

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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2SK1059, 2SK1059-Z

DESCRIPTION The 2SK1059, 2SK1059-Z are N-Channel MOS Field Effect Power Transistor designed for solenoid, motor and lamp driver.

- FEATURES**
- 4 V Gate Drive — Logic level —
 - Low $R_{DS(on)}$
 - No Second Breakdown
 - Designed for Hybrid Integrated Circuits

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature -55 to $+150$ °C

Junction Temperature 150 °C Maximum

Maximum Power Dissipations

Total Power Dissipation* 2.0 W

Total Power Dissipation ($T_C = 25$ °C)** 20 W

Maximum Voltages and Currents ($T_a = 25$ °C)

V_{DS} Drain to Source Voltage 60 V

V_{GS} Gate to Source Voltage ± 20 V

$I_{D(DC)}$ Drain Current (DC) ± 5 A

$I_{D(pulse)}$ Drain Current (pulse)*** ± 20 A

* Mounted on ceramic substrate of $7.5\text{ cm}^2 \times 0.7\text{ mm}$

** $T_C = 25$ °C

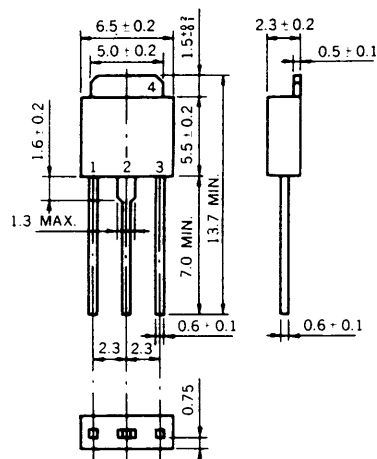
*** $PW \leq 10\text{ }\mu\text{s}$, Duty Cycle $\leq 1\%$

ELECTRICAL CHARACTERISTICS ($T_a = 25$ °C)

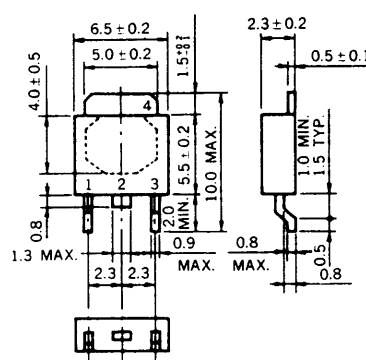
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
$R_{DS(on)}$	Drain to Source On-State Resistance		0.1	0.135	Ω	$V_{GS} = 10\text{ V}$, $I_D = 3\text{ A}$
$R_{DS(on)}$	Drain to Source On-State Resistance		0.15	0.22	Ω	$V_{GS} = 4\text{ V}$, $I_D = 3\text{ A}$
$V_{GS(off)}$	Gate to Source Cutoff Voltage	1.0		2.5	V	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$
$ y_{fs} $	Forward Transfer Admittance	4.0			S	$V_{DS} = 10\text{ V}$, $I_D = 3\text{ A}$
I_{DSS}	Drain Leakage Current			10	μA	$V_{DS} = 60\text{ V}$, $V_{GS} = 0$
I_{GSS}	Gate to Source Leakage Current			± 100	nA	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0$
C_{iss}	Input Capacitance		900		pF	$V_{DS} = 10\text{ V}$
C_{oss}	Output Capacitance		350		pF	$V_{GS} = 0$
C_{rss}	Reverse Transfer Capacitance		100		pF	$f = 1\text{ MHz}$
$t_{d(on)}$	Turn-On Delay Time		10		ns	$I_D = 3\text{ A}$, $V_{DD} = 10\text{ V}$ $R_L = 17\text{ }\Omega$ $R_{in} = 10\text{ }\Omega$
t_r	Rise Time		40		ns	
$t_{d(off)}$	Turn-Off Delay Time		110		ns	
t_f	Fall Time		30		ns	

PACKAGE DIMENSIONS (Unit: mm)

2SK1059

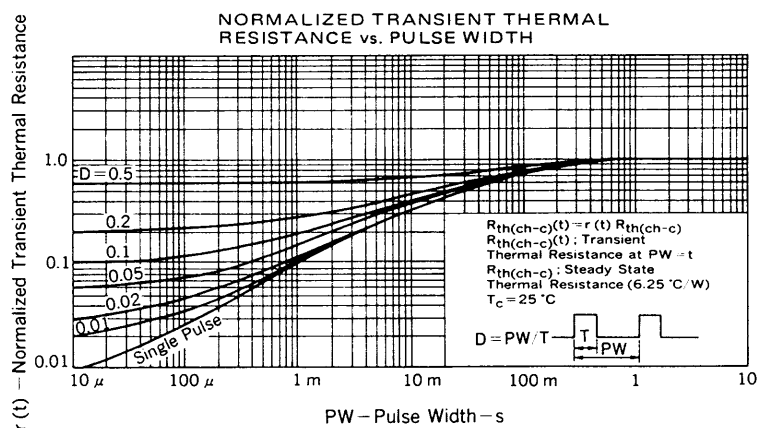
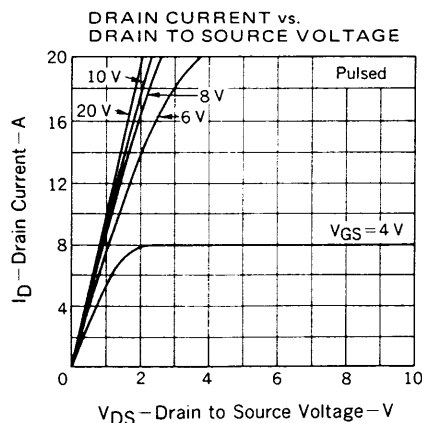
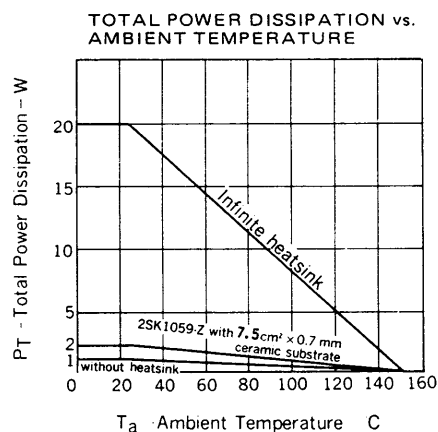
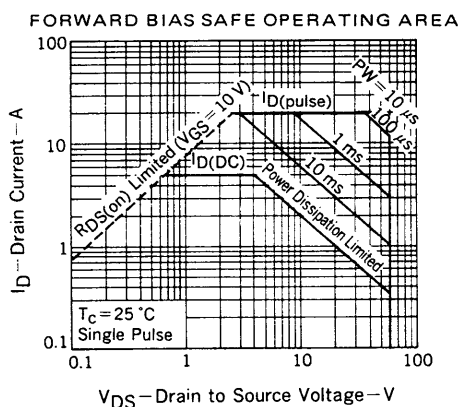
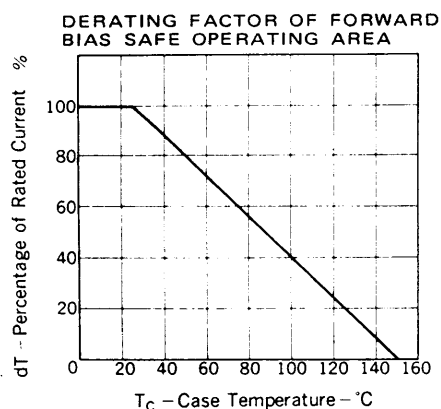


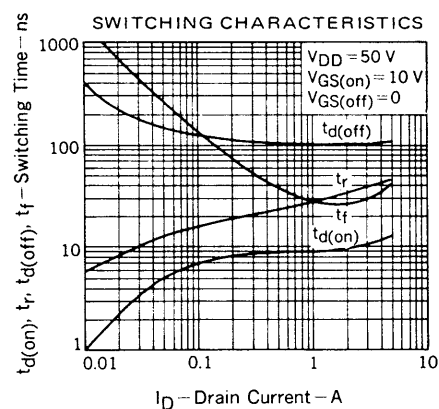
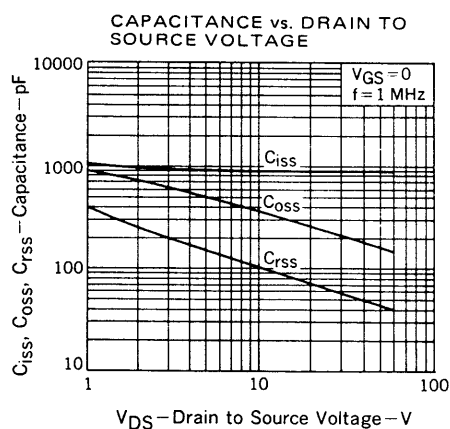
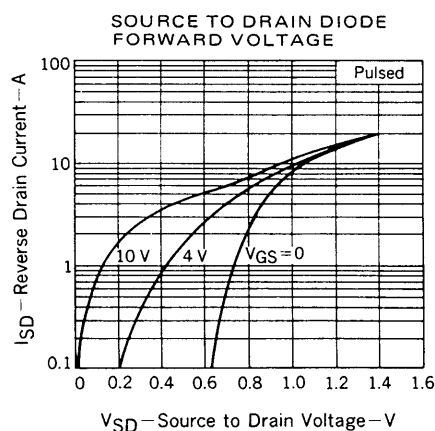
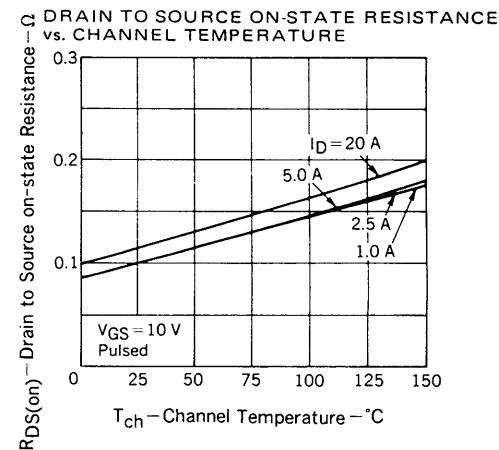
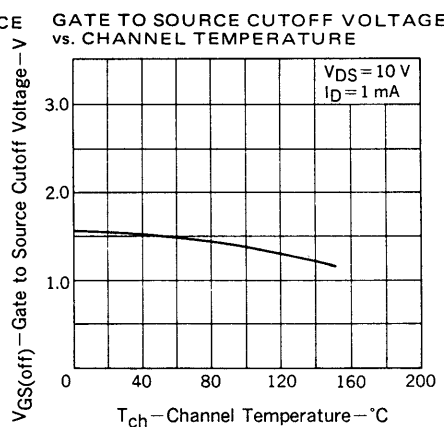
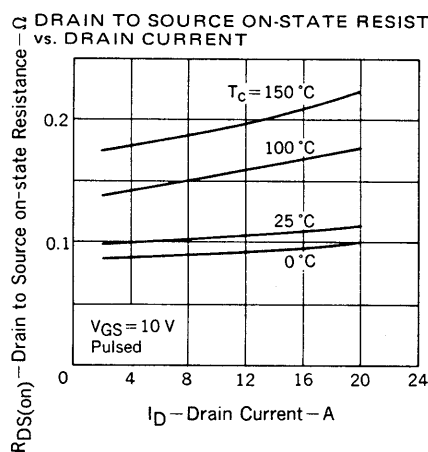
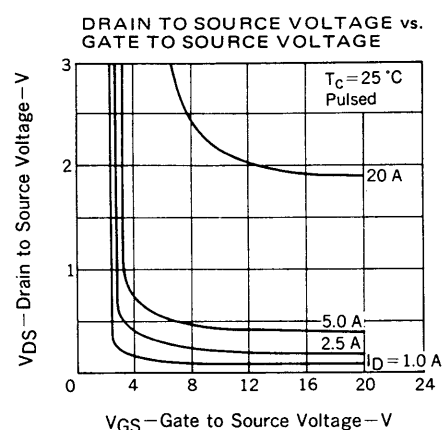
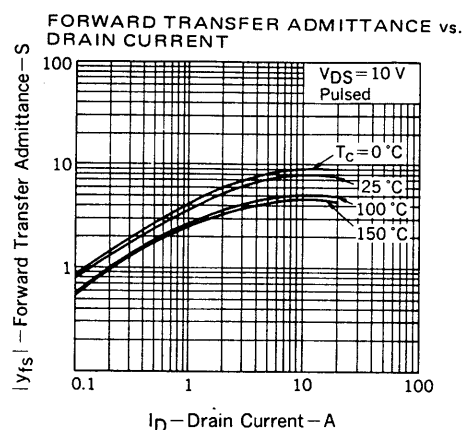
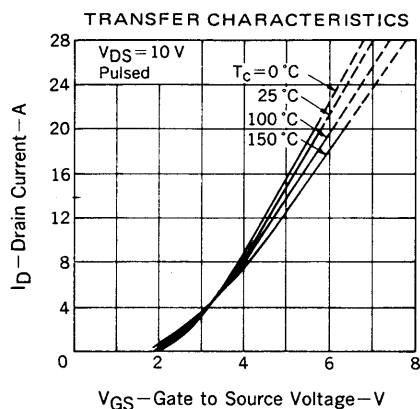
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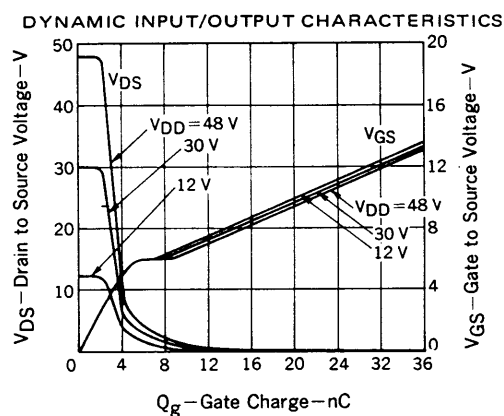


1. Gate
2. Drain
3. Source
4. Drain (Fin)

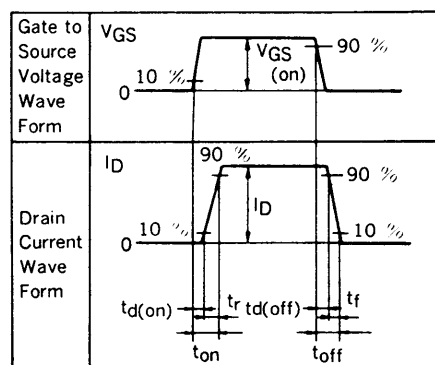
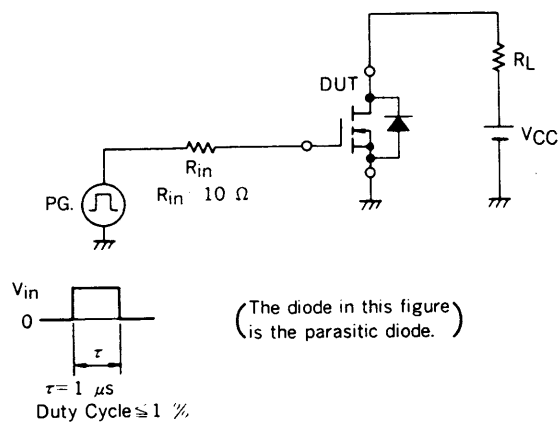
TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)







SWITCHING TIME TEST CIRCUIT



GATE CHARGE TEST CIRCUIT

