OptiMOS®3 Power-Transistor

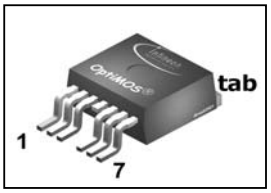
Features

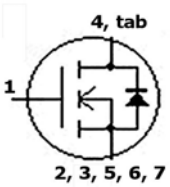
- MOSFET for ORing and Uninterruptible Power Supply
- Qualified according to JEDEC[1] for target applications
- N-channel
- Logic level
- Ultra-low on-resistance $R_{DS(on)}$
- 100% Avalanche tested
- Pb-free plating; RoHS compliant

Product Summary

V_{DS}	40	V
$R_{DS(on),max}$	1.1	mΩ
I_D	180	A

PG-TO263-7





Type	Package	Marking
IPB011N04L G	PG-TO263-7	011N04L

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	V_{GS}=10 V, T_C=25 °C	180	A
		V_{GS}=10 V, T_C=100 °C	180	
		V_{GS}=4.5 V, T_C=25 °C	180	
		V_{GS}=4.5 V, T_C=100 °C	180	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	1260	
Avalanche current, single pulse[3]	I_{AS}	T_C=25 °C	100	
Avalanche energy, single pulse	E_{AS}	I_D=100 A, R_{GS}=25 Ω	525	mJ
Gate source voltage	V_{GS}		±20	V

[1] J-STD20 and JESD22

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	T_C=25 °C	250	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	0.6	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm² cooling area[4)]	-	-	40	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	40	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=200 µA	1.2	-	2	
Zero gate voltage drain current	I_{DSS}	V_{DS}=40 V, V_{GS}=0 V, T_j=25 °C	-	0.1	2	µA
		V_{DS}=40 V, V_{GS}=0 V, T_j=125 °C	-	20	200	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=4.5 V, I_D=100 A	-	1.0	1.4	mΩ
		V_{GS}=10 V, I_D=100 A	-	0.8	1.1	
Gate resistance	R_G		-	1.5	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=100 A	180	370	-	S

[2)] See figure 3 for more detailed information

[3)] See figure 13 for more detailed information

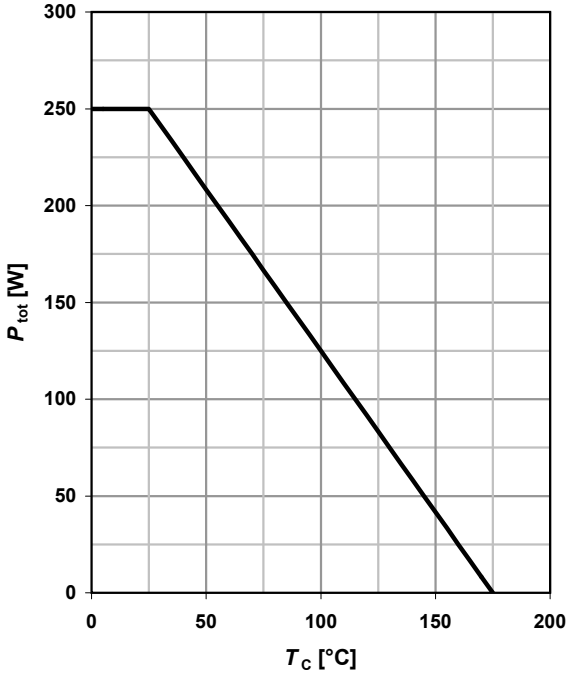
[4)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=20 V, f=1 MHz	-	22000	29000	pF
Output capacitance	C_{oss}		-	4100	5500	
Reverse transfer capacitance	C_{rss}		-	240	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20 V, V_{GS}=10 V, I_D=30 A, R_G=1.6 Ω	-	25	-	ns
Rise time	t_r		-	13	-	
Turn-off delay time	$t_{d(off)}$		-	106	-	
Fall time	t_f		-	21	-	
Gate Charge Characteristics[5)]						
Gate to source charge	Q_{gs}	V_{DD}=20 V, I_D=100 A, V_{GS}=0 to 10 V	-	61	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	33	-	
Gate to drain charge	Q_{gd}		-	26	-	
Switching charge	Q_{sw}		-	53	-	
Gate charge total	Q_g		-	260	346	
Gate plateau voltage	$V_{plateau}$		-	2.9	-	V
Gate charge total	Q_g	V_{DD}=20 V, I_D=100 A, V_{GS}=0 to 4.5 V	-	125	167	nC
Gate charge total, sync. FET	$Q_{g(sync)}$	V_{DS}=0.1 V, V_{GS}=0 to 10 V	-	244	-	
Output charge	Q_{oss}	V_{DD}=20 V, V_{GS}=0 V	-	153	-	
Reverse Diode						
Diode continuous forward current	I_S	T_C=25 °C	-	-	180	A
Diode pulse current	$I_{S,pulse}$		-	-	1260	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=100 A, T_j=25 °C	-	0.82	1	V
Reverse recovery charge	Q_{rr}	V_R=20 V, I_F=I_S, di_F/dt=400 A/µs	-	120	-	nC

[5)] See figure 16 for gate charge parameter definition

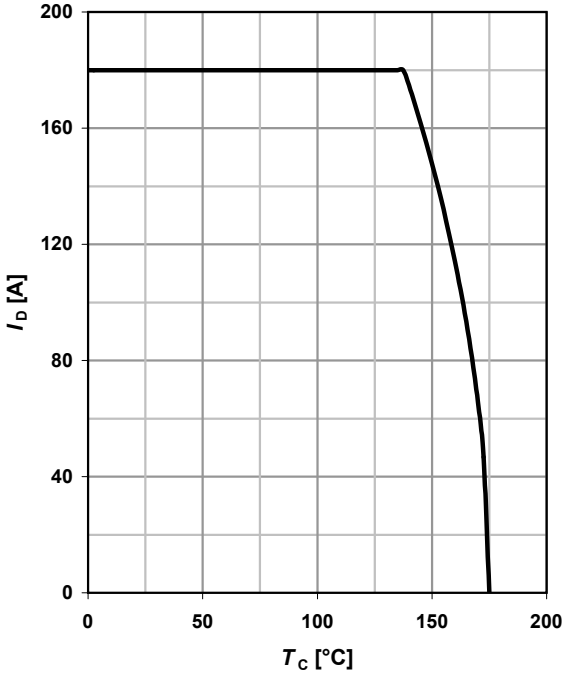
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

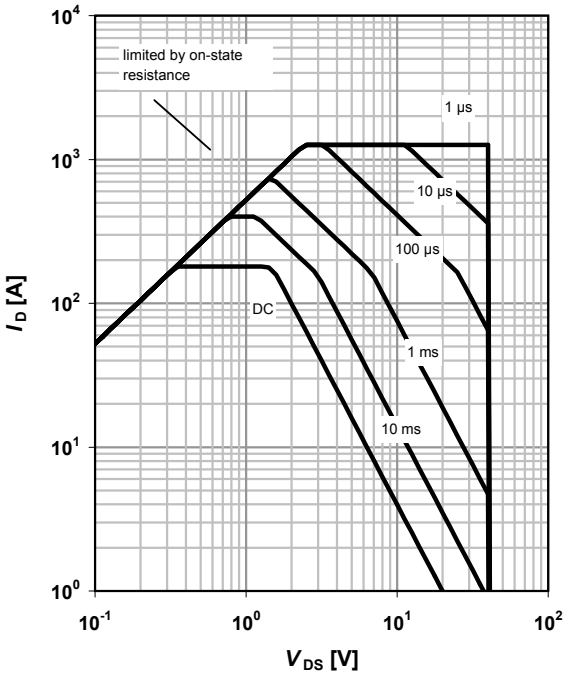
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

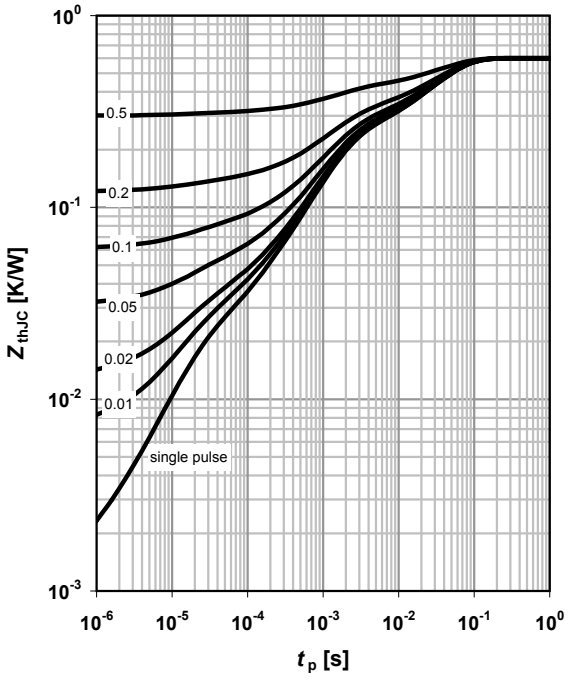
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

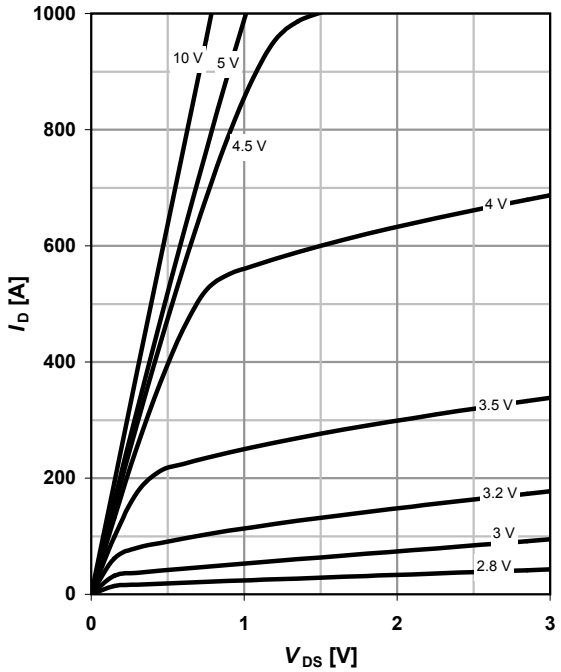
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

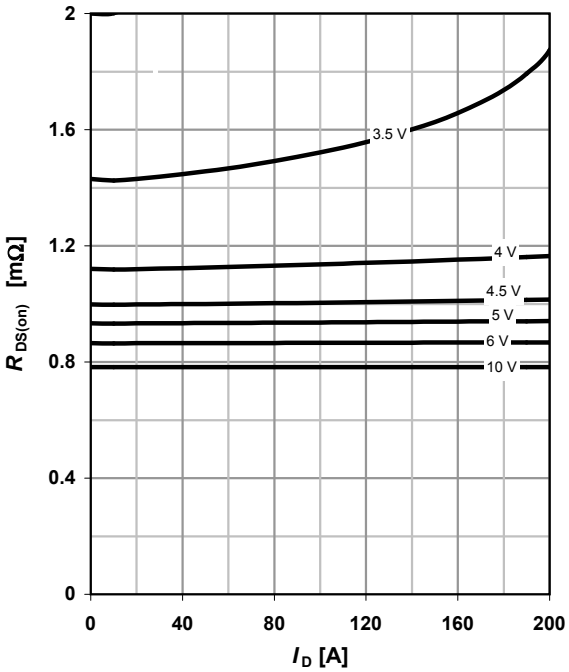
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

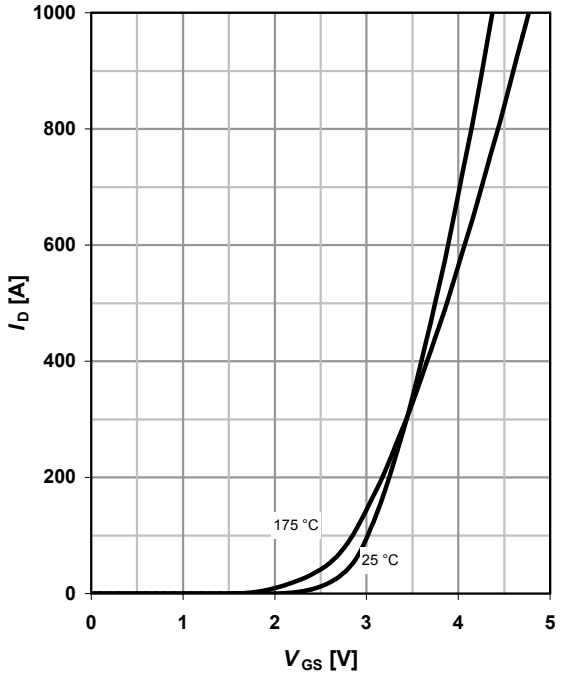
parameter: V_{GS}



7 Typ. transfer characteristics

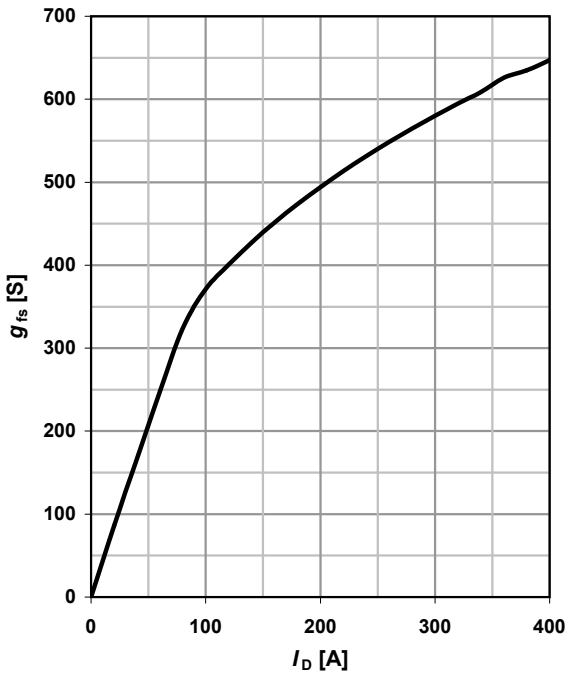
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



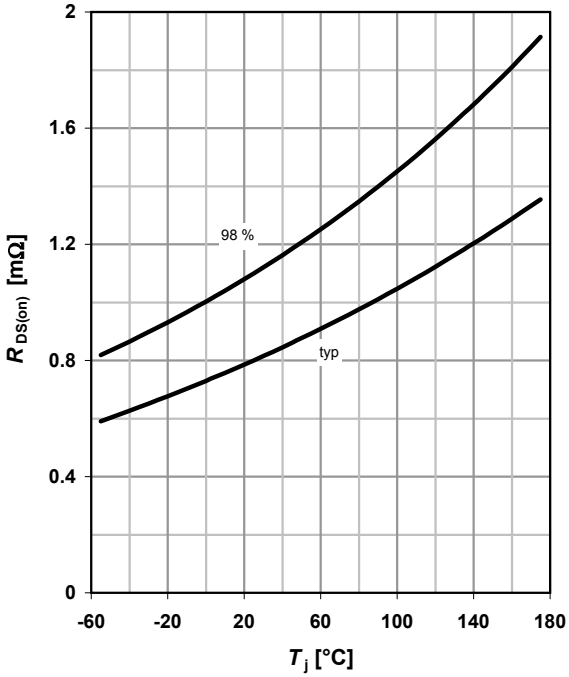
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



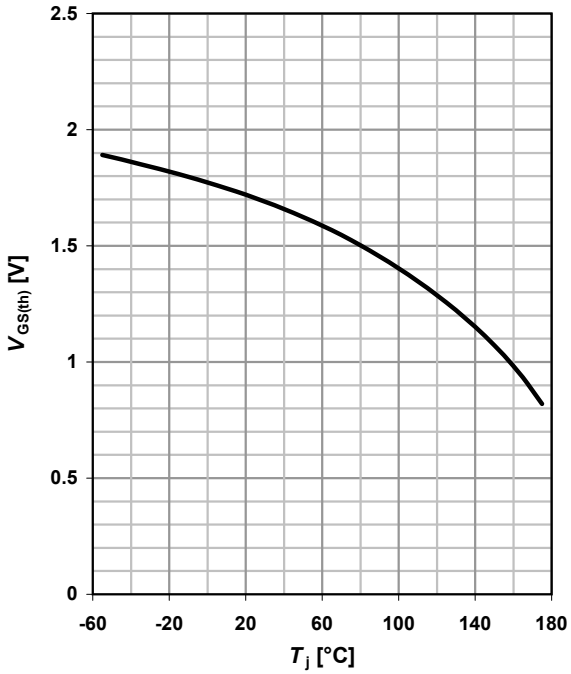
9 Drain-source on-state resistance

$R_{DS(on)}$=f(T_j); I_D=100 A; V_{GS}=10 V



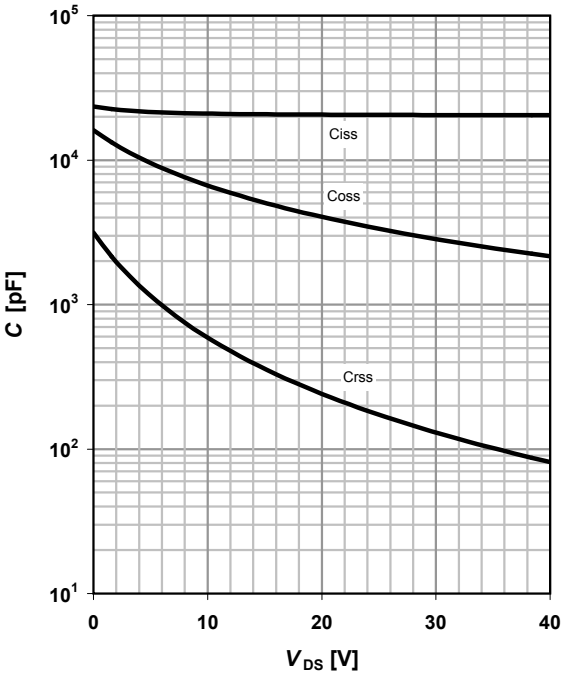
10 Typ. gate threshold voltage

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=1mA



11 Typ. capacitances

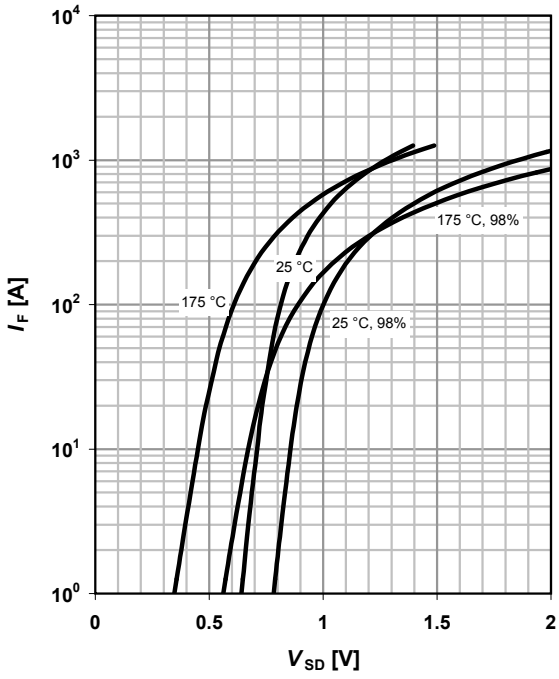
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

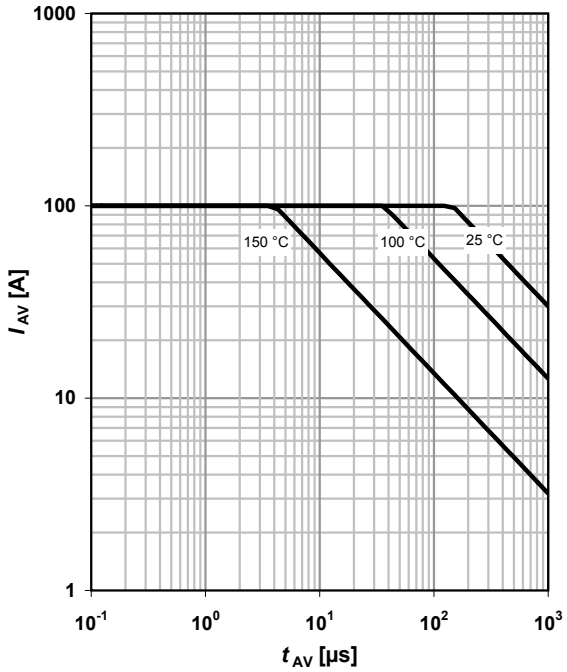
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

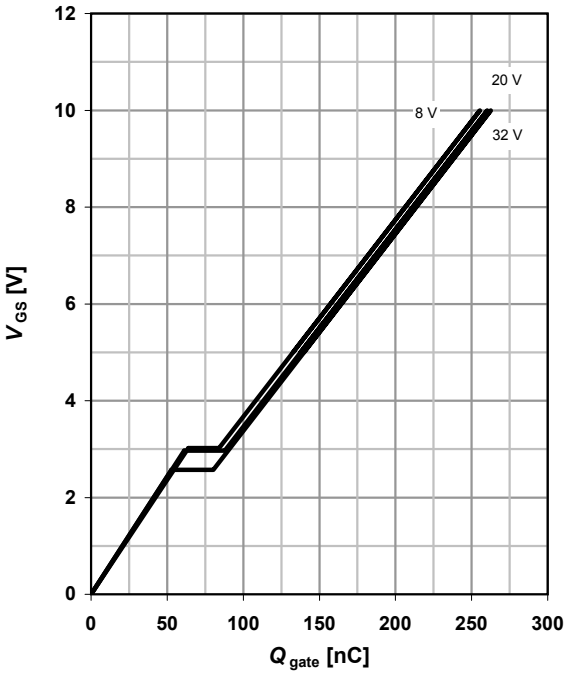
parameter: $T_{j(start)}$



14 Typ. gate charge

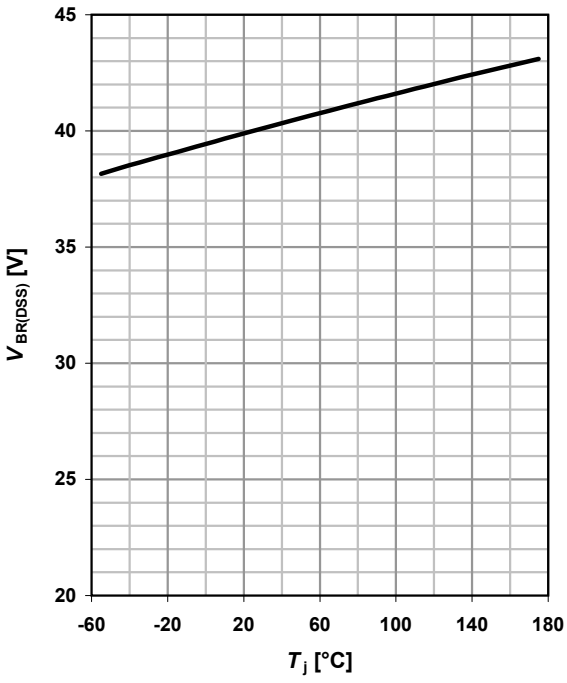
V_{GS}=f(Q_{gate}); I_D=100 A pulsed

parameter: V_{DD}

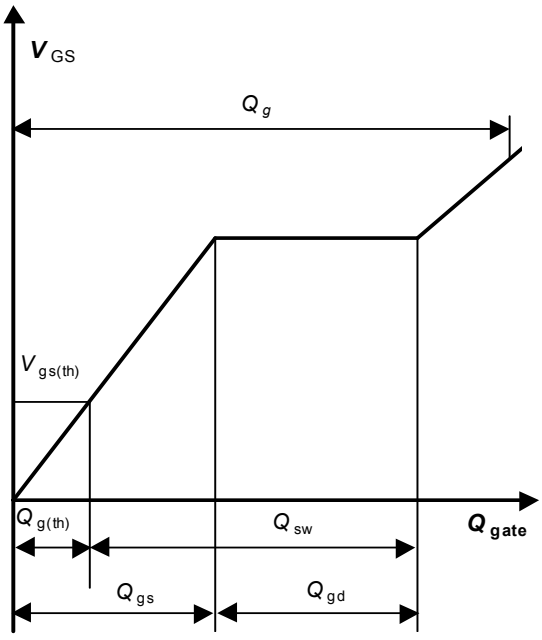


15 Drain-source breakdown voltage

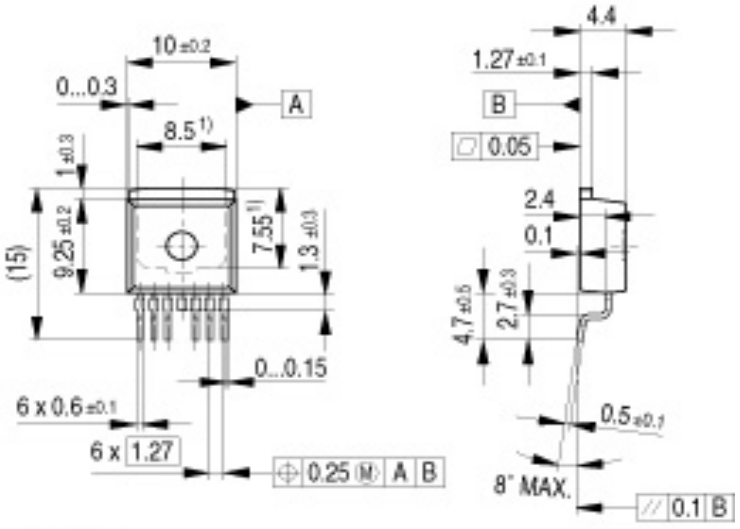
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



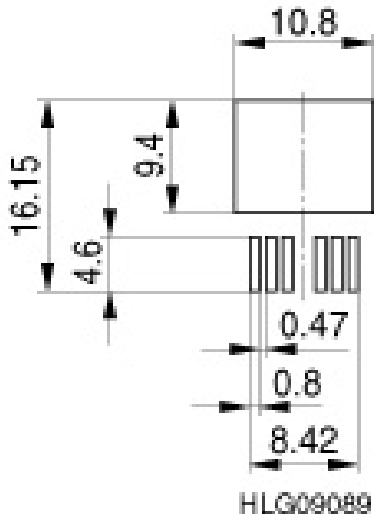
Package Outline **PG-TO263-7**



1) Typical
Metal surface min. X = 7.25, Y = 6.9
All metal surfaces tin plated, except area of cut.

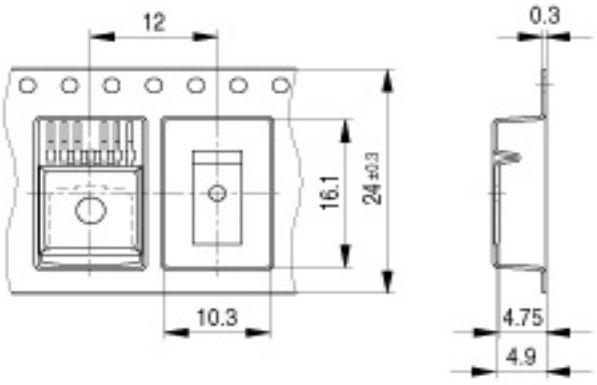
GPT09063

Footprint:



HLG09089

Packaging:



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