

To our customers,

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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MOS FIELD EFFECT TRANSISTOR

Phase-out/Discontinued

2SK1122

**SWITCHING
N-CHANNEL POWER MOS FET**

DESCRIPTION

The 2SK1122 is N-Channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 50 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 20 \text{ A)}$
 $R_{DS(on)2} = 70 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 20 \text{ A)}$
- Low C_{iss} $C_{iss} = 3300 \text{ pF TYP.}$
- Built-in G-S gate protection diodes

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	100	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS(AC)}	±20	V
	V _{GSS(DC)}	+20, -10	V
Drain Current (DC)	I _{D(DC)}	±40	A
Drain Current (pulse) ^{Note}	I _{D(pulse)}	±160	A
Total Power Dissipation (T _c = 25°C)	P _{T1}	100	W
Total Power Dissipation (T _A = 25°C)	P _{T2}	3.0	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

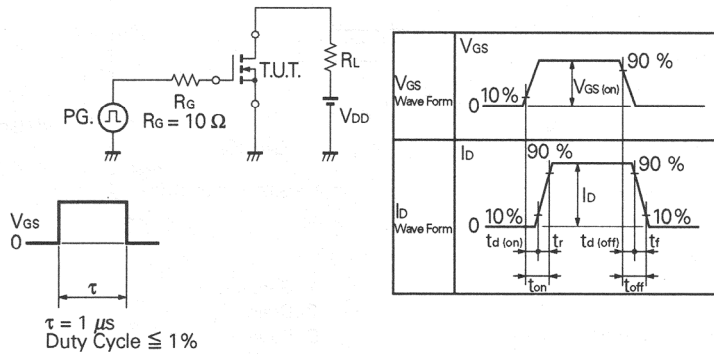
Note PW ≤ 10 μs, Duty cycle ≤ 1%

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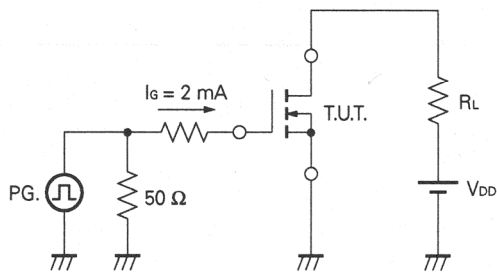
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R _{DS(on)1}		42	50	mΩ	V _{GS} = 10 V, I _D = 20 A
Drain to Source On-state Resistance	R _{DS(on)2}		50	70	mΩ	V _{GS} = 4.0 V, I _D = 20 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}	12			S	V _{DS} = 10 V, I _D = 20 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}		3300		pF	V _{DS} = 10 V
Output Capacitance	C _{oss}		800		pF	V _{GS} = 0
Reverse Transfer Capacitance	C _{rss}		200		pF	f = 1 MHz
Turn-On Delay Time	t _{d(on)}		40		ns	V _{GS(on)} = 10 V V _{DD} = 50 V I _D = 20 A, R _G = 10 Ω R _L = 2.5 Ω
Rise Time	t _r		210		ns	
Turn-Off Delay Time	t _{d(off)}		210		ns	
Fall Time	t _f		155		ns	
Total Gate Charge	Q _G		80		nC	V _{GS} = 10 V
Gate to Source Charge	Q _{GS}		10		nC	I _D = 40 A
Gate to Drain Charge	Q _{GD}		30		nC	V _{DD} = 80 V
Diode Forward Voltage	V _{SD}		1.2		V	I _{SD} = 40 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		210		ns	I _F = 40 A, V _{GS} = 0
Reverse Recovery Charge	Q _{rr}		600		nC	di/dt = 50 A/μs

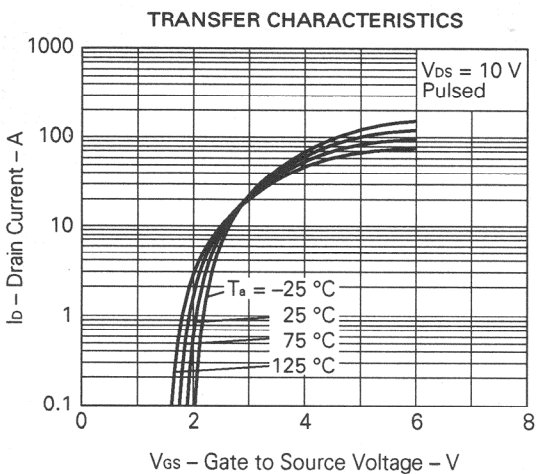
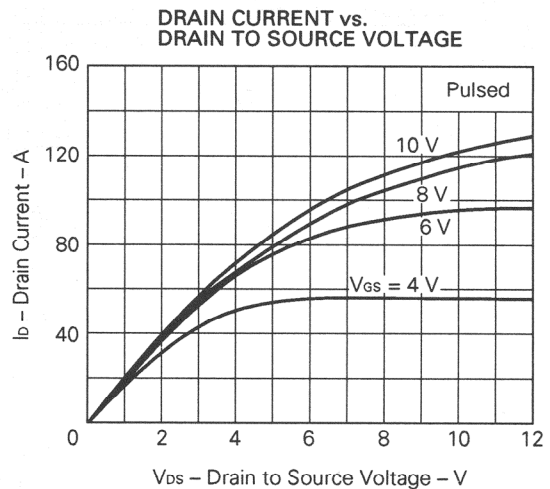
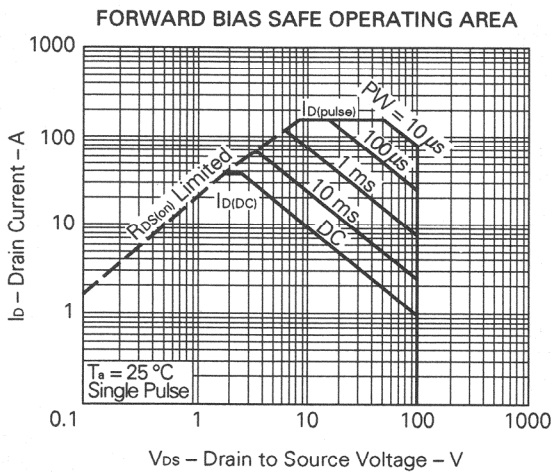
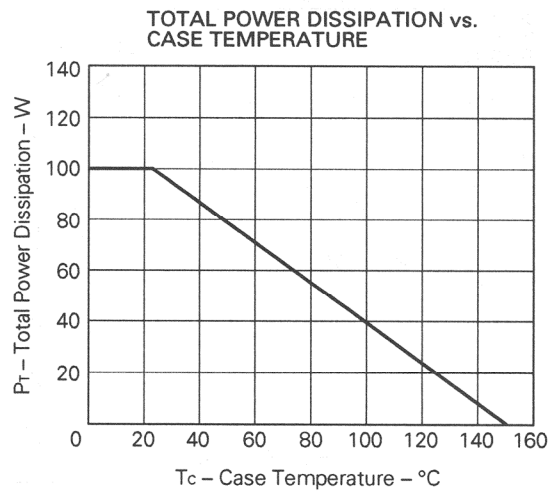
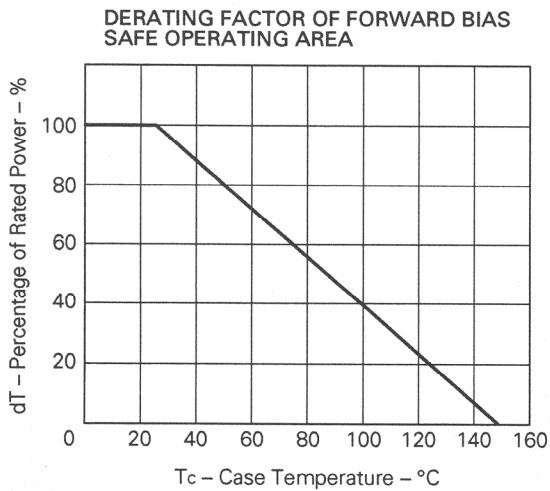
Test Circuit 1: Switching Time

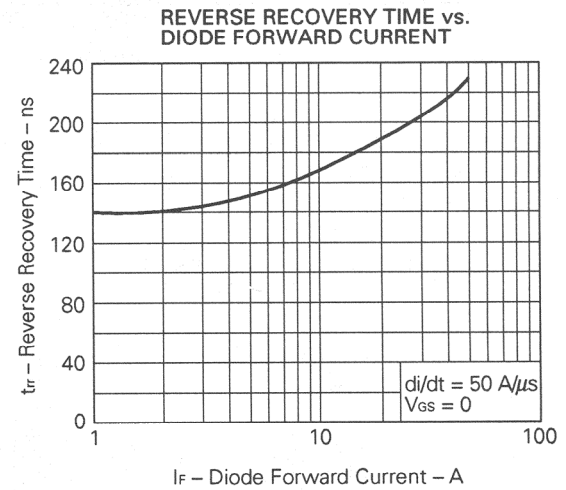
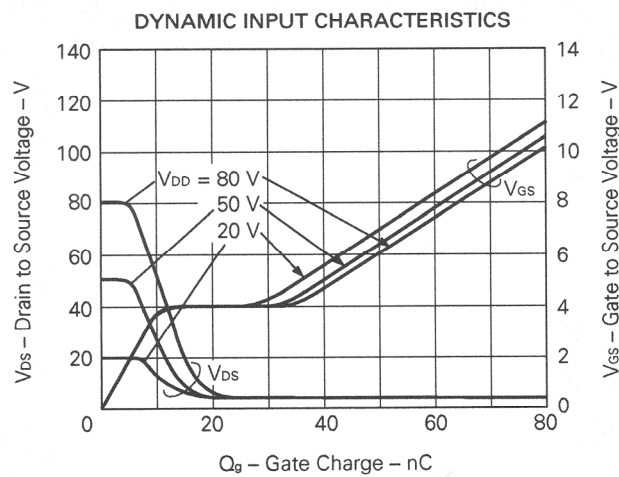
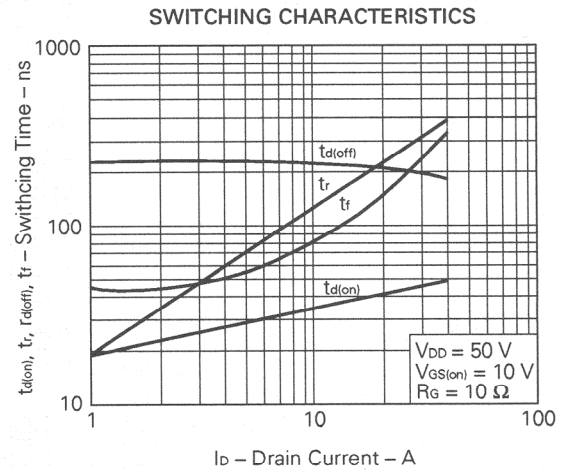
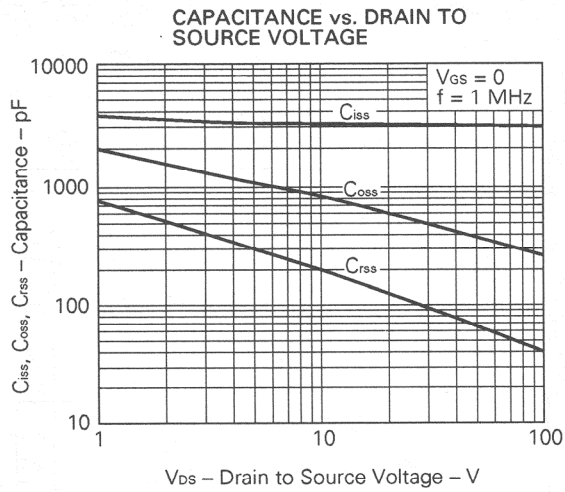
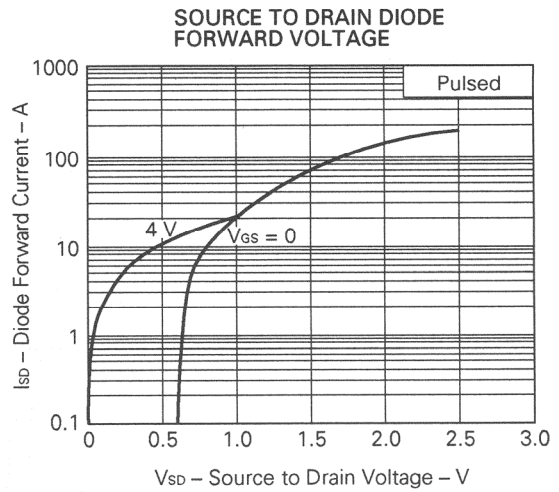
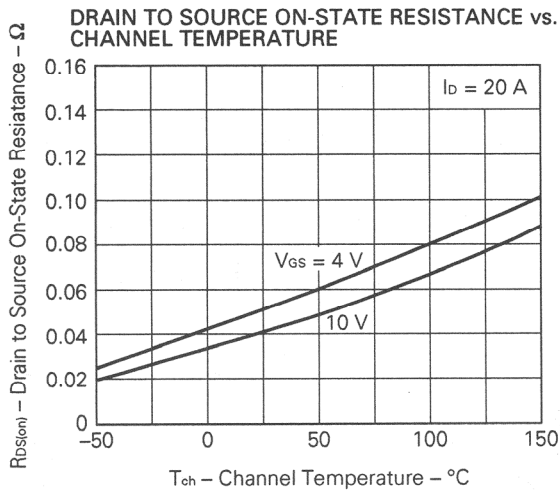


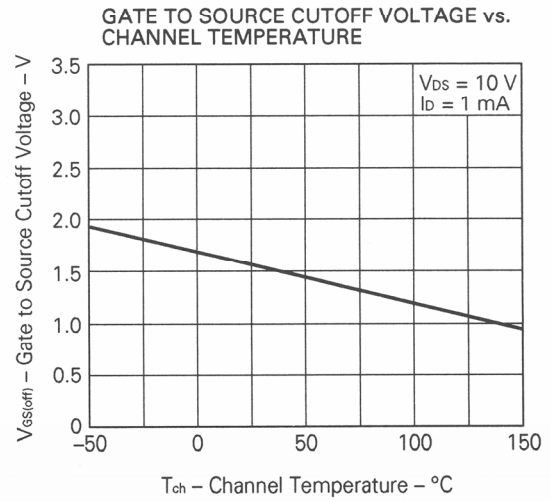
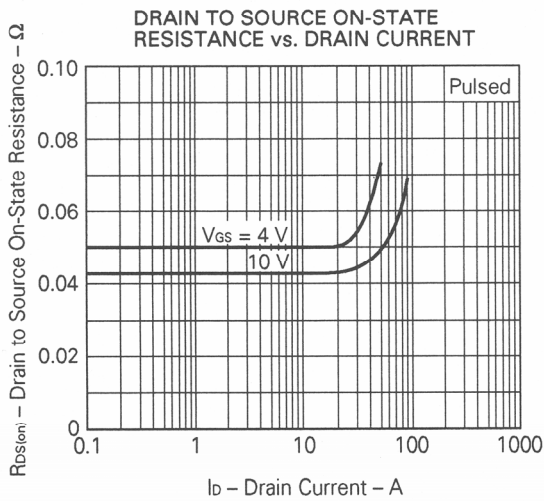
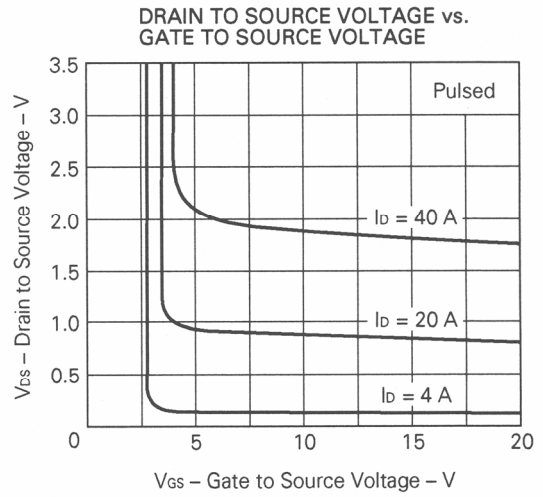
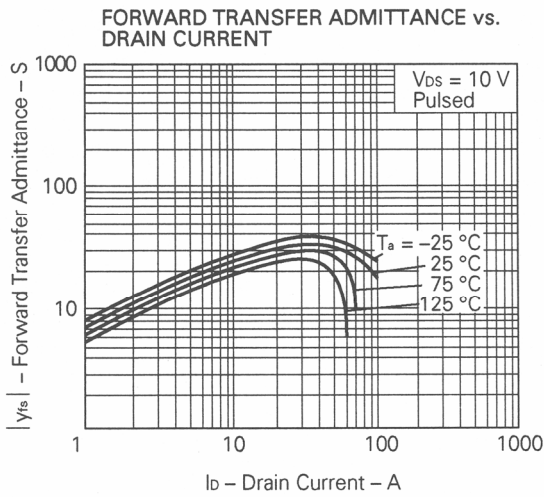
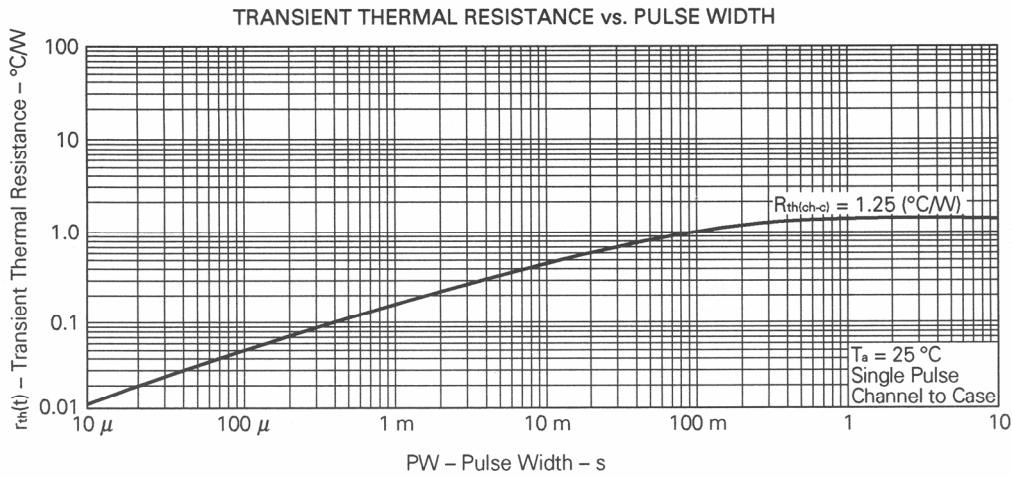
Test Circuit 2: Gate Charge



TYPICAL CHARACTERISTICS (T_a = 25 °C)

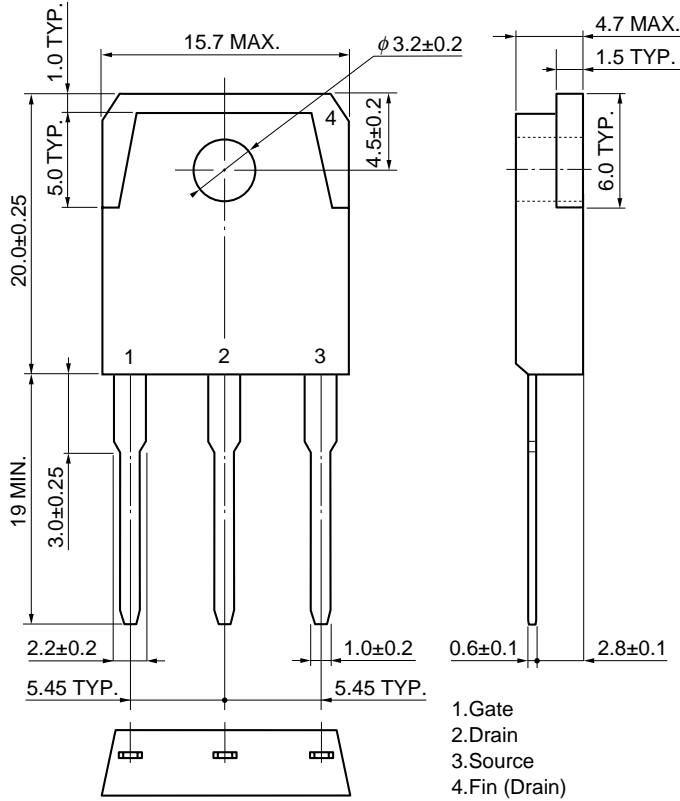




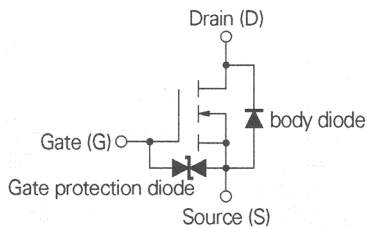


PACKAGE DRAWING (Unit: mm)

<R> TO-3P (MP-88)



EQUIVALENT CIRCUIT



Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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