

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SK3367 is N-Channel MOS Field Effect Transistor designed for DC/DC converter application of notebook computers.

FEATURES

- Low on-resistance
 $R_{DS(on)1} = 9.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 18 \text{ A)}$
 $R_{DS(on)2} = 12.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 18 \text{ A)}$
 $R_{DS(on)3} = 14.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 18 \text{ A)}$
- Low C_{iss} : $C_{iss} = 2800 \text{ pF TYP.}$
- Built-in gate protection diode

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3367	TO-251
2SK3367-Z	TO-252

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

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)	$I_{D(DC)}$	± 36	A
Drain Current (Pulse) ^{Note}	$I_{D(pulse)}$	± 144	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_T	40	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_T	1.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to + 150	$^\circ\text{C}$

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

THERMAL RESISTANCE

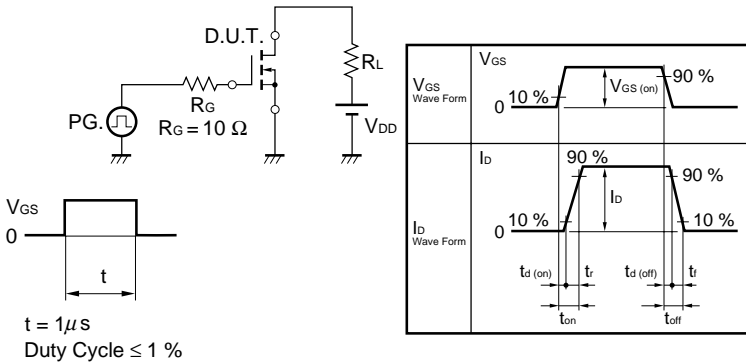
Channel to case	$R_{th(ch-C)}$	3.13	$^\circ\text{C/W}$
Channel to ambient	$R_{th(ch-A)}$	125	$^\circ\text{C/W}$

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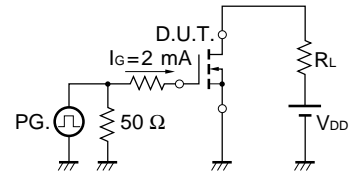
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 18 A		7.3	9.0	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 18 A		9.0	12.0	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 18 A		9.7	14.0	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 18 A	13	26		S
Drain Leakage Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			10	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Input Capacitance	C _{iSS}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		2800		pF
Output Capacitance	C _{oss}			880		pF
Reverse Transfer Capacitance	C _{rSS}			400		pF
Turn-on Delay Time	t _{d(on)}	I _D = 18 A, V _{GS(on)} = 10 V, V _{DD} = 15 V, R _G = 10 Ω		75		ns
Rise Time	t _r			1130		ns
Turn-off Delay Time	t _{d(off)}			165		ns
Fall Time	t _f			210		ns
Total Gate Charge	Q _G	I _D = 36 A, V _{DD} = 24 V, V _{GS} = 10 V		49		nC
Gate to Source Charge	Q _{GS}			10		nC
Gate to Drain Charge	Q _{GD}			14		nC
Body Diode forward Voltage	V _{F(S-D)}	I _F = 36 A, V _{GS} = 0 V		0.95		V
Reverse Recovery Time	t _{rr}	I _F = 36 A, V _{GS} = 0 V di/dt = 100 A/μs		45		ns
Reverse Recovery Charge	Q _{rr}			50		nC

TEST CIRCUIT 1 SWITCHING TIME

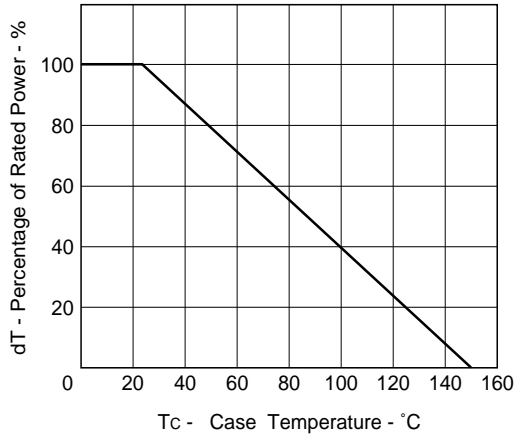


TEST CIRCUIT 2 GATE CHARGE

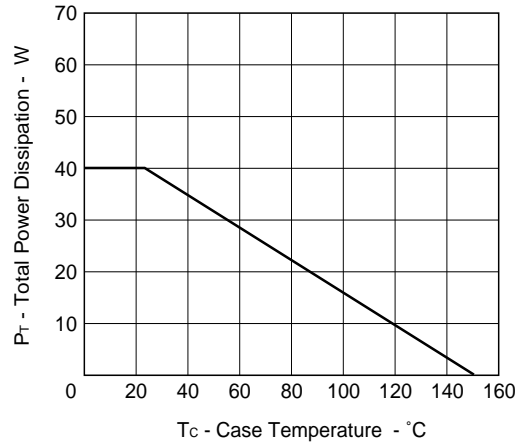


TYPICAL CHARACTERISTICS (T_A = 25°C)

DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA

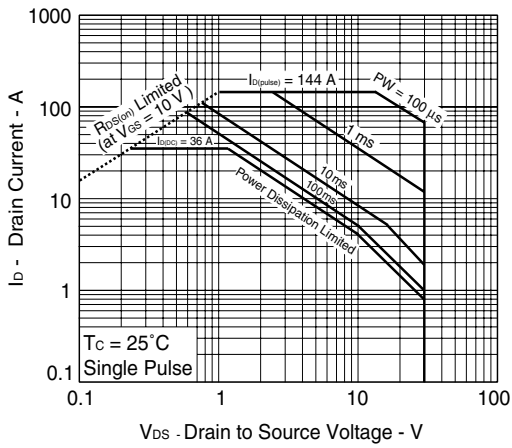


TOTAL POWER DISSIPATION vs. CASE TEMPERATURE

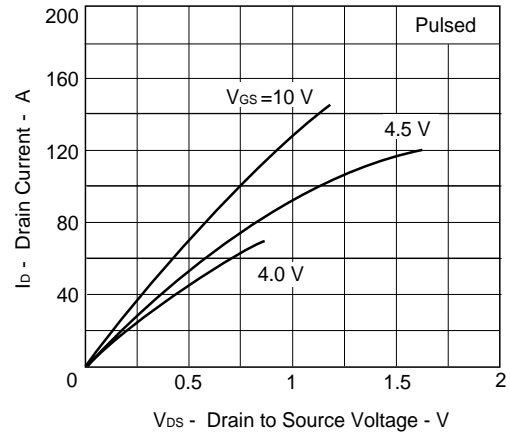


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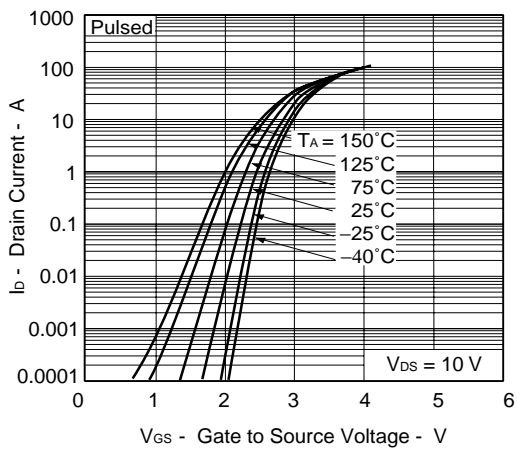
FORWARD BIAS SAFE OPERATING AREA



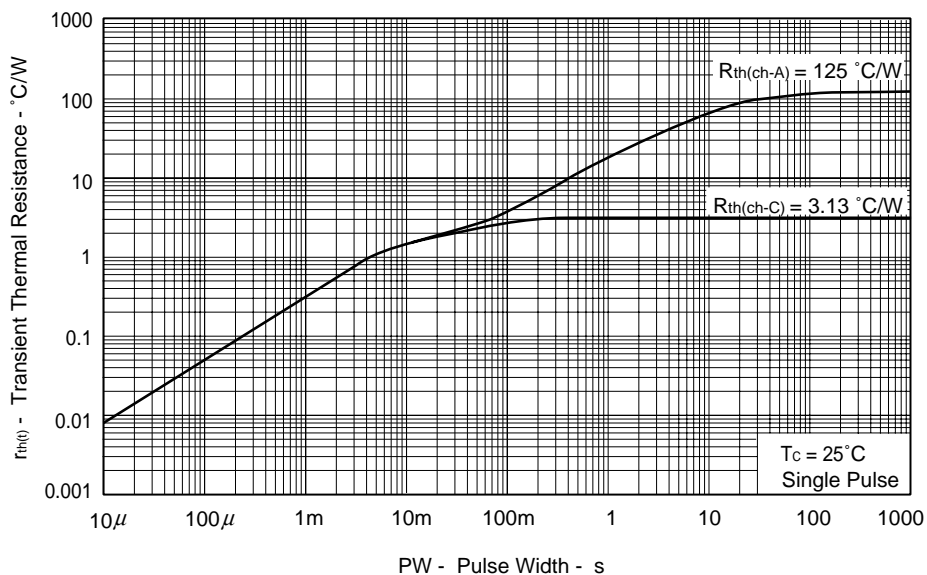
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



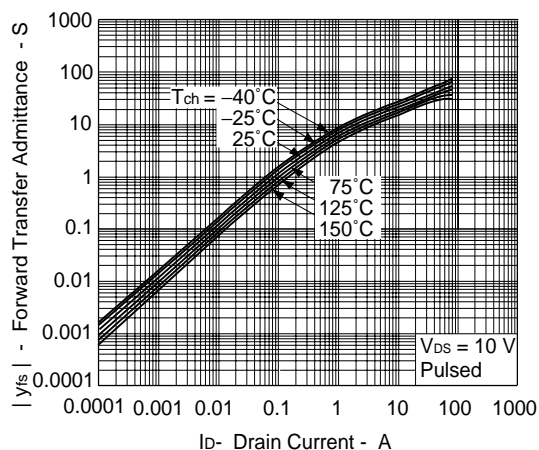
FORWARD TRANSFER CHARACTERISTICS



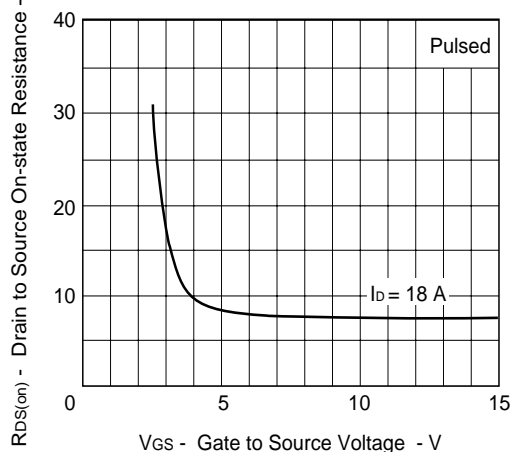
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



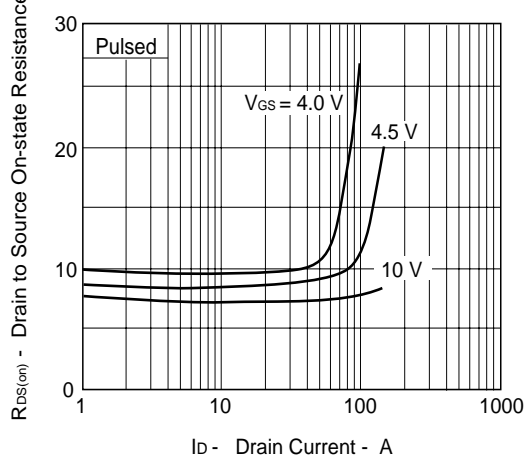
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



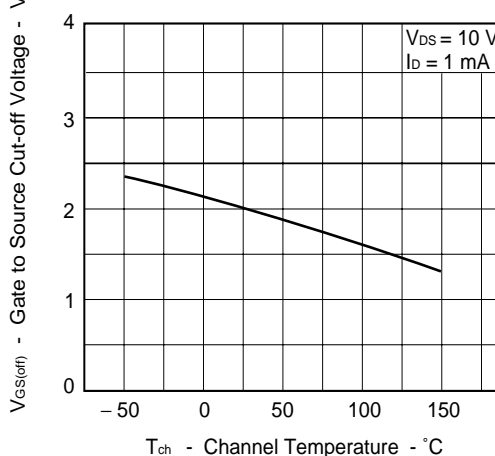
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



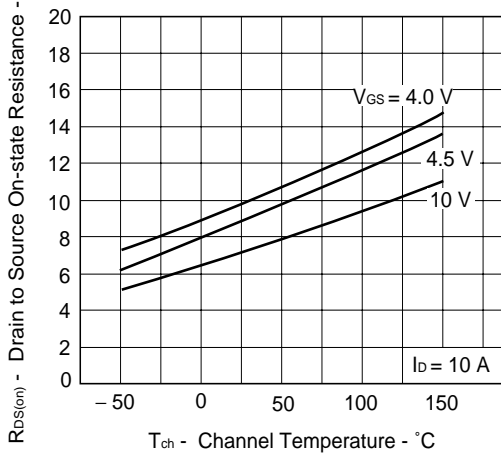
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



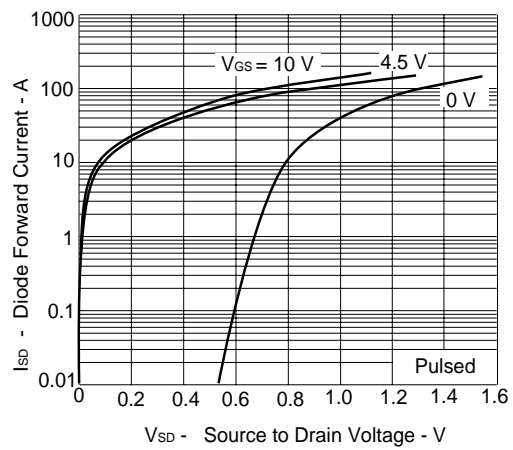
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



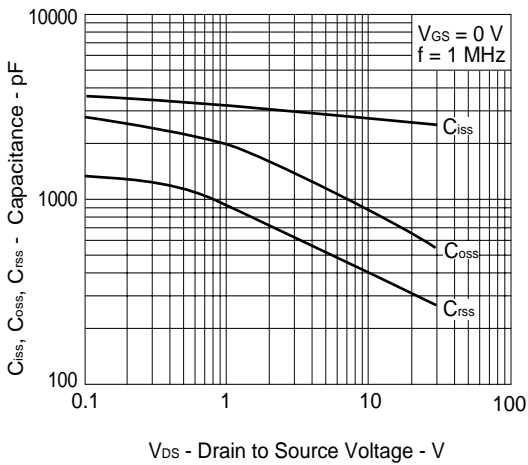
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



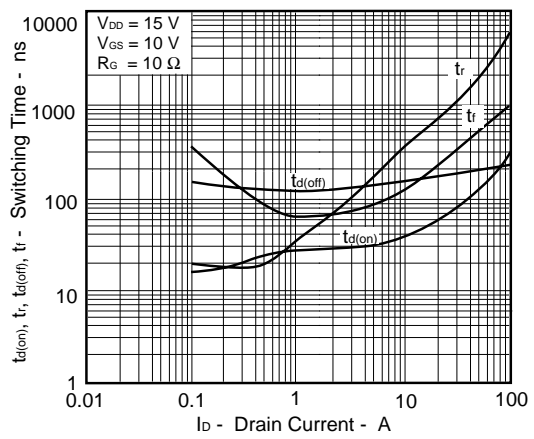
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



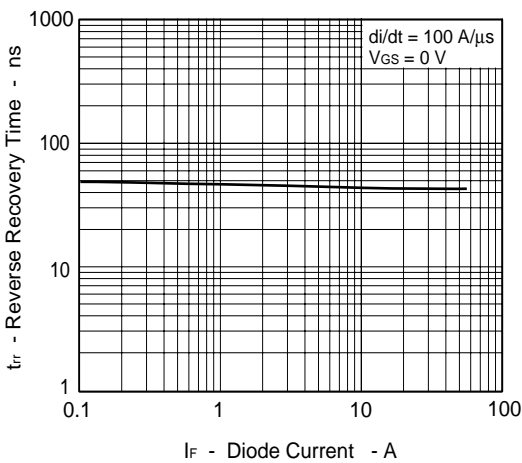
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



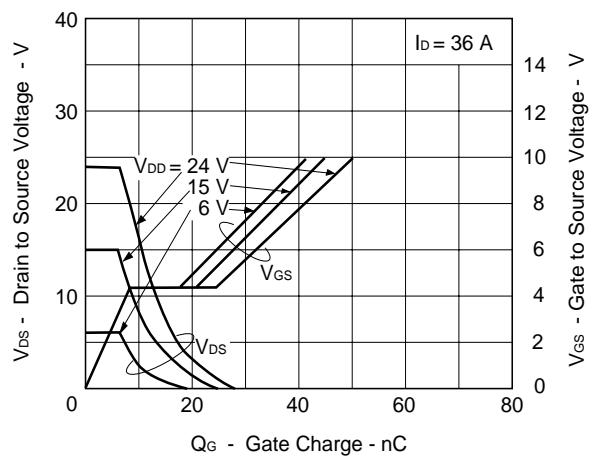
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DRAIN CURRENT

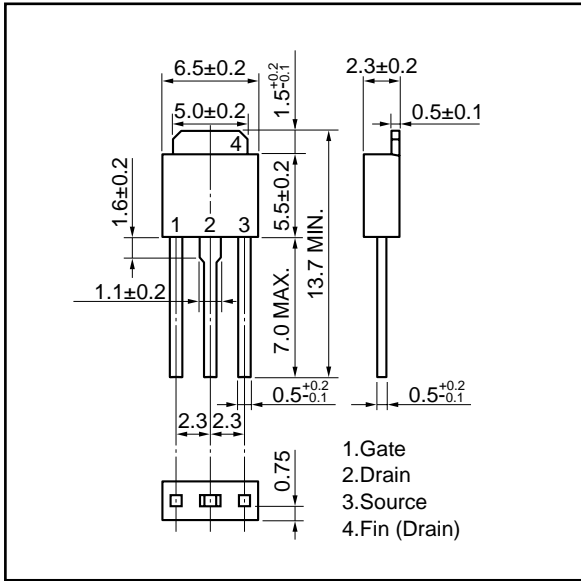


DYNAMIC INPUT/OUTPUT CHARACTERISTICS

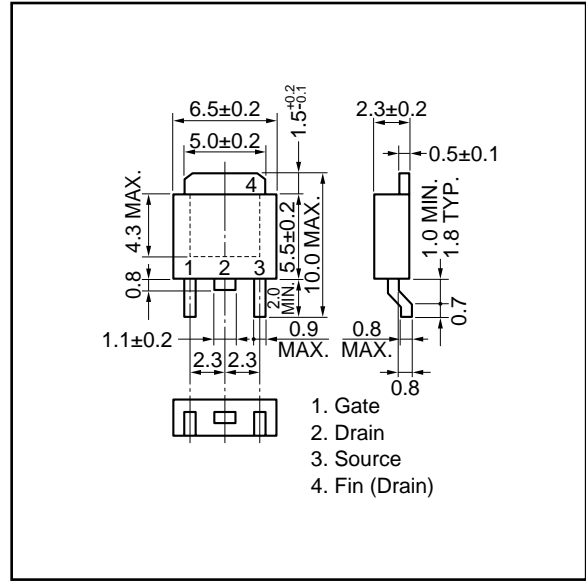


PACKAGE DRAWINGS (Unit: mm)

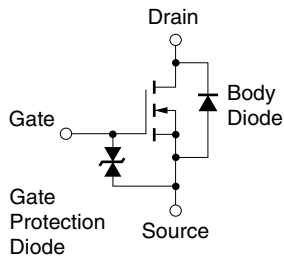
1) TO-251 (MP-3)



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.

[MEMO]

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