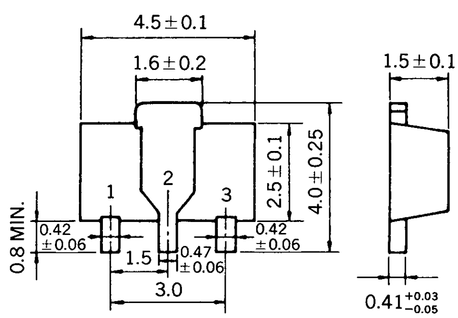
DATA SHEET

NEC

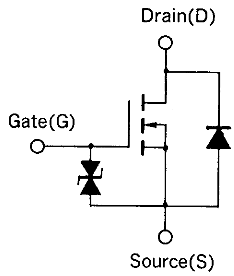
MOS FIELD EFFECT TRANSISTOR
2SK1273

N-CHANNEL MOS FET
FOR HIGH SPEED SWITCHING

PACKAGE DIMENSIONS (Unit : mm)



1.Source
2.Drain
3.Gate
MARK:NA



(Diode in the figure is the parasitic diode.)

The 2SK1273, N-channel vertical type MOS FET, is a switching device which can be driven directly by the output of ICs having a 5 V power source.

As the MOS FET has low on-state resistance and excellent switching characteristics, it is suitable for driving actuators such as motors, relays, and solenoids.

FEATURES

- Directly driven by ICs having a 5 V power source.
- Has low on-state resistance
  $R_{DS(on)}$ = 1.00 Ω MAX. @V_{GS} = 4.0 V, I_D = 0.5 A
  $R_{DS(on)}$ = 0.65 Ω MAX. @V_{GS} = 10 V, I_D = 0.5 A
- Not necessary to consider driving current because of its high input impedance.
- Possible to reduce the number of parts by omitting the bias resistor.

QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	V_{DSS}	60	V	V_{GS} = 0
Gate to Source Voltage	V_{GSS}	±20	V	V_{DS} = 0
Drain Current	$I_{D(DC)}$	±2.0	A	
Drain Current	$I_{D(pulse)}$	±4.0	A	PW ≦ 10 ms, Duty Cycle ≦ 50 %
Total Power Dissipation	P_T	2.0	W	when using ceramic board of 16 cm² x 0.7 mm
Channel Temperature	T_{ch}	150	°C	
Storage Temperature	T_{stg}	−55 to +150	°C	

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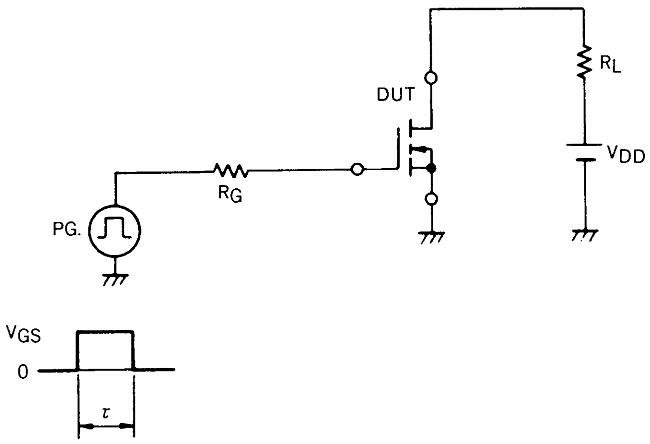
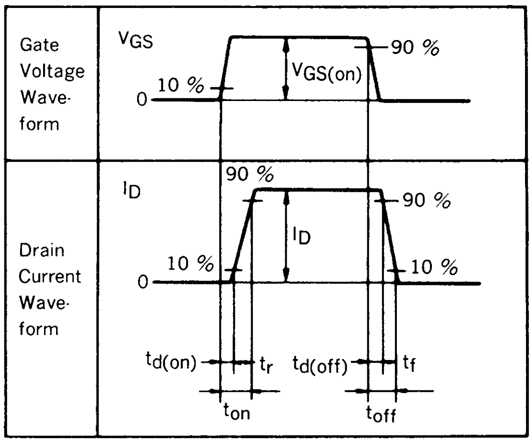
ELECTRICAL CHARACTERISTICS ($T_a = 25\ ^\circ C$)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Cut-off Current	I_{DSS}			10	μA	$V_{DS} = 60$ V, $V_{GS} = 0$
Gate Leakage Current	I_{GSS}			±10	μA	$V_{GS} = \pm 20$ V, $V_{DS} = 0$
Gate Cut-off Voltage	$V_{GS(off)}$	1.0	1.7	2.5	V	$V_{DS} = 10$ V, $I_D = 1$ mA
Forward Transfer Admittance	$\lvert y_{fs} \rvert$	0.4			S	$V_{DS} = 10$ V, $I_D = 0.5$ A
Drain to Source On-State Resistance	$R_{DS(on)1}$		0.31	1.00	Ω	$V_{GS} = 4.0$ V, $I_D = 0.5$ A
Drain to Source On-State Resistance	$R_{DS(on)2}$		0.24	0.65	Ω	$V_{GS} = 10$ V, $I_D = 0.5$ A
Input Capacitance	C_{iss}		220		pF	$V_{DS} = 10$ V, $V_{GS} = 0$, f = 1 MHz
Output Capacitance	C_{oss}		105		pF	
Feedback Capacitance	C_{rss}		16		pF	
Turn-On Delay Time	$t_{d(on)}$		15		ns	$V_{GS(on)} = 10$ V, $R_G = 10$ Ω $V_{DD} = 25$ V, $I_D = 0.5$ A $R_L = 50$ Ω
Rise Time	t_r		35		ns	
Turn-Off Delay Time	$t_{d(off)}$		380		ns	
Fall Time	t_f		120		ns	

SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS

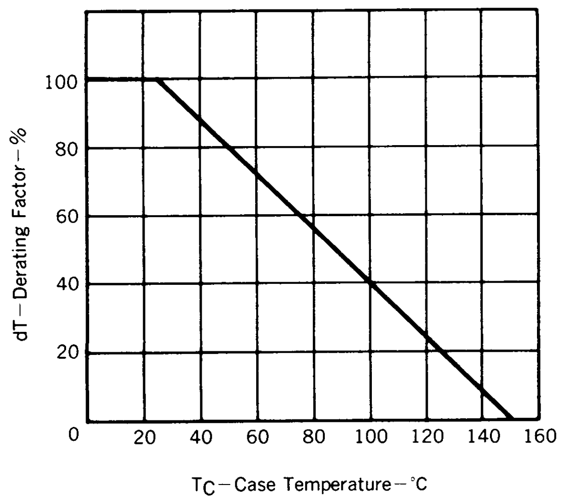


τ = 1 μs
Duty Cycle ≦ 1 %

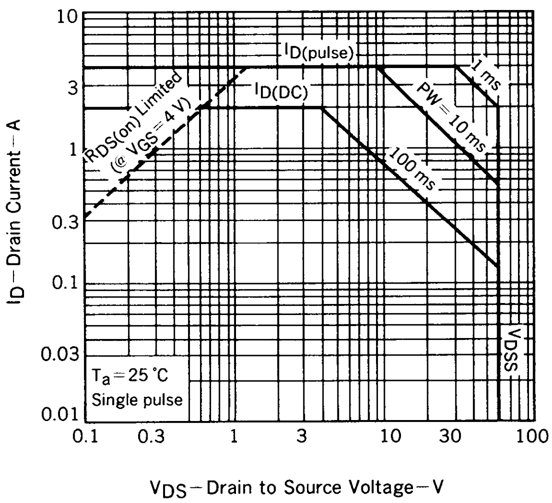


TYPICAL CHARACTERISTICS ($T_a = 25\ ^\circ C$)

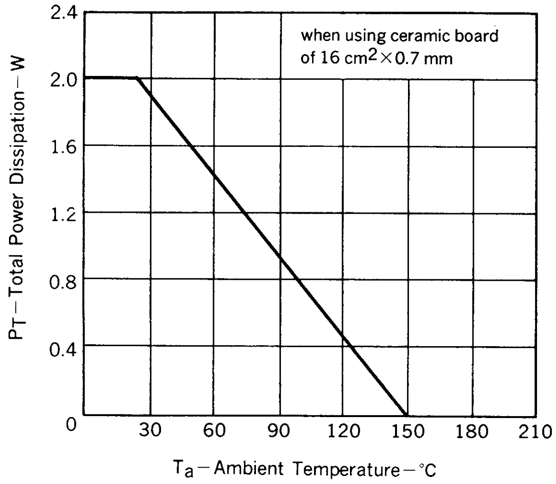
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



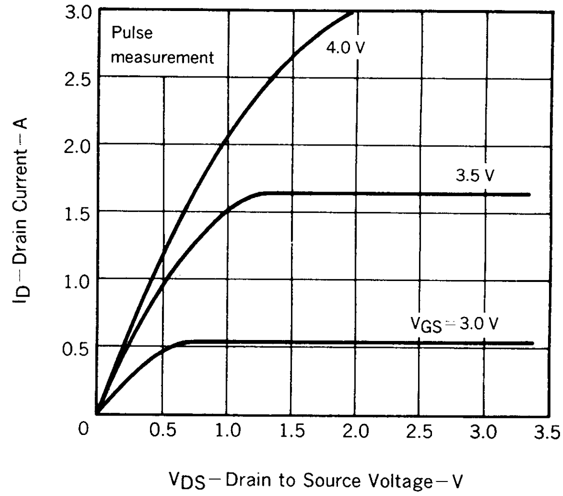
FORWARD BIAS SAFE OPERATING AREA



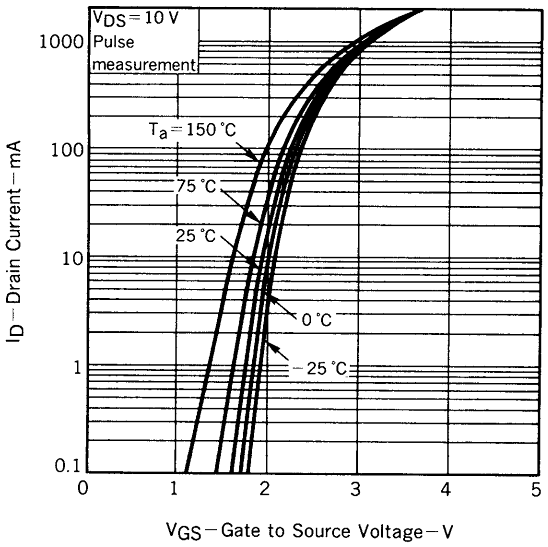
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



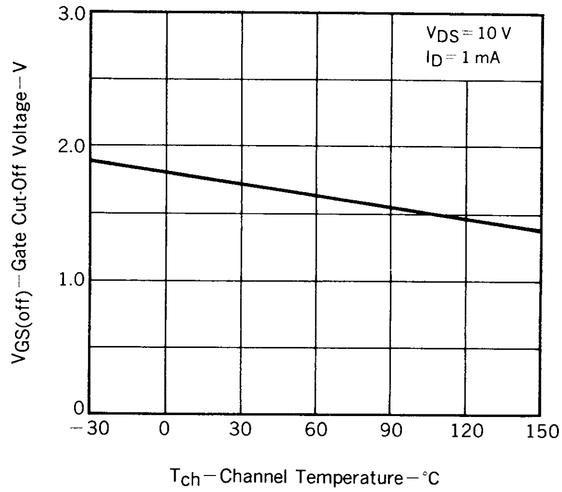
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



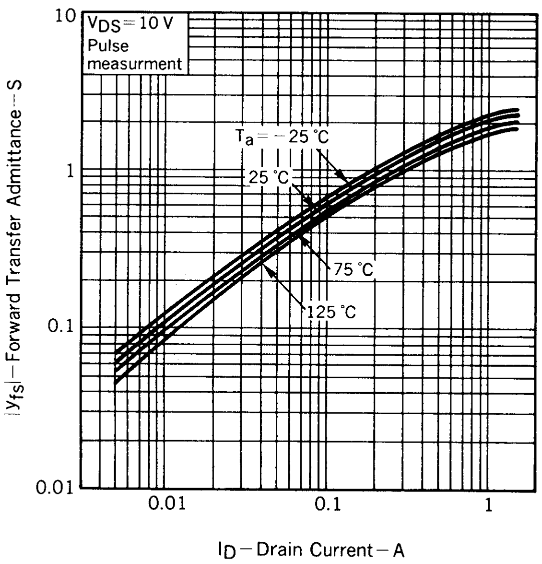
TRANSFER CHARACTERISTICS



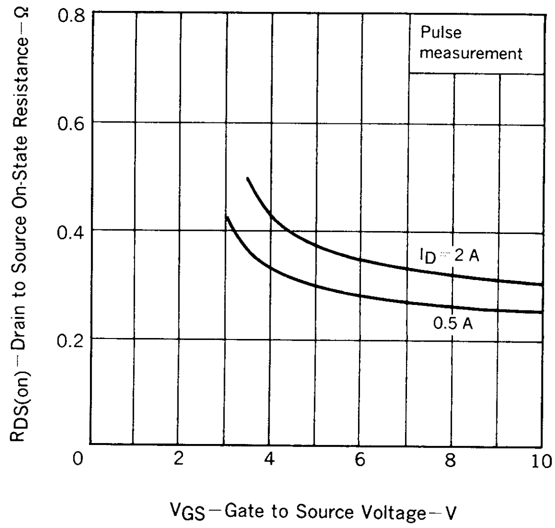
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



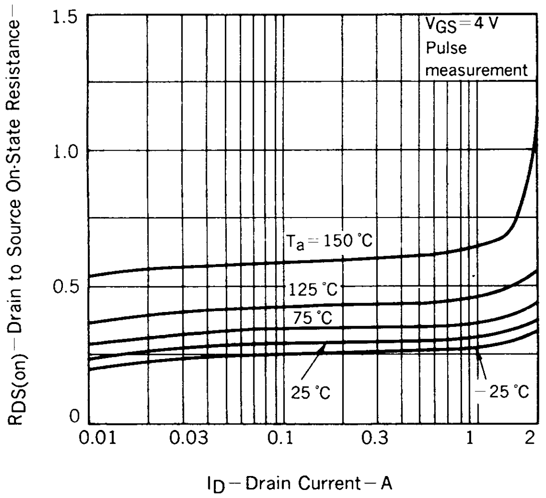
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



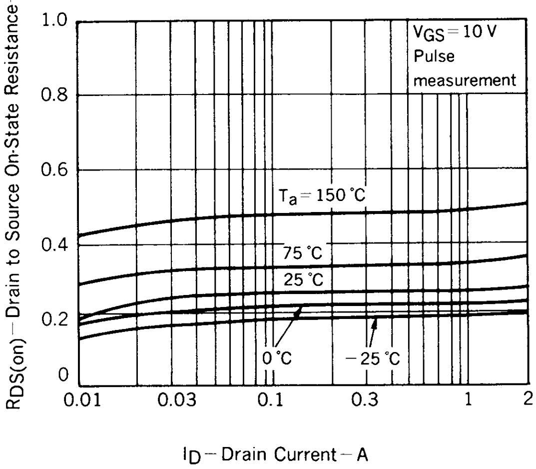
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



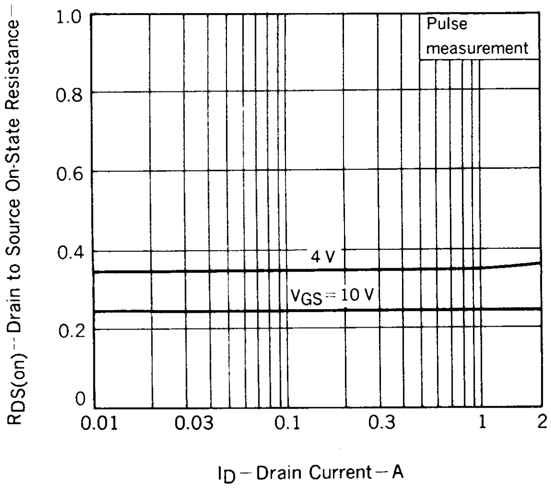
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



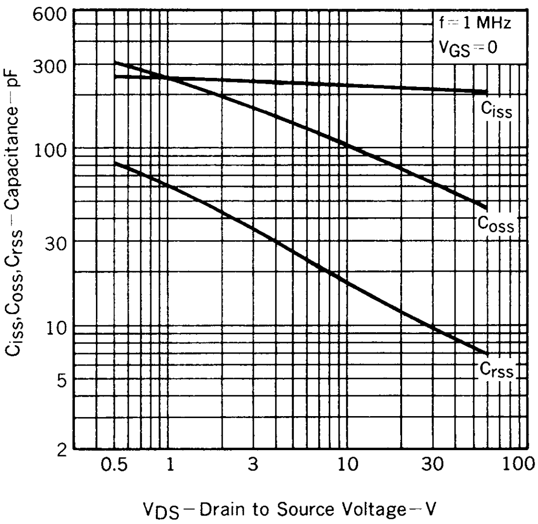
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



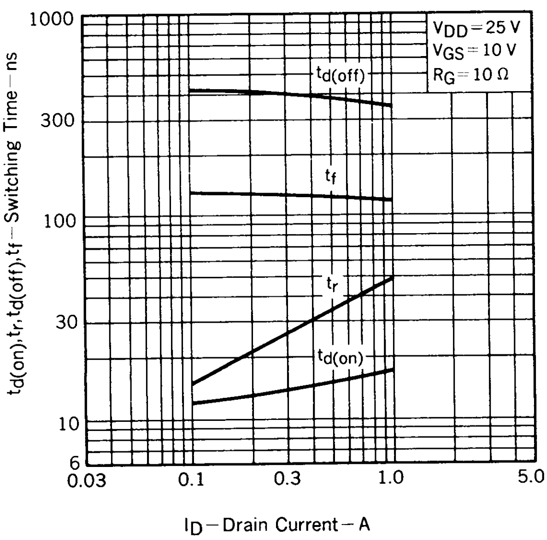
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



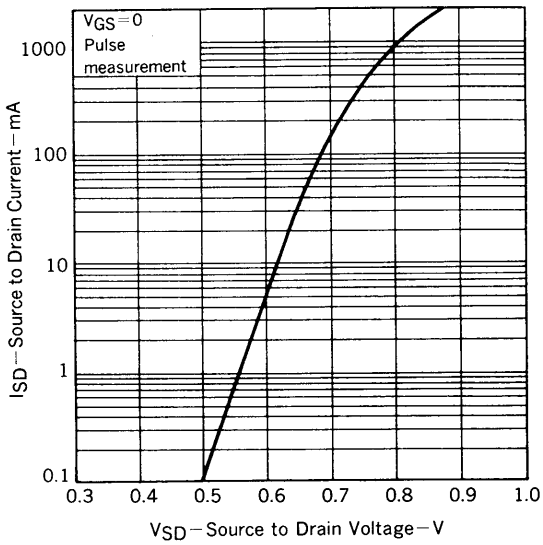
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



RECOMMENDED SOLDERING CONDITIONS

Mounting of this product by soldering should be done under the following conditions.
Please consult our representatives about soldering methods and conditions other than these.

SURFACE MOUNT TYPE

For details of the recommended soldering conditions, see the information document.
"Device Mounting Manual for Surface Mounting (IEI-1207)."

Soldering Method	Soldering Conditions	Symbol for Recommended Conditions
Infrared Reflow	Package peak temp.: 230 °C Soldering time: within 30 sec (above 210 °C) Soldering times: 1, Days limitation: none*	IR30-00
Vapor Phase Soldering	Package peak temp.: 215 °C Soldering time: within 40 sec (above 200 °C) Soldering times: 1, Days limitation: none*	VP15-00
Wave Soldering	Soldering bath temp.: below 260 °C Soldering time: within 10 sec Soldering times: 1, Days limitation: none*	WS60-00

*: Stored days under storage conditions at 25 °C and below 65 % R.H. after the dry-pack has been opened.

Note 1 Combination of soldering methods should be avoided.

REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	IEI-1209
Semiconductor device mounting technology manual.	IEI-1207
Semiconductor device package manual.	IEI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134

〔MEMO〕

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