

MOS FIELD EFFECT TRANSISTOR 2SJ603

SWITCHING P-CHANNEL POWER MOS FET

DESCRIPTION

The 2SJ603 is P-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

FEATURES

- Super low on-state resistance: $R_{DS(on)1} = 48 \text{ m}\Omega \text{ MAX.}$ (V_{GS} = -10 V, I_D = -13 A) $R_{DS(on)2} = 75 \text{ m}\Omega \text{ MAX.}$ (V_{GS} = -4.0 V, I_D = -13 A)
- Low input capacitance: $C_{iss} = 1900 \text{ pF TYP}. (V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V})$
- Built-in gate protection diode

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage (Vgs = 0 V)	Vdss	-60	V
Gate to Source Voltage (Vbs = 0 V)	Vgss	∓20	V
Drain Current (DC) (Tc = 25°C)	ID(DC)	∓25	А
Drain Current (pulse) ^{Note1}	D(pulse)	∓70	А
Total Power Dissipation (Tc = 25° C)	Pτ	50	W
Total Power Dissipation (T _A = 25°C)	Pτ	1.5	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	–55 to +150	°C
Single Avalanche Current Note2	las	-25	А
Single Avalanche Energy ^{Note2}	Eas	62.5	mJ

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

2. Starting T_{ch} = 25°C, V_{DD} = -30 V, R_G = 25 Ω , V_{GS} = $-20 \rightarrow 0$ V

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SJ603	TO-220AB
2SJ603-S	TO-262
2SJ603-ZJ	TO-263
2SJ603-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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Document No. Date Published Printed in Japan

90%

90%

tf

toff

ELECTRICAL CHARACTERISTICS (TA = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	loss	$V_{DS} = -60 V, V_{GS} = 0 V$			-10	μA
Gate Leakage Current	lgss	$V_{GS} = \mp 20 \text{ V}, \text{ V}_{DS} = 0 \text{ V}$			∓10	μA
Gate Cut-off Voltage	VGS(off)	$V_{DS} = -10 V$, $I_D = -1 mA$	-1.5	-2.0	-2.5	V
Forward Transfer Admittance	y _{fs}	$V_{DS} = -10 V$, $I_D = -13 A$	10	21		s
Drain to Source On-state Resistance	RDS(on)1	$V_{GS} = -10 \text{ V}, \text{ Id} = -13 \text{ A}$		38	48	mΩ
	RDS(on)2	$V_{GS} = -4.0 \text{ V}, \text{ Id} = -13 \text{ A}$		53	75	mΩ
Input Capacitance	Ciss	V _{DS} = -10 V		1900		pF
Output Capacitance	Coss	V _G s = 0 V		350		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		140		pF
Turn-on Delay Time	td(on)	$V_{DD} = -30 \text{ V}, \text{ Id} = -13 \text{ A}$		10		ns
Rise Time	tr	Vgs = -10 V		11		ns
Turn-off Delay Time	td(off)	R _G = 0 Ω		66		ns
Fall Time	tr			20		ns
Total Gate Charge	QG	$V_{DD} = -48 \text{ V}$		38		nC
Gate to Source Charge	Q _{GS}	V _{GS} = -10 V		7		nC
Gate to Drain Charge	Qgd	Id = -25 A		10		nC
Body Diode Forward Voltage	VF(S-D)	IF = 25 A, VGS = 0 V		1.0		V
Reverse Recovery Time	trr	IF = 25 A, VGS = 0 V		49		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A/ μs		100		nC

TEST CIRCUIT 1 AVALANCHE CAPABILITY

TEST CIRCUIT 2 SWITCHING TIME

D.U.T.

Rg

PG.

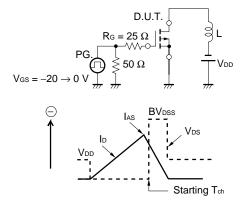
τ

Duty Cycle $\leq 1\%$

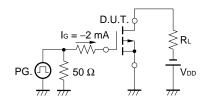
 $\tau = 1 \, \mu s$

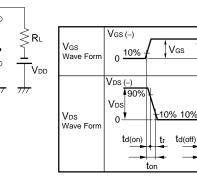
Vgs (-)

0

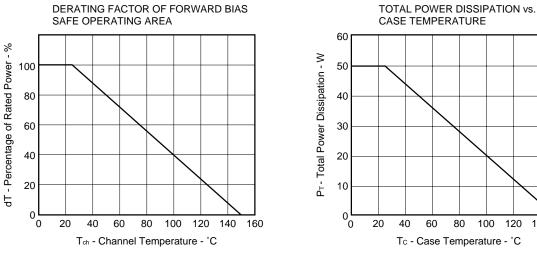


TEST CIRCUIT 3 GATE CHARGE

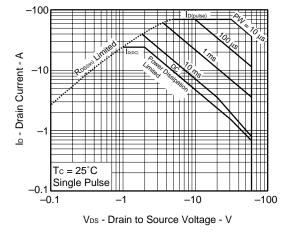


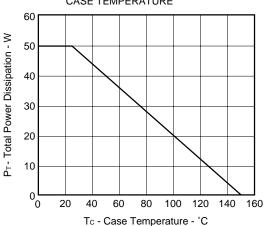


TYPICAL CHARACTERISTICS (TA = 25°C)

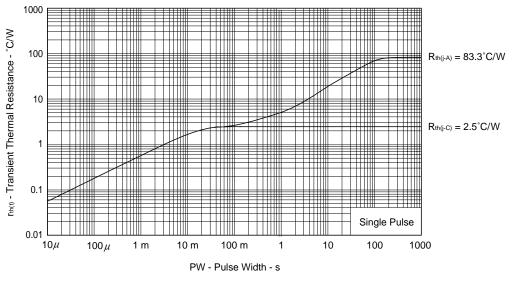


FORWARD BIAS SAFE OPERATING AREA



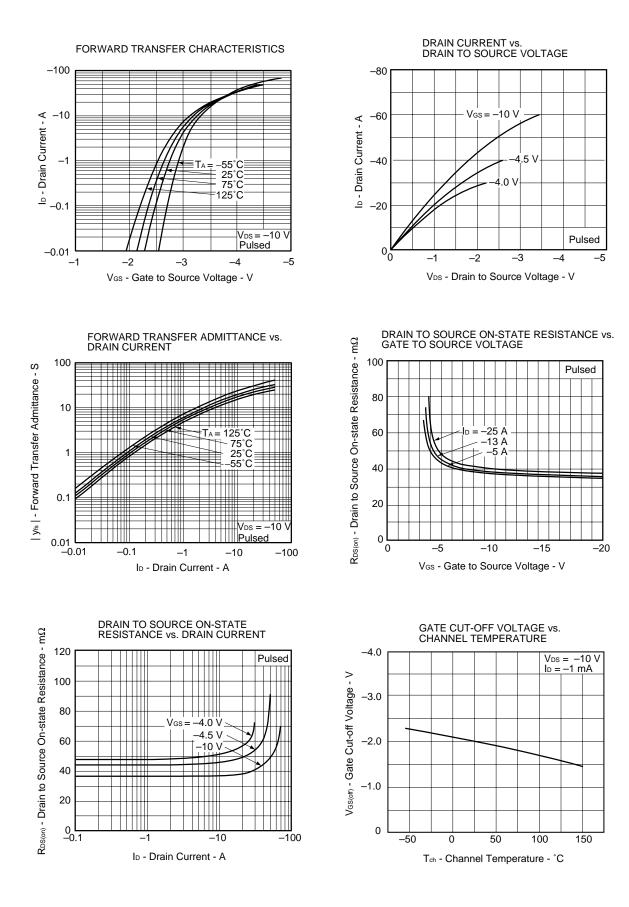






Data Sheet D14648EJ3V0DS





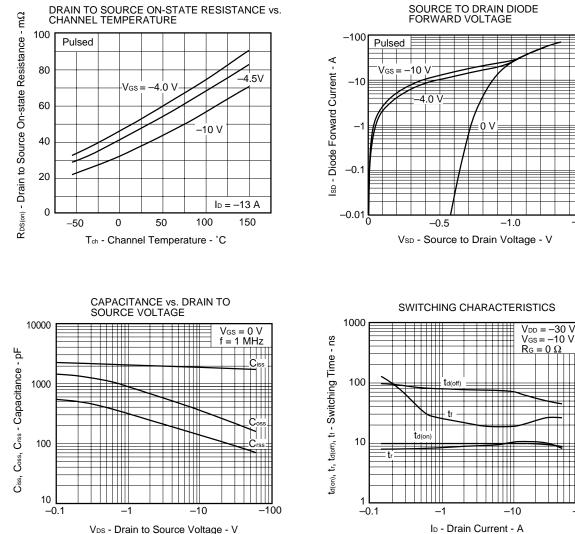
- ns

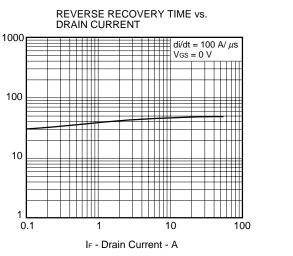
Reverse Recovery Time

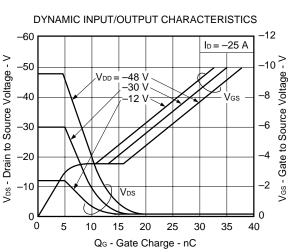
ţ,

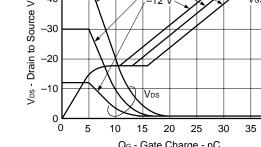
-1.5

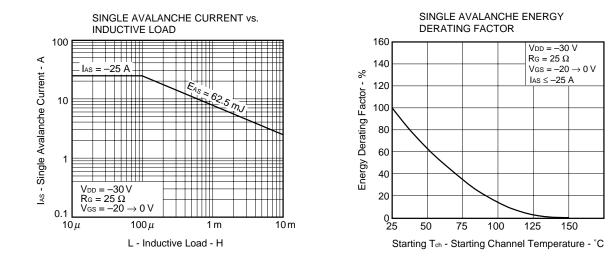
-100





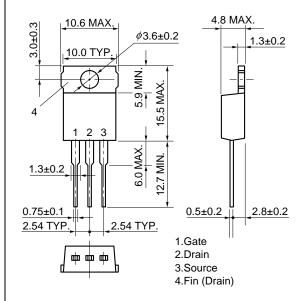




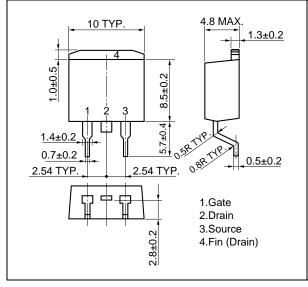


* PACKAGE DRAWINGS (Unit: mm)

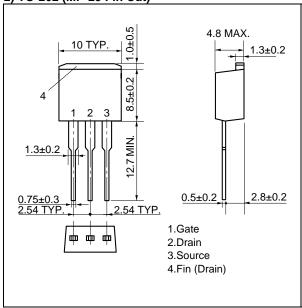
1) TO-220AB (MP-25)



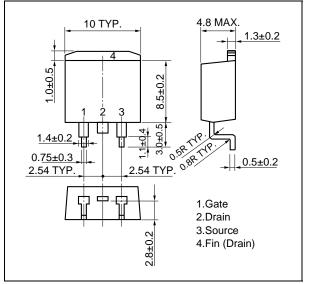
3) TO-263 (MP-25ZJ)



2) TO-262 (MP-25 Fin Cut)

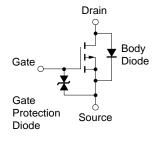


4) TO-220SMD (MP-25Z) Note



Note This package is produced only in Japan.

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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