

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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SWITCHING N-CHANNEL MOSFET

DESCRIPTION

The 2SK4071 is the best switching element for the DC-DC converter usage to 24 V in the direct current input voltage.

It excels in the switching characteristics in low on-state resistance, and is the best for the high-speed switching usage.

FEATURES

- Low input capacitance $C_{iss} = 150$ pF TYP.
- Low on-state resistance
 $R_{DS(on)1} = 1.5 \Omega$ MAX. ($V_{GS} = 4.5$ V, $I_D = 0.5$ A)
- 2.5 V drive available

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK4071-AZ <small>Note</small>	TO-92 (SC-43A)
2SK4071-T-AZ <small>Note</small>	TO-92 (SC-43A)

Note Pb-free (This product does not contain Pb in external electrode.)

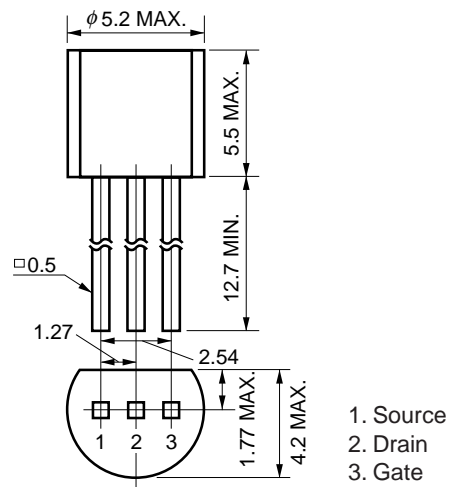
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage ($V_{GS} = 0$ V)	V_{DSS}	150	V
Gate to Source Voltage ($V_{DS} = 0$ V)	V_{GSS}	± 12	V
Drain Current (DC) ($T_A = 25^\circ\text{C}$)	$I_{D(DC)}$	± 1.0	A
Drain Current (pulse) <small>Note</small>	$I_{D(pulse)}$	± 4.0	A
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_T	0.75	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

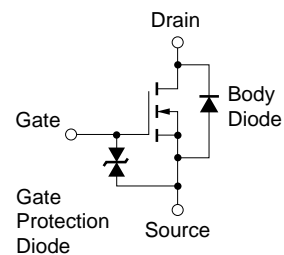
Note $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT



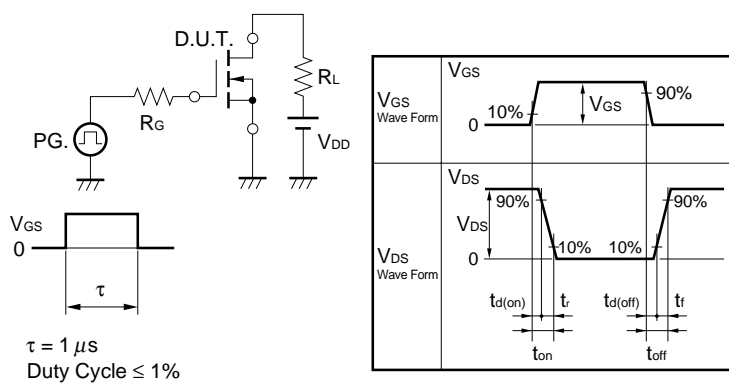
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

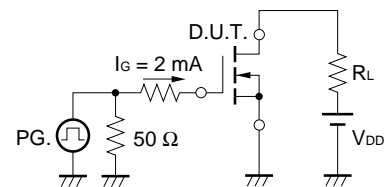
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance Note	y _{fs}	V _{DS} = 10 V, I _D = 0.5 A	0.8	2.3		S
Drain to Source On-state Resistance Note	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 0.5 A		1.2	1.5	Ω
Drain to Source On-state Resistance Note	R _{DS(on)2}	V _{GS} = 2.5 V, I _D = 0.5 A		1.3	1.75	Ω
Input Capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1.0 MHz		150		pF
Output Capacitance	C _{oss}			30		pF
Reverse Transfer Capacitance	C _{rss}			14		pF
Turn-on Delay Time	t _{d(on)}	I _D = 0.5 A, V _{GS} = 4.5 V, V _{DD} = 75 V, R _G = 10 Ω		7		ns
Rise Time	t _r			8		ns
Turn-off Delay Time	t _{d(off)}			15		ns
Fall Time	t _f			9		ns
Total Gate Charge	Q _G		I _D = 1.0 A, V _{DD} = 120 V, V _{GS} = 4.5 V		4	
Gate to Source Charge	Q _{GS}			0.5		nC
Gate to Drain Charge	Q _{GD}			1.6		nC
Body Diode Forward Voltage Note	V _{F(S-D)}	I _F = 1.0 A, V _{GS} = 0 V		0.85	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 1.0 A, V _{GS} = 0 V		59		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		73		nC

Note Pulsed

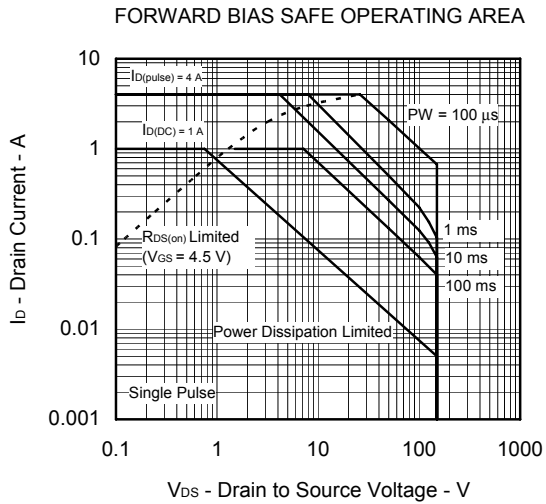
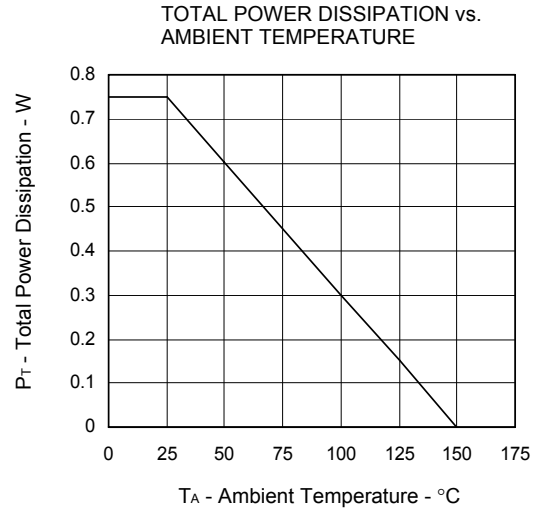
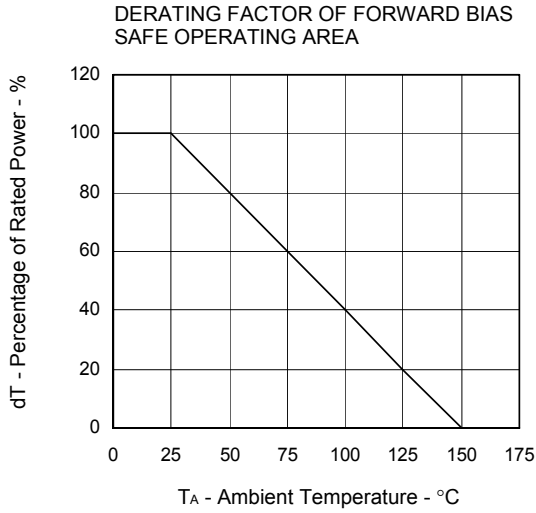
TEST CIRCUIT 1 SWITCHING TIME



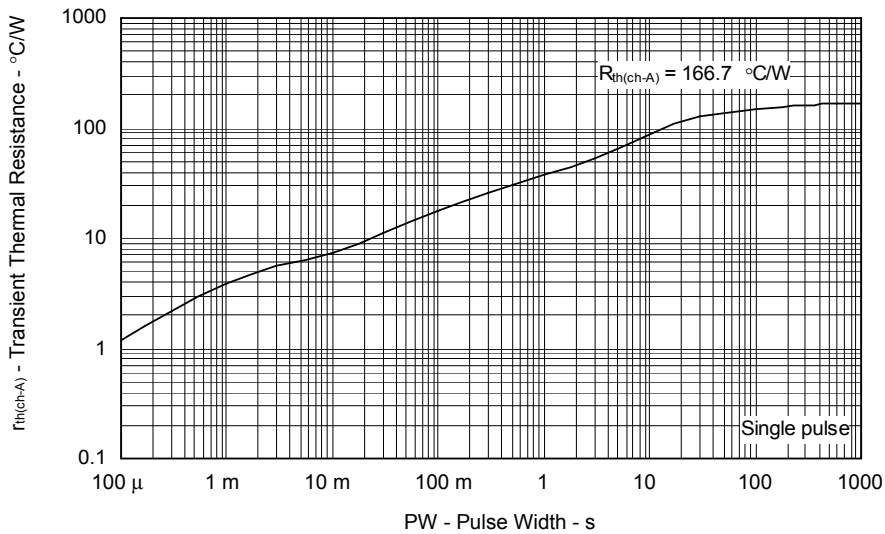
TEST CIRCUIT 2 GATE CHARGE



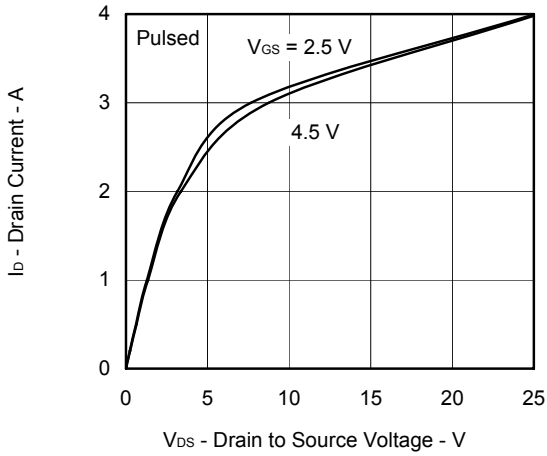
TYPICAL CHARACTERISTICS (T_A = 25°C)



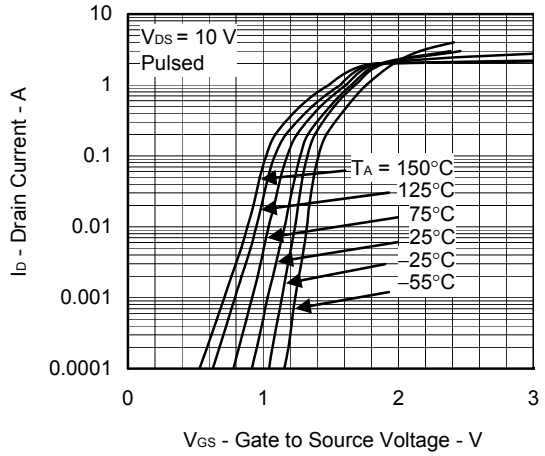
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



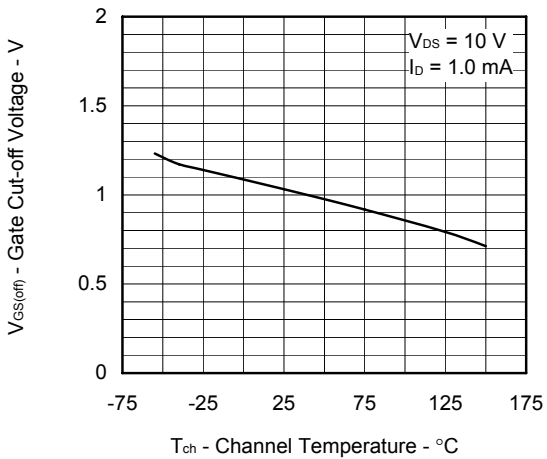
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



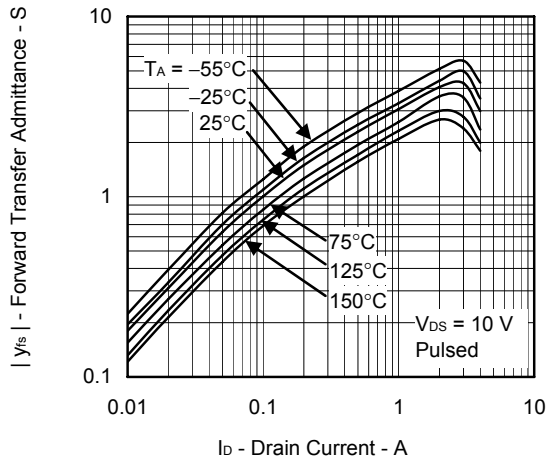
FORWARD TRANSFER CHARACTERISTICS



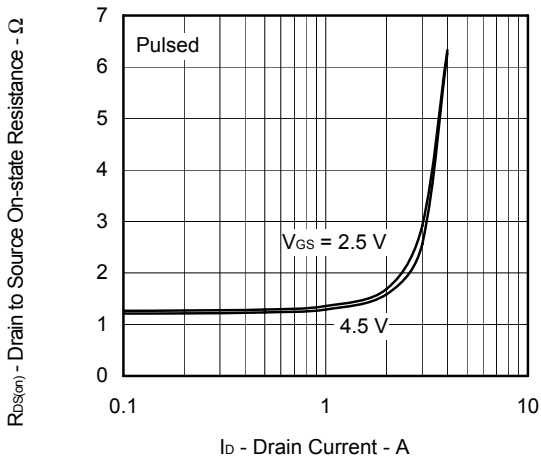
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



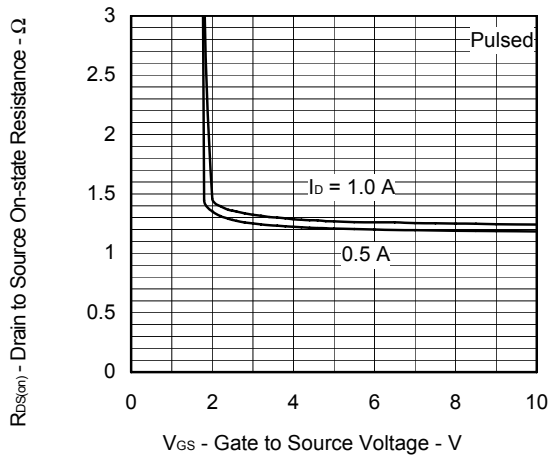
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



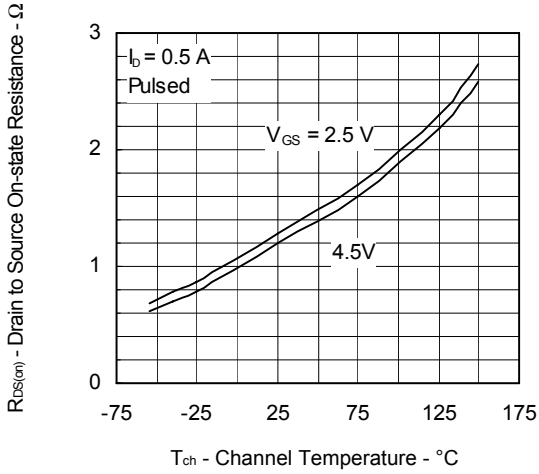
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



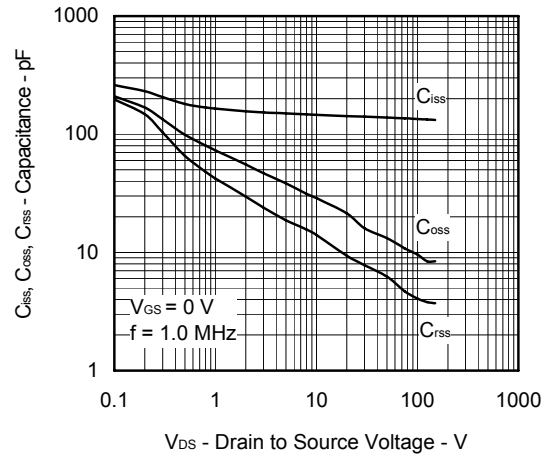
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



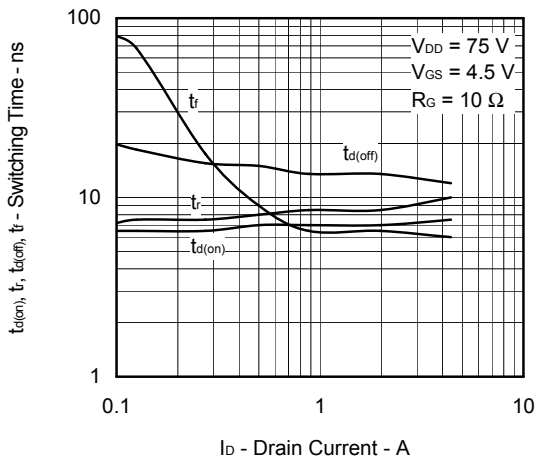
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



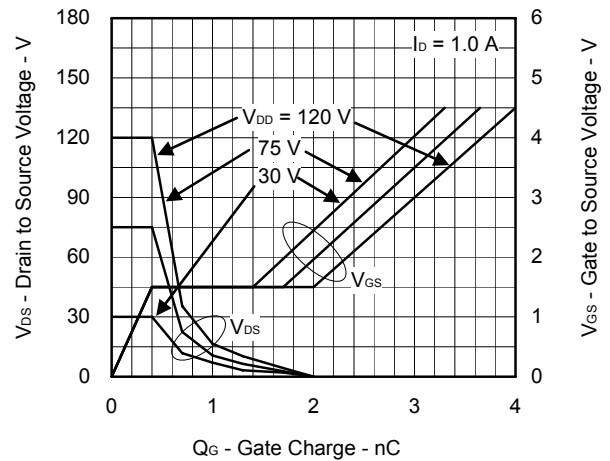
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



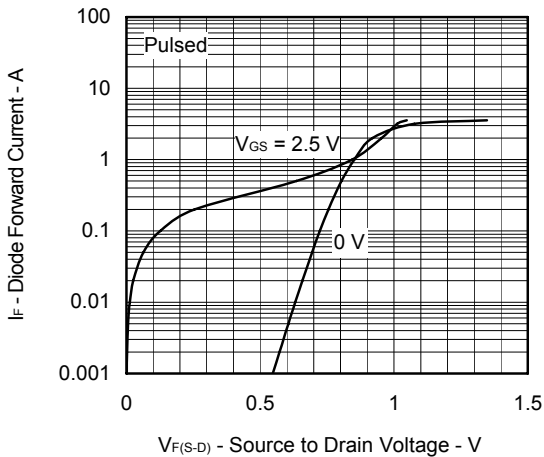
SWITCHING CHARACTERISTICS



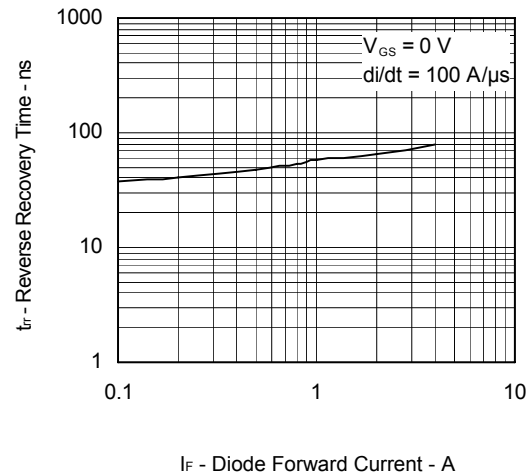
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



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