

MOS FIELD EFFECT TRANSISTOR

2SK3511

SWITCHING N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3511 is N-channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Super low on-state resistance: $R_{DS(on)} = 12.5 \text{ m}\Omega \text{ MAX.} (V_{GS} = 10 \text{ V}, I_D = 42 \text{ A})$
- Low Ciss: Ciss = 5900 pF TYP.
- Built-in gate protection diode

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage (V _{GS} = 0 V)	Vdss	75	V
Gate to Source Voltage (VDS = 0 V)	Vgss	±20	V
Drain Current (DC) (Tc = 25°C)	ID(DC)	±83	А
Drain Current (pulse) ^{Note1}	D(pulse)	±260	А
Total Power Dissipation (Tc = 25°C)	Рт	100	W
Total Power Dissipation (T _A = 25°C)	Рт	1.5	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	–55 to +150	°C
Single Avalanche Current Note2	AS	52	А
Single Avalanche Energy ^{Note2}	Eas	250	mJ

Notes 1. PW \leq 10 μ s, Duty cycle \leq 1%

2. Starting T_{ch} = 25°C, V_{DD} = 35 V, R_G = 25 Ω , V_{GS} = 20 \rightarrow 0 V

THERMAL RESISTANCE

Channel to Case Thermal Resistance	$R_{th(ch-C)}$	1.25	°C/W
Channel to Ambient Thermal Resistance	Rth(ch-A)	83.3	°C/W

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3511	TO-220AB
2SK3511-S	TO-262
2SK3511-ZJ	TO-263
2SK3511-Z	TO-220SMD Note

Note TO-220SMD package is produced only in Japan.



(TO-220AB)

(TO-262)



(TO-263, TO-220SMD)



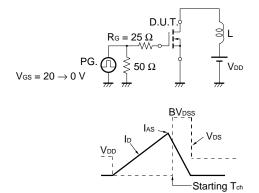
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ELECTRICAL CHARACTERISTICS (TA = 25°C)

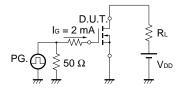
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	IDSS	$V_{DS} = 75 V, V_{GS} = 0 V$			10	μA
Gate Leakage Current	lgss	$V_{GS} = \pm 20 \text{ V}, \text{ V}_{DS} = 0 \text{ V}$			±10	μA
Gate Cut-off Voltage	VGS(off)	$V_{DS} = 10 V, I_{D} = 1 mA$	2.0	3.0	4.0	V
Forward Transfer Admittance	y₁s	VDS = 10 V, ID = 42 A	21	45		S
Drain to Source On-state Resistance	RDS(on)	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 42 \text{ A}$		9.5	12.5	mΩ
Input Capacitance	Ciss	V _{DS} = 10 V		5900		pF
Output Capacitance	Coss	V _{GS} = 0 V		810		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		400		pF
Turn-on Delay Time	td(on)	Vdd = 38 V, Id = 42 A		30		ns
Rise Time	tr	Vgs = 10 V		21		ns
Turn-off Delay Time	td(off)	Rg = 0 Ω		72		ns
Fall Time	tr			12		ns
Total Gate Charge	QG	Vdd = 60 V		100		nC
Gate to Source Charge	QGS	Vgs = 10 V		24		nC
Gate to Drain Charge	Qgd	ID = 83 A		35		nC
Body Diode Forward Voltage	VF(S-D)	IF = 83 A, VGS = 0 V		1.1		V
Reverse Recovery Time	trr	IF = 83 A, VGS = 0 V		70		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A/ μs		200		nC

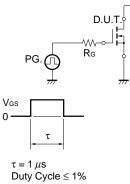
TEST CIRCUIT 1 AVALANCHE CAPABILITY

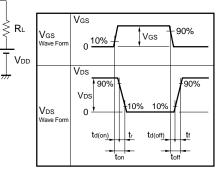
TEST CIRCUIT 2 SWITCHING TIME



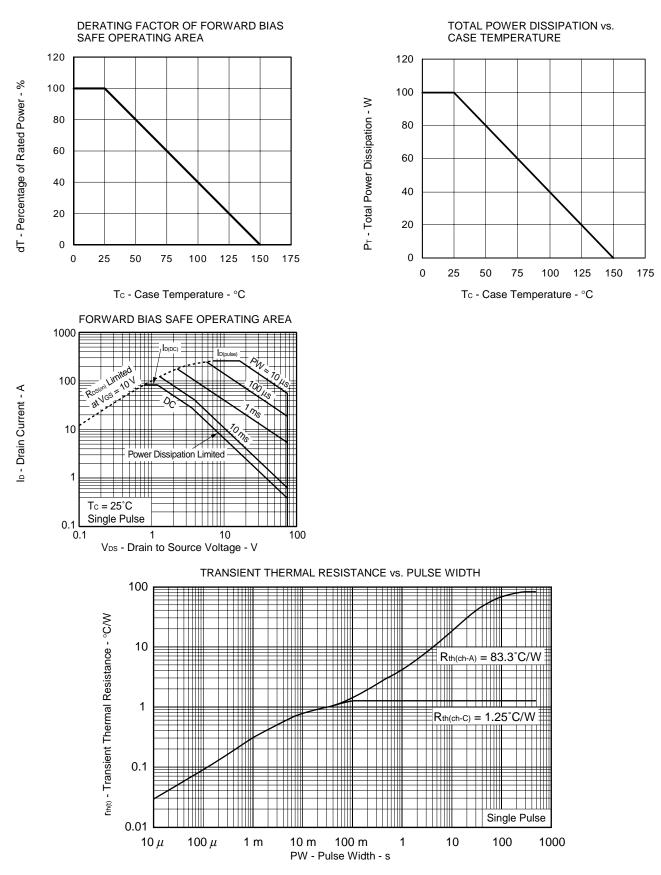
TEST CIRCUIT 3 GATE CHARGE



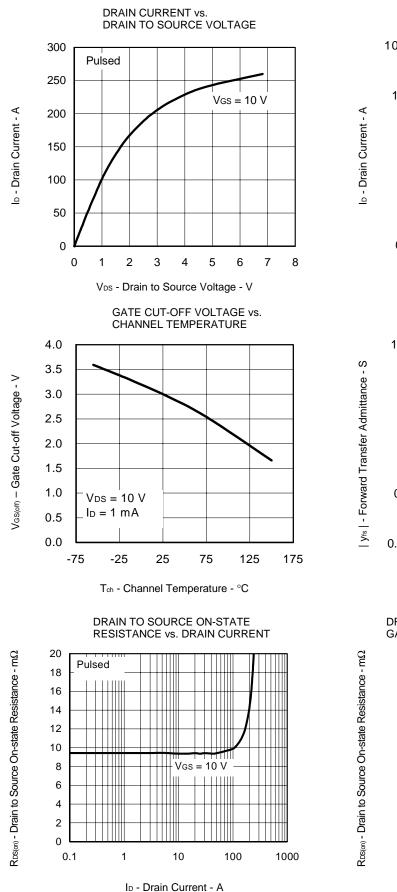




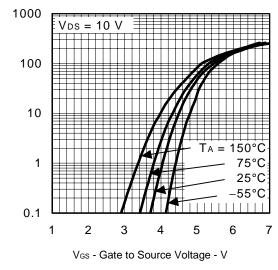
TYPICAL CHARACTERISTICS ($T_A = 25^{\circ}C$)



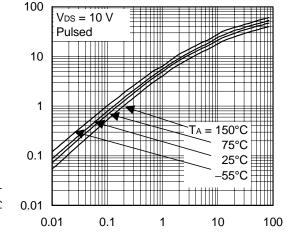
Data Sheet D15617EJ1V0DS

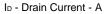


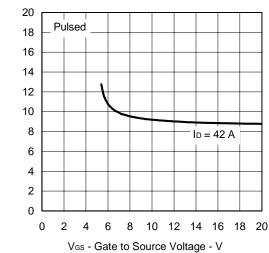
FORWARD TRANSFER CHARACTERISTICS



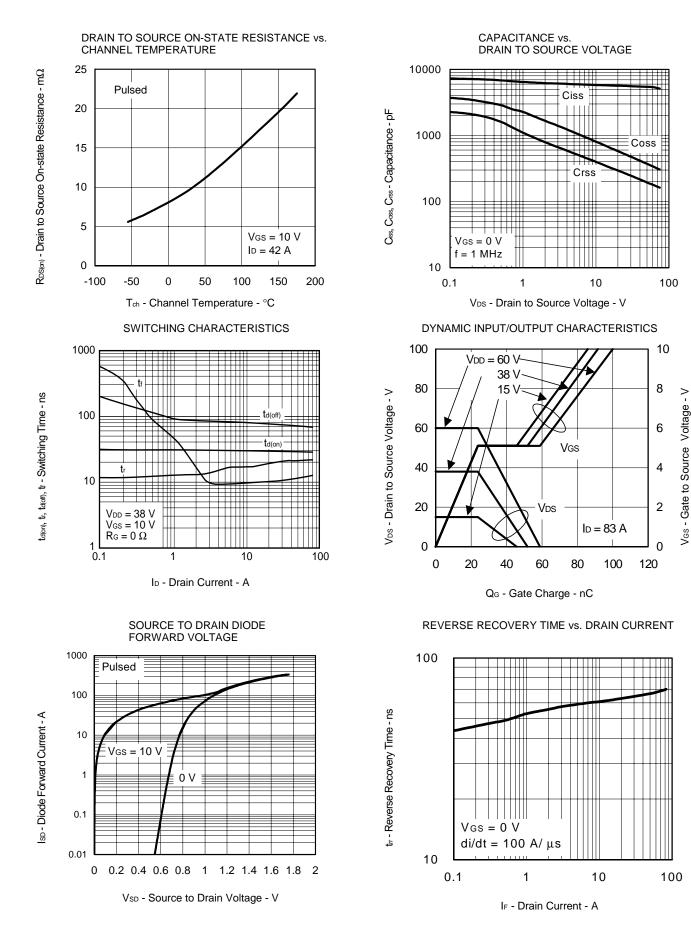
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

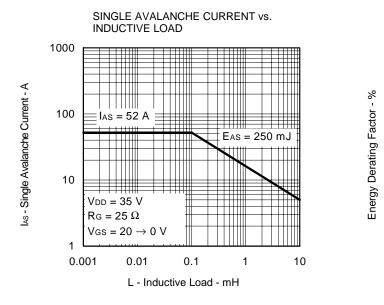




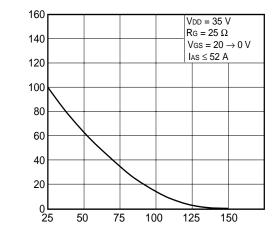


DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE





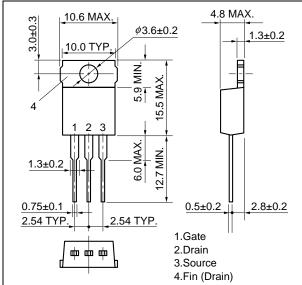
SINGLE AVALANCHE ENERGY DERATING FACTOR



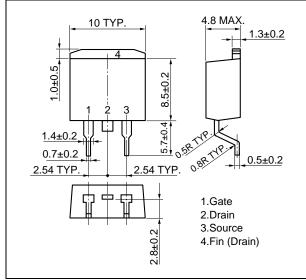
Starting Tch - Starting Channel Temperature - °C

PACKAGE DRAWINGS (Unit: mm)

1) TO-220 (MP-25)

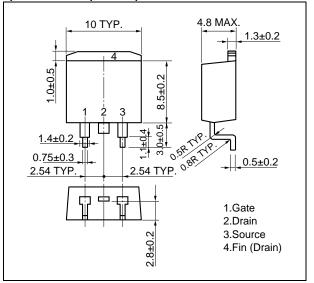


3) TO-263 (MP-25ZJ)



2) TO-262 (MP-25 Fin Cut) 4.8 MAX. 1.0 ± 0.5 10 TYP 1.3±0.2 E 5±0.2 4 œ 1 2 3 MM 1.3±0.2 12.7 <u>.75±0.3</u> .54 TYF 0.5±0.2 2.8±0.2 2.54 TYP. 1.Gate 中中 ф 2.Drain 3.Source 4.Fin (Drain)

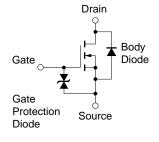
4) TO-220SMD (MP-25Z) Note



Note This Package is only produced in Japan.

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.

EQUIVALENT CIRCUIT



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