

MOS FIELD EFFECT TRANSISTOR 2SK3115

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

The 2SK3115 is N-Channel DMOS FET device that features a low gate charge and excellent switching haracteristics, and designed for high voltage applications such as switching power supply, AC adapter.

FEATURES

- Low gate charge
 QG = 26 nC TYP. (VDD = 450 V, VGS = 10 V, ID = 6.0 A)
- Gate voltage rating ±30 V
- Low on-state resistance
 RDS(on) = 1.2 Ω MAX. (VGS = 10 V, ID = 3.0 A)
- · Avalanche capability ratings

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3115	Isolated TO-220

★ (Isolated TO-220)



ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage (Vss = 0 V)	VDSS	600	V
Gate to Source Voltage (Vps = 0 V)	Vgss	±30	V
Drain Current (DC) (Tc = 25°C)	ID(DC)	±6.0	Α
Drain Current (pulse) Note1	D(pulse)	±24	Α
Total Power Dissipation (TA = 25°C)	P _{T1}	2.0	W
Total Power Dissipation (Tc = 25°C)	P _{T2}	35	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C
Single Avalanche Current Note2	las	6.0	Α
Single Avalanche Energy Note2	Eas	24	mJ

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

2. Starting $T_{ch} = 25^{\circ}C$, $V_{DD} = 150 \text{ V}$, $R_{G} = 25 \Omega$, $V_{GS} = 20 \rightarrow 0 \text{ V}$

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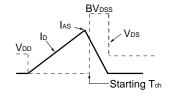


ELECTRICAL CHARACTERISTICS (TA = 25°C)

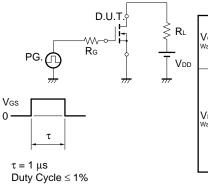
Characteristics	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Zero Gate Voltage Drain Current	Ioss	V _{DS} = 600 V, V _{GS} = 0 V			100	μΑ
Gate Leakage Current	Igss	VGS = ±30 V, VDS = 0 V			±100	nA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	2.5		3.5	V
Forward Transfer Admittance	yfs	V _{DS} = 10 V, I _D = 3.0 A	2.0			S
Drain to Source On-state Resistance	RDS(on)	Vgs = 10 V, ID = 3.0 A		0.9	1.2	Ω
Input Capacitance	Ciss	V _{DS} = 10 V		1100		pF
Output Capacitance	Coss	Vgs = 0 V		200		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		20		pF
Turn-on Delay Time	td(on)	V _{DD} = 150 V, I _D = 3.0 A		18		ns
Rise Time	t r	V _{GS(on)} = 10 V		12		ns
Turn-off Delay Time	t _{d(off)}	$R_G = 10 \Omega$, $R_L = 50 \Omega$		50		ns
Fall Time	tr			15		ns
Total Gate Charge	Q _G	V _{DD} = 450 V		26		nC
Gate to Source Charge	Qgs	Vgs = 10 V		6		nC
Gate to Drain Charge	Q _{GD}	ID = 6.0 A		10		nC
Body Diode Forward Voltage	V _{F(S-D)}	IF = 6.0 A, VGS = 0 V		1.0		V
Reverse Recovery Time	trr	IF = 6.0 A, VGS = 0 V		1.4		μs
Reverse Recovery Charge	Qrr	di/dt = 50 A/μs		6.5		μC

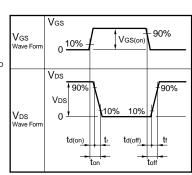
* TEST CIRCUIT 1 AVALANCHE CAPABILITY

$\begin{array}{c} \text{D.U.T.} \\ \text{RG} = 25 \ \Omega \\ \text{VGS} = 20 \rightarrow 0 \ \text{V} \end{array} \begin{array}{c} \text{PG.} \\ \text{PS.} \\ \text{PS.} \\ \text{M.S.} \end{array} \begin{array}{c} \text{D.U.T.} \\ \text{I.I.} \\ \text{VDD} \\ \text{M.S.} \end{array}$

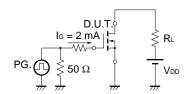


TEST CIRCUIT 2 SWITCHING TIME

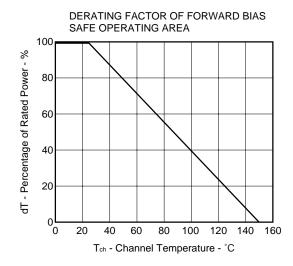


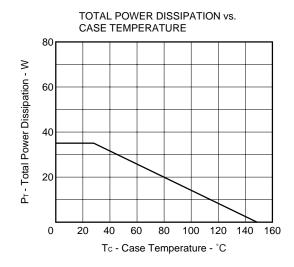


TEST CIRCUIT 3 GATE CHARGE



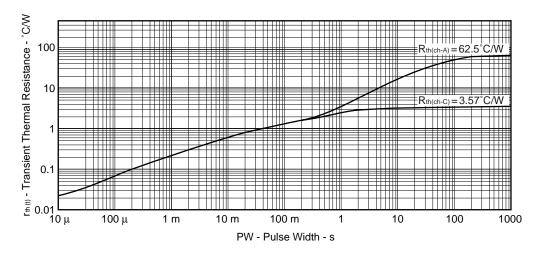
★ TYPICAL CHARACTERISTICS (TA = 25°C)





FORWARD BIAS SAFE OPERATING AREA 100 10 | Dipulse | Di

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



25

20

15

10

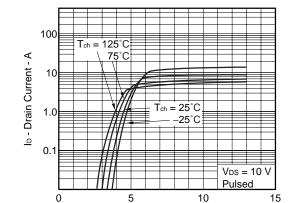
0

lo - Drain Current - A

DRAIN TO SOURCE VOLTAGE Pulsed

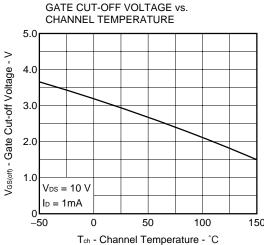
DRAIN CURRENT vs.

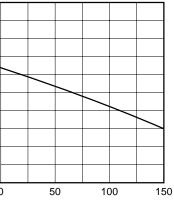
10 20 30 V_{DS} - Drain to Source Voltage - V



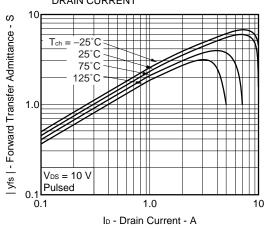
FORWARD TRANSFER CHARACTERISTICS

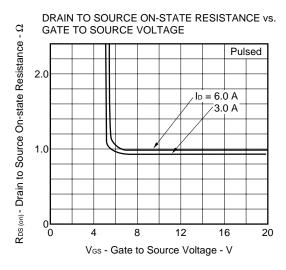
V_{GS} - Gate to Source Voltage - V

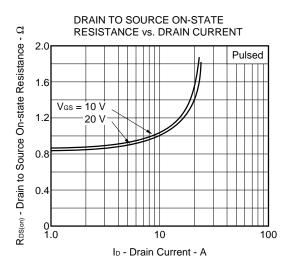


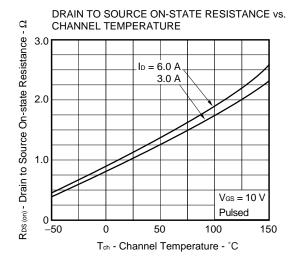




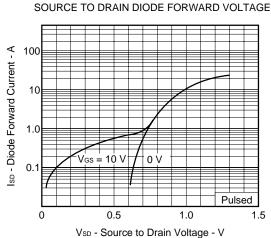


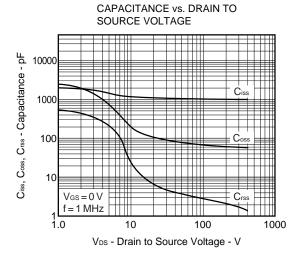


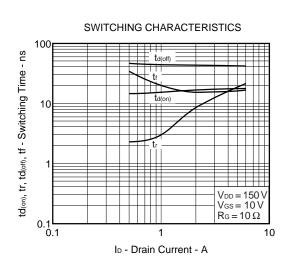


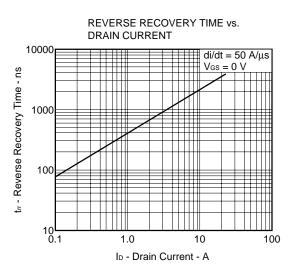


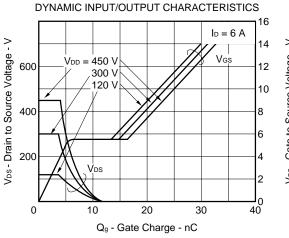




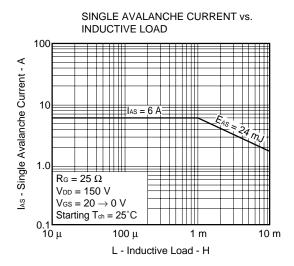


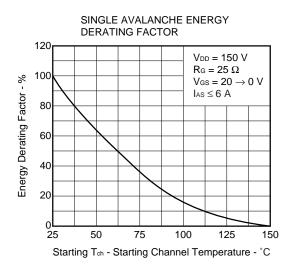






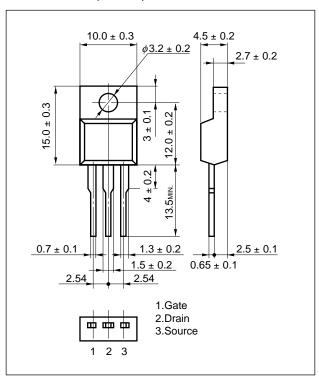
Ves - Gate to Source Voltage - V



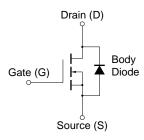


PACKAGE DRAWING (Unit: mm)

Isolated TO-220(MP-45F)



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.

NEC 2SK3115

[MEMO]

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