

MOS FIELD EFFECT TRANSISTOR

2SK3299

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

DESCRIPTION

The 2SK3299 is N-Channel MOS FET device that features a low gate charge and excellent switching characteristics, designed for high voltage applications such as switching power supply, AC adapter.

FEATURES

- Low gate charge
 $Q_G = 34 \text{ nC TYP. (} V_{DD} = 450 \text{ V, } V_{GS} = 10 \text{ V, } I_D = 10 \text{ A)}$
- Gate voltage rating $\pm 30 \text{ V}$
- Low on-state resistance
 $R_{DS(on)} = 0.75 \Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 5.0 \text{ A)}$
- Avalanche capability ratings
- Surface mount package available

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3299	TO-220AB
2SK3299-S	TO-262
2SK3299-ZJ	TO-263

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

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	600	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 30	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)}$	± 10	A
Drain Current (Pulse) ^{Note1}	$I_{D(pulse)}$	± 40	A
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_{T1}	1.5	W
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T2}	75	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
Single Avalanche Current ^{Note2}	I_{AS}	10	A
Single Avalanche Energy ^{Note2}	E_{AS}	66.7	mJ

Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

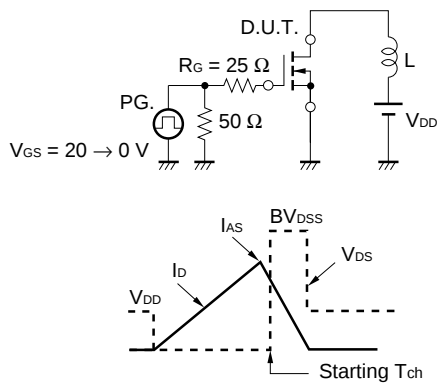
2. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 150 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 20 \text{ V} \rightarrow 0 \text{ V}$

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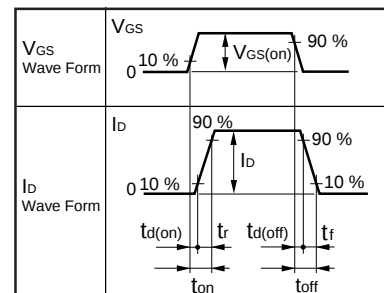
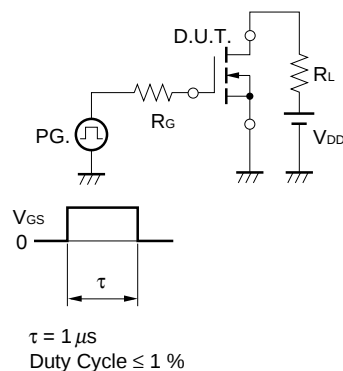
ELECTRICAL CHARACTERISTICS(T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Leakage Current	I _{DSS}	V _{DS} = 600 V, V _{GS} = 0 V			100	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30 V, V _{DS} = 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	y _{fs}	V _{DS} = 10 V, I _D = 5.0 A	3.2			S
Drain to Source On-state Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 5.0 A		0.68	0.75	Ω
Input Capacitance	C _{iss}	V _{DS} = 10 V		1580		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		280		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		25		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 150 V, I _D = 5.0 A		27		ns
Rise Time	t _r	V _{GS(on)} = 10 V		17		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		66		ns
Fall Time	t _f			24		ns
Total Gate Charge	Q _G	V _{DD} = 450 V		34		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V		8.2		nC
Gate to Drain Charge	Q _{GD}	I _D = 10 A		12.3		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 10 A, V _{GS} = 0 V		1.0		V
Reverse Recovery Time	t _{rr}	I _F = 10 A, V _{GS} = 0 V		1.9		μs
Reverse Recovery Charge	Q _{rr}	di/dt = 50 A/μs		12		μC

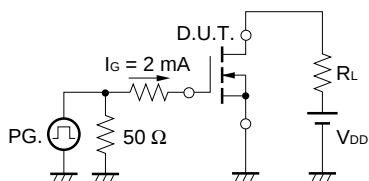
TEST CIRCUIT 1 AVALANCHE CAPABILITY



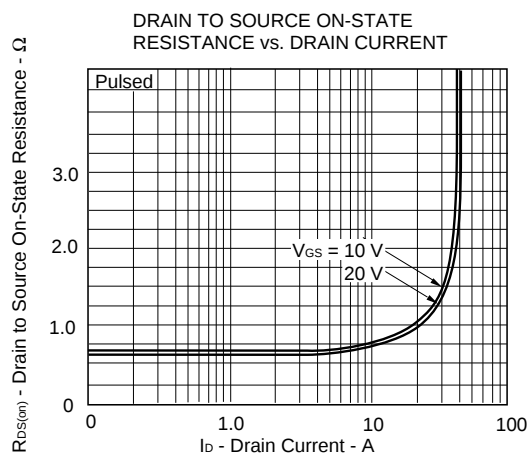
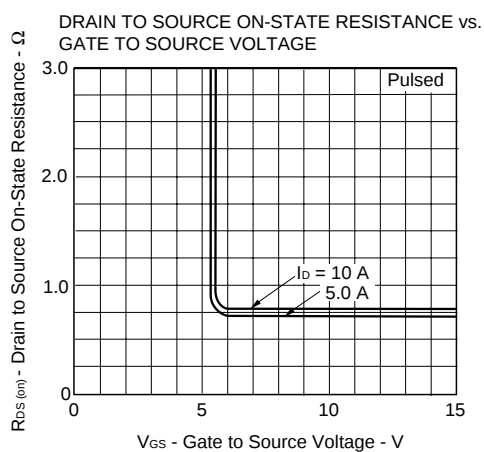
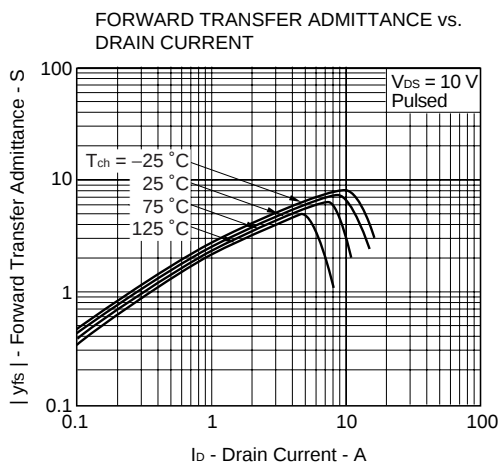
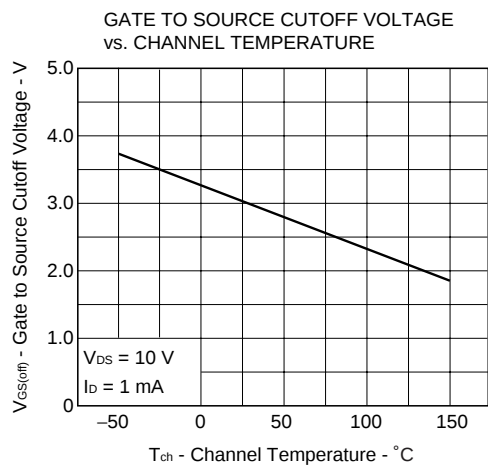
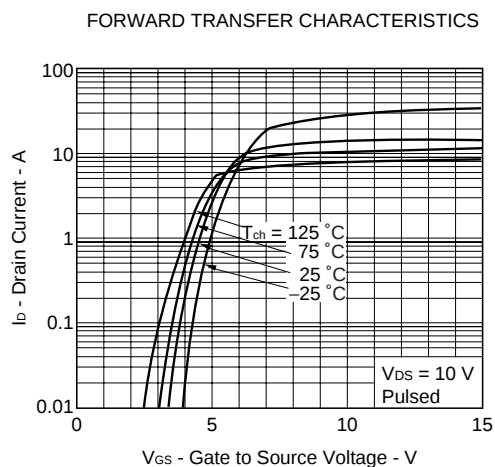
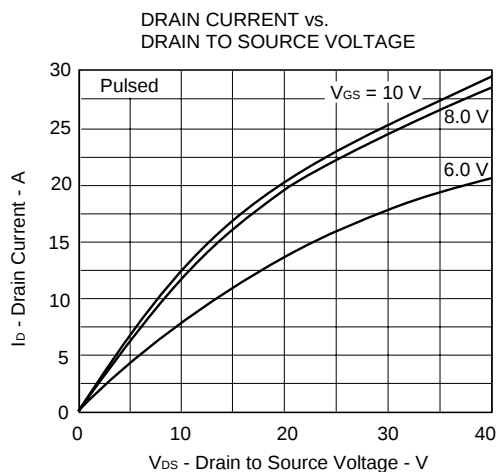
TEST CIRCUIT 2 SWITCHING TIME



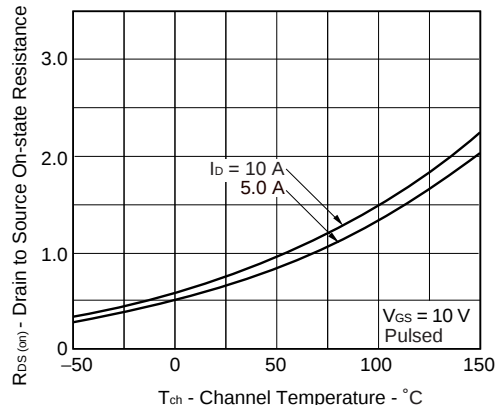
TEST CIRCUIT 3 GATE CHARGE



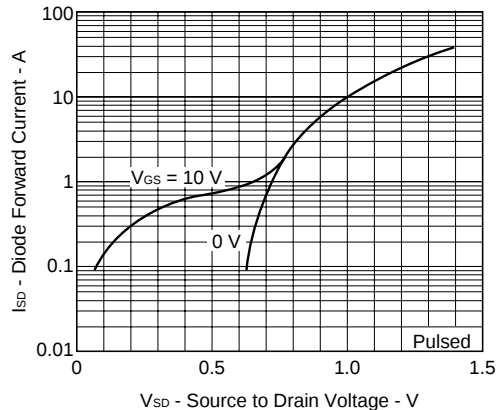
★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



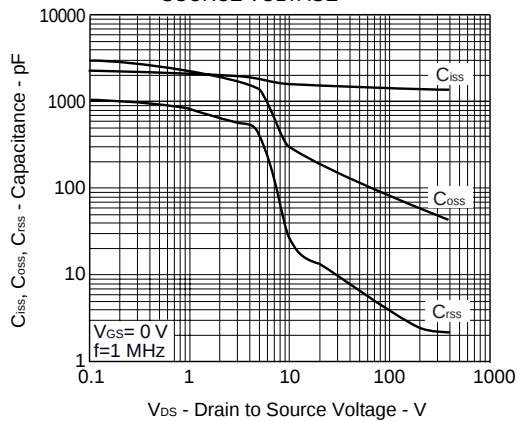
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



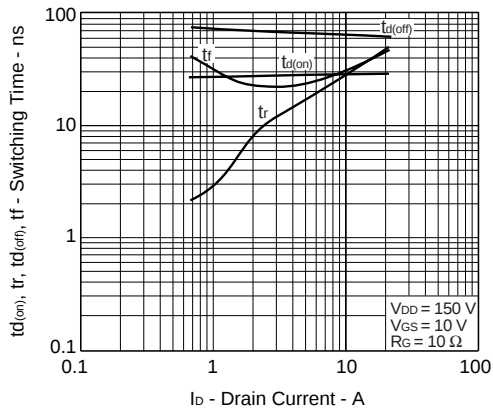
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



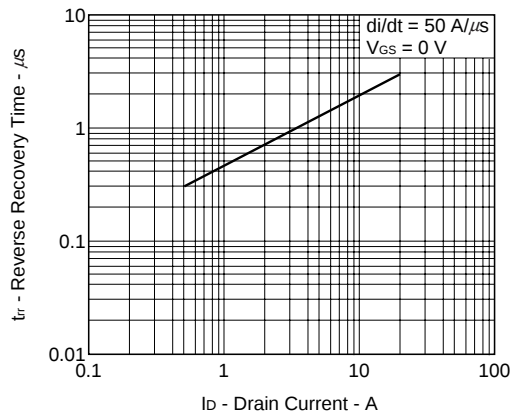
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



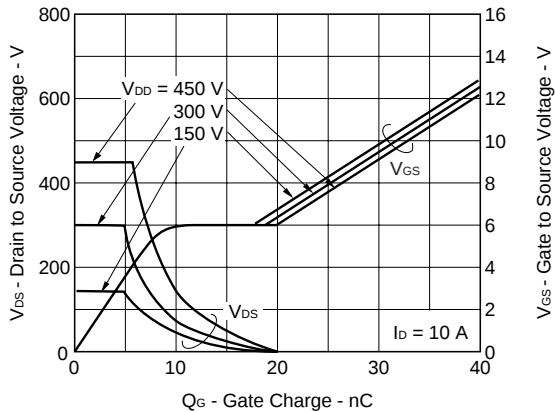
SWITCHING CHARACTERISTICS

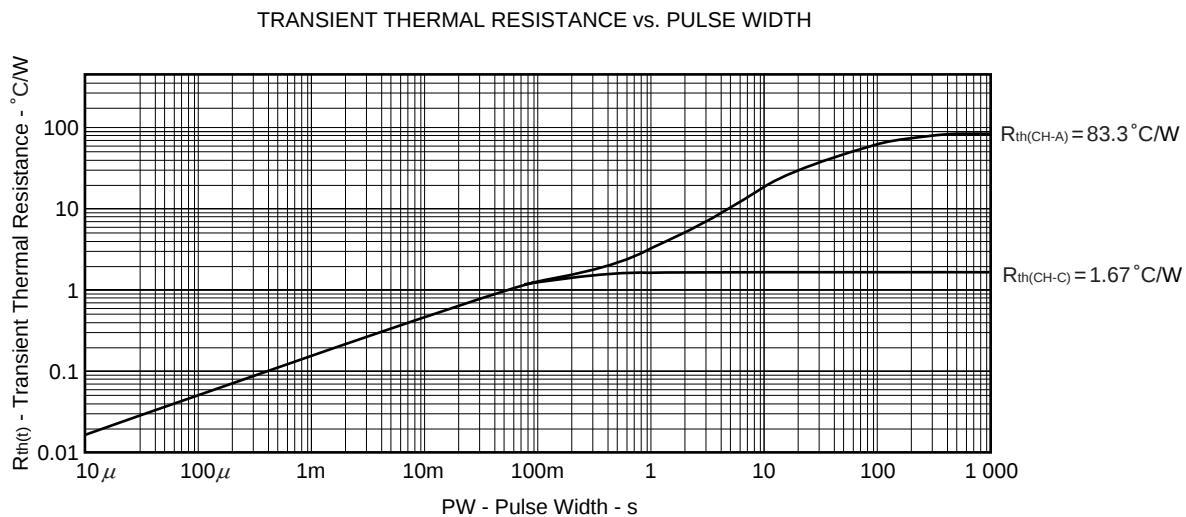
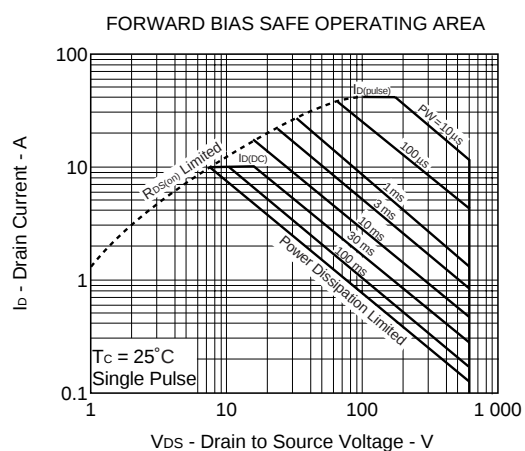
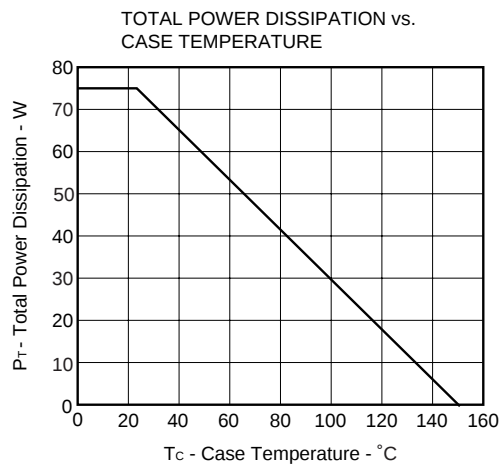
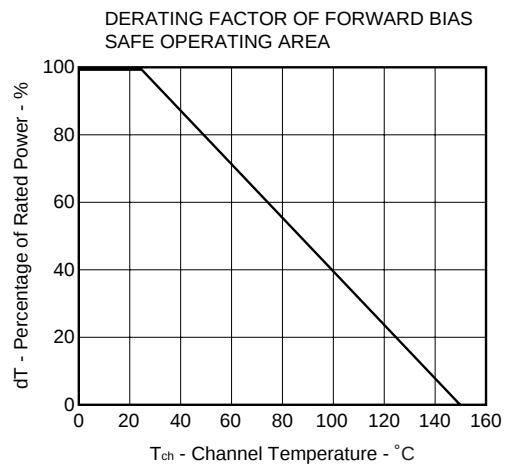


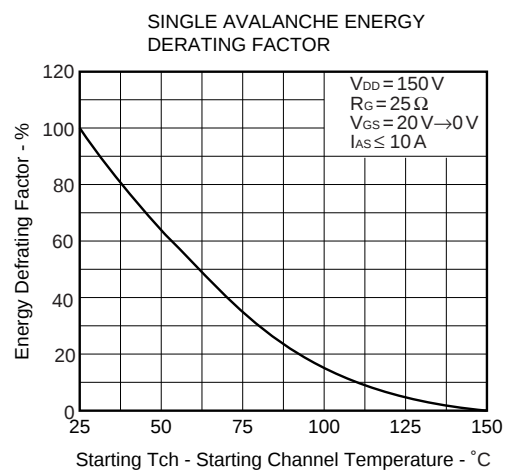
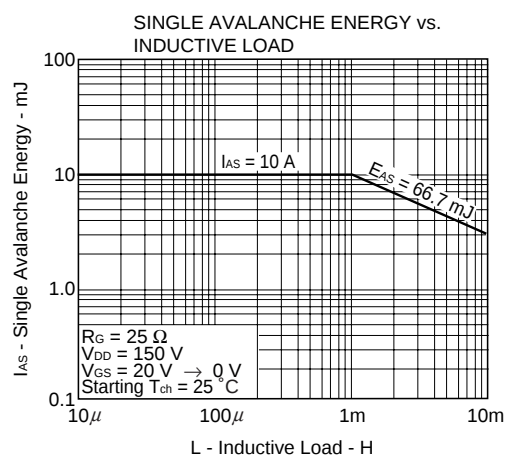
REVERSE RECOVERY TIME vs. DRAIN CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS

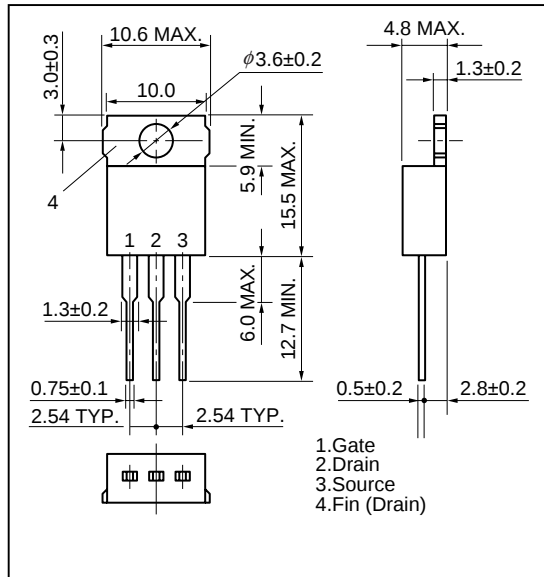




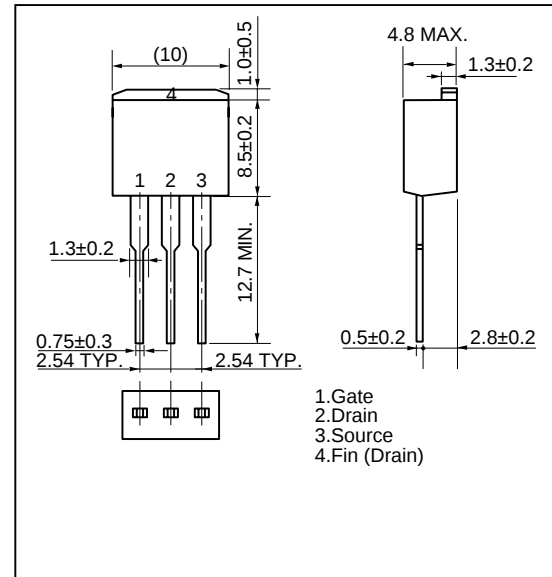


PACKAGE DRAWINGS (Unit : mm)

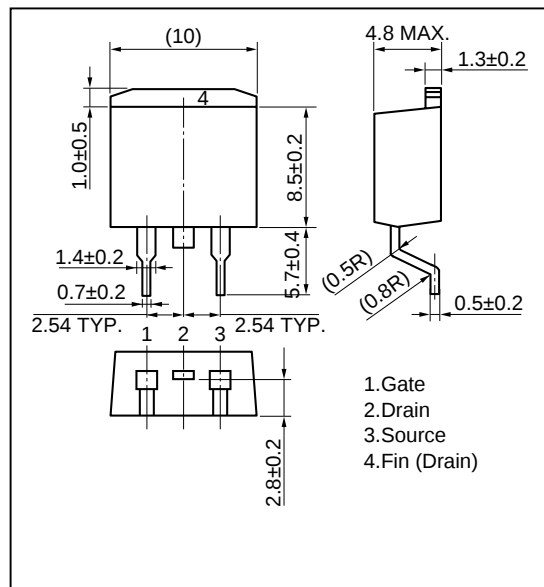
1)TO-220AB (MP-25)



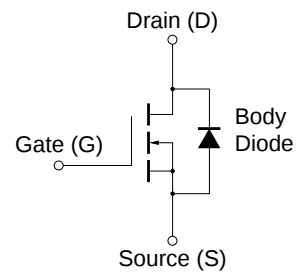
2)TO-262 (MP-25 Fin Cut)



3)TO-263 (MP-25ZJ)



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.

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