

# MOS FIELD EFFECT TRANSISTOR 2SK3366

### SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

#### DESCRIPTION

The 2SK3366 is N-Channel MOS Field Effect Transistor designed for DC/DC converter application of notebook computers.

#### FEATURES

- Low on-resistance  $R_{DS(on)1} = 21 \text{ m}\Omega \text{ (MAX.)} \text{ (Vgs} = 10 \text{ V, Id} = 10 \text{ A)}$   $R_{DS(on)2} = 33 \text{ m}\Omega \text{ (MAX.)} \text{ (Vgs} = 4.5 \text{ V, Id} = 10 \text{ A)}$  $R_{DS(on)3} = 43 \text{ m}\Omega \text{ (MAX.)} \text{ (Vgs} = 4.0 \text{ V, Id} = 10 \text{ A)}$
- Low Ciss : Ciss = 730 pF (TYP.)
- Built-in gate protection diode

#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C)

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Drain to Source Voltage (VGs = 0 V)	VDSS	30	V
Gate to Source Voltage (VDs = 0 V)	Vgss	±20	V
Drain Current (DC)	D(DC)	±20	А
Drain Current (Pulse) Note	D(pulse)	±80	А
Total Power Dissipation (Tc = 25 °C)	P⊤	30	W
Total Power Dissipation (TA = 25 °C)	P⊤	1.0	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	–55 to + 150	°C

**Note** PW  $\leq$  10  $\mu$ s, Duty cycle  $\leq$  1 %

#### THERMAL RESISTANCE

Channel to case	Rth(ch-C)	4.17	°C/W
Channel to ambient	Rth(ch-A)	125	°C/W

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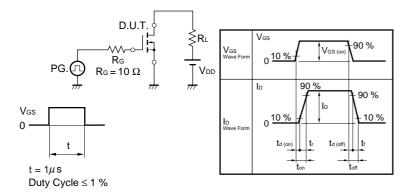
### ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3366	TO-251
2SK3366-Z	TO-252

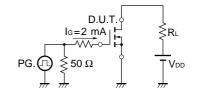
ELECTRICAL	CHARACTERISTICS (TA = 25 °	C)
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CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	RDS(on)1	Vgs = 10 V, Id = 10 A		17.2	21	mΩ
	RDS(on)2	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10 A		26	33	mΩ
	RDS(on)3	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 10 A		33	43	mΩ
Gate to Source Cut-off Voltage	V <sub>GS(off)</sub>	$V_{DS} = 10 V, I_{D} = 1 mA$	1.5	2.0	2.5	V
Forward Transfer Admittance	y <sub>fs</sub>	Vds = 10 V, Id = 10 A	5	10		s
Drain Leakage Current	IDSS	Vds = 30 V, Vgs = 0 V			10	μA
Gate to Source Leakage Current	lgss	$V_{GS} = \pm 20 \text{ V}, \text{ V}_{DS} = 0 \text{ V}$			±10	μA
Input Capacitance	Ciss	Vbs = 10 V, Vgs = 0 V, f = 1 MHz		730		pF
Output Capacitance	Coss			250		pF
Reverse Transfer Capacitance	Crss			120		pF
Turn-on Delay Time	td(on)	$I_D = 10 \text{ A}, V_{GS(on)} = 10 \text{ V}, V_{DD} = 15 \text{ V},$		28		ns
Rise Time	tr	R <sub>G</sub> = 10 Ω		420		ns
Turn-off Delay Time	td(off)			47		ns
Fall Time	tr			64		ns
Total Gate Charge	QG	ID = 20 A, VDD = 24 V, VGS = 10 V		15		nC
Gate to Source Charge	QGS			2.8		nC
Gate to Drain Charge	Qgd			4.1		nC
Body Diode forward Voltage	VF(S-D)	IF = 20 A, VGS = 0 V		1.0		V
Reverse Recovery Time	trr	IF = 20 A, VGS = 0 V		30		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A/µs		26		nC

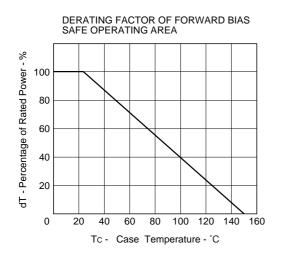
#### TEST CIRCUIT 1 SWITCHING TIME



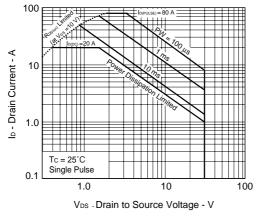
#### **TEST CIRCUIT 2 GATE CHARGE**



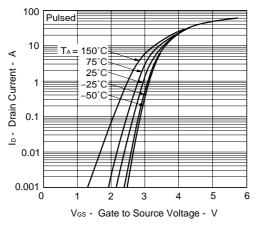
#### TYPICAL CHARACTERISTICS (TA = 25 °C)

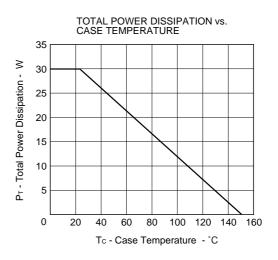




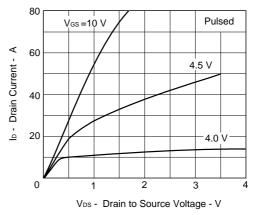




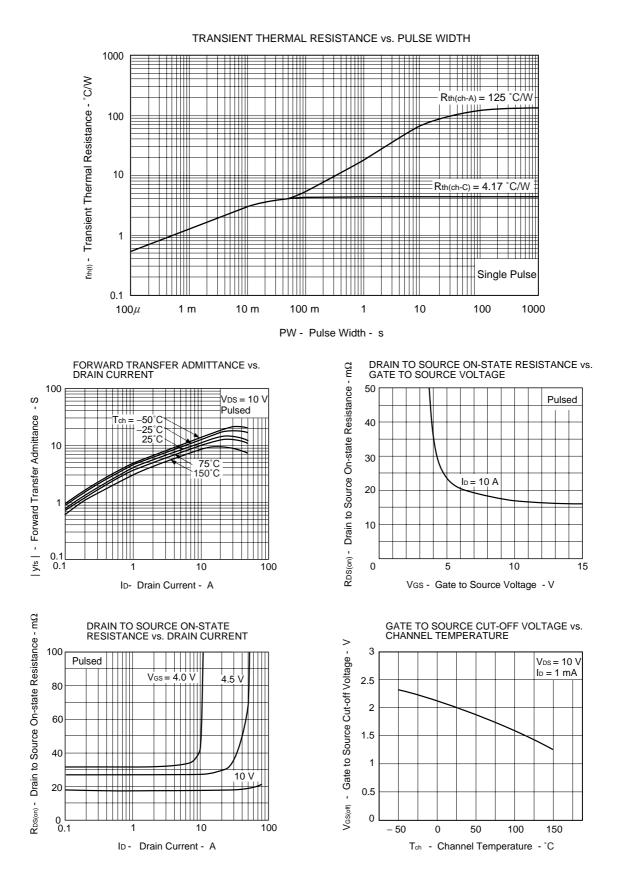




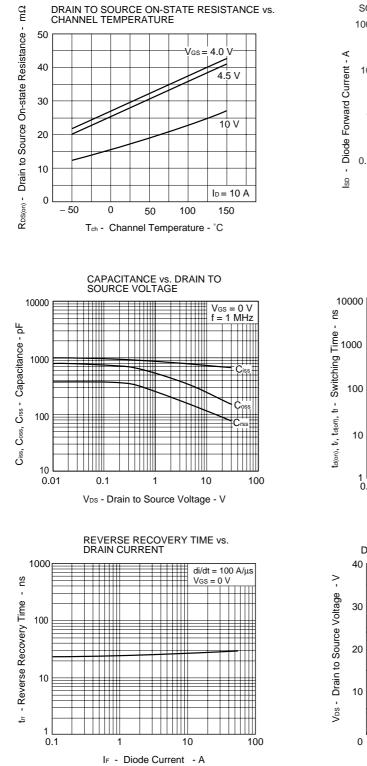






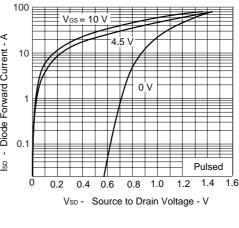


Data Sheet D14256EJ1V0DS00

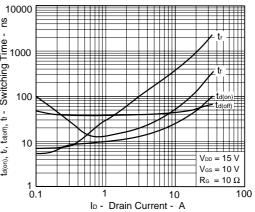


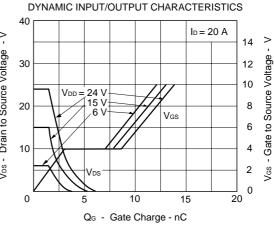
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SOURCE TO DRAIN DIODE FORWARD VOLTAGE



SWITCHING CHARACTERISTICS

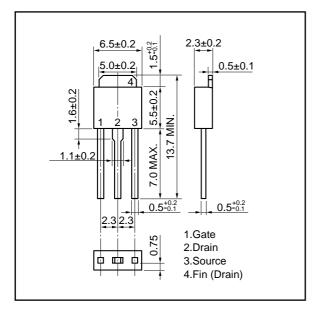




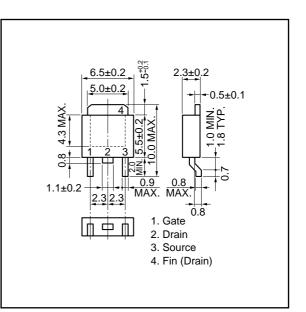
Data Sheet D14256EJ1V0DS00

#### PACKAGE DRAWINGS (Unit : mm)

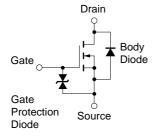
#### 1) TO-251 (MP-3)



#### 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.

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