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April 1st, 2010
Renesas Electronics Corporation

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

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MOS FIELD EFFECT TRANSISTOR
2SK3365

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3365 is N-Channel MOS Field Effect Transistor designed for DC/DC converters application of notebook computers.

FEATURES

- Low on-resistance
 $R_{DS(on)1} = 14 \text{ m}\Omega$ (MAX.) ($V_{GS} = 10 \text{ V}$, $I_D = 15 \text{ A}$)
 $R_{DS(on)2} = 21 \text{ m}\Omega$ (MAX.) ($V_{GS} = 4.5 \text{ V}$, $I_D = 15 \text{ A}$)
 $R_{DS(on)3} = 29 \text{ m}\Omega$ (MAX.) ($V_{GS} = 4.0 \text{ V}$, $I_D = 15 \text{ A}$)
- Low C_{iss} : $C_{iss} = 1300 \text{ pF}$ (TYP.)
- Built-in gate protection diode

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3365	TO-251 (MP-3)
2SK3365-Z	TO-252 (MP-3Z)

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

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 20	V
Drain Current (DC)	$I_{D(DC)}$	± 30	A
Drain Current (Pulse) ^{Note}	$I_{D(pulse)}$	± 120	A
Total Power Dissipation ($T_C = 25 \text{ }^\circ\text{C}$)	P_T	36	W
Total Power Dissipation ($T_A = 25 \text{ }^\circ\text{C}$)	P_T	1.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to + 150	$^\circ\text{C}$

Note $PW \leq 10 \text{ }\mu\text{s}$, Duty cycle $\leq 1\%$

THERMAL RESISTANCE

Channel to case Thermal Resistance	$R_{th(ch-C)}$	3.48	$^\circ\text{C/W}$
Channel to ambient Thermal Resistance	$R_{th(ch-A)}$	125	$^\circ\text{C/W}$

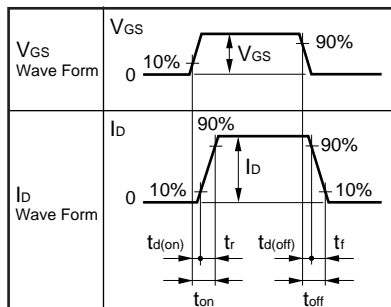
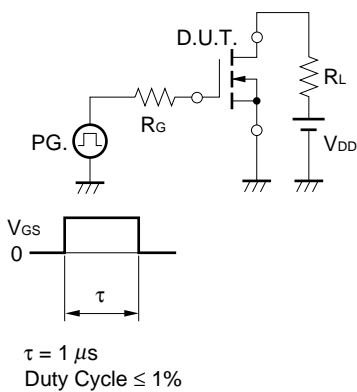
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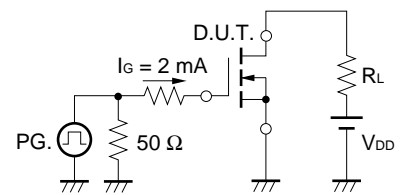
ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$		11.5	14	mΩ
	$R_{DS(on)2}$	$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		15.2	21	mΩ
	$R_{DS(on)3}$	$V_{GS} = 4.0\text{ V}, I_D = 15\text{ A}$		18	29	mΩ
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.5	2.0	2.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 15\text{ A}$	8.0	16.0		S
Drain Leakage Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			10	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1300		pF
Output Capacitance	C_{oss}			405		pF
Reverse Transfer Capacitance	C_{rss}			190		pF
Turn-on Delay Time	$t_{d(on)}$	$I_D = 15\text{ A}, V_{GS} = 10\text{ V}, V_{DD} = 15\text{ V},$ $R_G = 10\ \Omega$		37		ns
Rise Time	t_r			500		ns
Turn-off Delay Time	$t_{d(off)}$			75		ns
Fall Time	t_f			95		ns
Total Gate Charge	Q_G	$I_D = 30\text{ A}, V_{DD} = 24\text{ V}, V_{GS} = 10\text{ V}$		25		nC
Gate to Source Charge	Q_{GS}			4.5		nC
Gate to Drain Charge	Q_{GD}			7.0		nC
Body Diode forward Voltage	$V_{F(S-D)}$	$I_F = 30\text{ A}, V_{GS} = 0\text{ V}$		1.0		V
Reverse Recovery Time	t_{rr}	$I_F = 30\text{ A}, V_{GS} = 0\text{ V}$		35		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		32		nC

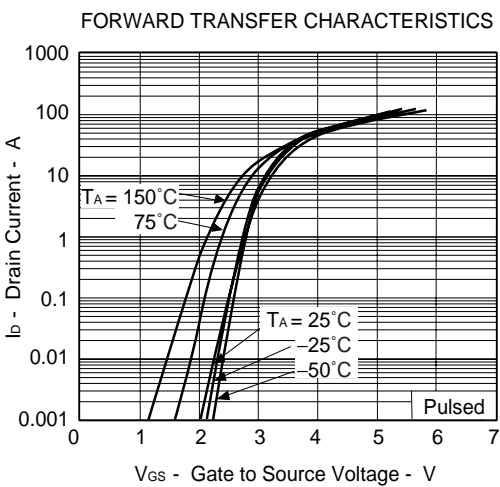
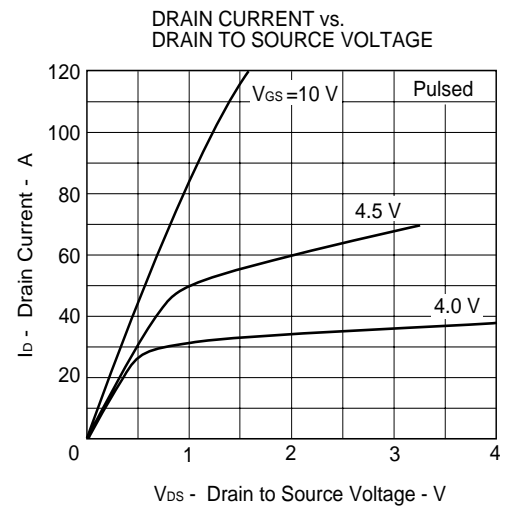
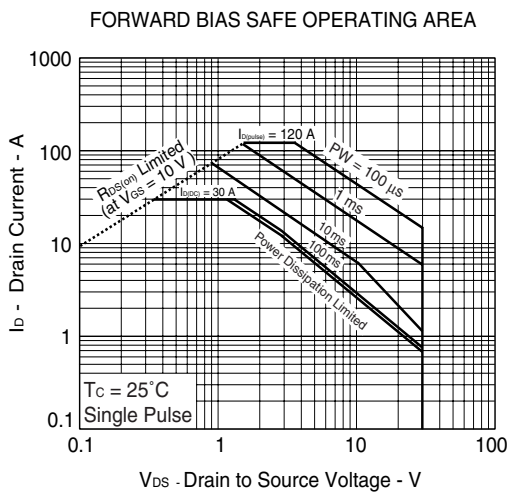
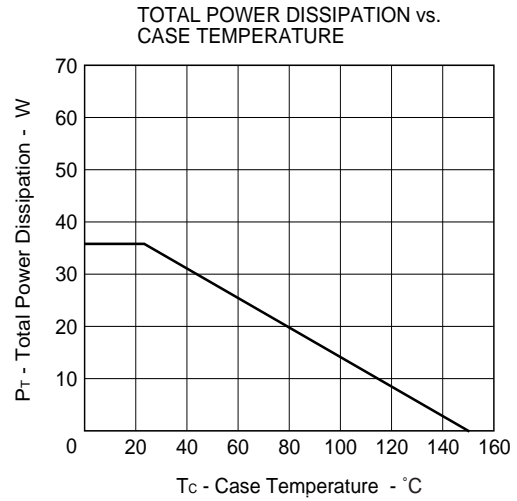
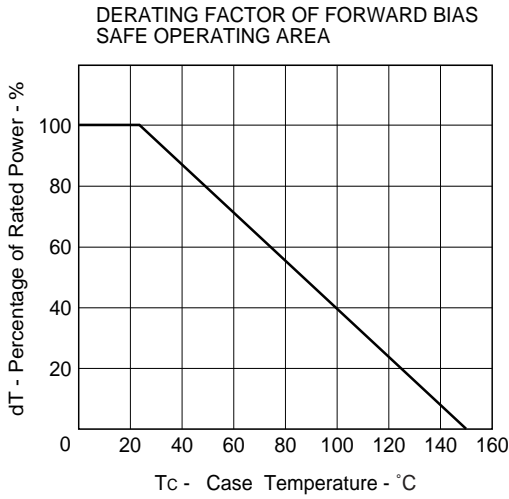
TEST CIRCUIT 1 SWITCHING TIME



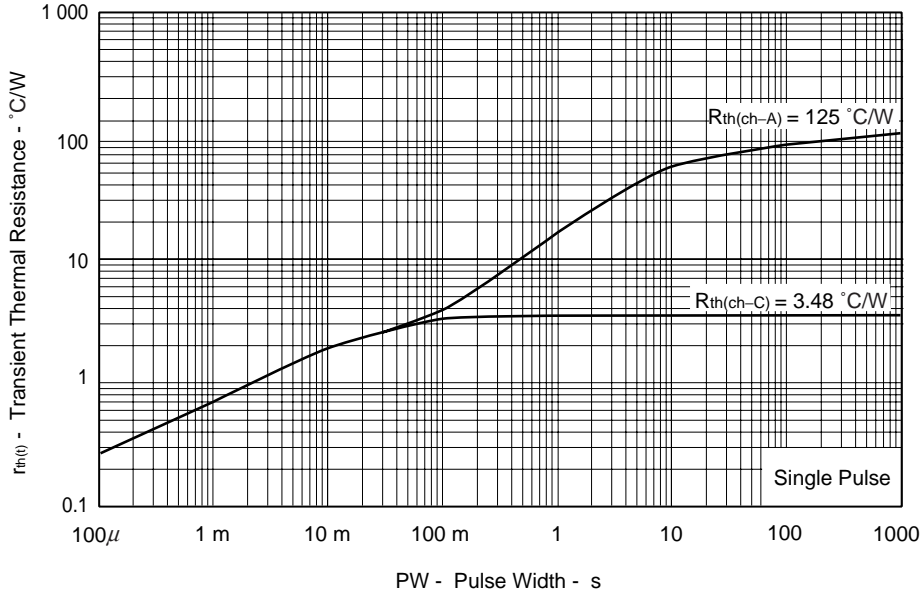
TEST CIRCUIT 2 GATE CHARGE



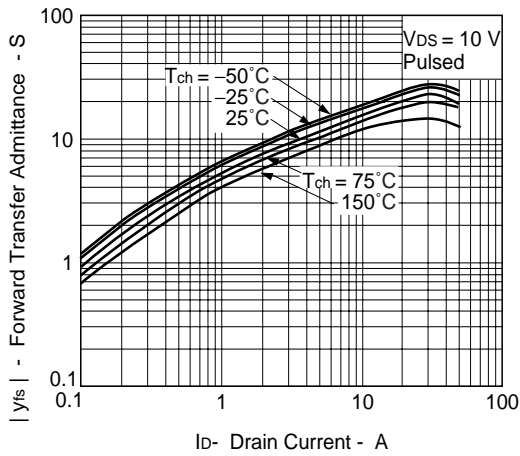
TYPICAL CHARACTERISTICS (TA = 25°C)



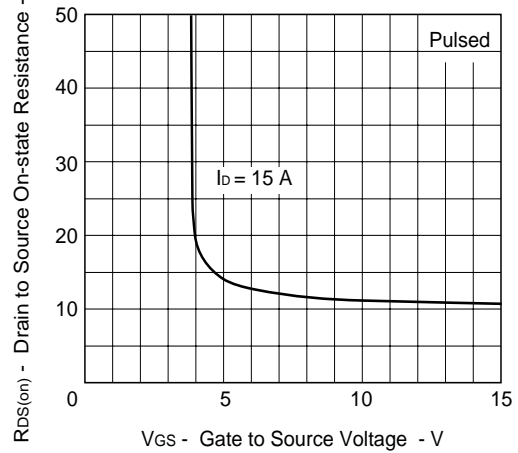
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



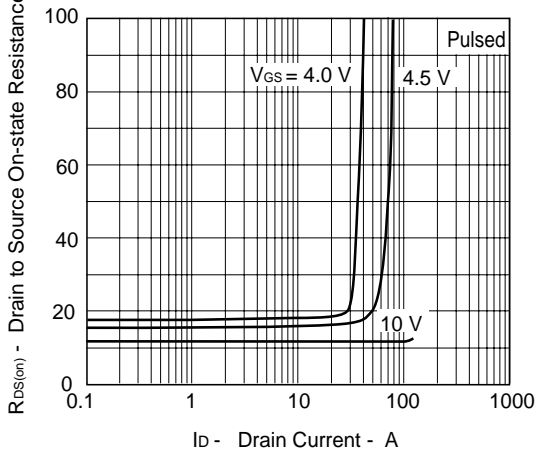
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



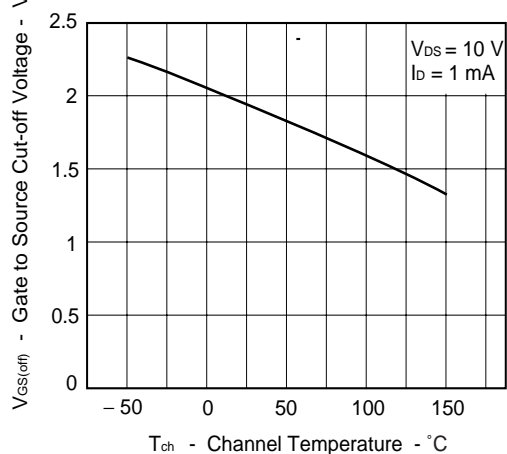
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

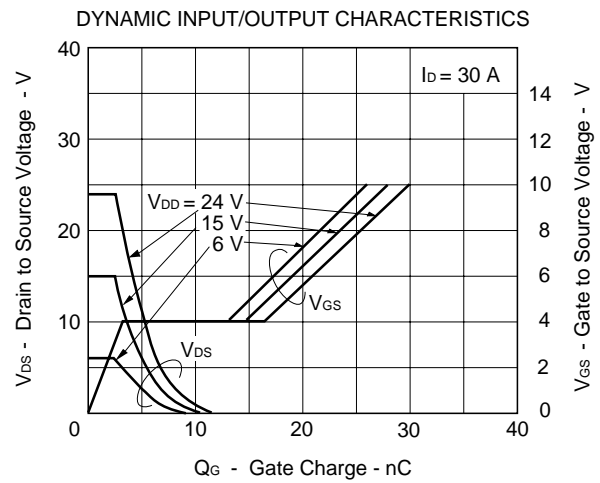
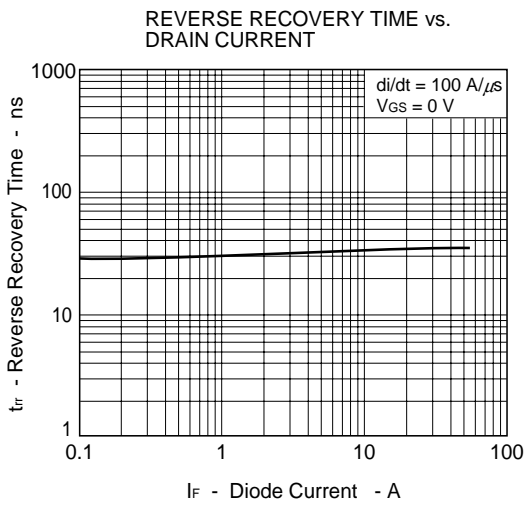
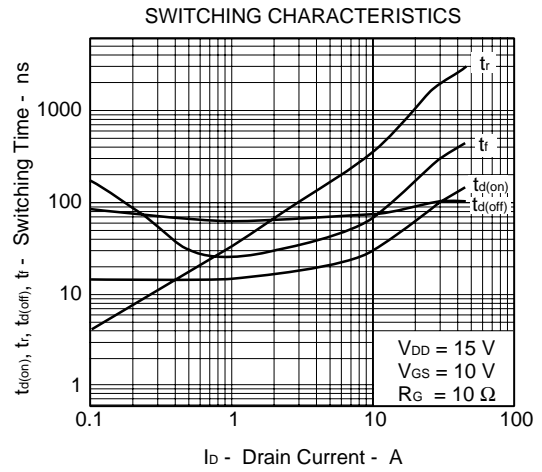
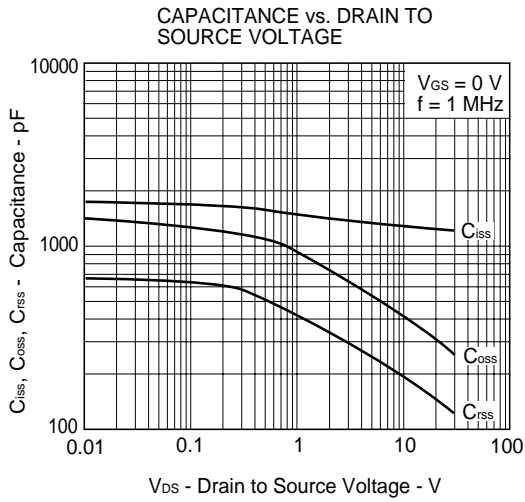
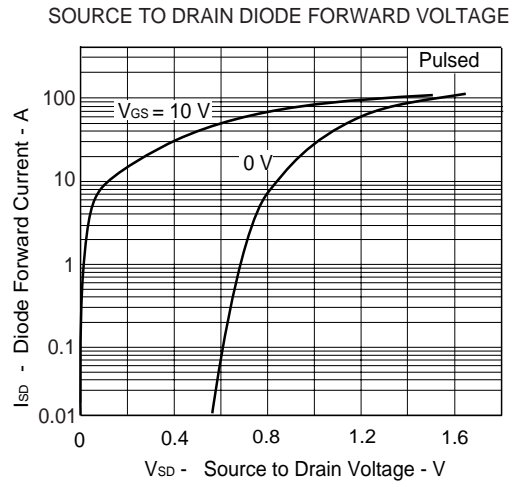
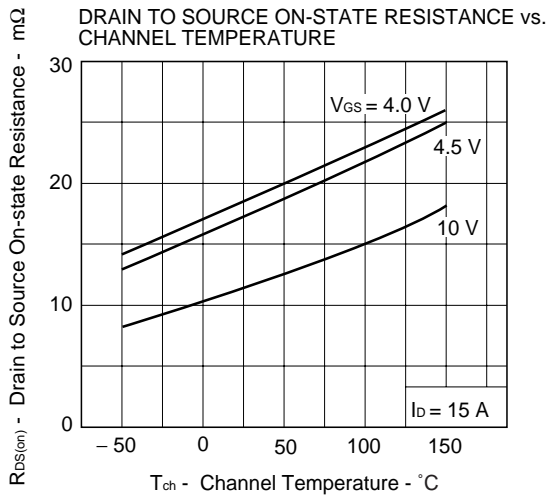


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



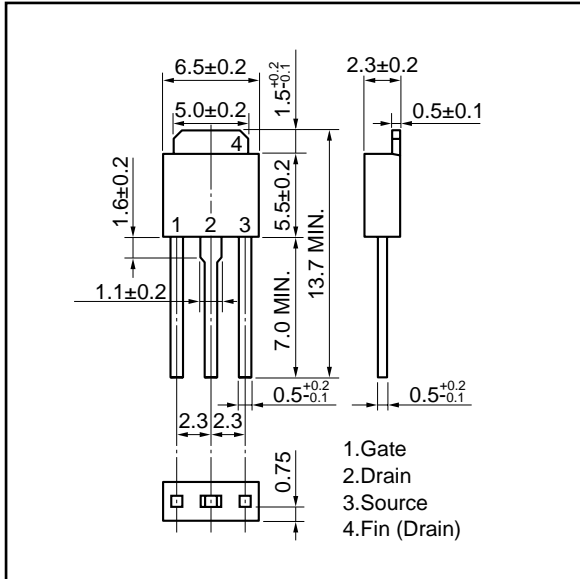
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



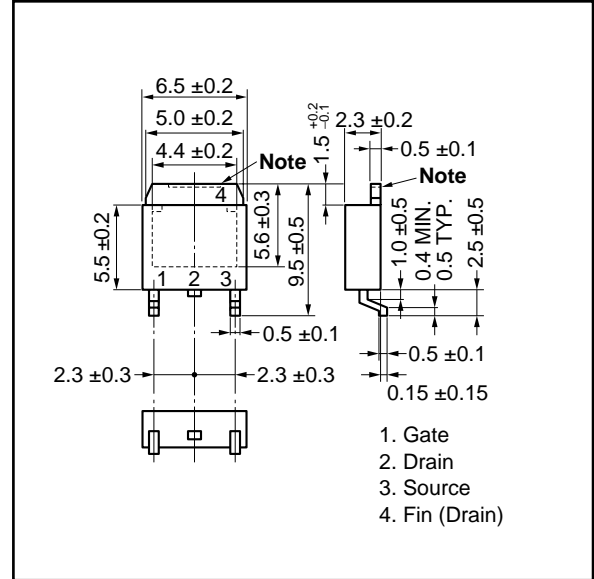


PACKAGE DRAWINGS (Unit: mm)

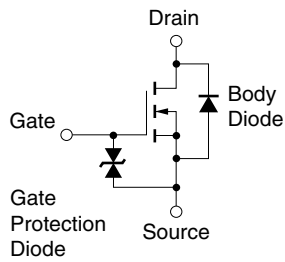
1) TO-251 (MP-3)



<R> 2) TO-252 (MP-3Z)



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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