DATA SHEET

NEC

Phase-out/Discontinued

MOS FIELD EFFECT TRANSISTOR

2SK4071

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

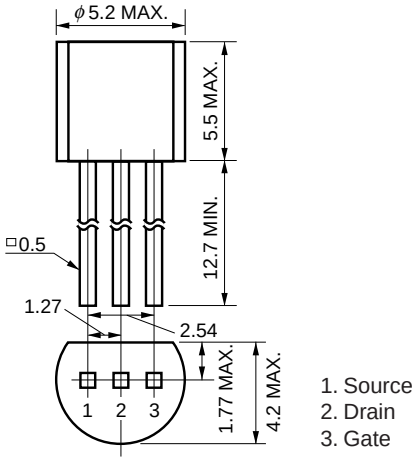
- Low input capacitance C_{iss} = 150 pF TYP.
- Low on-state resistance
  $R_{DS(on)1}$ = 1.5 Ω MAX. (V_{GS} = 4.5 V, I_D = 0.5 A)
- 2.5 V drive available

ORDERING INFORMATION

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

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

PACKAGE DRAWING (Unit: mm)

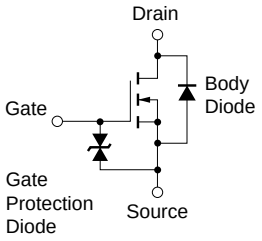


ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

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°C)	$I_{D(DC)}$	±1.0	A
Drain Current (pulse) Note	$I_{D(pulse)}$	±4.0	A
Total Power Dissipation (T_A = 25°C)	P_T	0.75	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note PW ≤ 10 μs, Duty Cycle ≤ 1%

EQUIVALENT CIRCUIT



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.

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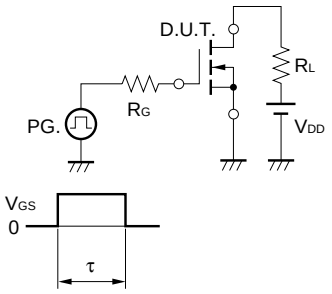
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

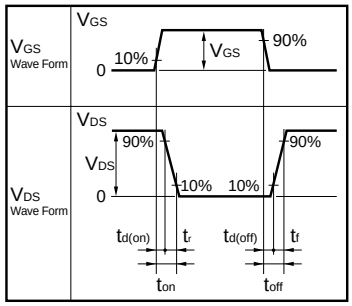
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 150 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±12 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance 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,		7		ns
Rise Time	t_r	R_G = 10 Ω		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		nC
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

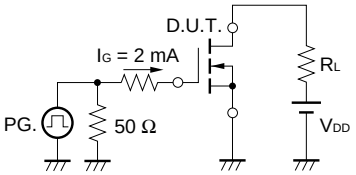
TEST CIRCUIT 1 SWITCHING TIME



τ = 1 μs
Duty Cycle ≤ 1%

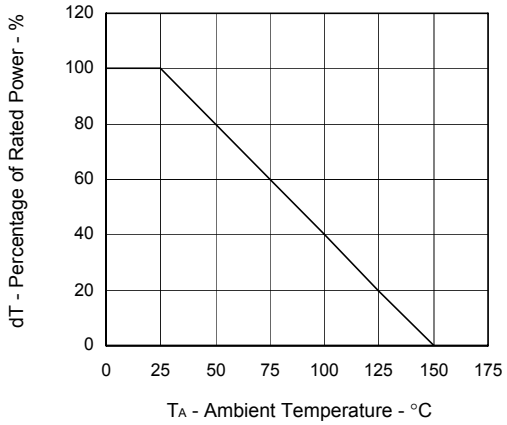


TEST CIRCUIT 2 GATE CHARGE

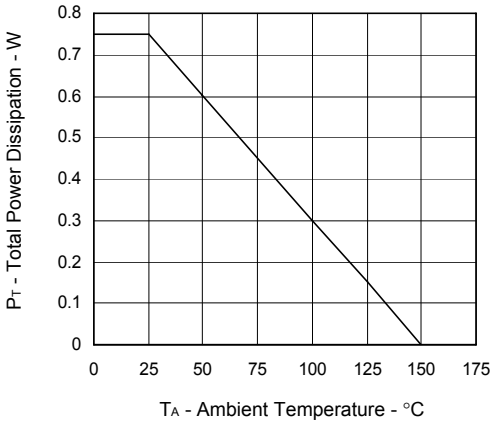


TYPICAL CHARACTERISTICS (T_A = 25°C)

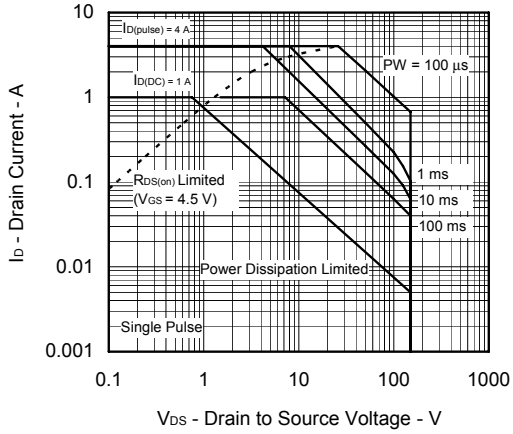
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



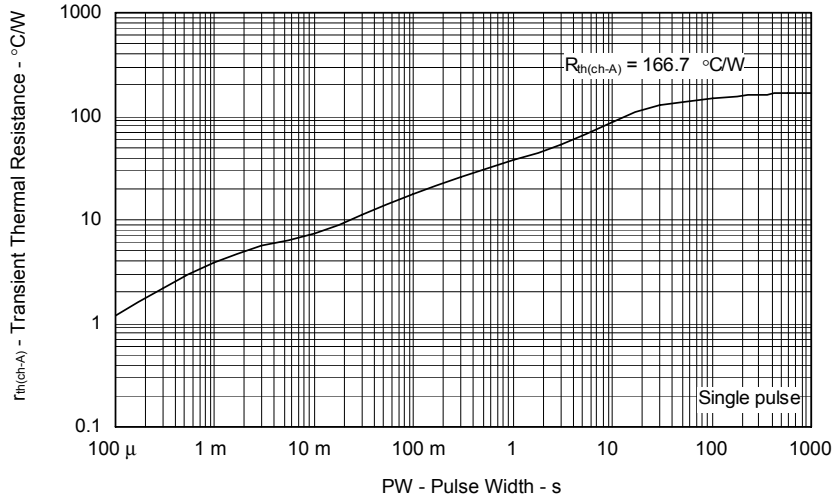
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



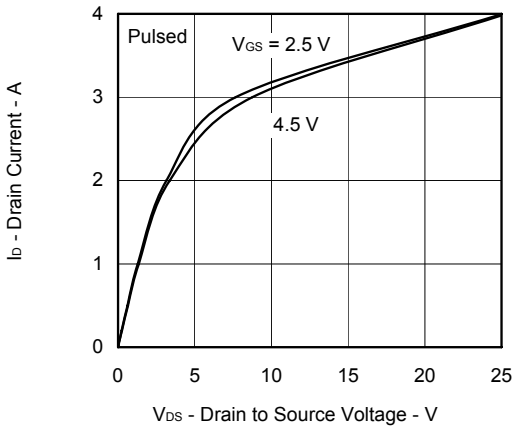
FORWARD BIAS SAFE OPERATING AREA



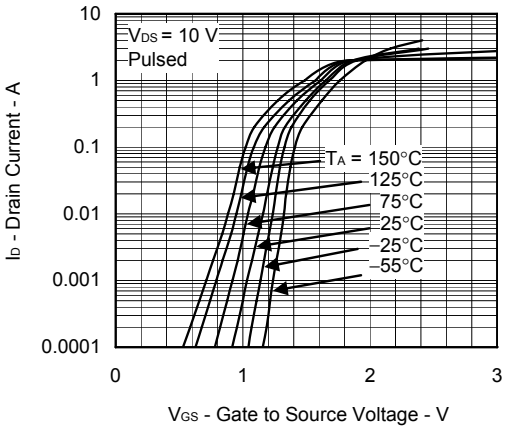
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



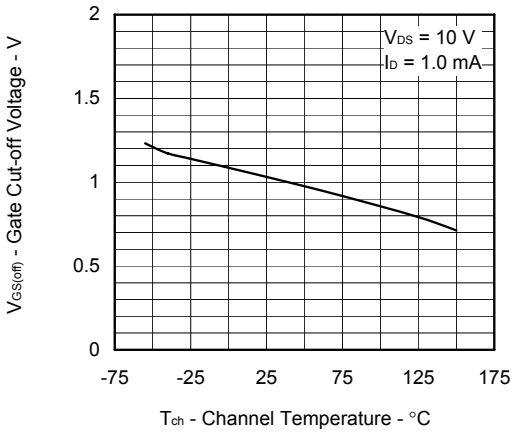
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



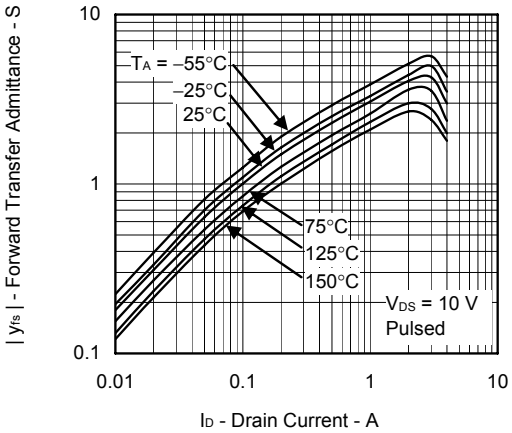
FORWARD TRANSFER CHARACTERISTICS



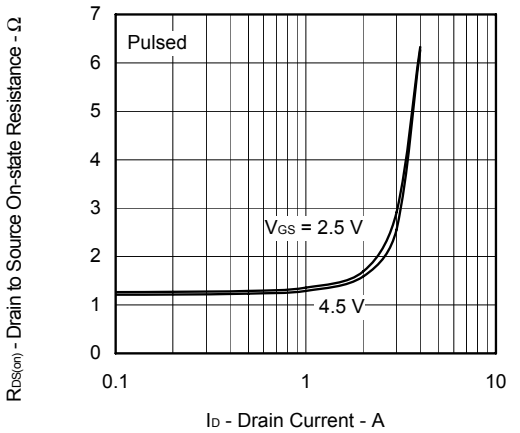
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



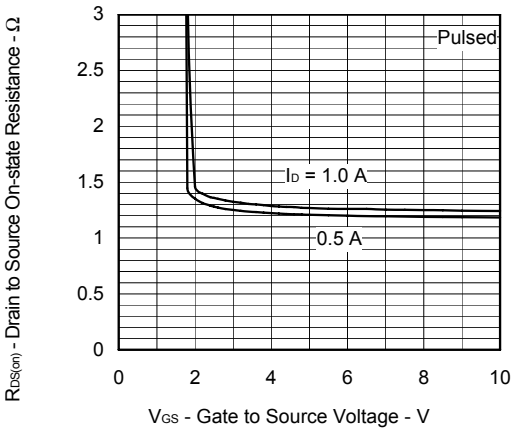
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



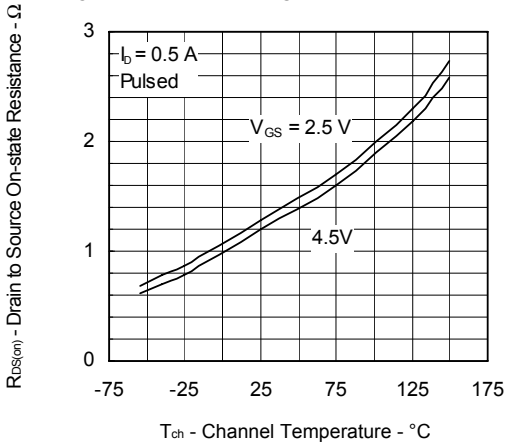
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



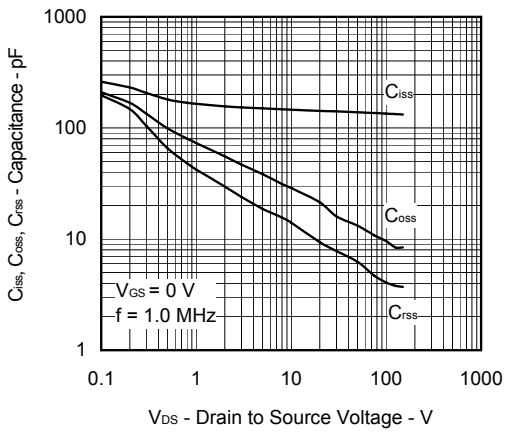
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



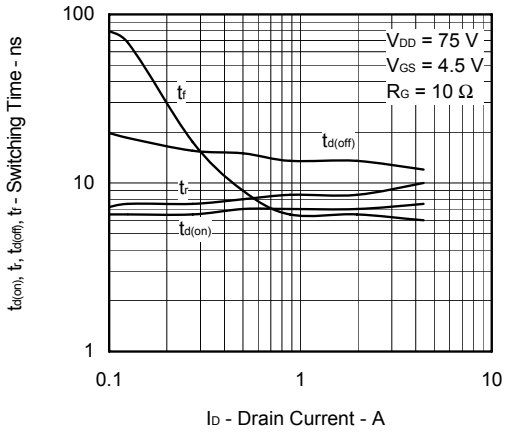
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



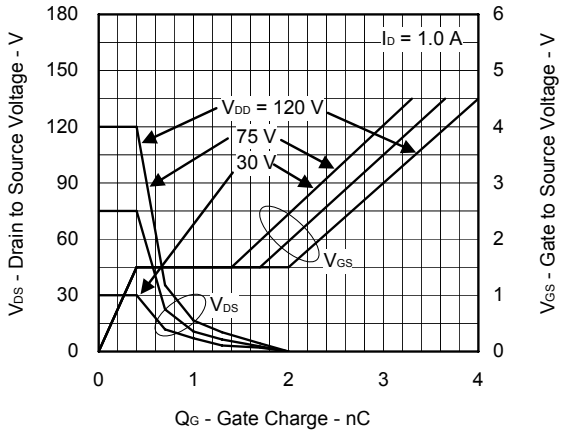
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



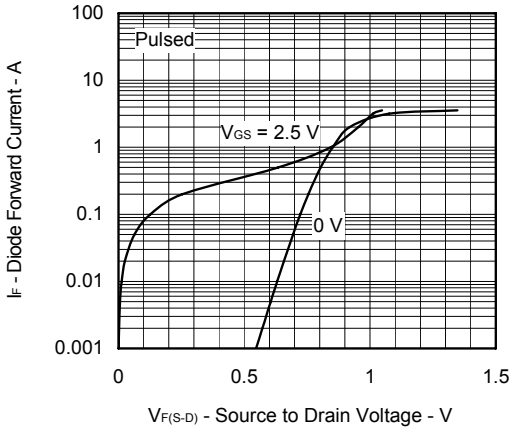
SWITCHING CHARACTERISTICS



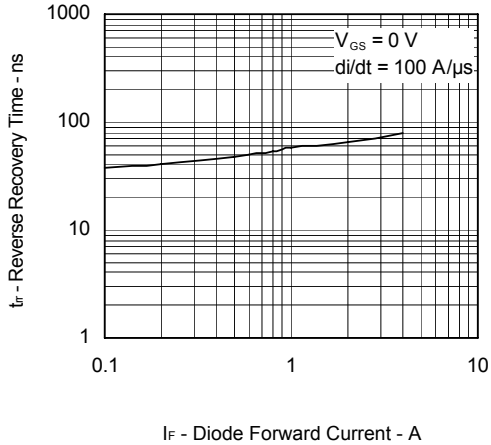
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



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