	5**	10**	P
MCT26	**SOT-90B**	0.06	30	4.4	3*	3*	P

High-voltage transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 10 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
4N38	**SOT-90B**	0.2	80	2.82	5	5	P
4N38A	**SOT-90B**	0.2	80	2.82	5	5	P

* t_r/t_f

** I_F = 20 mA, R_{be} = 100 kΩ, R_L = 2kΩ

For detailed information on these and other types see Data Handbook S8b
Standard types, UL recognized, VDE approved

High-voltage transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 5 V min	C.T.R. I_F = 10 mA V_{CE} = 5 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNY17-1	**SOT-90B**	0.4	0.8	70	4.4	5	5	P
CNY17-3	**SOT-90B**	1	2	70	4.4	5	5	P
CNY17-2	**SOT-90B**	0.63	1.25	70	4.4	5	5	P

Darlington transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 5 V min	C.T.R. I_F = 10 mA V_{CE} = 5 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
H11B1	**SOT-90B**	5*	–	25	2.8	125[1]	100[1]	P
H11B2	**SOT-90B**	2*	–	25	2.8	125[1]	100[1]	P
H11B3	**SOT-90B**	1*	–	25	2.8	125[1]	100[1]	P
H11B255	**SOT-90B**	1	–	55	2.8	125[1]	100[1]	P
MCA230	**SOT-90B**	1	–	30	4.4	5[2]	100[2]	P
MCA231	**SOT-90B**	2	–	30	4.4	5[2]	100[2]	P
MCA255	**SOT-90B**	1	–	55	4.4	5[2]	100[2]	P
4N29	**SOT-90B**	1**	–	30	4.4	0.7[3]	25[3]	P
4N30	**SOT-90B**	1**	–	30	4.4	0.7[3]	25[3]	P
4N31	**SOT-90B**	0.5**	–	30	4.4	0.7[3]	25[3]	P
4N32	**SOT-90B**	5**	–	30	4.4	0.7[3]	25[3]	P
4N33	**SOT-90B**	5**	–	30	4.4	0.7[3]	25[3]	P

* I_F = 1 mA
** V_{CE} = 10 V

1) I_C = 10 mA
2) I_F = 10 mA
3) I_C = 50 mA, R_L = 180 Ω

For detailed information on these and other types see Data Handbook S8b
Types for mains applications, UL recognized, VDE approved

Darlington transistor output (cont.)

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX62	**SOT-174**	0.4		50	5.3	3	3	P
CNX72	**SOT-90B**	0.4	1.6	30	5.3*	26	2.5	P
CNX82	**SOT-212**	0.4		50	5.3	3	3	P
CNX83	**SOT-212**	0.4		50	5.3	3	3	P
CNX71	**SOT-90B**	0.4	1.6	30	5.3*	20**	120**	P

* VDE approved for 4.4 kV
** Max. values, I_C = 10 mA, V_{CC} = 10 V, R_L = 4.7 kΩ
Note:
CNX82 pin distance 10.16 mm
CNX62 and CNX82 have no base connection

Types with input/output pin distance 15.24 mm

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	$V_{(BR)CEO}$ min V	V_{IORM} kV (AC) peak	t_{on} I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX21	**SOT-211**	0.2	30	10	3	3	P

Types for telephony applications, recognised by French CNET

type	case	C.T.R. I_F = 10 mA V_{CE} = 4 V min	C.T.R. I_F = 10 mA V_{CE} = 4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNG35	**SOT-90B**	0.4	1.6	30	4.4	3	3	P
CNG36	**SOT-90B**	0.8		30	4.4	8	6	P

For detailed information on these and other types see Data Handbook S8b
GaAlAs types for mains applications, UL recognized, VDE approved

Optocouplers for mains applications

type	case	C.T.R. I_F = 10 mA V_{CE} = 4 V min	C.T.R. I_F = 10 mA V_{CE} = 4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNG82	**SOT–212**	0.4	1.6	50	5.3	3	3	P
CNG83	**SOT–212**	0.4		50	5.3	3	3	P

For detailed information on these and other types see Data Handbook S8b
For telephony applications approved by British Telecom

S

Low current types, transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.5 V min	C.T.R. I_F = 10 mA V_{CE} = 0.5 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
PO40/44A	**SOT-90B**	0.6	1.5	30	3.5	7	7	P

High speed type, diode/transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 4.5 V min	C.T.R. I_F = 10 mA V_{CE} = 4.5 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_F = 10 mA V_{CC} = 5 V R_L = 2.5 kΩ µs	t_{off} typ I_F = 10 mA V_{CC} = 5 V R_L = 2.5 kΩ µs	status
CNR36	**SOT-97F**	0.2		18	3.5	0.8	0.8	P
6N135	**SOT-97F**	0.07		15	3.5	1.5	1.5	P
6N136	**SOT-97F**	0.19		15	3.5	0.8	0.8	P
SL5505S	**SOT-97F**	0.2	0.4	22	3.5	0.8	0.8	P

Optocouplers for mains applications

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX62A	**SOT-230**	0.4		50	5.3	3	3	P
CNX72A	**SOT-229**	0.4	1.6	30	5.3*	26[1)]	2.5[1)]	P
CNX82A	**SOT-231**	0.4		50	5.3	3	3	P
CNX83A	**SOT-231**	0.4		50	5.3	3	3	P
CNW82	**SOT-228**	0.4		50	8.3	3	3	P
CNW83	**SOT-228**	0.4		50	8.3	3	3	P

1) t_{on}/t_{off} = max values. R_{BE} = 56 kΩ. R_L = 1 kΩ.
2) t_{on}/t_{off} measured at I_F.
3) I_F = 16 mA.
* for VDE 4.4 kV

CNX82A/83A and CNW82/83 have 10.16 mm pin spacing
CNX82A and CNW82 have no base connection

LCDs features and product options

For detailed information on these types see Data Handbook S14

Features of LCDs
- very low power consumption
- low operating voltage
- easy to drive/CMOS compatible
- excellent legibility under most ambient light conditions
- expected life time > 100 000 hours

Available product variations
- reflective, transflective or transmissive versions
- positive or negative image
- various electro-optical specifications
- commercial or extended temperature ranges
- connection with fixed pins or for elastomer connector(elastomer connectors not supplied)

Standard products
A range of standard products are available. For more information refer to Handbook S14.

Standard LCD cells
A range of standard LCD cells are available for multiple applications fields e.g. clocks, counters, point of sales equipment etc.

Standard LCD modules
A range of standard LCD modules are available for multiple applications fields. An LCD module combines an LCD cell with driver circuitry in a compact unit. Our LCD modules are classified as:

segment types (mainly for application in telephony equipment)
character types, displaying 1 or more lines of 5 x 7 characters (used in a variety of applications e.g. typewriters, point of sales equipment etc).
dot matrix types intended for full graphic applications e.g. PCs, measuring equipment etc.

LCDs custom design facilities

For detailed information on these types see Data Handbook S14

Custom design facilities
We offer a complete custom design service for LCD cells in which the following can be customer specified:

- dimensions
- display pattern
- electro–optical characteristics
- connection method

Our custom design facility has been divided into two categories: semi–standard products and custom products each category has different priorities on design flexibility versus development cost.

Semi–standard productsare a custom designed display pattern incorporated with a variety of standfard options. These options include a range of standard glass sizes and a selection of electro–optical characteristics. Semi–standard products are characterized by simple product definition, fast development time and low development cost.

For more information please refer to the Data Handbook S14 which has a section dedicated to semi–standard
products, or to the nearest Philips Components sales organization (see back cover for details).

Custom products offer more flexibility in dimensions and electro–optical characteristics and are best suited to when semi–standard products do not meet with user requirements.

For more information please refer to the Data Handbook S14 which has a section dedicated to custom products, or to the nearest Philips Components sales organization (see back cover for details).

For detailed information on these types see Data Handbook S14

extended type no.	illumination mode	quality grade*	dimensions (mm) excluding pins		drive method**	connection method	family characteristics
			width	height			
LTA141R–12	reflective	comm.	50.8	80.0	DD	with pins	TR0
LTA141F–12	transflective	comm.	50.8	80.0	DD	with pins	TF0
LTA141R–22	reflective	ext.	50.8	80.0	DD	with pins	TR2
LTA141F–22	transflective	ext.	50.8	80.0	DD	with pins	TF2
LTA142U–12	transmissive	comm.	51.0	80.0	DD	with pins	TR0
LTA331R–11	reflective	comm.	69	23	MUX 1:16	for elastomer	–
LTA331F–11	transflective	comm.	69	23	MUX 1:16	for elastomer	–
LTA332R–11	reflective	comm.	69	25	MUX 1:16	for elastomer	–
LTA332F–11	transflective	comm.	69	25	MUX 1:16	for elastomer	–
LTA341R–11	reflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA341F–11	transflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA342R–11	reflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA342F–11	transflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA343R–11	reflective	comm.	160	27	MUX 1:16	for elastomer	–
LTA343F–11	transflective	comm.	160	27	MUX 1:16	for elastomer	–
LTD101R–11	reflective	comm.	50.8	22.9	DD	for elastomer	TR0
LTD132R–11	reflective	comm.	46.8	54.8	MUX 1:2	for elastomer	TR1
LTD133F–21	transflective	comm.	38.6	20.8	MUX 1:2	for elastomer	TR3
LTD201R–11	reflective	comm.	23.9	14.0	DD	for elastomer	TR0
LTD202R–12	reflective	comm.	27.9	30.4	DD	with pins	TR0
LTD202R–22	reflective	ext.	27.9	30.4	DD	with pins	TR2
LTD202F–22	transflective	ext.	27.9	30.4	DD	with pins	TF2
LTD203R–11	reflective	comm.	38.0	20.3	DD	for elastomer	TR0
LTD203R–21	reflective	ext.	38.0	20.3	DD	for elastomer	TR2
LTD203F–21	transflective	ext.	38.0	20.3	DD	for elastomer	TF2
LTD211R–11	reflective	comm.	38.0	20.3	MUX 1:2	for elastomer	TR1
LTD211F–11	translective	comm.	38.0	20.3	MUX 1:2	for elastomer	TF1
LTD211R–21	reflective	ext.	38.0	20.3	MUX 1:2	for elastomer	TR2
LTD211F–21	translective	ext.	38.0	20.3	MUX 1:2	for elastomer	TF2
LTD221R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD221R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD221F–12	transflective	comm.	50.8	30.4	DD	with pins	TR2
LTD221R–22	reflective	ext.	50.8	30.4	DD	with pins	TF0
LTD221F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD222R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD222R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD222F–12	transflective	comm.	50.8	30.4	DD	with pins	TF0
LTD222R–21	reflective	comm.	50.8	30.4	DD	for elastomer	TR2
LTD222F–21	transflective	comm.	50.8	30.4	DD	for elastomer	TF2
LTD222R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD222F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD224R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD225R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD226R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD226R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD226F–12	transflective	comm.	50.8	30.4	DD	with pins	TF0
LTD226R–21	reflective	ext.	50.8	30.4	DD	for elastomer	TR2
LTD226F–21	transflective	ext.	50.8	30.4	DD	for elastomer	TF2
LTD226R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD226F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2

* comm. = commercial quality grade
ext. = extended quality grade

** DD = direct drive.

note:
all types are positive image mode except LTA142U–12 which has a negative image

For detailed information on these types see Data Handbook S14

extended type no.	illumination mode	quality grade*	dimensions (mm) excluding pins		drive method**	connection method	family characteristics
			width	height			
LTD227R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD227R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD227F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD228R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD229R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD229R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD229F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD231R–11	reflective	comm.	50.8	30.4	MUX 1:3	for elastomer	TR1
LTD232R–11	reflective	comm.	50.8	30.4	MUX 1:3	for elastomer	TR1
LTD233R–11	reflective	comm.	69.8	20.3	MUX 1:2	for elastomer	TR1
LTD234R–11	reflective	comm.	69.8	20.3	MUX 1:4	for elastomer	TR2
LTD241R–12	reflective	comm.	69.8	38.0	DD	with pins	TR0
LTD241R–22	reflective	ext.	69.8	38.0	DD	with pins	TR2
LTD241F–22	transflective	ext.	69.8	38.0	DD	with pins	TF2
LTD242R–12	reflective	comm.	69.8	38.0	DD	with pins	TR0
LTD242R–22	reflective	ext.	69.8	38.0	DD	with pins	TR2
LTD242F–22	transflective	ext.	69.8	38.0	DD	with pins	TF2
LTD261R–12	reflective	comm.	76.2	101.6	DD	with pins	TR0
LTD261R–22	reflective	ext.	76.2	101.6	DD	with pins	TR2
LTD261F–22	transflective	ext.	76.2	101.6	DD	with pins	TF2
LTD262R–12	reflective	comm.	93.8	30.8	DD	with pins	TR0
LTD262R–22	reflective	ext.	93.8	30.8	DD	with pins	TR2
LTD262F–22	transflective	ext.	93.8	30.8	DD	with pins	TF2
LTD263R–12	reflective	comm.	93.8	38.0	DD	with pins	TR0
LTD263R–22	reflective	ext.	93.8	38.0	DD	with pins	TR2
LTD264R–22	reflective	ext.	114.0	46.0	DD	with pins	TR2
LTD264F–22	transflective	ext.	114.0	46.0	DD	with pins	TF2
LTD321R–12	reflective	comm.	69.8	30.4	DD	with pins	TR0
LTD351R–11	reflective	comm.	26.0	114.0	MUX 1:2	for elastomer	TR1

* comm. = commercial quality grade
ext. = extended quality grade

** DD = direct drive.

For detailed information on these types see Data Handbook S14

extended type no.	description	illumination mode	dimensions (mm) excluding pins		drive method
			width	height	
Segment types					
LP–1471–B	16–digit module with I^2C	reflective	92.5	25.0	MUX 1:2
LTM233R–10	16–digit module	reflective	92.5	25.0	MUX 1:2
Character types					
LTN111R–10	16 character 5 x 7 dot 1–line module	reflective	80.0	36.0	MUX 1:16
LTN111F–10	16 character 5 x 7 dot 1–line module	transflective	80.0	36.0	MUX 1:16
LTN211R–10	16 character 5 x 7 dot 2–line module	reflective	84.0	44.0	MUX 1:16
LTN211F–10	16 character 5 x 7 dot 2–line module	transflective	84.0	44.0	MUX 1:16
LTN242R–10	40 character 5 x 7 dot 2–line module	reflective	182.0	33.5	MUX 1:16
LTN242F–10	40 character 5 x 7 dot 2–line module	transflective	182.0	33.5	MUX 1:16
Graphic full dot types					
LBG402R–10	graphic full dot module	reflective	256.0	128	MUX 1:100
LBG402F–10	graphic full dot module	transflective	256.0	128	MUX 1:100
LBG403R–10	graphic full dot module	reflective	256.0	128	MUX 1:100
LBG403F–10	graphic full dot module	transflective	256.0	128	MUX 1:100
LTG201R–10	graphic full dot module	reflective	180.0	75.0	MUX 1:64

For detailed information on these types see Data Handbook S14

LTD201

7Z22297

LTD203

7Z22299

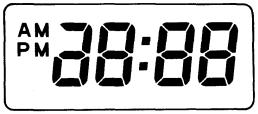
LTD211

7Z22300

LTD101

7Z22295

LP-2703

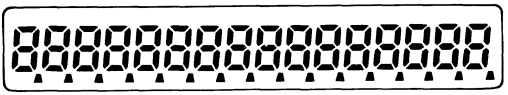


7Z22271

LTD202

7Z22298

LTD233



7Z22311

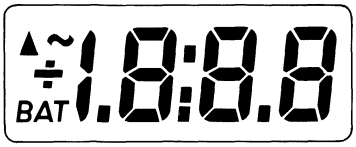
LTD234

7Z22312

PHILIPS

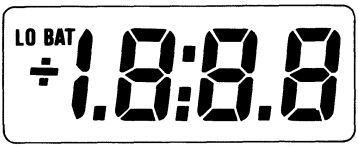
For detailed information on these types see Data Handbook S14

LTD221



7Z22301

LTD222

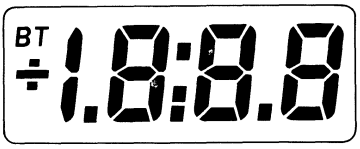


7Z22302

LTD224

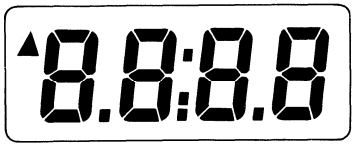
7Z22303

LTD225



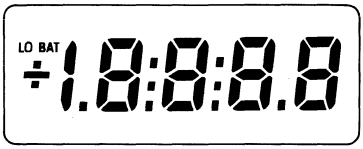
7Z22304

LTD226



7Z22305

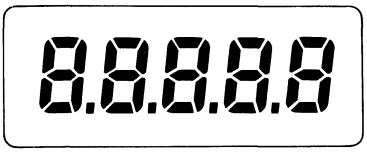
LTD227



7Z22306

For detailed information on these types see Data Handbook S14

LTD228

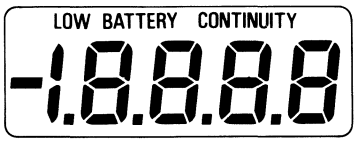


7Z22307

LTD231

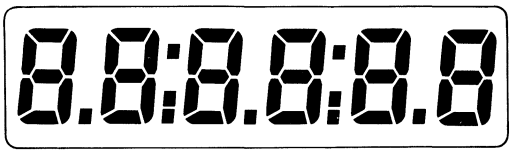
7Z22309

LTD232



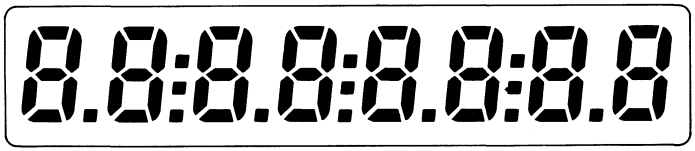
7Z22310

LTD229



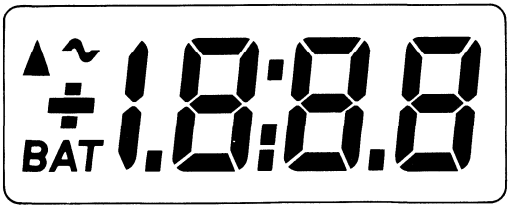
7Z22308

LTD262



7Z22315

LTD241

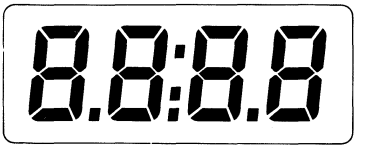


7Z22313

Optical selection guide (cont.)

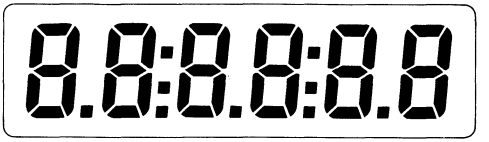
For detailed information on these types see Data Handbook S14

LTD242



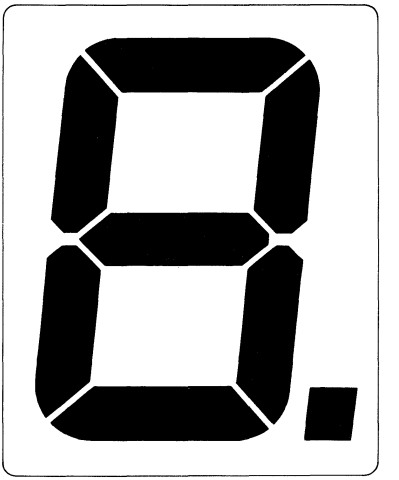
7Z22314

LTD263



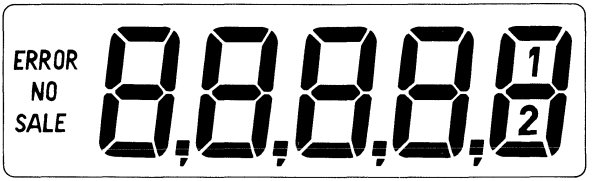
7Z22316

LTD261



7Z22320

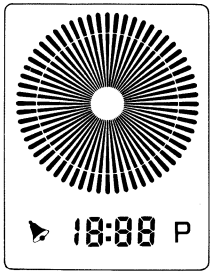
LTD264



7Z22317

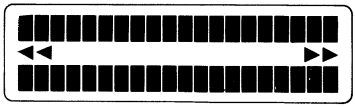
For detailed information on these types see Data Handbook S14

LTD132



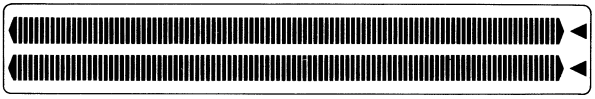
7Z22296

LTD321



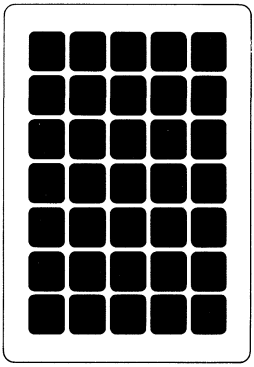
7Z22318

LTD351



7Z22319

LTA141

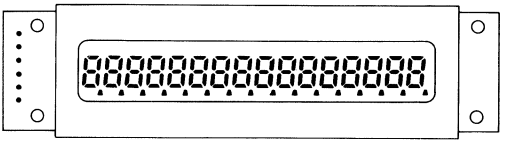


7Z22323

Optical selection guide (cont.)

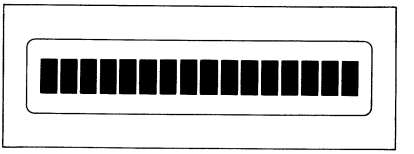
For detailed information on these types see Data Handbook S14

LTM233



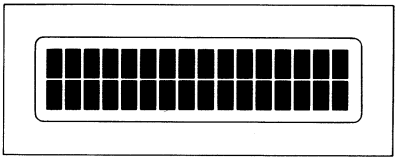
7Z22321

LTN111



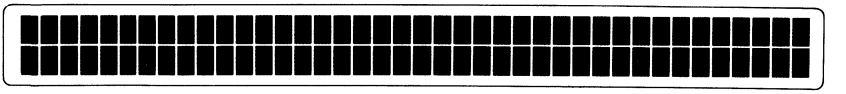
7Z22322

LTN211



7Z22324

LTN241



7Z22325

Operating characteristics extended quality grade

For detailed information on family characteristics see Data Handbook S14

TR0, TF0**

parameter	symbol		drive method DD*	unit
operating voltage	V_{op}	min typ max	3.0 4.5 6.0	V V V
operating ambient temperature	T_{amb}	min typ max	−10 – +60	°C °C °C
turn on time T_{amb} 25°C T_{amb} 0°C	t_{on}		 40 200	 ms ms
turn off time T_{amb} 25°C T_{amb} 0°C	t_{off}		 80 150	 ms ms
specific capacitance	C_s		11	pF/mm²
specific current consumption	I_s		10	nA/mm²
frame frequency	f_{dr}	min max	30 200	Hz Hz

* DD = direct drive
** TR = transmissive, TF = transflective

Operating characteristics extended quality grade

For detailed information on family characteristics see Data Handbook S14

TR1, TF1

parameter	symbol		drive method				unit
			DD*	1:2	1:3	1:4	
operating voltage	V_{op}	min	2.5	–	–	–	V
		typ	4.5	2.8	3.1	3.2	V
		max	6.0	–	–	–	V
operating ambient temperature	T_{amb}	min	−10	−10	−10	−10	°C
		typ	–	–	–	–	°C
		max	+60	+50	+50	+40	°C
turn on time	t_{on}						
T_{amb} 25°C			50	150	180	160	ms
T_{amb} 0°C			250	1000	1200	1400	ms
turn off time	t_{off}						
T_{amb} 25°C			90	90	60	75	ms
T_{amb} 0°C			400	300	300	300	ms
specific capacitance	C_s		15	15	15	15	pF/mm²
specific current consumption	I_s		15	15	22	22	nA/mm²
frame frequency	f_{dr}	min	30	30	30	30	Hz
		max	200	100	100	100	Hz

* DD = direct drive

Operating characteristics extended quality grade

For detailed information on family characteristics see Data Handbook S14

S

TR2, TF2

parameter	symbol		drive method				unit
			DD*	1:2	1:3	1:4	
operating voltage	V_{op}	min	3.0	–	–	–	V
		typ	4.5	3.9	4.4	4.5	V
		max	6.0	–	–	–	V
operating ambient temperature	T_{amb}	min	−25	−25	−25	−20	°C
		typ	–	–	–	–	°C
		max	+80	+80	+50	+50	°C
turn on time	t_{on}						
T_{amb} 25°C			40	75	90	100	ms
T_{amb} 0°C			200	300	450	500	ms
turn off time	t_{off}						
T_{amb} 25°C			80	40	50	40	ms
T_{amb} 0°C			150	180	110	150	ms
specific capacitance	C_s		11	11	11	11	pF/mm²
specific current consumption	I_s		10	10	15	15	nA/mm²
frame frequency	f_{dr}	min	30	30	30	30	Hz
		max	200	100	100	100	Hz

* DD = direct drive

For detailed information on these types see Data Handbook S14

extended type no.	description	illumination mode	character size mm	dot size mm	supply voltage V
Segment types					
LP–1471–B	16–digit module with I^2C	reflective	32 x 6.0		+3
LTM233R–10	16–digit module	reflective	32 x 6.0		+3
Character types					
LTN111R–10	16 character 5 x 7 dot 1–line module	reflective	3.07 x 5.73	0.55 x 0.75	+5
LTN111F–10	16 character 5 x 7 dot 1–line module	transflective	3.07 x 5.73	0.55 x 0.75	+5
LTN211R–10	16 character 5 x 7 dot 2–line module	reflective	2.96 x 4.86	0.56 x 0.66	+5
LTN211F–10	16 character 5 x 7 dot 2–line module	transflective	2.96 x 4.86	0.56 x 0.66	+5
LTN221R–10	20 character 5 x 7 dot 2–line module	reflective	3.2 x 5.55	0.6 x 0.65	+5
LTN221F–10	20 character 5 x 7 dot 2–line module	transflective	3.2 x 5.55	0.6 x 0.65	+5
LTN222R–10	24 character 5 x 7 dot 2–line module	reflective	2.7 x 5.55	0.5 x 0.65	+5
LTN222F–10	24 character 5 x 7 dot 2–line module	transflective	2.7 x 5.55	0.5 x 0.65	+5
LTN242R–10	40 character 5 x 7 dot 2–line module	reflective	3.2 x 4.85	0.6 x 0.65	+5, –5
LTN242F–10	40 character 5 x 7 dot 2–line module	transflective	3.2 x 4.85	0.6 x 0.65	+5, –5
Graphic full dot types					
LBG402R–10	graphic full dot module	reflective	0.35 x 0.49	0.48 x 0.48	+5, –13
LBG402F–10	graphic full dot module	transflective	0.35 x 0.49	0.48 x 0.48	+5, –13
LBG403R–10	graphic full dot module	reflective	0.35 x 0.49	0.48 x 0.48	+5, –12
LBG403F–10	graphic full dot module	transflective	0.35 x 0.49	0.48 x 0.48	+5, –12
LTG201R–10	graphic full dot module	reflective	2.6 x 3.66	0.48 x 0.48	+5, –11

For detailed information on these types see Data Handbook S14

LCD drivers

type no.	description
Dedicated drivers	
PCF2100	C bus control, 40–segments
PCF2110	C bus control, 60–segments, 2 LEDs
PCF2111	C bus control, 64–segments
PCF2112	C bus control, 32–segments
PCF8566	I²C bus control, universal multiplex drive, 1:2 to 1:4 MUX ratios (24 segs)
PCF8576	I²C bus control, universal multiplex drive, 1:2 to 1:4 MUX ratios (40 segs)
PCF8577	I²C bus control, direct drive (32 segs) duplex drive (64 segs)
PCF2201	Flat panel ROW/COLUMN driver
PCF8578	Flat panel ROW/COLUMN driver
PCF8579	Flat panel COLUMN driver
PCF1303T	18–segment bargraph display LCD driver, with analog input
HEF4754V	18–segment bargraph display LCD driver
PC74HC4543	BCD to 7–segment latch/decoder/driver
PC74HCT4543	for LCD
HEF4543B	BCD to 7–segment latch/decoder/driver for LED and LCD
PCF1171	4–digit LCD car clock circuit
PCF1172	3 1/2–digit LCD car clock circuit
PCF1174	4–digit LCD car clock circuit
PCF1175	4–digit, duplex drive LCD car clock circuit

Class A bipolar medium power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

status = C

Class-A medium power

type	f GHz	V_{CE} V	I_C mA	P_{L1}* mW	G_{po}** dB
LAE6000Q* **	2	10	4	–	–
LBE2003S	2	18	30	250	11
LCE2003S	2	18	30	250	11
LUE2003S	2	18	30	250	11
LBE2009S	2	18	110	900	9.8
LCE2009S	2	18	110	900	9.8
LUE2009S	2	18	110	900	9.8
LTE21009R	2.1	16	150	1000	8.5
LTE21015R	2.1	16	250	1600	8.1
LTE21025R	2.1	16	400	2800	7.8
LVE21050R	2.1	16	1100	5500	8
LWE2015R	2.3	16	250	1600	8.1
LWE2025R	2.3	16	400	2800	7.8
LAE4001R	4	15	25	110	9.5
LAE4002S	4	18	30	160	8
LTE4002S	4	18	30	160	8
LTE42005S	4.2	18	110	550	7.2
LTE42008R	4.2	16	250	940	7.5
LTE42012R	4.2	16	400	1250	7

* Load power for 1 dB compressed power gain
** Low-level power gain associated with P_{L1}
*** Low-noise type

Class A bipolar high power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

Class–A high power (wideband)

type	f GHz	V_{CE} V	I_C A	P_{L1}* W	G_{po}** dB
LZ1418E100R	1.4 to 1.8	16	2	11	11
LV1721E50R	1.7 to 2.1	16	1.1	5.5	8
LV2024E45R	2.0 to 2.4	16	1.1	5	7
LV2327E40R	2.3 to 2.7	16	1	5	8
LV2931E50S	2.9 to 3.1	18	1	5	6.5

* Load power for 1 dB compressed power gain
** Low–level power gain associated with P_{L1}

Class C bipolar power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

Class–C medium power

type	f GHz	V_{CE} V	P_L W	G_p dB	η_C %
PTB23001X	2	24	1.8	9	50
PTB23003X	2	24	4.0	10	50
PTB23005X	2	24	7.0	11	50
PTB32001X	3	24	1.8	9.5	45
PTB32003X	3	24	3.0	9.5	40
PTB32005X	3	24	5.5	9.5	40
PTB42001X	4.2	24	1.0	6	33
PTB42002X	4.2	24	2.0	6	35
PTB42003X	4.2	24	3.0	6	33
PVB42004X	1	24	13	11	60
	2	24	10	10	48
	3	24	7.5	8.8	30
	4	24	4	6	25

Class–C high power

type	f GHz	V_{CE} V	P_L W	G_p dB	η_C %
PZ1418B15U	1.4 to 1.8	28	15	7.8	45
PZ1418B30U	1.4 to 1.8	28	35	8.4	45
PZB16035U	1.64	28	38	9.8	50
PZB16040U	1.64	28	45	9	45
PZ1721B12U	1.7 to 2.1	28	16	8	45
PZ1721B25U	1.7 to 2.1	28	30	7.8	41
PZ2024B10U	2.0 to 2.4	28	12	6.8	45
PZ2024B20U	2.0 to 2.4	28	26	7	42
PZ2327B15U	2.3 to 2.7	28	16	8	45

Oscillator power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

Oscillator power transistors

type	f GHz	V_{CE} V	I_C mA	P_L mW	case
PPC5001T	5	20	200	450	FO–102
PQC5001T	5	20	200	450	FO–85

Bipolar transistors: pulsed power types

For detailed information on these types see data handbook S11
Products supplied as single units

Radar pulsed power transistors

Status = C

L–band

type	f GHz	V_{CC} V	t_p at µs	δ %	P_L W	G_p dB	η_C %
RZ1214B35Y	1.2 to 1.4	42	50	10	40	7.8	40
	1.2 to 1.4	50	300	10	40	7	35
RZ1214B65Y	1.2 to 1.4	42	50	10	80	7	38
	1.2 to 1.4	50	300	10	80	7	30
RZ1214B125Y	1.2 to 1.4	42	50	10	150	7	38
	1.2 to 1.4	50	300	10	150	7	30
RX1214B150W	1.2 to 1.4	40	1000	10	150	7	42
	1.2 to 1.4	50	150	5	240	9	45
RX1214B300Y	1.2 to 1.4	50	300	5	300	7.5	35
	1.2 to 1.4	50	300	5	320	8	38

S–band

RV2833B5X	2.8 to 3.3*	24	100	10	5.6	5.7	47
RV3135B5X	3.1 to 3.5	24	100	10	5.6	5.7	47
RZ2833B15W	2.8 to 3.3*	40	100	10	18	5.5	33
RZ3135B15W	3.1 to 3.5	40	100	10	18	5.5	33
RZ2833B30W	2.8 to 3.3*	40	100	10	34	5.5	33
RZ3135B30W	3.1 to 3.5	40	100	10	34	5.5	33
RZ2731B45W	2.7 to 3.1	40	100	10	45	7	40
RZ2833B45W	2.8 to 3.3	40	100	10	45	7	37
RZ3135B40W	3.1 to 3.5	40	100	10	40	6.4	35
RZ2731B60W	2.7 to 3.1	40	100	10	70	6.3	65
RZ2833B60W	2.8 to 3.3	40	100	10	60	6	37
RZ3135B50W	3.1 to 3.5	40	100	10	55	5.6	35
RZ2731B90W	2.7 to 3.1	40	100	10	100	6.5	40
RX3034470W	3.0 to 3.4	40	100	10	80	6	35

* may also be used for 2.7 to 3.1 GHz

Bipolar transistors: pulsed power types

For detailed information on these types see data handbook S11
Products supplied as single units

Avionics pulsed power transistors

type	f GHz	V_{CC} V	t_p at µs	δ %	P_L W	G_p dB	η_C %
MRB11080Y	1.09	50	10	1	100	8.5	40
MRB11175Y	1.09	50	10	1	200	8.5	40
MRB11350Y	1.09	50	10	1	400	8	35
MRB11900Y	1.09	50	10	1	850	7.5	35
RZB12050Y	1.09	50	100	10	50	10	45
	1.09	50	300	10	100	10	40
	1.09	50	–	–	100	9	40
RZB12100Y	1.09	50	100	10	100	10	45
	1.09	50	300	10	100	10	40
	1.09	50	–	–	100	9	40
RZB12250Y	1.09	50	100	10	250	7.5	25
	1.09	50	300	10	200	7.0	30
	1.09	50	–	–	100	9.0	30
RXB12350Y	1.09	50	100	10	350	7.8	38
	1.09	50	300	10	300	7.5	35
	1.09	50	–	–	300	7.5	35
RX1011B250Y	1.03–1.09	50	300	10	250	7.5	40
RX1011B350Y	1.03–1.09	50	300	10	250	7.5	40

Low noise and Class A power Ga As FETs

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

type	f GHz	V_{DS} V	I_D A	P_{L1}* mW	N_F dB	G_{po}** dB	G_a dB	case
CFX16–26	12	3	10	–	2.3	–	8	FO–92
CFX16–29	12	3	10	–	2.7	–	7.5	FO–92
CFX17–19	12	3	10	–	1.8	–	8.5	FO–92
CFX17–21	12	3	10	–	2.0	–	8.5	FO–92
CFX17–23	12	3	10	–	2.2	–	8.5	FO–92
CFX17–26	12	3	10	–	2.4	–	8	FO–92
CFX22	12	5	50	80	–	9	–	FO–92
CFX30	11	8	50	125	–	8	–	FO–85
CFX31	11	8	100	280	–	8	–	FO–85
CFX32	6	8	180	550	–	8.5	–	FO–85
	8.5	8	180	550	–	7.5	–	
CFX33	6	8	370	1100	–	7.0	–	FO–85
	8.5	8	370	1100	–	5.5	–	

* Load power for 1 dB compressed power gain
** Low–level power gain associated with P_{L1}

For detailed information on these types refer to our Data Handbook System

S

	type	description	case application
Accessories	**56201j**	Insulating bushes (height 5 mm)	TO–3
	56201d	Mica washer	TO–3
	56245	Distance disc of insulating material	TO–5; TO–39
	56246	Distance disc of insulating material	TO–18; TO–72
	56261a	2 insulating bushes (height 6,5 mm)	TO–3
	56264a	Mica washer	DO–5; TO–48
	56264b	Insulating bush	TO–48; DO–5 TO–48
	56295a	mica washer	DO–4; TO–64
	56295b	PTFE ring	
	56295c	insulating bush	
	56326	Metal washer	TO–126 (SOT–32)
	56339	Mica washer	TO–3
	56352	Mounting support	TO–3
	56353	Clip	TO–126; SOT–82
	56354	Mica insulator	TO–126; SOT–82
	56359b	Mica insulator	TO–220
	56359c	Insulating bush	TO–220
	56359d	Rectangular insulating bush	TO–220
	56360a	Rectangular washer	TO–220
	56363	Clip (direct mounting)	TO–220
	56364	Clip; to be used in conjunction with 56367 or 56369	TO–220
	56367	Alumina insulators, to be used in conjunction with 56364	TO–220
	56368a	Mica insulator	SOT–93
	56368b	Insulating bush	SOT–93
	56369	Mica insulator, to be used with 56364	TO–220
	56378	Mica insulator	SOT–93
	56379	Clip	SOT–93
	56387a	Mica insulator (up to 300 V)	TO–126
	56387b	Insulating bush (up to 300 V)	TO–126

More detailed information on these types can be supplied on request

KTY81–1 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY81–110	990–1010	–55 to +150	0.79	1
KTY81–120	980–1020	–55 to +150	0.79	1
KTY81–121	980–1000	–55 to +150	0.79	1
KTY81–122	1000–1020	–55 to +150	0.79	1
KTY81–150	950–1050	–55 to +150	0.79	1
KTY81–151	950–1000	–55 to +150	0.79	1
KTY81–152	1000–1050	–55 to +150	0.79	1

KTY81–2 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY81–210	1980–2020	–55 to +150	0.79	1
KTY81–220	1960–2040	–55 to +150	0.79	1
KTY81–221	1960–2000	–55 to +150	0.79	1
KTY81–222	2000–2040	–55 to +150	0.79	1
KTY81–250	1900–2100	–55 to +150	0.79	1
KTY81–251	1900–2000	–55 to +150	0.79	1
KTY81–252	2000–2100	–55 to +150	0.79	1

KTY83–1 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY83–110	990–1010	–55 to +175	1.67	1
KTY83–120	980–1020	–55 to +175	1.67	1
KTY83–121	980–1000	–55 to +175	1.67	1
KTY83–122	1000–1020	–55 to +175	1.67	1
KTY83–150	950–1050	–55 to +175	1.67	1
KTY83–151	950–1000	–55 to +175	1.67	1
KTY83–152	1000–1050	–55 to +175	1.67	1

More detailed information on these types can be supplied on request

KTY84–1 series

type number	nominal resistance T_{amb} = 100°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY84–130	970–1030	0 to +300	0.61	2
KTY84–150	950–1050	0 to +300	0.61	2
KTY84–151	950–1000	0 to +300	0.61	2
KTY84–152	1000–1050	0 to +300	0.61	2

KTY85–1 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY85–110	990–1010	–40 to +125	0.76	1
KTY85–120	980–1020	–40 to +125	0.76	1
KTY85–121	980–1000	–40 to +125	0.76	1
KTY85–122	1000–1020	–40 to +125	0.76	1
KTY85–150	950–1050	–40 to +125	0.76	1
KTY85–151	950–1000	–40 to +125	0.76	1
KTY85–152	1000–1050	–40 to +125	0.76	1

KTY86–2 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY86–205	1890–1910	–40 to +150	0.76	0.1

KTY87–2 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY87–205	1890–1910*	–40 to +125	0.75	0.1

* nominal resistance at T_{amb} = 100 °C = 3327–3361 Ω

Monolithic membrane pressure sensors / Magnetic field sensors

More detailed information on these types can be supplied on request

Monolithic membrane pressure sensors

type	characteristics				
	pressure range	application mode	operating voltage (V)	sensitivity at T_{amb} = 25°C	internal temp. compensation
KP100A	0 to 2 bar	absolute	7.5	60 mV/bar	yes
KP100A1	0 to 2 bar	absolute	5	40 mV/bar	yes
KP101A	0 to 1.2 bar	absolute	7.5	40 mV/bar	yes
KPZ20G	−1 to +2 bar	relative	7.5	79 mV/bar	no
KPZ21G	−1 to +10 bar	relative	7.5	26 mV/bar	no
KPZ21GE	−1 to +10 bar	relative	6.1	500 mV/bar	yes

Magnetic field sensors

type	magnetic field range	sensitivity mVm/kA	recommended aux. field kA/m	supply voltage V
KMZ10A	0 to ±0.5 kA/m	70	0.5	5
KMZ10A1*	0 to ±0.5 kA/m	70	0.5	5
KMZ10B	0 to ±2.0 kA/m	20	3	5
KMZ10C	0 to ±7.5 kA/m	7.5	3	5

* identical to KZM101A except direction of magnetic sensitivity is rotated by 90°

Guide to packing quantities

SPQ = smallest packing quantity
PQ = packing quantity

case	packing description	SPQ	PQ
DO–4	box	25	250
DO–5	box	10	100
DO–7	tape	7000	7000
DO–30	box	1	8
DO–34	reel	10000	10000
DO–35	reel	5000	5000
DO–41	reel	5000	5000
FO38	tray/box	25	75
FO41	box	1	–
FO45	box	1	–
FO46	box	1	–
FO49	tray/box	25	75
FO53	box	1	–
FO57	box	1	–
FO58	box	1	–
FO67	box	1	–
FO83	box	1	–
FO85	box	1	–
FO91	box	1	–
FO92	box	1	–
FO93	box	1	–
FO96	box	1	–
FO102	box	1	–
NO–243	bulk (box)	50	50
SOD–18	box	450	450
SOD–53	bulk (bags)	1000	6000
SOD–57	reel	5000	5000
SOD–61	reel	5000	5000
SOD–63	bulk (bags)	1000	2000
SOD–64	reel	4000	4000
SOD–67	bulk	1000	2000
SOD–70	box	500	4000
SOD–74	bulk (bags)	1000	2000
SOD–75	bulk (bags)	1000	2000
SOD–76	bulk (bags)	1000	2000
SOD–77	bulk (bags)	1000	2000
SOD–78	bulk (bags)	1000	2000
SOD–79	bulk (bags)	1000	6000
SOD–80	blister tape	2500	2500
SOD–81	reel	5000	5000
SOD–82	bags	100	1000
SOD–83	reel	5000	5000
SOD–85	bulk (bags)	1000	2000
SOT–5	bulk (bags)	50	1000
SOT–18	bulk (bags)	500	4000
SOT–23	bulk (phials)	500	25000
	tape (reel)/box	3000	6000
SOT–32	bulk (bags)	50	1500
	rail	50	1000

case	packing description	SPQ	PQ
SOT–37	bulk (bags)	500	8000
SOT–42	bulk (bags)	500	5000
SOT–48	tray/box	25	75
SOT–54	bulk (bags)	500	4000
	tape (reel)	1600	8000
	tape (ammo pack)	2000	10000
SOT–70	bags	100	2000
SOT–71	bags	100	2000
SOT–82	bulk (bags)	50	1000
	rail	50	1000
SOT–89	bulk (phials)	1000	10000
	tape (reel)	1000	1000
SOT–90	rail	75	1000
SOT–91	box	50	200
SOT–93	rail	25	500
SOT–103	bulk (bags)	500	5000
SOT–104	bulk (bags)	500	4000
SOT–112	box	200	200
SOT–115	bulk (tray)	1	50
SOT–122	tray/box	25	75
SOT–128	rail	50	1000
SOT–143	bulk (phials)	500	25000
	tape (reel)	3000	6000
SOT–148	box	20	120
SOT–173	bulk (box)	50	50
SOT–174	rail	75	1000
SOT–186	rail	50	1000
SOT–199	rail	25	500
TO–3	box	50	250
TO–18	bulk (bags)		
	transistors	500	4000
	LEDS	100	2000
TO–39	bulk (bags)	50	1000
TO–46	bulk (bags)	100	100
TO–48	box	10	100
TO–64	box	25	250
TO–65	box	5	50
TO–72	bulk (bags)	500	4000
TO–92	bulk (bags)	2000	2000
	tape (reel)	1600	8000
	tape (ammo pack)	2000	10000
TO–94	box	–	–
TO–126	bulk (bags)	50	1500
	rail	50	1000
TO–202	rail	50	1000
TO–220	rail	50	1000
TO–238	box	5	50
TO–240	box	1	10

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

type	CECC detail specification
BA314	CECC 50 001–026
BAT85	CECC 50 001–059
BAV18	CECC 50 001–022
BAV19	CECC 50 001–022
BAV20	CECC 50 001–022
BAV21	CECC 50 001–022
BAW62	CECC 50 001–021
BAX16	CECC 50 001–022
BAX17	CECC 50 001–022
BC107	CECC 50 002–076
BC108	CECC 50 002–077
BC109	CECC 50 002–078
BC140	CECC 50 002–004
BC141	CECC 50 002–005
BC160	CECC 50 002–015
BC161	CECC 50 002–016
BCY70	CECC 50 002–079
BCY71	CECC 50 002–080
BCY72	CECC 50 002–081
BFR90A	CECC 50 002–086
BFR91A	CECC 50 002–125
BFR96	CECC 50 002–126
BFX29	CECC 50 002–071
BFX30	CECC 50 004–083
BFX34	CECC 50 004–025
BFX37	CECC 50 002–185
BFX84	CECC 50 004–100
BFX85	CECC 50 004–100
BFX86	CECC 50 004–100
BFX87	CECC 50 002–071
BFX88	CECC 50 002–071
BFY50	CECC 50 002–089
BFY51	CECC 50 002–089
BFY52	CECC 50 002–089
BSS50	CECC 50 004–073
BSS51	CECC 50 004–073
BSS52	CECC 50 004–073
BSS60	CECC 50 004–074
BSS61	CECC 50 004–074
BSS62	CECC 50 004–074
BSV15	CECC 50 002–131
BSV16	CECC 50 002–131
BSV17	CECC 50 002–131
BSV64	CECC 50 004–008
BSV78	CECC 50 012–011
BSV79	CECC 50 012–011
BSV80	CECC 50 012–011
BSW66A	CECC 50 004–040
BSW67A	CECC 50 004–040
BSW68A	CECC 50 004–040
BSX45	CECC 50 002–174
BSX46	CECC 50 002–174
BSX47	CECC 50 002–174

type	CECC detail specification
BSX62	CECC 50 004–025
BSX63	CECC 50 004–025
BSX64	CECC 50 004–025
BT151–500R	CECC 50 011–003
BT151–650R	CECC 50 011–003
BT152–400	CECC 50 011–011
BT152–600	CECC 50 011–011
BT152–800	CECC 50 011–011
BT155–600	CECC 50 011–009
BT155–800	CECC 50 011–009
BTW38–600	CECC 50 011–006
BTW38–800	CECC 50 011–006
BTW38–1000	CECC 50 011–006
BTW38–1200	CECC 50 011–006
BTW42–600	CECC 50 011–006
BTW42–800	CECC 50 011–006
BTW42–1000	CECC 50 011–006
BTW42–1200	CECC 50 011–006
BTW45–200R	CECC 50 011–002
BTW45–400R	CECC 50 011–002
BTW45–600R	CECC 50 011–002
BTW45–800R	CECC 50 011–002
BTW45–1000R	CECC 50 011–002
BTW45–1200R	CECC 50 011–002
BTW63–600	CECC 50 011–010
BTW63–800	CECC 50 011–010
BTY79–100	CECC 50 011–006
BTY79–200	CECC 50 011–006
BTY79–300	CECC 50 011–006
BTY79–400	CECC 50 011–006
BTY79–500	CECC 50 011–006
BTY79–600	CECC 50 011–006
BTY79–800	CECC 50 011–006
BTY79–1000	CECC 50 011–006
BY229–200	CECC 50 009–021
BY229–400	CECC 50 009–021
BY229–600	CECC 50 009–021
BY229–800	CECC 50 009–021
BY229–1000	CECC 50 009–021
BYV20–30	CECC 50 009–033
BYV20–35	CECC 50 009–033
BYV20–40	CECC 50 009–033
BYV20–45	CECC 50 009–033
BYV21–30	CECC 50 009–018
BYV21–35	CECC 50 009–018
BYV21–40	CECC 50 009–018
BYV21–45	CECC 50 009–018
BYV22–30	CECC 50 009–034
BYV22–35	CECC 50 009–034
BYV22–40	CECC 50 009–034
BYV22–45	CECC 50 009–034
BYV23–30	CECC 50 009–036
BYV23–35	CECC 50 009–036

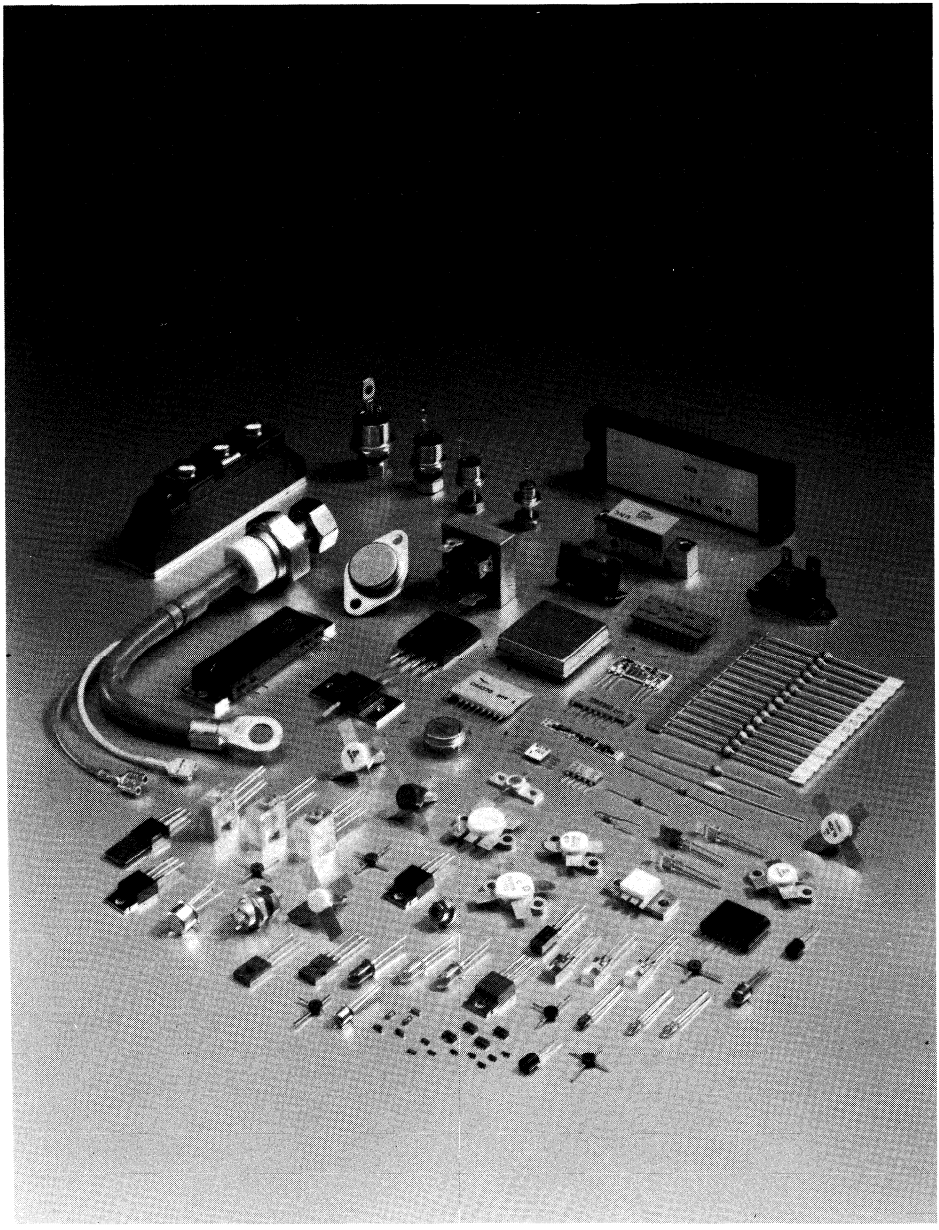
Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

type	CECC detail specification
BYV23–40	CECC 50 009–036
BYV23–45	CECC 50 009–036
BYV32–50(R)	CECC 50 009–026
BYV32–100(R)	CECC 50 009–026
BYV32–150(R)	CECC 50 009–026
BYV32–200(R)	CECC 50 009–026
BYW29–50	CECC 50 009–014
BYW29–100	CECC 50 009–014
BYW29–150	CECC 50 009–014
BYW29–200	CECC 50 009–014
BYW30–50	CECC 50 009–001
BYW30–100	CECC 50 009–001
BYW30–150	CECC 50 009–001
BYW30–200	CECC 50 009–001
BYW31–50	CECC 50 009–002
BYW31–100	CECC 50 009–002
BYW31–150	CECC 50 009–002
BYW31–200	CECC 50 009–002
BYW54	CECC 50 008–015
BYW55	CECC 50 008–015
BYW56	CECC 50 008–015
BYW92–50	CECC 50 009–003
BYW92–100	CECC 50 009–003
BYW92–150	CECC 50 009–003
BYW93–50	CECC 50 009–028
BYW93–100	CECC 50 009–028
BYW93–150	CECC 50 009–028
BYW93–200	CECC 50 009–028
BYX25–600(R)	CECC 50 009–022
BYX25–800(R)	CECC 50 009–022
BYX25–1000(R)	CECC 50 009–022
BYX25–1200(R)	CECC 50 009–022
BYX25–1400(R)	CECC 50 009–022
BYX38–300(R)	CECC 50 009–019
BYX38–600(R)	CECC 50 009–019
BYX38–900(R)	CECC 50 009–019
BYX38–1200(R)	CECC 50 009–019
BYX42–300(R)	CECC 50 009–020
BYX42–600(R)	CECC 50 009–020
BYX42–900(R)	CECC 50 009–020
BYX42–1200(R)	CECC 50 009–020
BYX49–300(R)	CECC 50 009–011
BYX49–600(R)	CECC 50 009–011
BYX49–1200(R)	CECC 50 009–011
BYX52–300(R)	CECC 50 009–024
BYX52–600(R)	CECC 50 009–024
BYX52–1200(R)	CECC 50 009–024
BYX56–600(R)	CECC 50 009–023
BYX56–800(R)	CECC 50 009–023
BYX56–1000(R)	CECC 50 009–023
BYX56–1200(R)	CECC 50 009–023
BYX56–1400(R)	CECC 50 009–023
BYX98–300(R)	CECC 50 009–004
BYX98–600(R)	CECC 50 009–004
BYX98–900(R)	CECC 50 009–004
BYX98–1200(R)	CECC 50 009–004
BYX99–300(R)	CECC 50 009–005
BYX99–600(R)	CECC 50 009–005
BYX99–900(R)	CECC 50 009–005
BYX99–1200(R)	CECC 50 009–005
BZT03 C9V1–C270	CECC 50 005–017
BZV85 series	CECC 50 005–010
BZW03 series	CECC 50 005–019
BZW70 series	CECC 50 005–015
BZX55 C2V4–C75	CECC 50 005–005
BZX70 series	CECC 50 005–015
BZX79 C2V4–C75	CECC 50 005–005
BZY88 C2V4–C75	CECC 50 005–005
1N914	CECC 50 001–021
1N916	CECC 50 001–021
1N3879(R)	CECC 50 009–006
1N3880(R)	CECC 50 009–006
1N3881(R)	CECC 50 009–006
1N3882(R)	CECC 50 009–006
1N3883(R)	CECC 50 009–006
1N3890(R)	CECC 50 009–007
1N3891(R)	CECC 50 009–007
1N3892(R)	CECC 50 009–007
1N3899	CECC 50 009–035
1N3900	CECC 50 009–035
1N3901	CECC 50 009–035
1N3902	CECC 50 009–035
1N3903	CECC 50 009–035
1N3909	CECC 50 009–035
1N3910	CECC 50 009–035
1N3911	CECC 50 009–035
1N3912	CECC 50 009–035
1N3913	CECC 50 009–035
1N4148	CECC 50 001–021
1N4149	CECC 50 001–021
1N4446	CECC 50 001–021
1N4447	CECC 50 001–021
1N4448	CECC 50 001–021
1N4449	CECC 50 001–021
1N5059	CECC 50 008–015
1N5060	CECC 50 008–015
1N5061	CECC 50 008–015
1N5062	CECC 50 008–015
2N1613	CECC 50 002–104
2N1711	CECC 50 002–104
2N1893	CECC 50 002–104
2N2218(A)	CECC 50 004–029
2N2219(A)	CECC 50 004–029
2N2222(A)	CECC 50 004–030
2N2904(A)	CECC 50 002–102
2N2905(A)	CECC 50 002–102

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

type	CECC detail specification
2N2906(A)	CECC 50 002–103
2N2907(A)	CECC 50 002–103
2N3019	CECC 50 002–175
2N3020	CECC 50 002–175
CV7099	CECC 50 005–005
CV7100	CECC 50 005–005
CV7101	CECC 50 005–005
CV7102	CECC 50 005–005
CV7103	CECC 50 005–005
CV7104	CECC 50 005–005
CV7105	CECC 50 005–005
CV7106	CECC 50 005–005
CV7138	CECC 50 005–005
CV7139	CECC 50 005–005
CV7140	CECC 50 005–005
CV7141	CECC 50 005–005
CV7142	CECC 50 005–005
CV7143	CECC 50 005–005
CV7144	CECC 50 005–005
CV7145	CECC 50 005–005
CV7146	CECC 50 005–005
CV7311	CECC 50 009–019
CV7312	CECC 50 009–019
CV7313	CECC 50 009–019
CV7314	CECC 50 009–019
CV7315	CECC 50 009–019
CV7316	CECC 50 009–019
CV7317	CECC 50 009–019
CV7318	CECC 50 009–019
CV7319	CECC 50 009–019
CV7320	CECC 50 009–019
CV7367	CECC 50 001–021
CV7368	CECC 50 001–021
CV7379	CECC 50 009–020
CV7380	CECC 50 009–020
CV7381	CECC 50 009–020
CV7382	CECC 50 009–020
CV7384	CECC 50 009–020
CV7385	CECC 50 009–020
CV7386	CECC 50 009–020
CV7387	CECC 50 009–020
CV7669	CECC 50 002–132
CV7670	CECC 50 002–132
CV7671	CECC 50 002–132
CV7672	CECC 50 002–132
CV7673	CECC 50 002–133
CV7674	CECC 50 002–133
CV7375	CECC 50 002–133
CV7376	CECC 50 002–133
CV7722	CECC 50 002–177
CV7723	CECC 50 002–177
CV7724	CECC 50 002–177
CV7725	CECC 50 004–096

type	CECC detail specification
CV7726	CECC 50 004–096
CV7727	CECC 50 004–096
CV7756	CECC 50 001–021
CV7757	CECC 50 001–021
CV7768	CECC 50 004–094
CV7770	CECC 50 004–094
CV7875	CECC 50 001–038
CV8308	CECC 50 001–020
CV8308–ID	CECC 50 001–020
CV8617	CECC 50 001–021
CV8790	CECC 50 001–022
CV8805	CECC 50 001–020
CV8805–ID	CECC 50 001–020
CV9507	CECC 50 004–050
CV9637	CECC 50 001–021
CV9638	CECC 50 001–037
CV9790	CECC 50 002–168
CV10253	CECC 50 004–095
CV10254	CECC 50 002–176
CV10440	CECC 50 004–087
CV10806	CECC 50 002–165
CV10807	CECC 50 004–085
CV10814	CECC 50 002–141
CV12253	CECC 50 004–095
CVA7026	CECC 50 008–015
CVA7027	CECC 50 008–015
CVA7028	CECC 50 008–015
CVA7029	CECC 50 008–015
CVA7030	CECC 50 008–015
CVA7476	CECC 50 008–015
PO15	CECC 50 004–084
PO17	CECC 50 004–085
PO33	CECC 50 001–026



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Introduction

Our Data Handbook System comprises more than 60 books with specifications on electronic components, subassemblies and materials. It is made up of six series of handbooks:

INTEGRATED CIRCUITS
DISCRETE SEMICONDUCTORS
DISPLAY COMPONENTS
PASSIVE COMPONENTS
PROFESSIONAL COMPONENTS
MATERIALS

The data handbooks contain all pertinent data available at the time of publication, and each is revised and reissued periodically.
When ratings or specifications differ from those published in the preceding edition they are indicated with arrows in the page margin. Where application information is given it is advisory and does not form part of the product specification.
Information on current Data Handbooks and on how to obtain a subscription for future issues is available from any of the Organizations listed on the back cover.
Product specialists are at your service and enquiries will be answered promptly.

INTEGRATED CIRCUITS
This series of data handbooks comprises:

IC01	**Radio, audio and associated systems** Bipolar, MOS
IC02a/b	**Video and associated systems** Bipolar, MOS
IC03	**ICs for Telecom** Bipolar, MOS Subscriber sets, Cordless Telephones
IC04	**HE4000B logic family** CMOS
IC05	**not yet issued**
IC06	**High-speed CMOS; PC74HC/HCT/HCU** Logic family
IC07	**not yet issued**
IC08	**ECL 10K and 100K logic families**
IC09	**TTL logic series**
IC10	**Memories** MOS, TTL, ECL
IC11	**Linear Products**
IC12	**I^2C-bus compatible ICs**
IC13	**Semi-custom** Programmable Logic Devices (PLD)
IC14	**Microcontrollers** Bipolar, MOS
IC15	**FAST TTL logic series**
IC16	**CMOS integrated circuits for clocks and watches**
IC17	**ICs for Telecom** Bipolar, MOS Radio pagers, Mobile telephones, ISDN
IC18	**Microprocessors and peripherals**
IC19	**Data communication products**

DISCRETE SEMICONDUCTORS

This series of data handbooks comprises:

current code	new code	handbook title
S1	**SC01**	**Diodes** High–voltage tripler units
S2a	**SC02**	**Power diodes**
S2b	**SC03**	**Thyristors and triacs**
S3	**SC04**	**Small–signal transistors**
S4a	**SC05**	**Low–frequency power transistors and hybrid IC power modules**
S4b	**SC06**	**High–voltage and switching power transistors**
S5	**SC07**	**Small–signal field–effect transistors**
S6*	**SC08** **SC09**	**RF power transistors** **RF power modules**
S7	**SC10**	**Surface mounted semiconductors**
S8a	**SC11**	**Light emitting diodes**
S8b	**SC12**	**Optocouplers**
S9	**SC13**	**PowerMOS transistors**
S10	**SC14**	**Wideband transistors and wideband hybrid IC modules**
S11	**SC15**	**Microwave transistors**
S15**	**SC16**	**Laser diodes**
S13	**SC17**	**Semiconductor sensors**
S14	**SC18**	**Liquid crystal displays and driver ICs for LCDs**

* The current handbook S6 will be divided into 2 handbooks (SC08 and SC09).
** New handbook in this series; will be issued shortly.

DISPLAY COMPONENTS

This series of data handbooks comprises:

current code	new code	handbook title
T8	**DC01**	**Colour display systems**
T16	**DC02**	**Monochrome tubes and deflection units**
C2	**DC03**	**Television tuners, coaxial aerial input assemblies**
C3	**DC04**	**Loudspeakers**
C20	**DC05**	**Wire–wound components for TVs and monitors**

PASSIVE COMPONENTS
This series of data handbooks comprises:

current code	new code	handbook title
C14	**PA01**	**Electrolytic capacitors; solid and non-solid**
C11	**PA02**	**Varistors, thermistors and sensors**
C12	**PA03**	**Potentiometers, encoders and switches**
C7	**PA04**	**Variable capacitors**
C22	**PA05**	**Film capacitors**
C15	**PA06**	**Ceramic capacitors**
C9	**PA07**	**Piezoelectric quartz devices**
C13	**PA08**	**Fixed resistors**

PROFESSIONAL COMPONENTS

This series of data handbooks comprises:

current code	new code	handbook title
T1	*	**Power tubes for RF heating and communications**
T2a	*	**Transmitting tubes for communications, glass types**
T2b	*	**Transmitting tubes for communications, ceramic types**
T3	**PC01**	**High–power klystrons**
T4	*	**Magnetrons for microwave heating**
T5	**PC02**	**Cathode–ray tubes**
T6	**PC03**	**Geiger–Müller tubes**
T9	**PC04**	**Photo and electron multipliers**
T10	**PC05**	**Plumbicon camera tubes and accessories**
T11	**PC06**	**Microwave diodes and sub–assemblies**
T12	**PC07**	**Vidicon and Newvicon camera tubes and deflection units**
T13	**PC08**	**Image intensifiers and infrared detectors**
T15	**PC09**	**Dry reed switches**
C8	**PC10**	**Variable mains transformers; annular fixed transformers**

* These handbooks will not be reissued.

MATERIALS

This series of data handbooks comprises:

current code	new code	handbook title
C4/C5	**MA01***	**Soft Ferrites**
C16	**MA02**	**Permanent magnet materials**
C19	**MA03**	**Piezoelectric ceramics**

* Handbooks C4 and C5 will be reissued as one handbook having the new code MA01.

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