

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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MOS FIELD EFFECT POWER TRANSISTOR  
**2SK1282, 1282-Z**

SWITCHING  
 N-CHANNEL POWER MOS FET  
 INDUSTRIAL USE

**DESCRIPTION**

The 2SK1282/1282-Z is N-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

**FEATURES**

- Low On-state Resistance  
 $R_{DS(on)} \leq 0.18 \Omega$  ( $V_{GS} = 10 V, I_D = 2 A$ )  
 $R_{DS(on)} \leq 0.24 \Omega$  ( $V_{GS} = 4 V, I_D = 2 A$ )
- Low  $C_{iss}$   $C_{iss} = 500 pF$  TYP.
- Built-in G-S Gate Protection Diodes

**QUALITY GRADE**

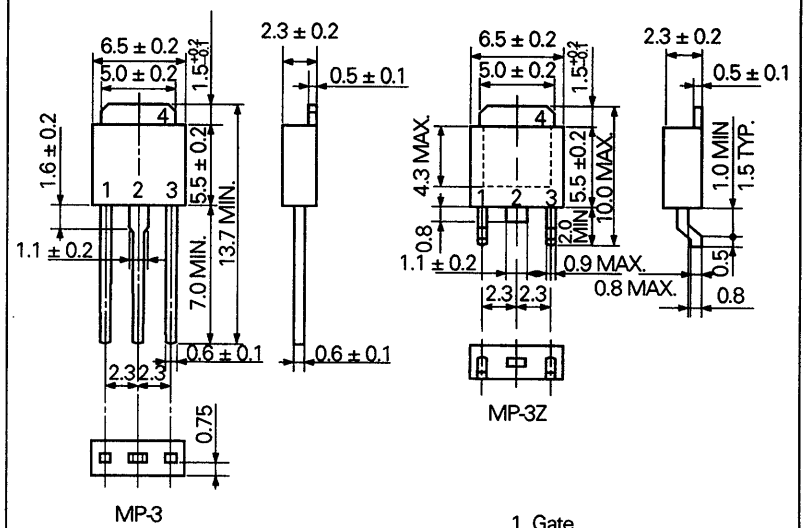
Standard  
 Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

**ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ C$ )**

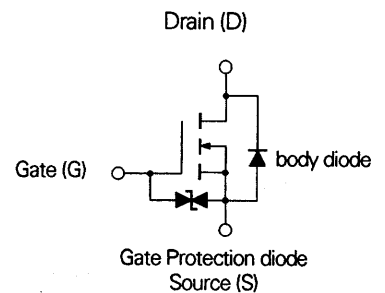
Drain to Source Voltage	$V_{DSS}$	60	V
Gate to Source Voltage	$V_{GSS(AC)}$	$\pm 20$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 3.0$	A
Drain Current (pulse)	$I_{D(pulse)*}$	$\pm 12$	A
Total Power Dissipation ( $T_a = 25^\circ C$ )	$P_{T1}$	1.0	W
Total Power Dissipation ( $T_c = 20^\circ C$ )	$P_{T2}$	20	W
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ C$

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

**PACKAGE DIMENSIONS**  
 (in millimeters)



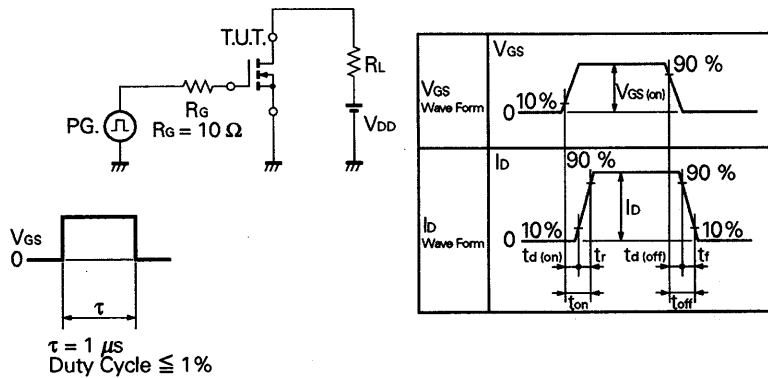
1. Gate
2. Drain
3. Source
4. Fin (Drain)



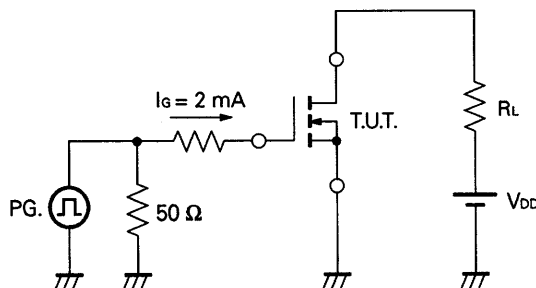
**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R <sub>DS(on)</sub>		0.15	0.18	Ω	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2 A
Drain to Source On-state Resistance	R <sub>DS(on)</sub>		0.18	0.24	Ω	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 2 A
Gate to Source Cutoff Voltage	V <sub>GS(off)</sub>	1.0		2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance	y <sub>fs</sub>	2.4			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2 A
Drain Leakage Current	I <sub>DSS</sub>			10	μA	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0
Gate to Source Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0
Input Capacitance	C <sub>ies</sub>		500		pF	V <sub>DS</sub> = 10 V
Output Capacitance	C <sub>oss</sub>		200		pF	V <sub>GS</sub> = 0
Reverse Transfer Capacitance	C <sub>rss</sub>		40		pF	f = 1 MHz
Turn-On Delay Time	t <sub>d(on)</sub>		40		ns	V <sub>GS(on)</sub> = 10 V
Rise Time	t <sub>r</sub>		100		ns	V <sub>DD</sub> = 30 V
Turn-Off Delay Time	t <sub>d(off)</sub>		550		ns	I <sub>D</sub> = 2 A, R <sub>G</sub> = 10 Ω
Fall Time	t <sub>f</sub>		200		ns	R <sub>L</sub> = 15 Ω
Total Gate Charge	Q <sub>G</sub>		13		nC	V <sub>GS</sub> = 10 V
Gate to Source Charge	Q <sub>GS</sub>		3		nC	I <sub>D</sub> = 3 A
Gate to Drain Charge	Q <sub>GD</sub>		3		nC	V <sub>DD</sub> = 48 V
Diode Forward Voltage	V <sub>SD</sub>		0.9		V	I <sub>SD</sub> = 3 A, V <sub>GS</sub> = 0
Reverse Recovery Time	t <sub>rr</sub>		140		ns	I <sub>F</sub> = 3 A, V <sub>GS</sub> = 0
Reverse Recovery Charge	Q <sub>rr</sub>		700		nC	di/dt = 50 A/μs

**Test Circuit 1: Switching Time**

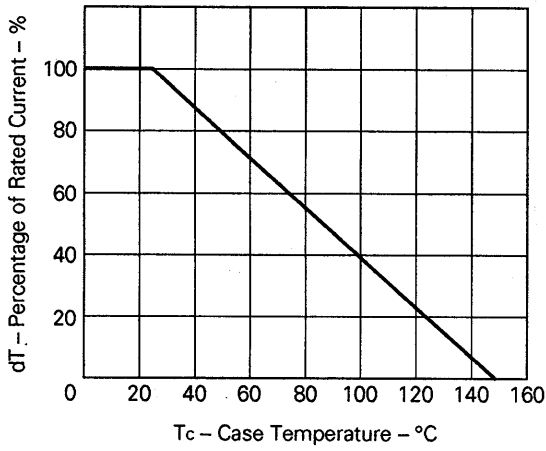


**Test Circuit 2: Gate Charge**

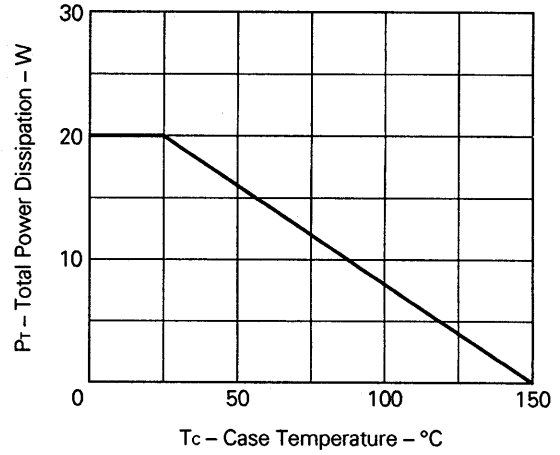


TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

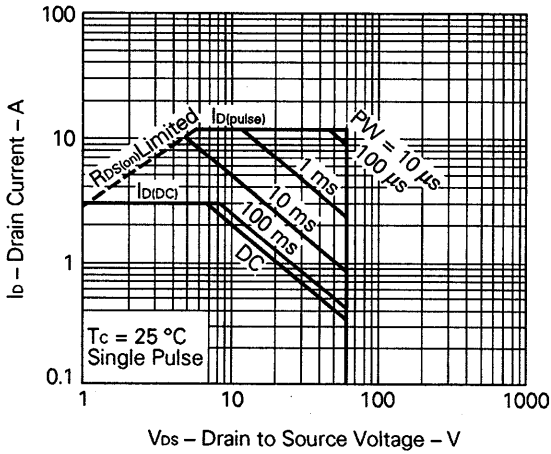
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



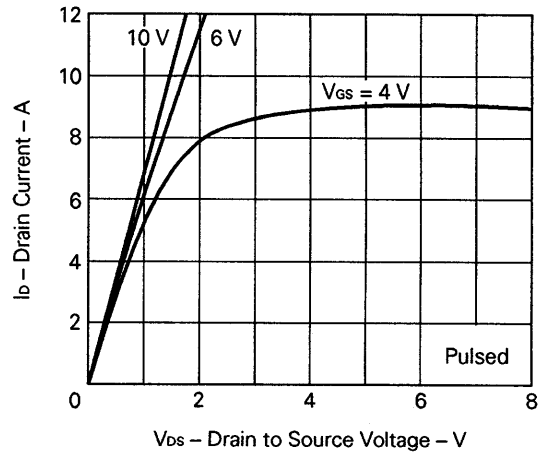
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



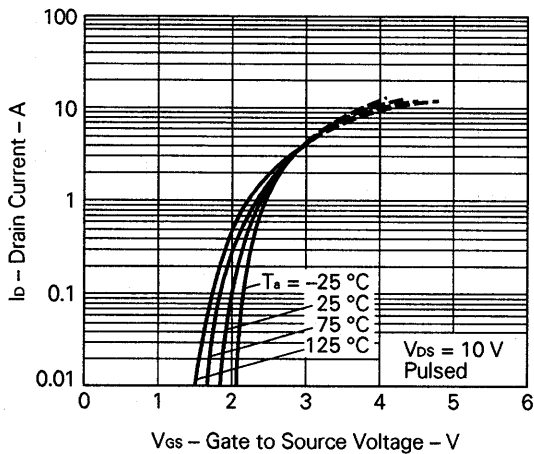
FORWARD BIAS SAFE OPERATING AREA

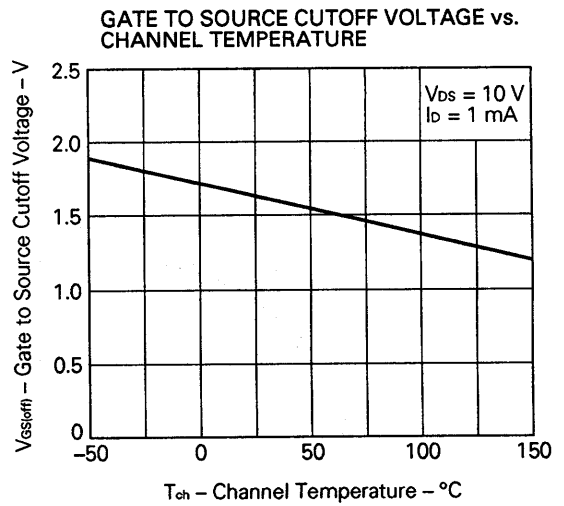
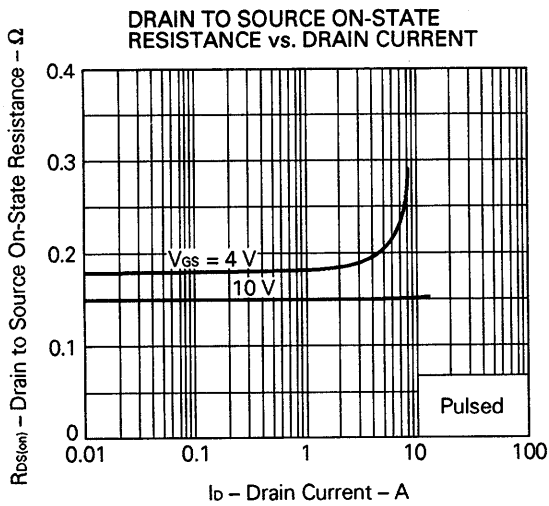
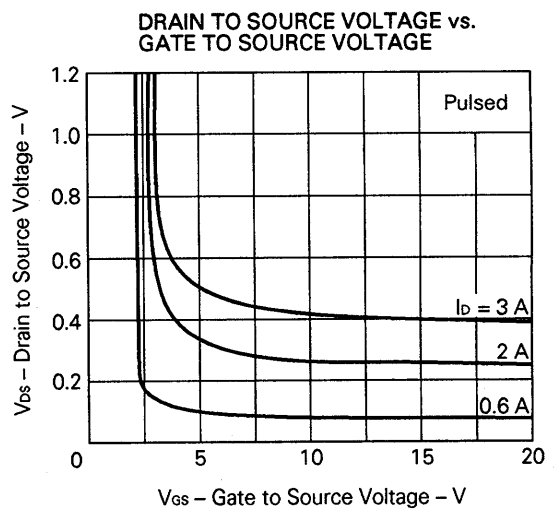
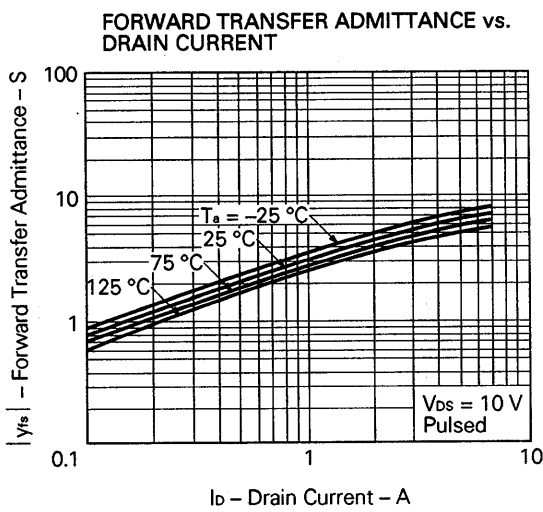
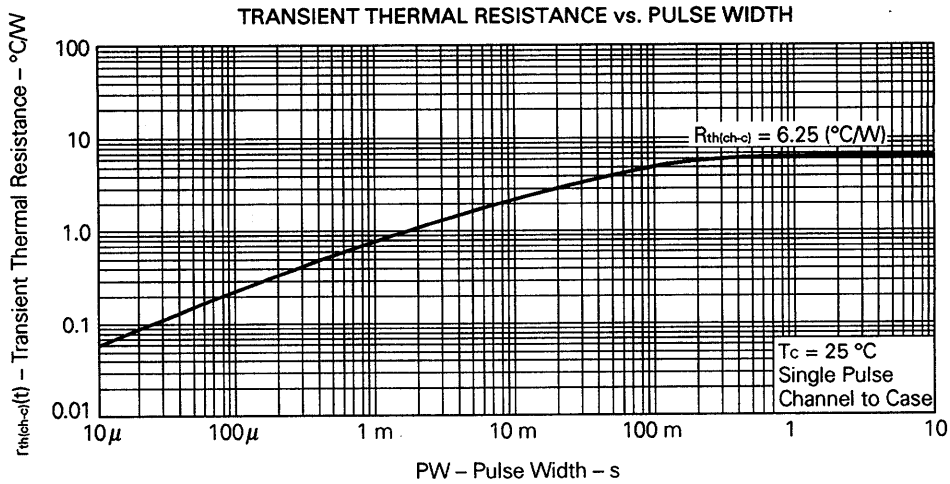


DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

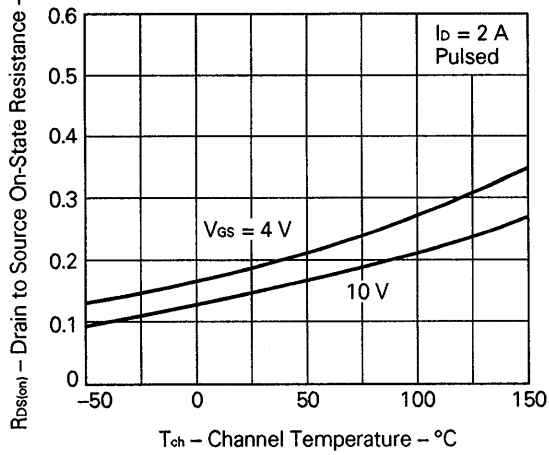


TRANSFER CHARACTERISTICS

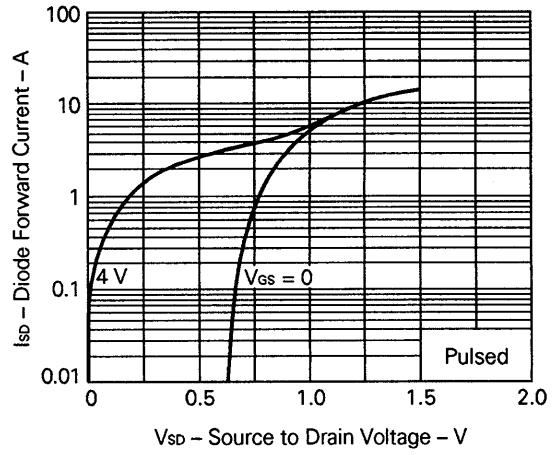




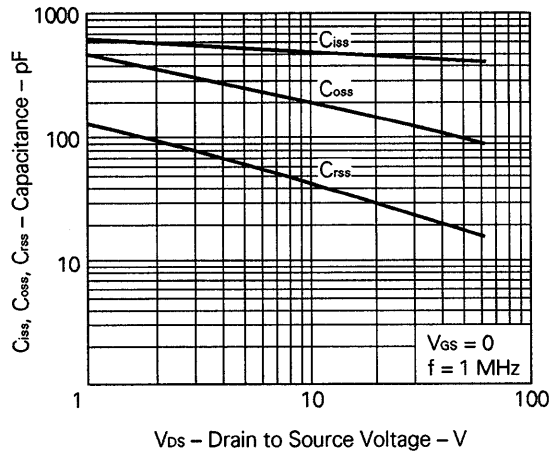
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



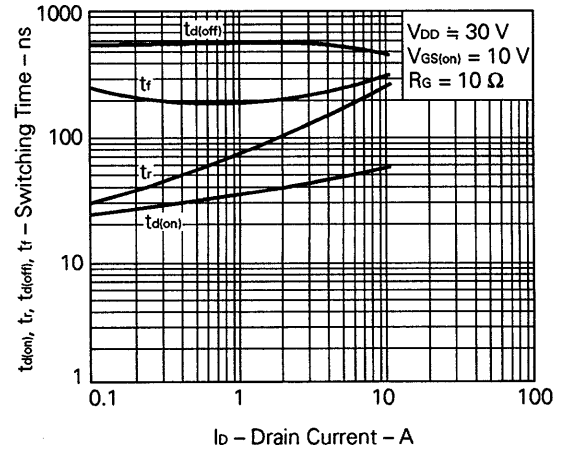
SOURCE TO DRAIN DIODE vs. FORWARD VOLTAGE



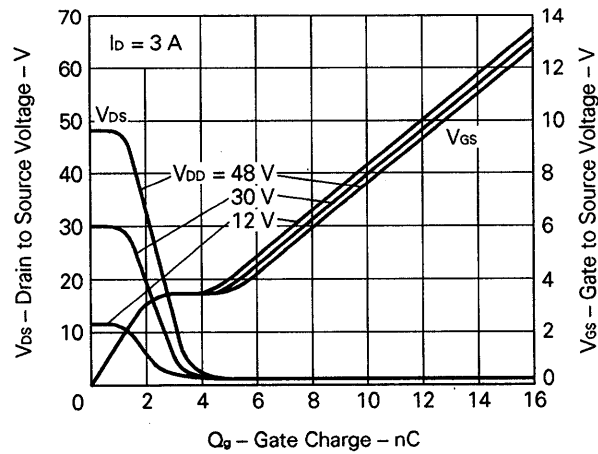
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



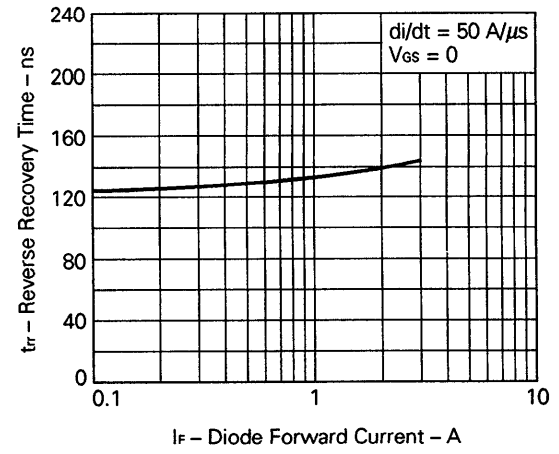
SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



**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



**[MEMO]**

[MEMO]

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