

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The μ PA2706TP, which has a heat spreader, is N-channel MOS Field Effect Transistor designed for DC/DC converter and power management application of notebook computer.

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA2706TP	Power HSOP8

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 15 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 5.5 \text{ A)}$
 $R_{DS(on)2} = 22.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 5.5 \text{ A)}$
- Low C_{iss} : $C_{iss} = 660 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Small and surface mount package (Power HSOP8)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, Unless otherwise noted, all terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 20	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)1}$	± 20	A
Drain Current (DC) ^{Note1}	$I_{D(DC)2}$	± 11	A
Drain Current (pulse) ^{Note2}	$I_{D(pulse)}$	± 44	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	15	W
Total Power Dissipation ^{Note1}	P_{T2}	3	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
Single Avalanche Current ^{Note3}	I_{AS}	11	A
Single Avalanche Energy ^{Note3}	E_{AS}	12.1	mJ

Notes 1. Mounted on glass epoxy board of 1 inch x 1 inch x 0.8 mm, PW = 10 sec

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

3. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 15 \text{ V}$, $R_G = 25 \Omega$, $L = 100 \mu\text{H}$, $V_{GS} = 20 \rightarrow 0 \text{ V}$

Caution 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.

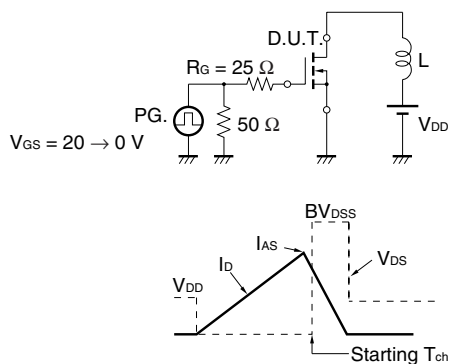
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ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

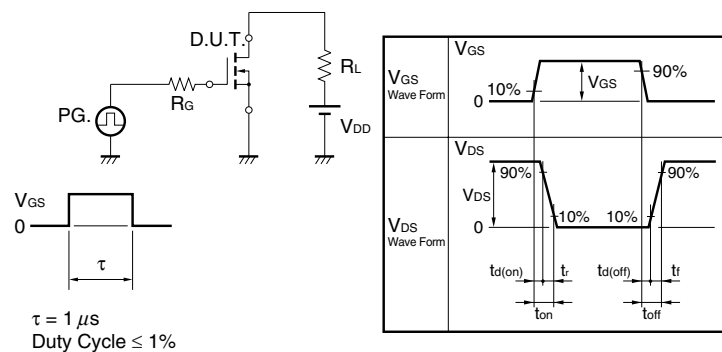
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage ^{Note}	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5		2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 5.5 A	4.5			S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 10 V, I _D = 5.5 A		11	15	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 5.5 A		16	22.5	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 5.5 A		19	29	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		660		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		270		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		83		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 5.5 A		9		ns
Rise Time	t _r	V _{GS} = 10 V		5		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		29		ns
Fall Time	t _f			6		ns
Total Gate Charge	Q _G	V _{DD} = 15 V		7.1		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 5.0 V		2.1		nC
Gate to Drain Charge	Q _{GD}	I _D = 11 A		3.1		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 11 A, V _{GS} = 0 V		0.84		V
Reverse Recovery Time	t _{rr}	I _F = 11 A, V _{GS} = 0 V		25		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		17		nC

Note Pulsed

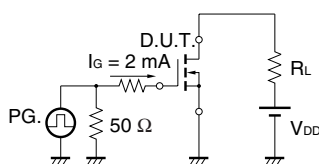
TEST CIRCUIT 1 AVALANCHE CAPABILITY



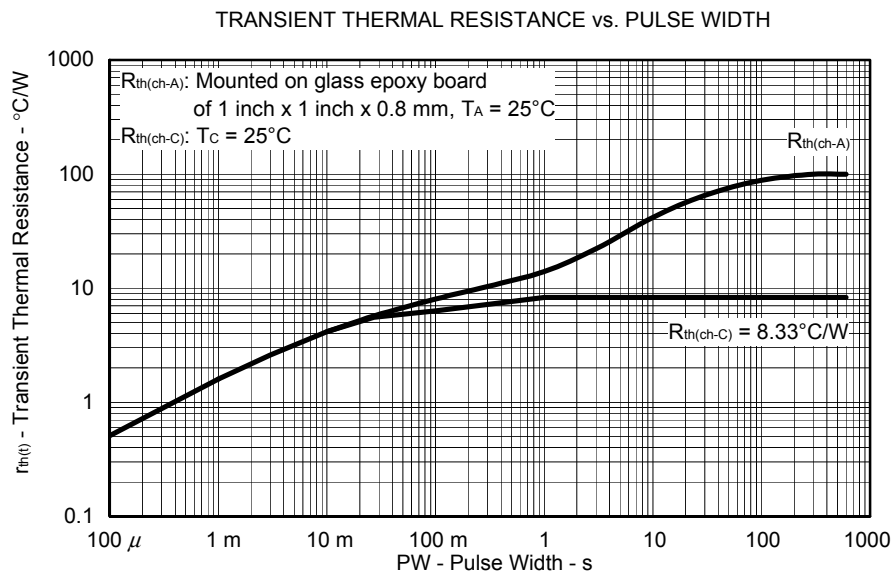
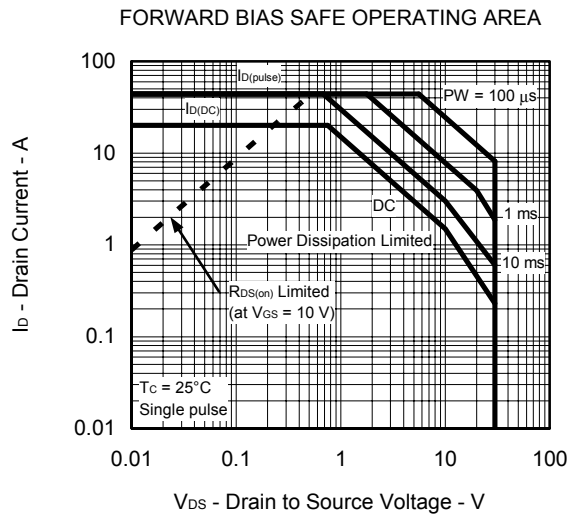
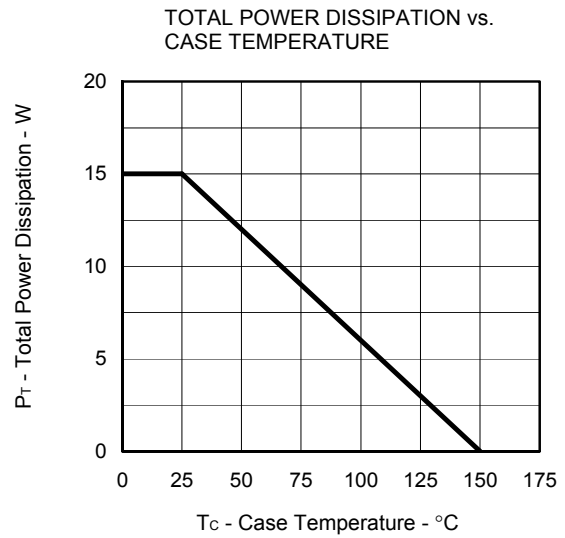
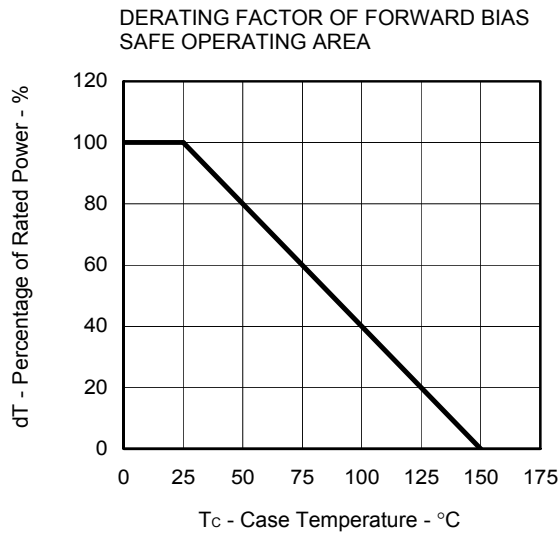
TEST CIRCUIT 2 SWITCHING TIME



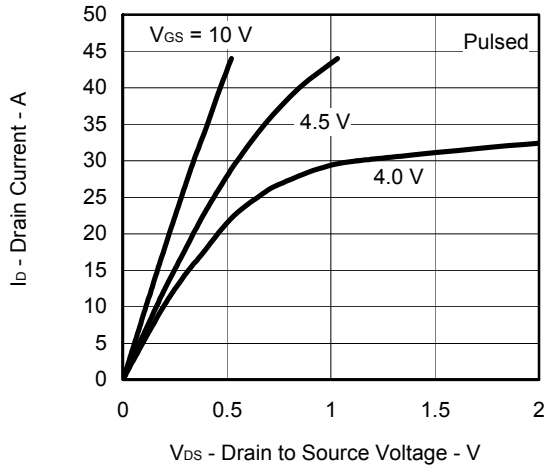
TEST CIRCUIT 3 GATE CHARGE



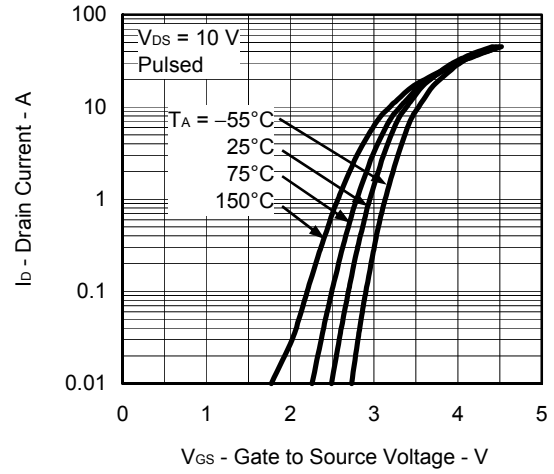
TYPICAL CHARACTERISTICS (T_A = 25°C)



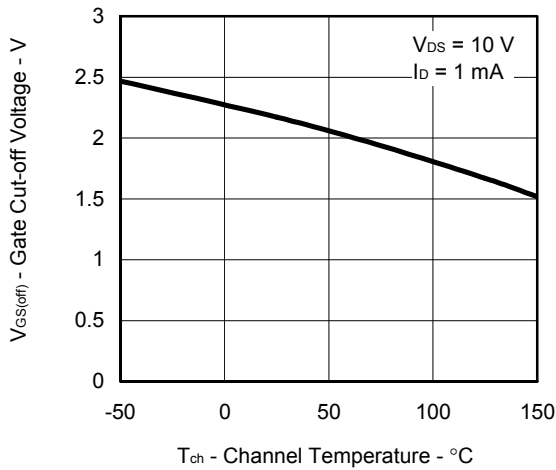
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



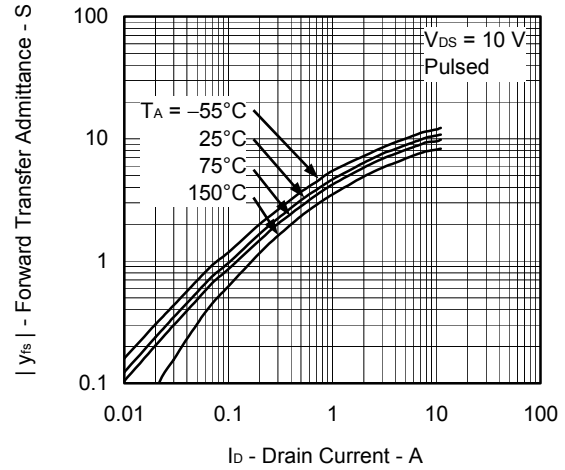
FORWARD TRANSFER CHARACTERISTICS



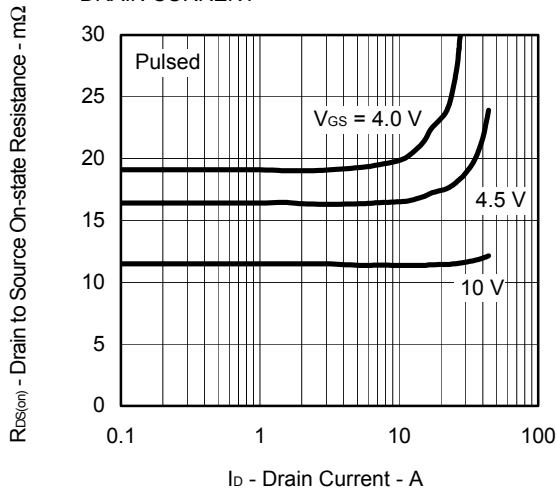
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



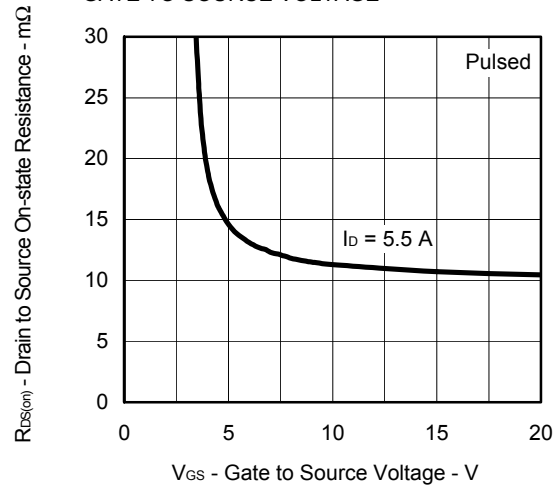
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



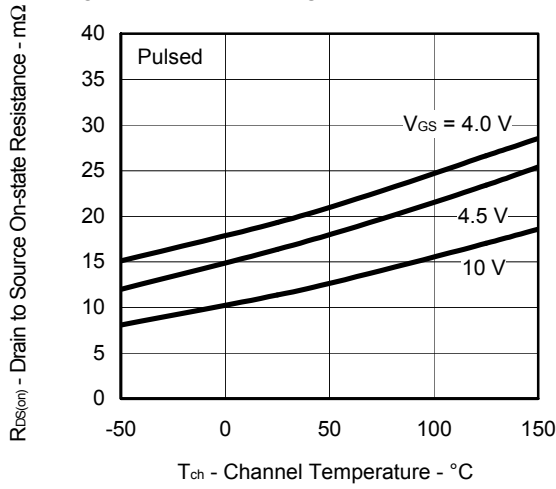
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



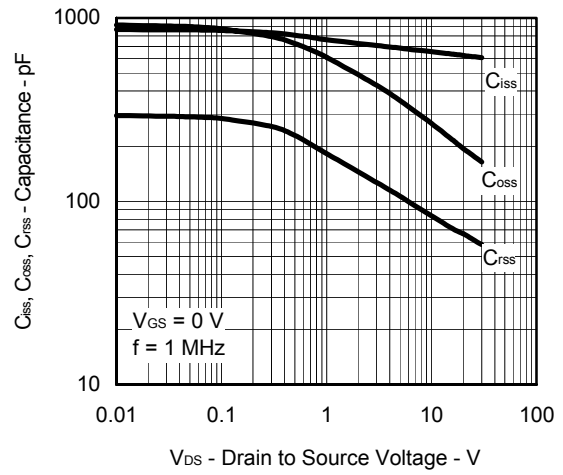
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



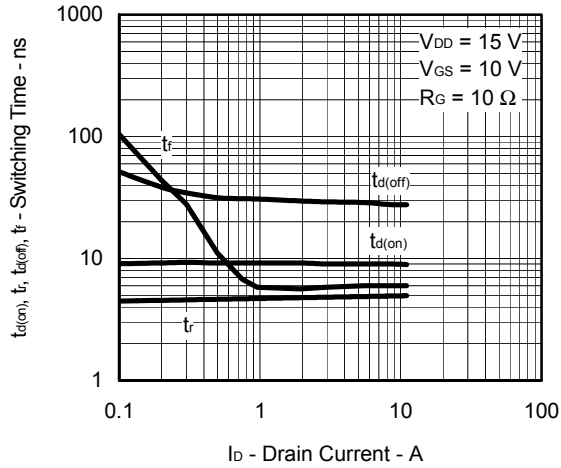
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



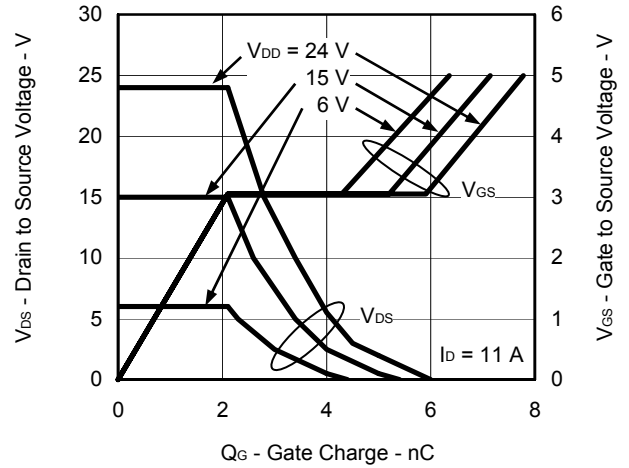
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



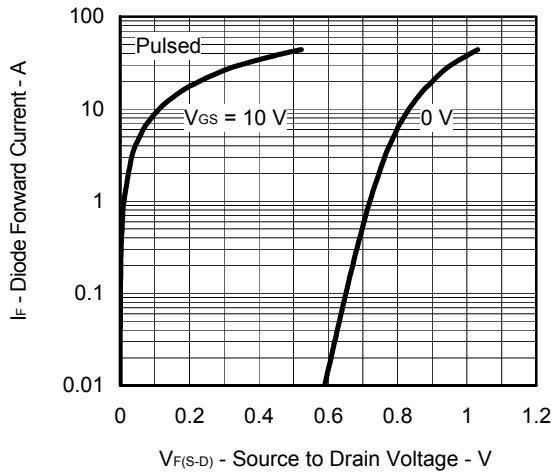
SWITCHING CHARACTERISTICS



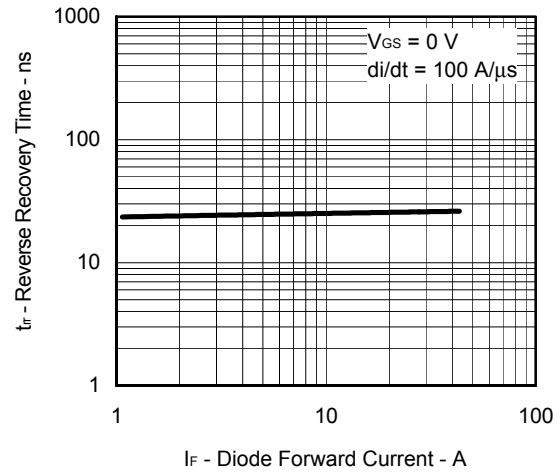
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



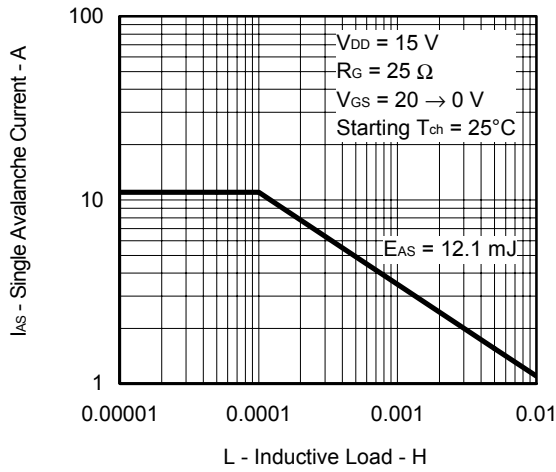
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



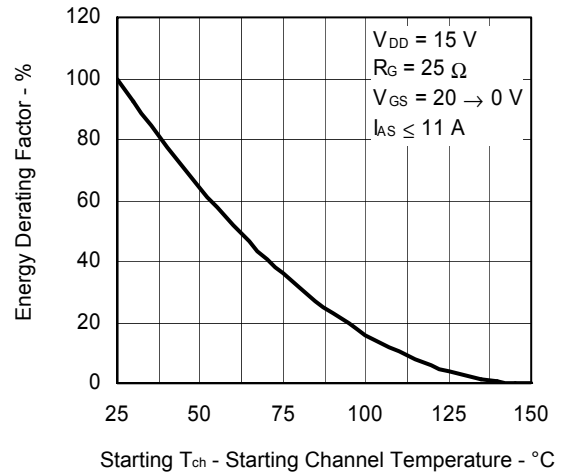
REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD

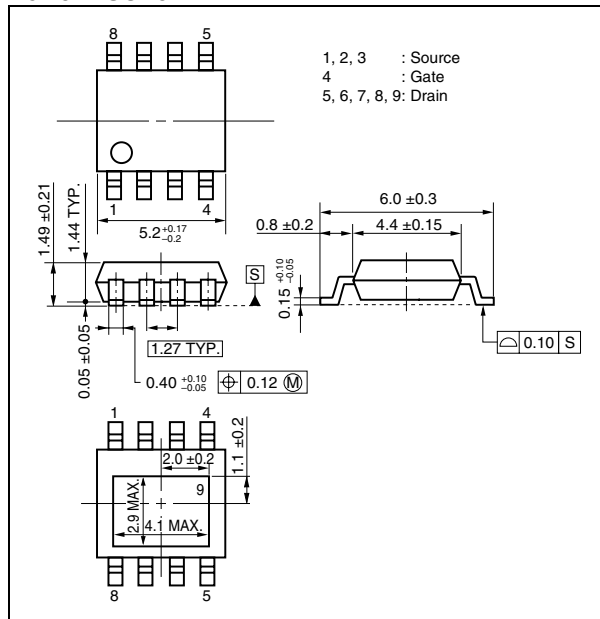


SINGLE AVALANCHE ENERGY DERATING FACTOR

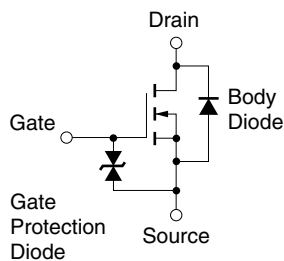


PACKAGE DRAWING (Unit: mm)

Power HSOP8



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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