NEC ELECTRON DEVICE

MOS FIELD EFFECT TRANSISTOR
2SK679A

N-CHANNEL MOS FET
FOR HIGH-SPEED SWITCHING

The 2SK679A, N-channel vertical type MOS FET, is a switching device which can be directly driven from an IC operating with a 5 V single power supply. The device featuring low ON-state resistance is of the voltage drive type and thus is ideal for driving actuators such as motors, solenoids, and relays.

FEATURES

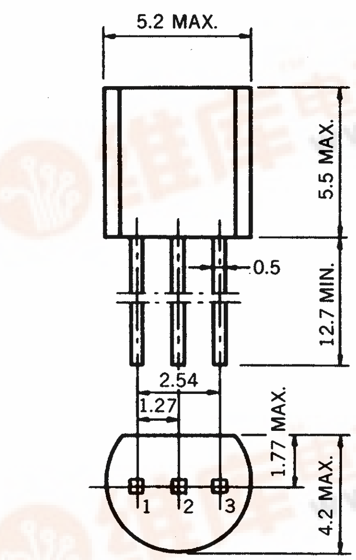
- Low ON-state resistance
  $R_{DS(on)}$ = 1.0 Ω MAX. at V_{GS} = 4.0 V, I_D = 0.5 A
  $R_{DS(on)}$ = 0.7 Ω MAX. at V_{GS} = 10 V, I_D = 0.5 A
- Voltage drive at logic level (V_{GS} = 4 V) is possible.
- Bidirectional zener diode for protection is incorporated in between the gate and the source.
- Inductive loads can be driven without protective circuit thanks to the improved breakdown voltage between the Drain and Source.

QUALITY GRADE

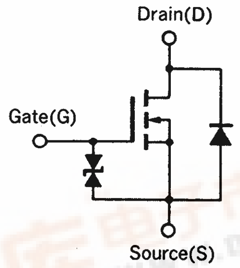
Standard

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.

PACKAGE DIMENSIONS (Unit : mm)



1. Gate (G)
2. Drain (D)
3. Source (S)



(Diode in the figure is the parasitic diode.)

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	V_{DSS}	30	V	V_{GS} = 0
Gate to Source Voltage	V_{GSS}	±20	V	V_{DS} = 0
Drain Current (DC)	$I_{D(DC)}$	±0.5	A	
Drain Current (pulse)	$I_{D(pulse)}$	±1.5	A	PW ≦ 10 ms, Duty Cycle ≦ 50 %
Total Power Dissipation	P_T	750	mW	
Channel Temperature	T_{ch}	150	°C	
Storage Temperature	T_{stg}	–55 to +150	°C	

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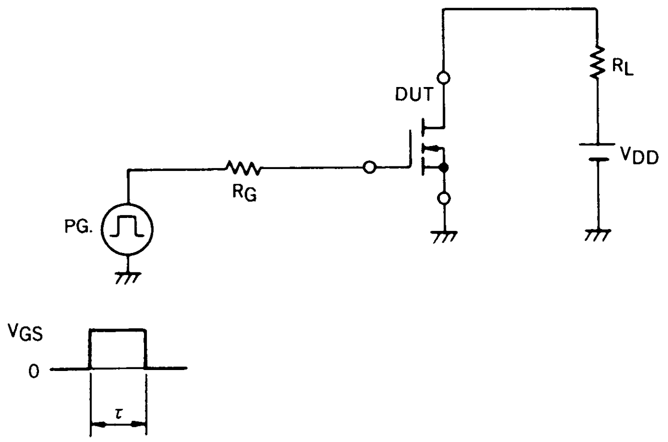
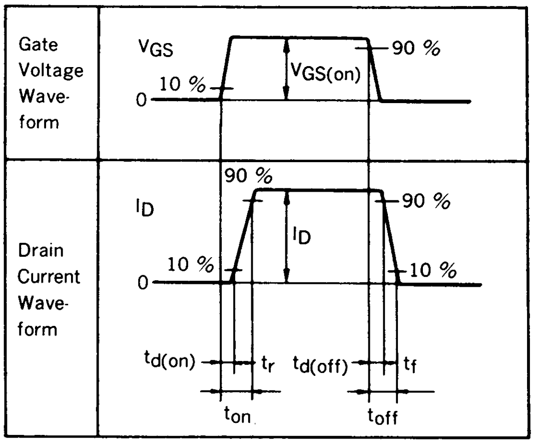
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Cut-off Current	I_{DSS}			10	μA	V_{DS} = 30 V, V_{GS} = 0
Gate Leakage Current	I_{GSS}			±10	μA	V_{GS} = ±20 V, V_{DS} = 0
Gate Cut-off Voltage	$V_{GS(off)}$	1.0	1.6	2.5	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance	$\|y_{fs}\|$	0.4			S	V_{DS} =10 V, I_D = 0.5 A
Drain to Source On-State Resistance	$R_{DS(on)1}$		0.6	1.0	Ω	V_{GS} = 4.0 V, I_D = 0.5 A
Drain to Source On-State Resistance	$R_{DS(on)2}$		0.4	0.7	Ω	V_{GS} = 10 V, I_D = 0.5 A
Input Capacitance	C_{iss}		130		pF	V_{DS} = 5.0 V, V_{GS} = 0, f = 1 MHz
Output Capacitance	C_{oss}		70		pF	
Feedback Capacitance	C_{rss}		30		pF	
Turn-On Delay Time	$t_{d(on)}$		12		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		44		ns	
Turn-Off Delay Time	$t_{d(off)}$		310		ns	
Fall Time	t_f		160		ns	

SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS

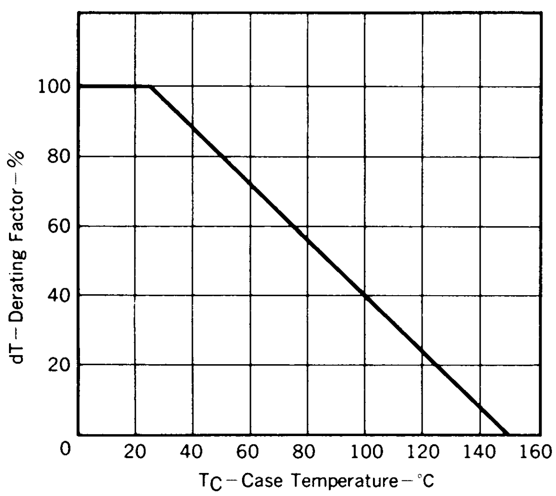


τ = 1 μs
Duty Cycle ≦ 1 %

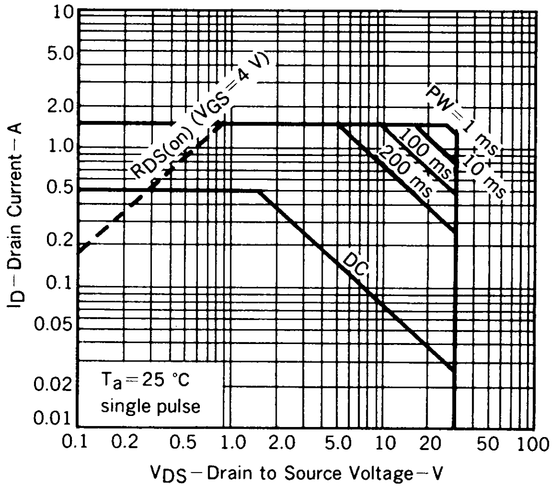


TYPICAL CHARACTERISTICS (T_a = 25 °C)

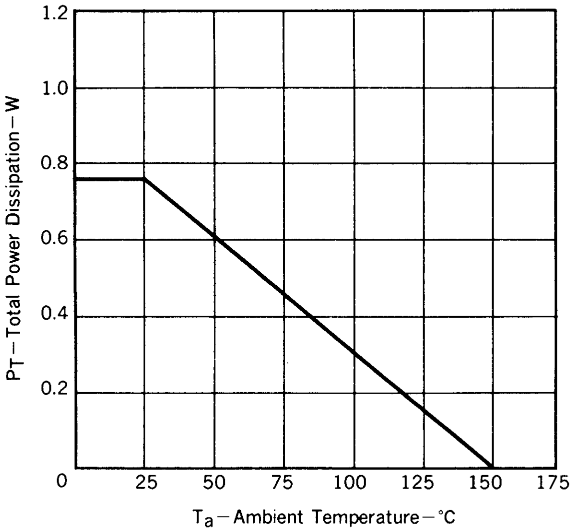
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



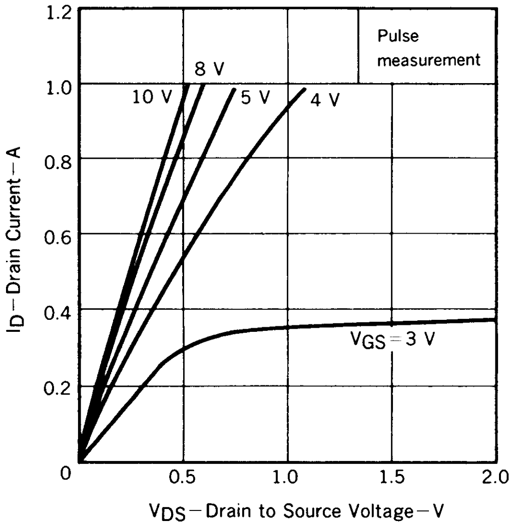
FORWARD BIAS SAFE OPERATING AREA



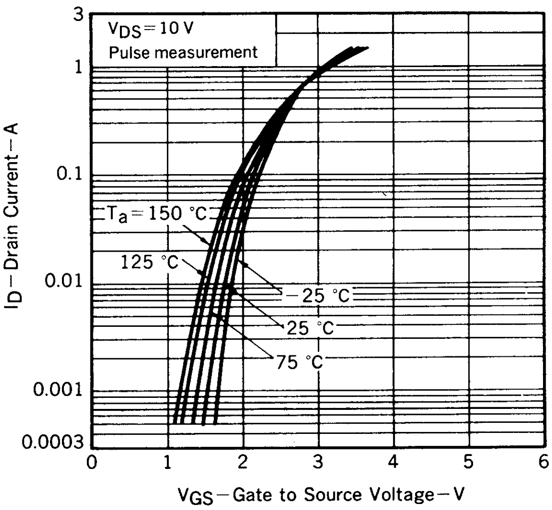
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



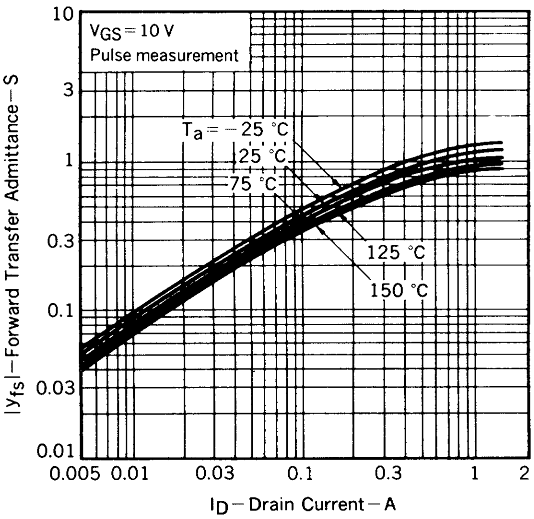
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



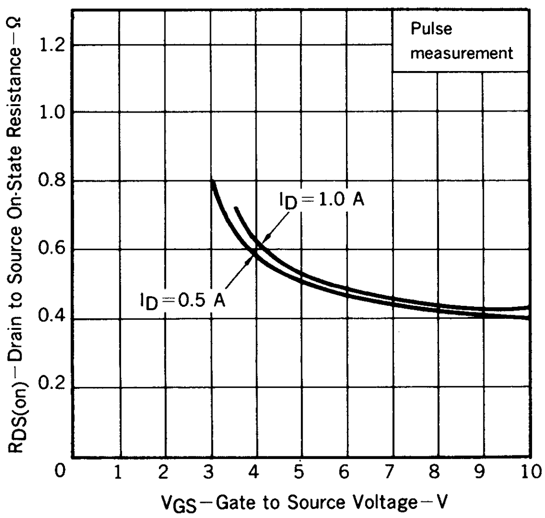
TRANSFER CHARACTERISTICS



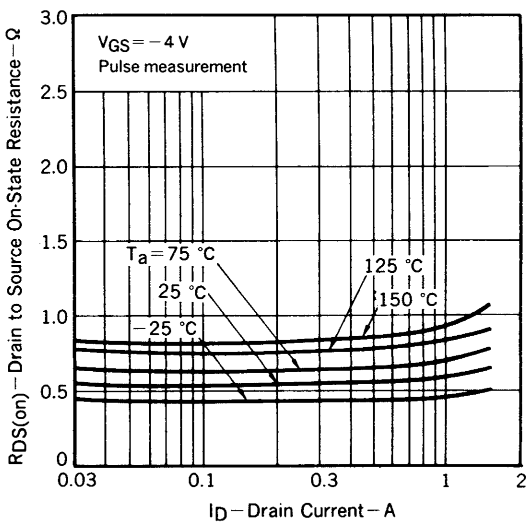
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



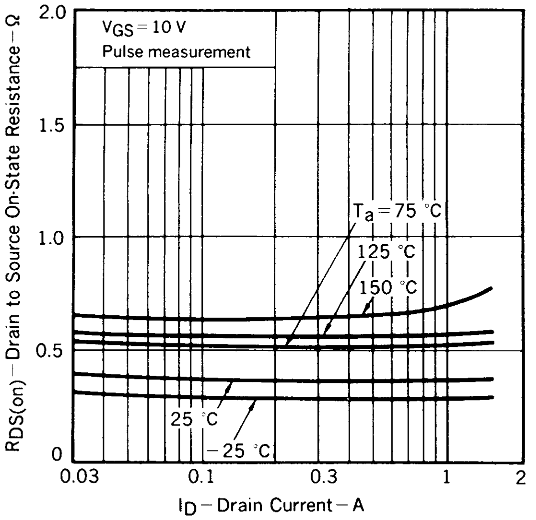
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



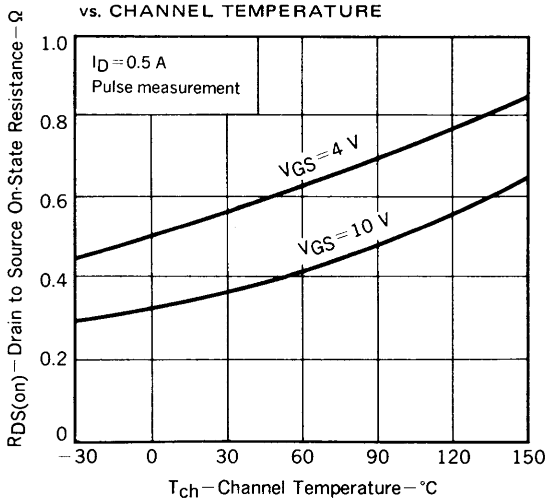
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



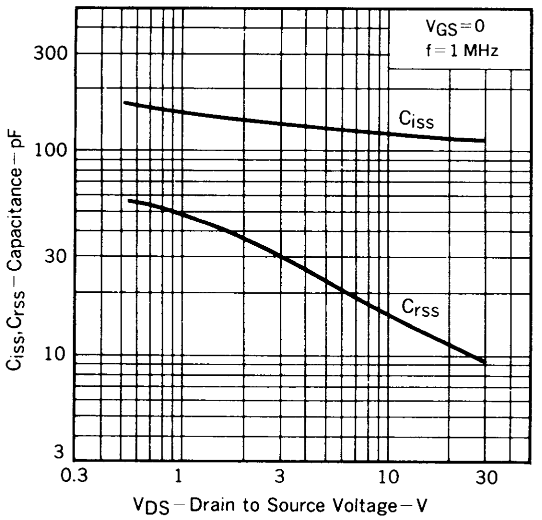
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



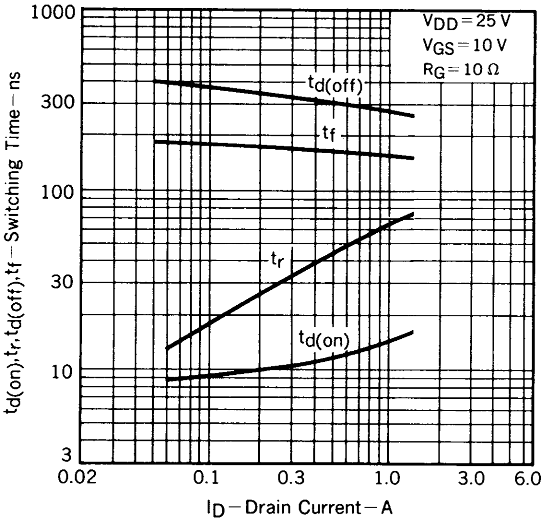
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



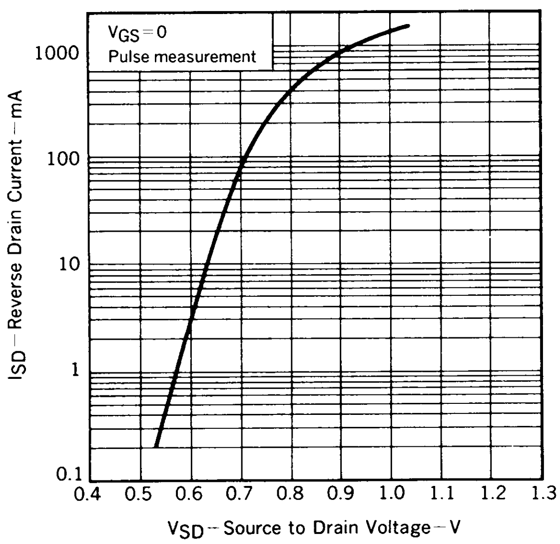
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



RECOMMENDED SOLDERING CONDITIONS

Solder this product under the following recommended conditions.
For soldering methods or soldering conditions other than those recommended in the table, please consult our NEC salespeople.

Insert type

Soldering method	Soldering conditions	Recommended condition code
Wave soldering	Solder bath ttemperature: 260 °C max. Soldering time: 10 sec max.	

〔MEMO〕