

MOS FIELD EFFECT TRANSISTOR

μ PA2727T1A

SWITCHING

N-CHANNEL POWER MOSFET

DESCRIPTION

The μ PA2727T1A is N-channel MOSFET designed for DC/DC converter applications.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 9.6 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 8 \text{ A)}$
 $R_{DS(on)2} = 15 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 8 \text{ A)}$
- Low Q_{GD}
 $Q_{GD} = 3.5 \text{ nC TYP. (} V_{DD} = 15 \text{ V, } I_D = 16 \text{ A)}$
- Built-in gate protection diode
- Thin type surface mount package with heat spreader (8-pin HVSON)
- RoHS Compliant

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, 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)	$I_{D(DC)}$	± 16	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 96	A
Total Power Dissipation ^{Note2}	P_{T1}	1.5	W
Total Power Dissipation (PW = 10 sec) ^{Note2}	P_{T2}	4.6	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}	16	A
Single Avalanche Energy ^{Note3}	E_{AS}	26	mJ

THERMAL RESISTANCE

Channel to Ambient Thermal Resistance ^{Note2}	$R_{th(ch-A)}$	83.3	$^\circ\text{C/W}$
Channel to Case (Drain) Thermal Resistance	$R_{th(ch-C)}$	2.0	$^\circ\text{C/W}$

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

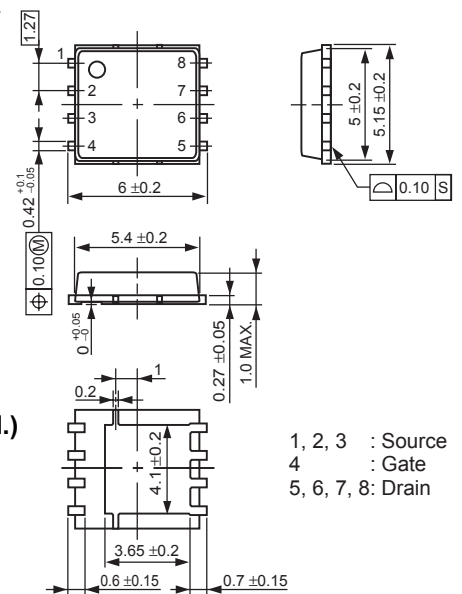
2. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

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

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.

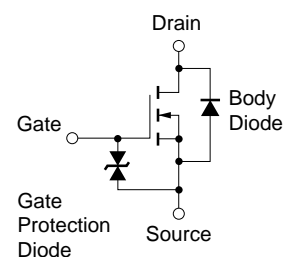
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PACKAGE DRAWING (Unit: mm)



1, 2, 3 : Source
 4 : Gate
 5, 6, 7, 8: Drain

EQUIVALENT CIRCUIT

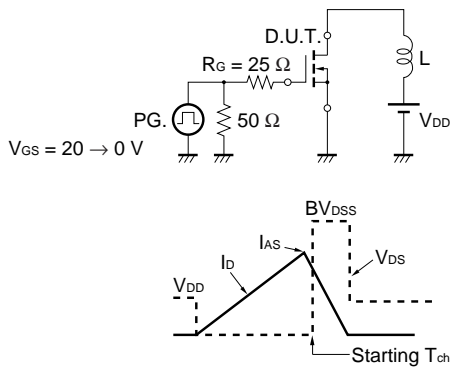


<R> ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

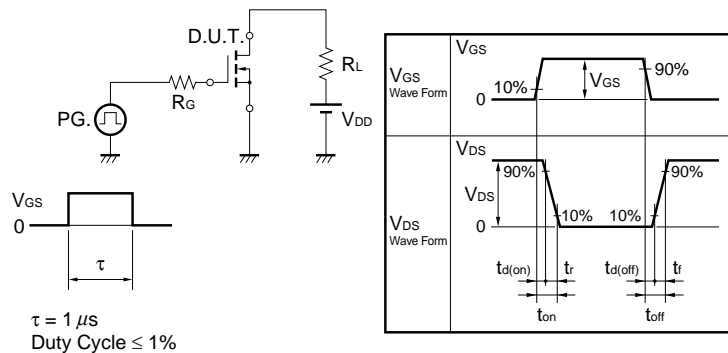
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5		2.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10 V, I _D = 8 A	6			S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 10 V, I _D = 8 A		7.6	9.6	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 8 A		11	15	mΩ
Input Capacitance	C _{iss}	V _{DS} = 15 V,		1170		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		250		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		90		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 8 A,		13		ns
Rise Time	t _r	V _{GS} = 10 V,		3.6		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		41		ns
Fall Time	t _f			8		ns
Total Gate Charge	Q _G	V _{DD} = 15 V,		11		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 5 V,		3.8		nC
Gate to Drain Charge	Q _{GD}	I _D = 16 A		3.5		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 16 A, V _{GS} = 0 V		0.83		V
Reverse Recovery Time	t _{rr}	I _F = 16 A, V _{GS} = 0 V,		27		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		23		nC
Gate Resistance	R _G	f = 1 MHz		2.2		Ω

Note Pulsed

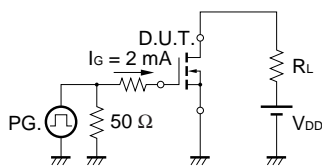
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

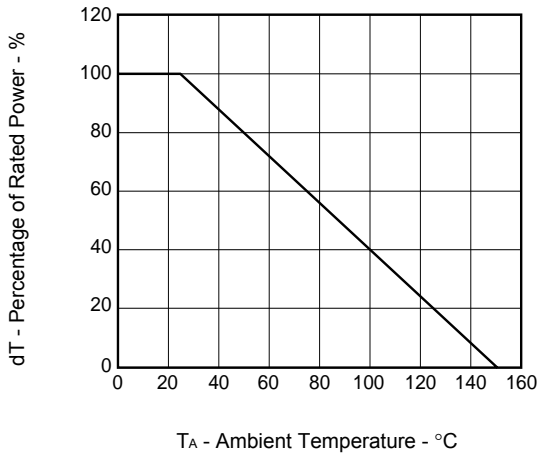


TEST CIRCUIT 3 GATE CHARGE

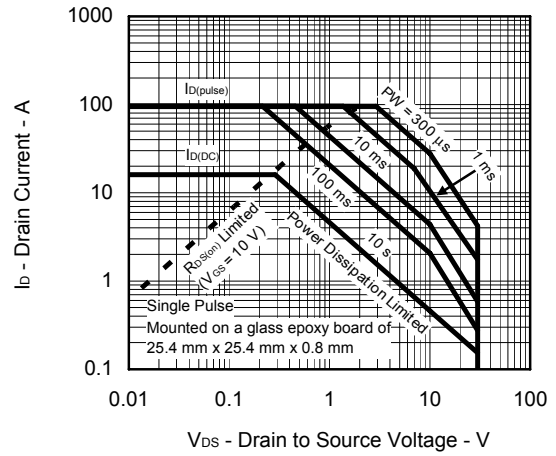


<R> TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

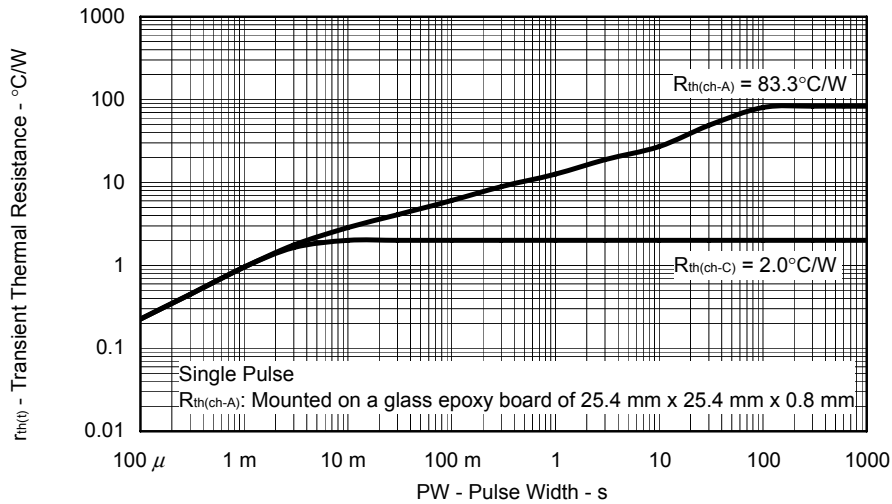
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



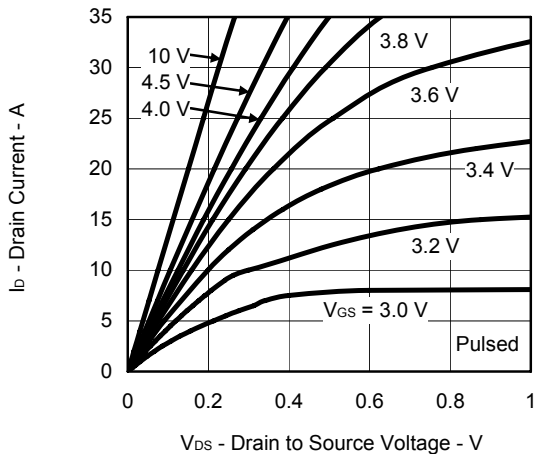
FORWARD BIAS SAFE OPERATING AREA



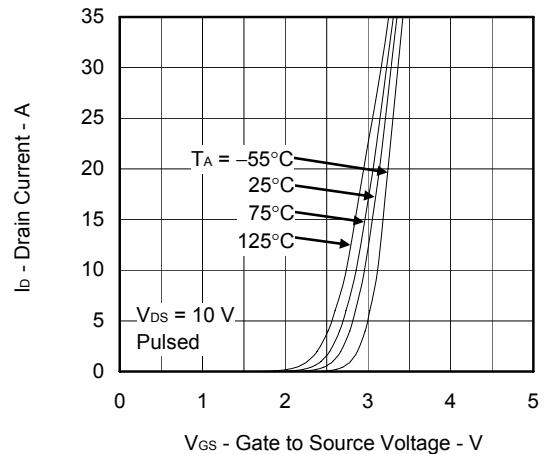
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

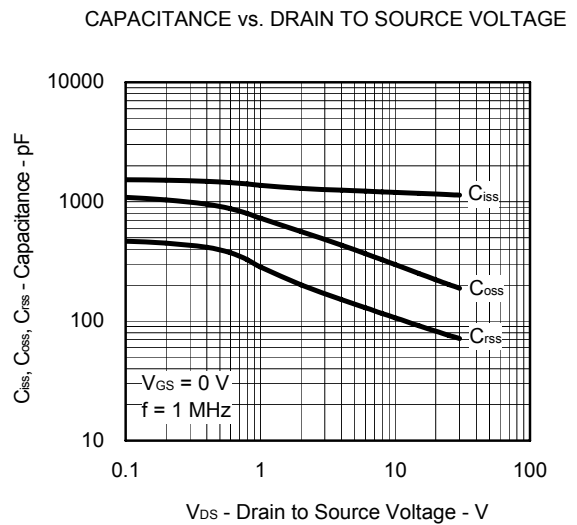
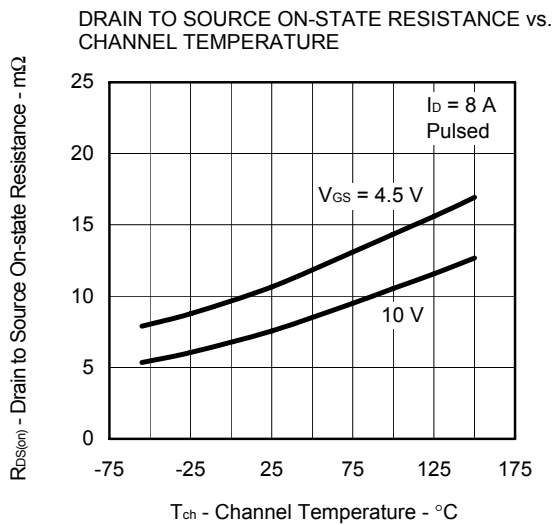
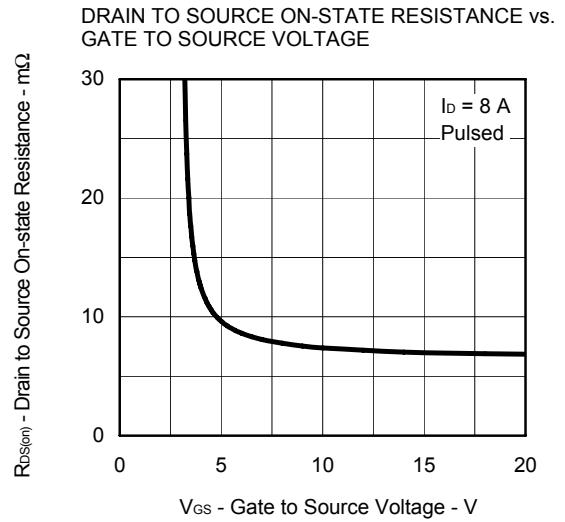
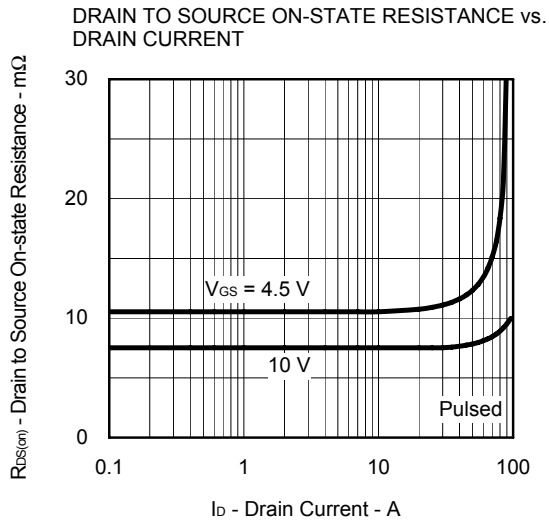
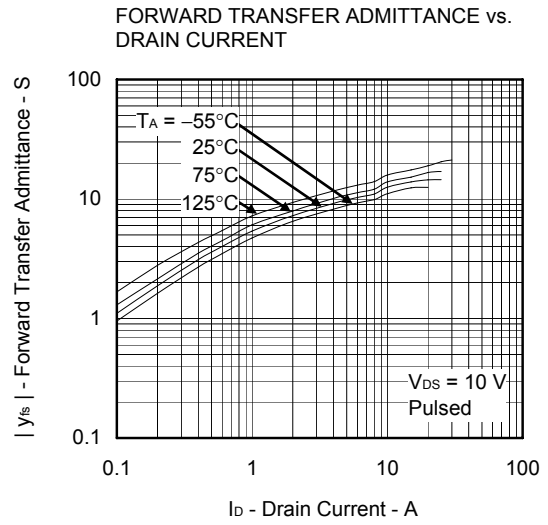
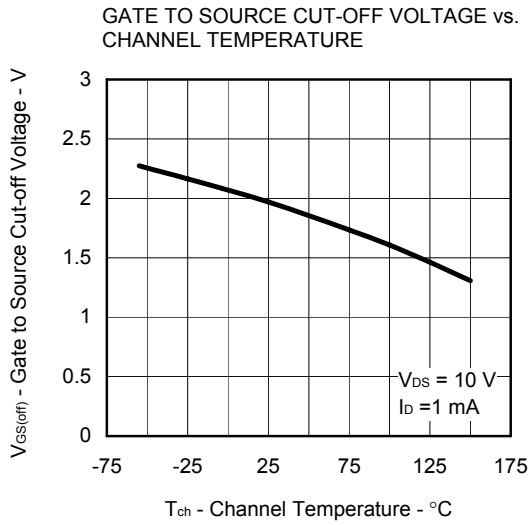


DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

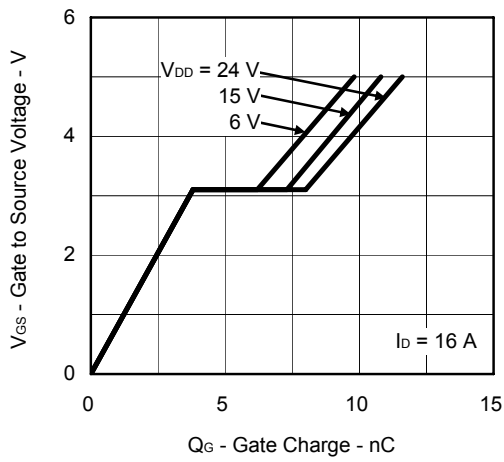


FORWARD TRANSFER CHARACTERISTICS

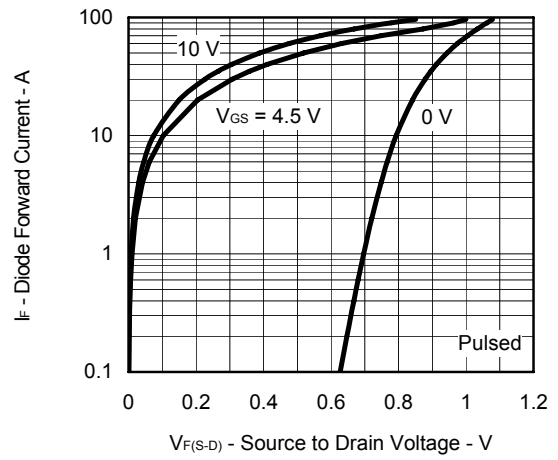




DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
μ PA2727T1A-E1-AZ ^{Note}	Sn-Bi	Tape 3000 p/reel	8-pin HVSON 0.10 g TYP.
μ PA2727T1A-E2-AZ ^{Note}			
μ PA2727T1A-E1-AY ^{Note}	Pure Sn		
μ PA2727T1A-E2-AY ^{Note}			

Note Pb-free (This product does not contain Pb in the external electrode.)

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