To our customers,

Old Company Name in Catalogs and Other Documents

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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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RENESAS

MOS FIELD EFFECT TRANSISTOR
2SK2857

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR HIGH SPEED SWITCHING

DESCRIPTION

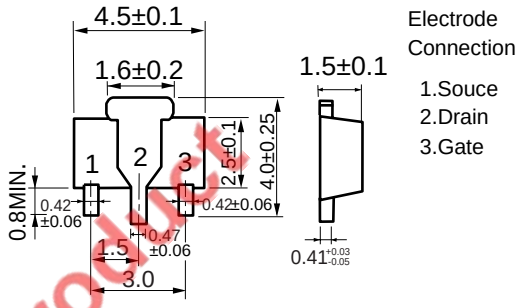
The 2SK2857 is a switching device which can be driven directly by a 5V power source.

The 2SK2857 features a low on-state resistance and excellent Switching Characteristics, and is suitable for applications such as actuator driver.

FEATURES

- Can be driven by a 5V power source.
- Low On-state resistance :
  $R_{DS(on)1}$ = 220 mΩ MAX. (V_{GS} = 4 V, I_D = 1.5 A)
  $R_{DS(on)2}$ = 150 mΩ MAX. (V_{GS} = 10 V, I_D = 2.5 A)

PACKAGE DRAWING (Unit : mm)

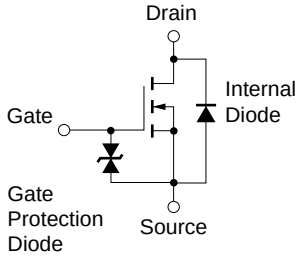


Marking : NX

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±4	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±16	A
Total Power Dissipation Note2	P_T	2	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

EQUIVALENT CIRCUIT



Notes1. PW ≤ 10 μs, Duty Cycle ≤ 1 %

2. Mounted on ceramic board of 16 cm^2 × 0.7 mm

Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is 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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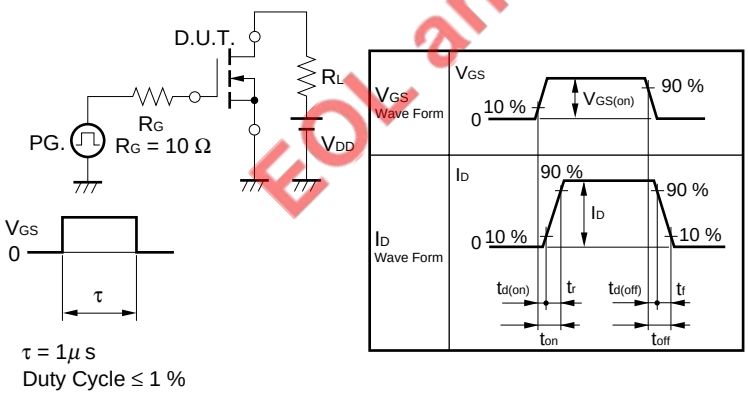
Date Published March 1999 NS CP (K)
Printed in Japan

The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

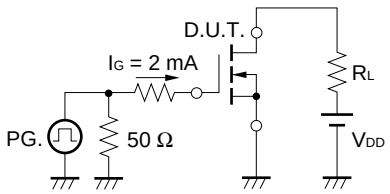
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	1.0	1.4	2.0	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 2 A	1			S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 4 V, I_D = 1.5 A		150	220	mΩ
	$R_{DS(on)2}$	V_{GS} = 10 V, I_D = 2.5 A		110	150	mΩ
Input Capacitance	C_{iss}	V_{DS} = 10 V		265		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		125		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		56		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 25 V, I_D = 1 A		8		ns
Rise Time	t_r	$V_{GS(on)}$ = 10 V, R_G = 10 Ω		11		ns
Turn-off Delay Time	$t_{d(off)}$	R_L = 25 Ω		52		ns
Fall Time	t_f			22		ns
Total Gate Charge	Q_G	V_{DS} = 48 V		10.6		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 10 V		0.7		nC
Gate to Drain Charge	Q_{GD}	I_D = 4 A		3.5		nC
Diode Forward Voltage	$V_{F(S-D)}$	I_F = 4 A, V_{GS} = 0 V		0.86		V
Reverse Recovery Time	t_{rr}	I_F = 4 A, V_{GS} = 0 V		49		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 50 A /μs		26.6		nC

TEST CIRCUIT 1 SWITCHING TIME



τ = 1μ s
Duty Cycle ≤ 1 %

TEST CIRCUIT 2 GATE CHARGE



TYPICAL CHARACTERISTICS (T_A = 25°C)

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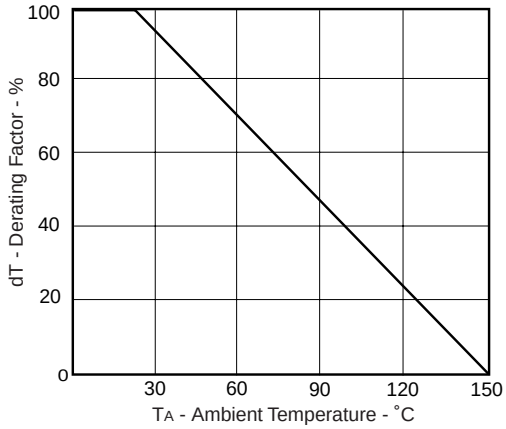
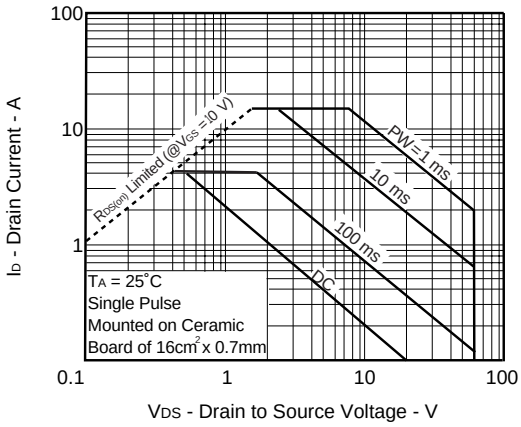
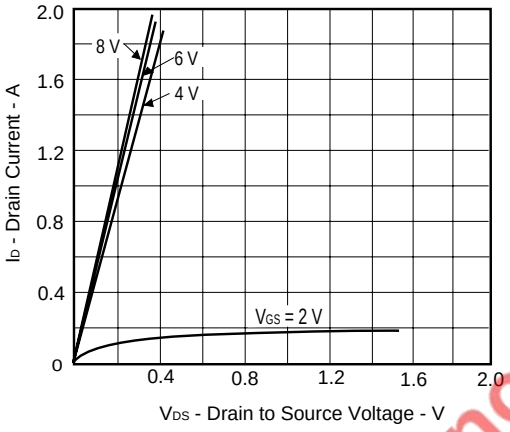
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



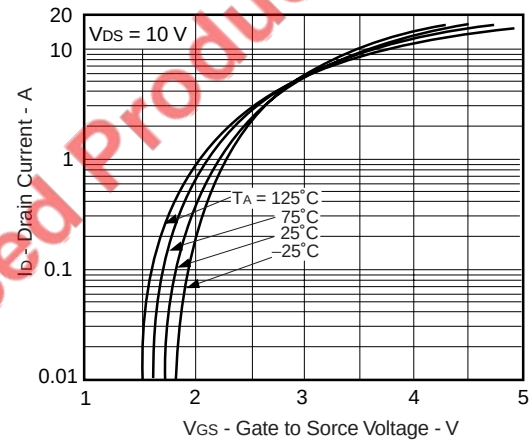
FORWARD BIAS SAFE OPERATING AREA



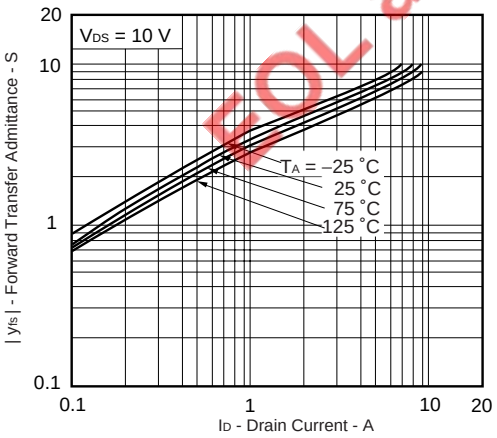
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



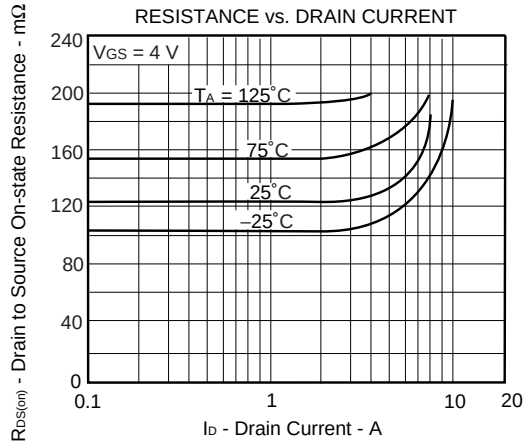
TRANSFER CHARACTERISTICS



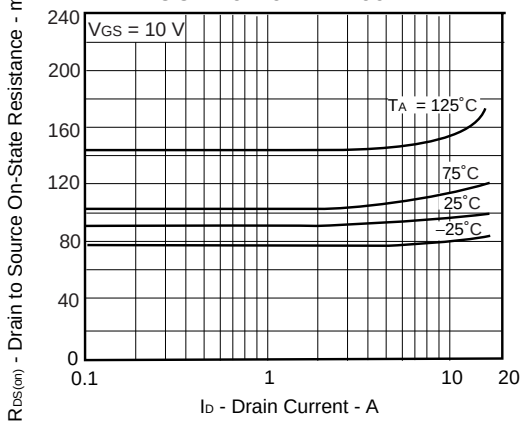
FORWARD TRANSFER ADMMITTANCE Vs. DRAIN CURRENT



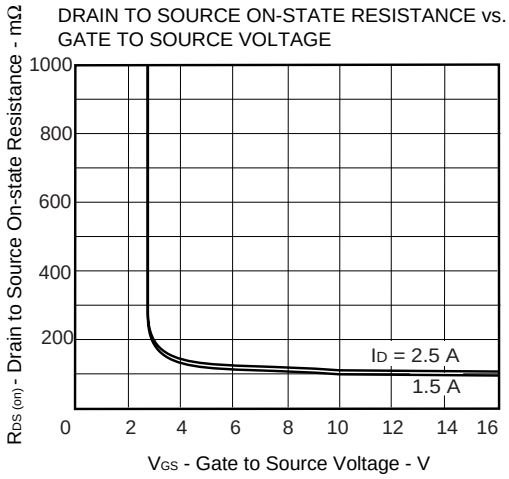
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



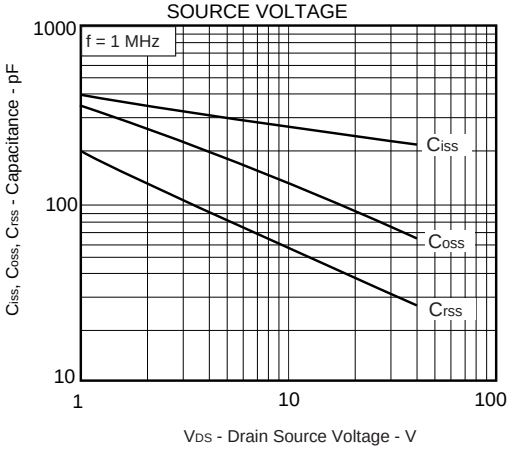
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



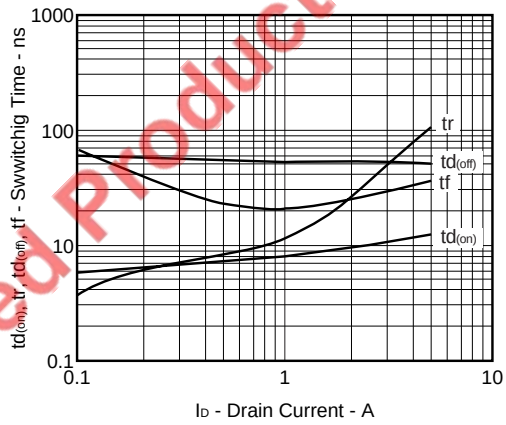
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



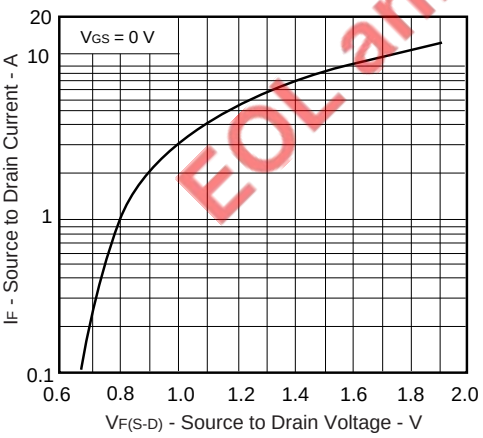
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



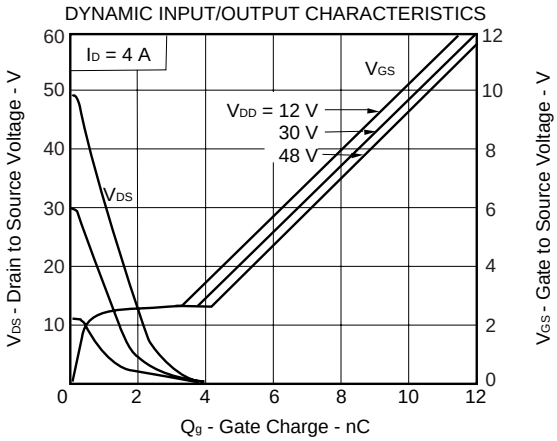
SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



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