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MOS FIELD EFFECT POWER TRANSISTOR

2SK1289

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

DESCRIPTION

The 2SK1289 is N-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

FEATURES

- Low On-state Resistance
 $R_{DS(on)} \leq 0.15 \Omega$ ($V_{GS} = 10 \text{ V}$, $I_D = 10 \text{ A}$)
 $R_{DS(on)} \leq 0.2 \Omega$ ($V_{GS} = 4 \text{ V}$, $I_D = 10 \text{ A}$)
- Low C_{iss} $C_{iss} = 1400 \text{ pF TYP.}$
- Built-in G-S Gate Protection Diodes

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.

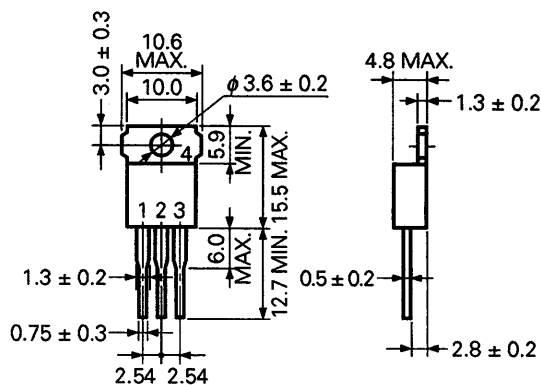
ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Drain to Source Voltage	V_{DSS}	100	V
Gate to Source Voltage	$V_{GSS(AC)}$	± 20	V
Drain Current (DC)	$I_{D(DC)}$	± 20	A
Drain Current (pulse)	$I_{D(pulse)^*}$	± 80	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	60	W
Total Power Dissipation ($T_a = 25^\circ\text{C}$)	P_{T2}	1.5	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

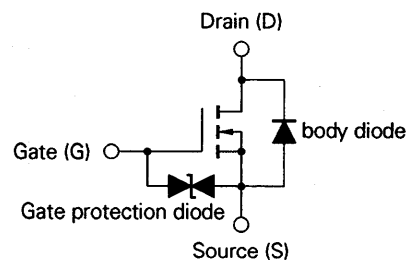
* $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

PACKAGE DIMENSIONS

(in millimeters)



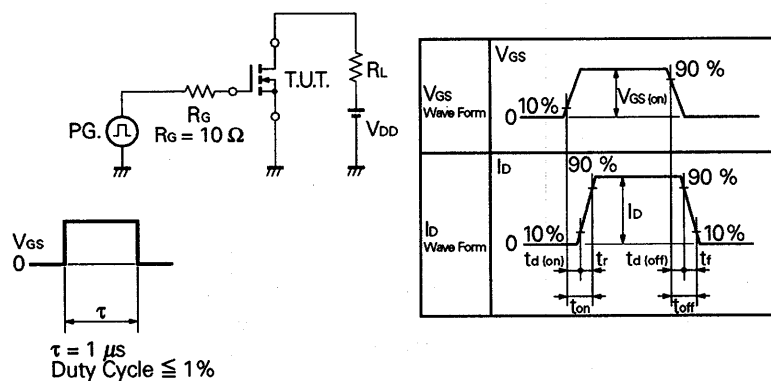
1. Gate
2. Drain
3. Source
4. Fin (Drain)



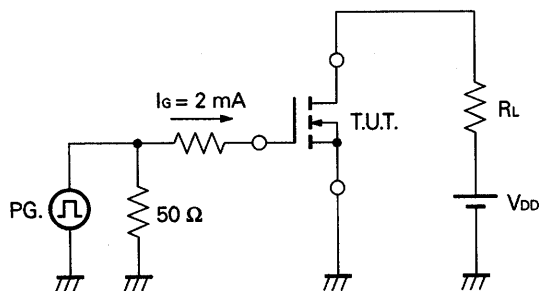
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R _{DS(on)}		0.12	0.15	Ω	V _{GS} = 10 V, I _D = 10 A
Drain to Source On-state Resistance	R _{DS(on)}		0.15	0.2	Ω	V _{GS} = 4.0 V, I _D = 10 A
Gate to Source Cutoff Voltage	V _{GS(off)}	1.0		2.5	V	V _{DS} = 10 V, I _D = 1 mA
Forward Transfer Admittance	y _{fs}	7.0	14		S	V _{DS} = 10 V, I _D = 10 A
Drain Leakage Current	I _{DSS}			10	μA	V _{DS} = 100 V, V _{GS} = 0
Gate to Source Leakage Current	I _{GSS}			±10	μA	V _{GS} = ±20 V, V _{DS} = 0
Input Capacitance	C _{iss}		1 400		pF	V _{DS} = 10 V V _{GS} = 0 f = 1 MHz
Output Capacitance	C _{oss}		350		pF	
Reverse Transfer Capacitance	C _{res}		50		pF	
Turn-On Delay Time	t _{d(on)}		25		ns	V _{GS(on)} = 10 V V _{DD} = 50 V I _D = 10 A, R _G = 10 Ω R _L = 5.0 Ω
Rise Time	t _r		110		ns	
Turn-Off Delay Time	t _{d(off)}		100		ns	
Fall Time	t _f		65		ns	
Total Gate Charge	Q _G		30		nC	V _{GS} = 10 V I _D = 20 A V _{DD} = 80 V
Gate to Source Charge	Q _{GS}		5		nC	
Gate to Drain Charge	Q _{GD}		10		nC	
Diode Forward Voltage	V _{SD}		1.2		V	I _{SD} = 20 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		200		ns	I _F = 20 A, V _{GS} = 0 di/dt = 50 A/μs
Reverse Recovery Charge	Q _{rr}		500		nC	

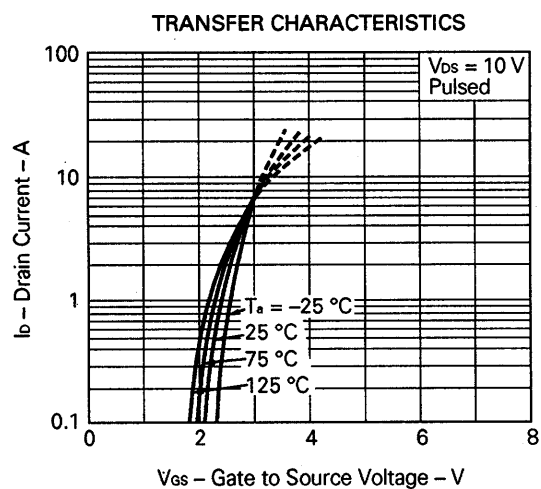
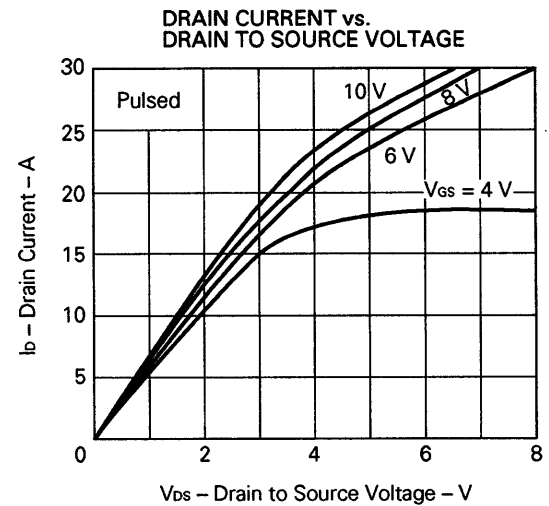
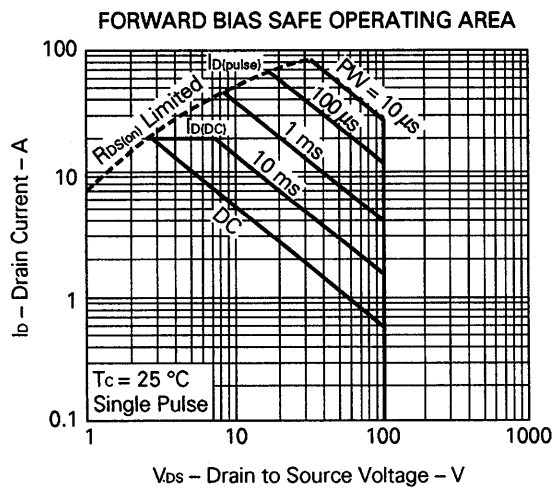
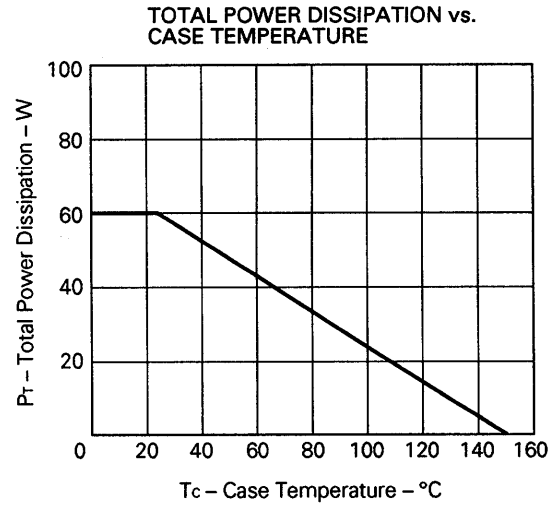
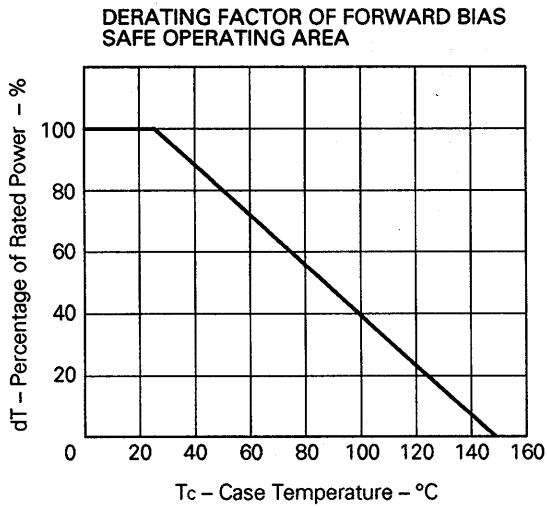
Test Circuit 1: Switching Time



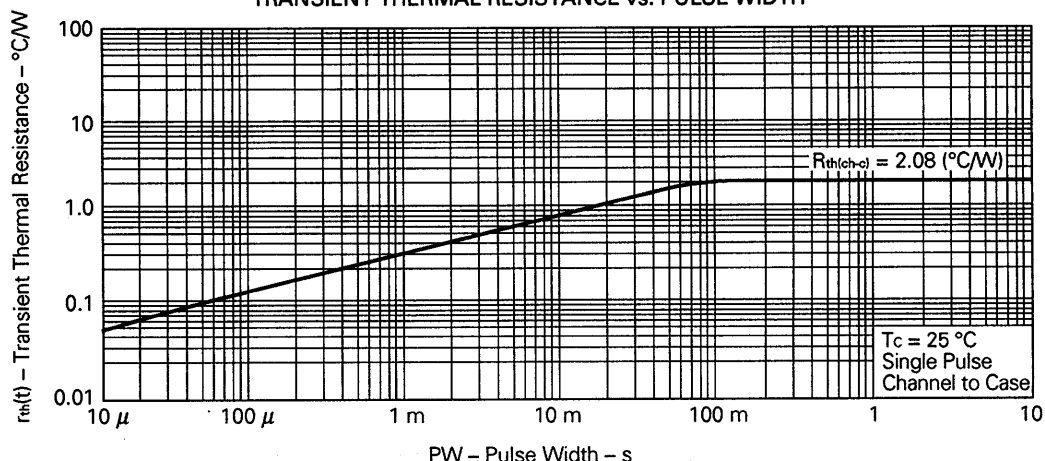
Test Circuit 2: Gate Charge



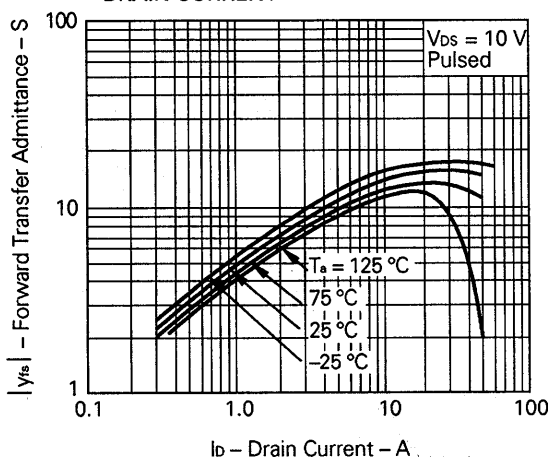
TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



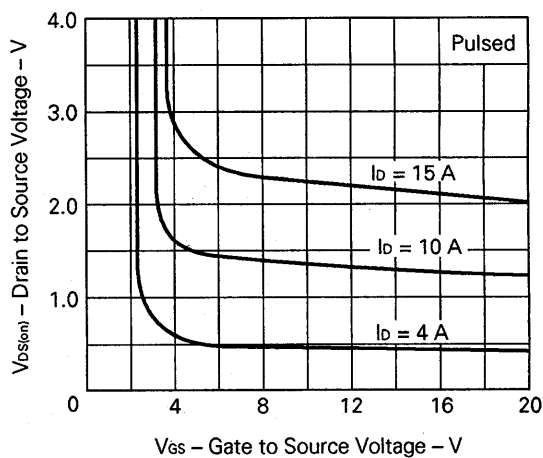
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



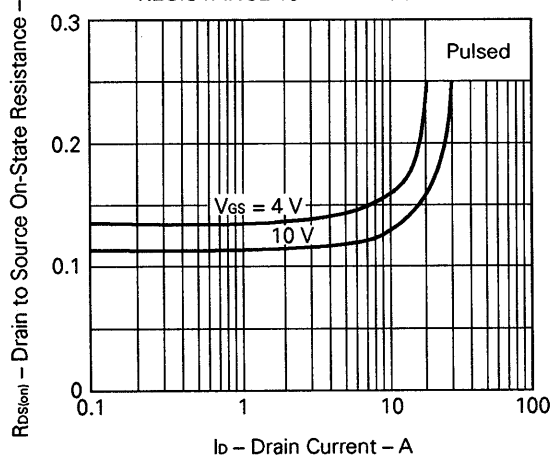
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



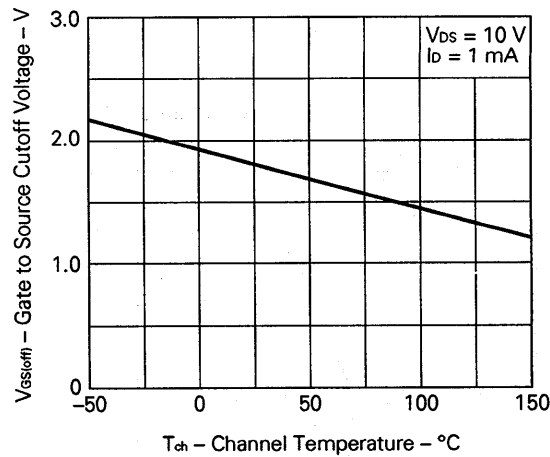
DRAIN TO SOURCE VOLTAGE vs. GATE TO SOURCE VOLTAGE

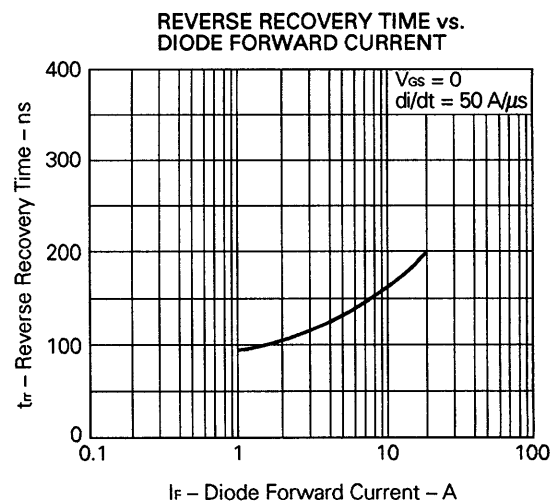
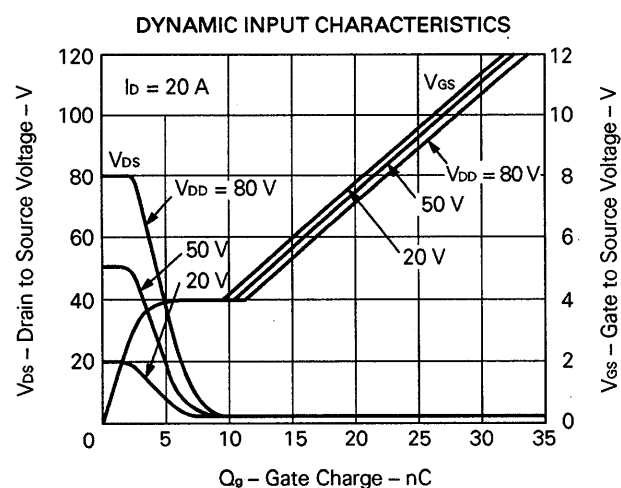
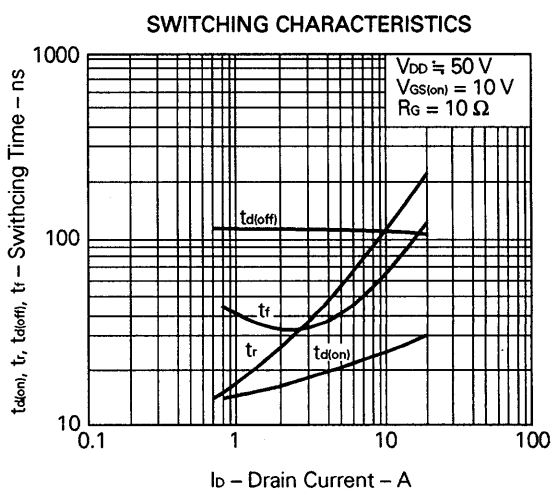
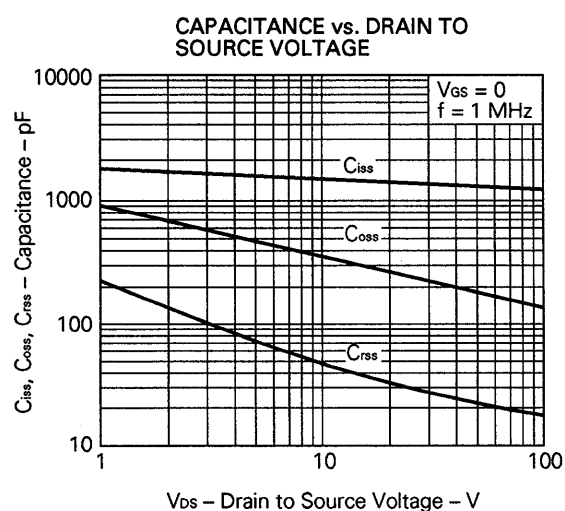
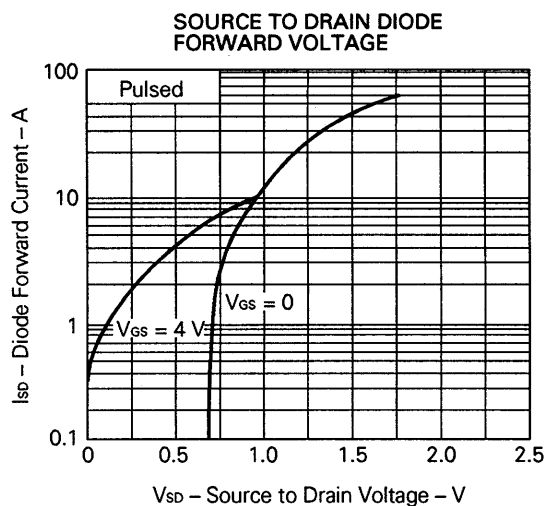
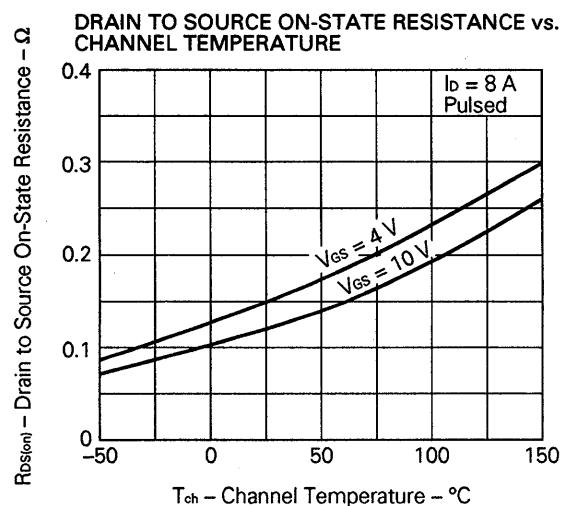


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE





Reference

Application note name	No.
Safe operating area of Power MOS FET.	TEA-1034
Application circuit using Power MOS FET.	TEA-1035
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207

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