

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°C, All terminals are connected.)

Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	30	V
Gate to Source Voltage (V _{DS} = 0 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	°C
Storage Temperature	T _{stg}	-55 to +150	°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	°C/W
Channel to Case (Drain) Thermal Resistance	R _{th(ch-C)}	2.0	°C/W

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

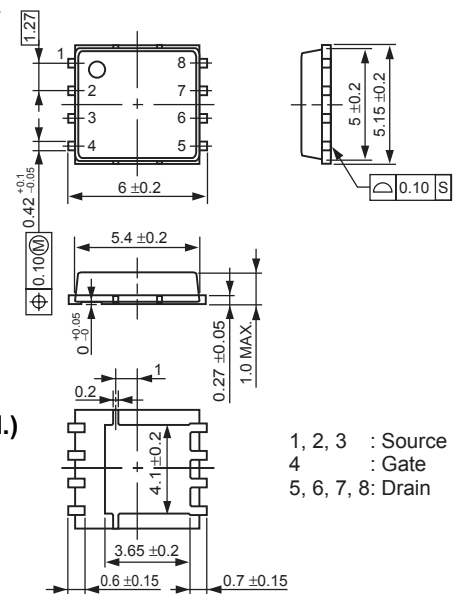
2. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

3. Starting T_{ch} = 25°C, V_{DD} = 15 V, R_G = 25 Ω, V_{GS} = 20 → 0 V, L = 100 μH

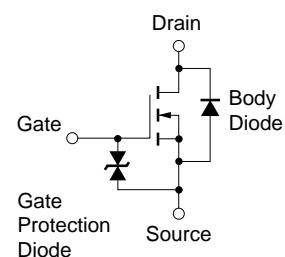
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

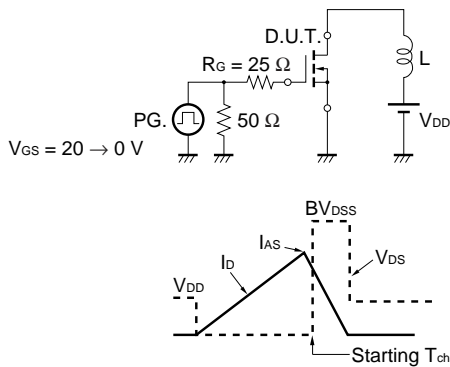


<R> ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

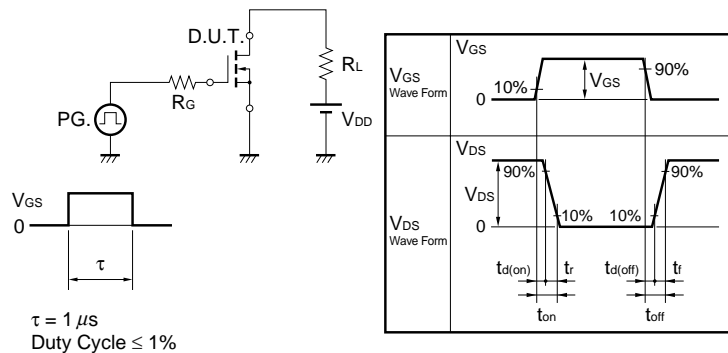
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.5		2.5	V
Forward Transfer Admittance ^{Note}	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 8\text{ A}$	6			S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 8\text{ A}$		7.6	9.6	mΩ
	$R_{DS(on)2}$	$V_{GS} = 4.5\text{ V}, I_D = 8\text{ A}$		11	15	mΩ
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V},$		1170		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V},$		250		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		90		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, I_D = 8\text{ A},$		13		ns
Rise Time	t_r	$V_{GS} = 10\text{ V},$		3.6		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		41		ns
Fall Time	t_f			8		ns
Total Gate Charge	Q_G	$V_{DD} = 15\text{ V},$		11		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 5\text{ V},$		3.8		nC
Gate to Drain Charge	Q_{GD}	$I_D = 16\text{ A}$		3.5		nC
Body Diode Forward Voltage ^{Note}	$V_{F(S-D)}$	$I_F = 16\text{ A}, V_{GS} = 0\text{ V}$		0.83		V
Reverse Recovery Time	t_{rr}	$I_F = 16\text{ A}, V_{GS} = 0\text{ V},$		27		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		23		nC
Gate Resistance	R_G	$f = 1\text{ MHz}$		2.2		Ω

Note Pulsed

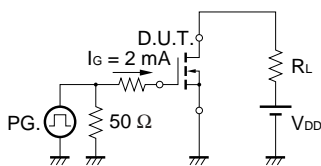
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

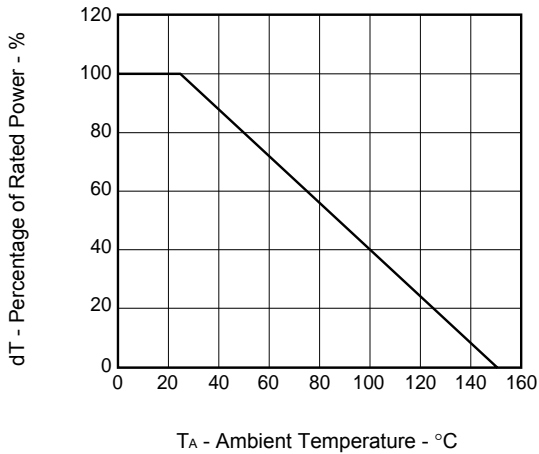


TEST CIRCUIT 3 GATE CHARGE

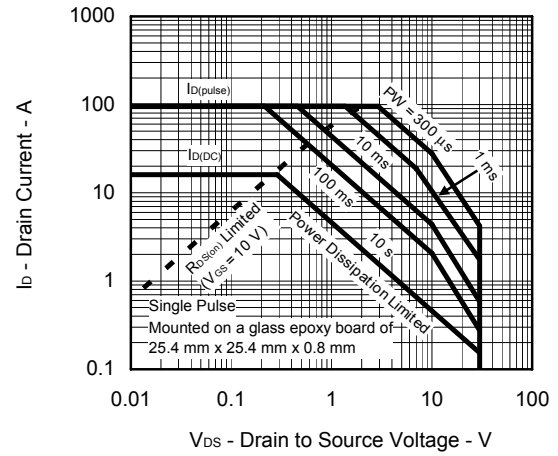


<R> TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

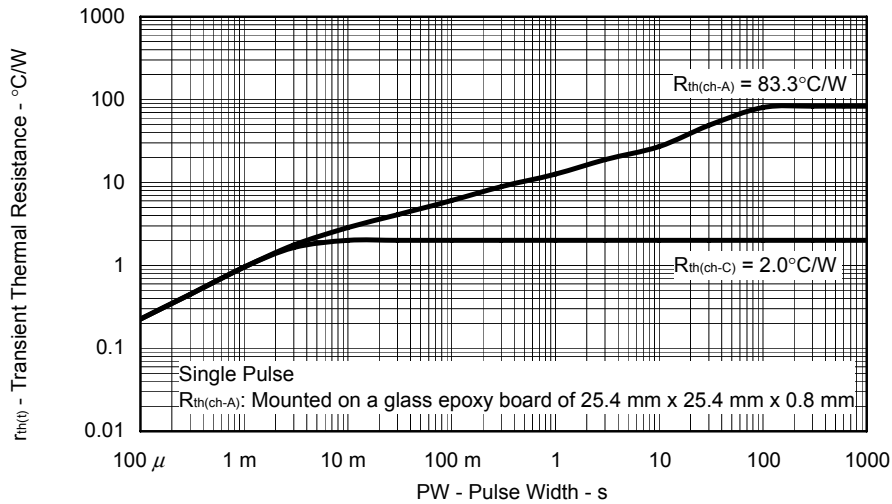
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



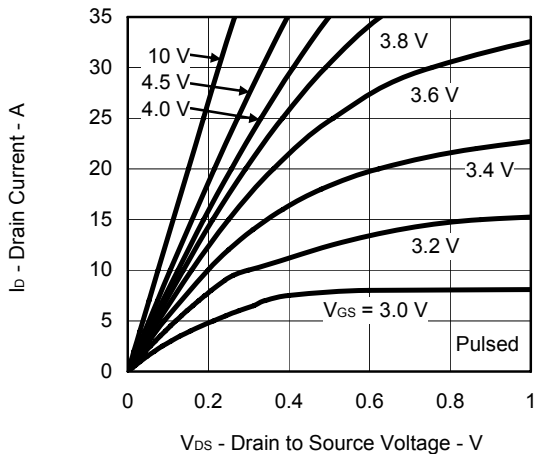
FORWARD BIAS SAFE OPERATING AREA



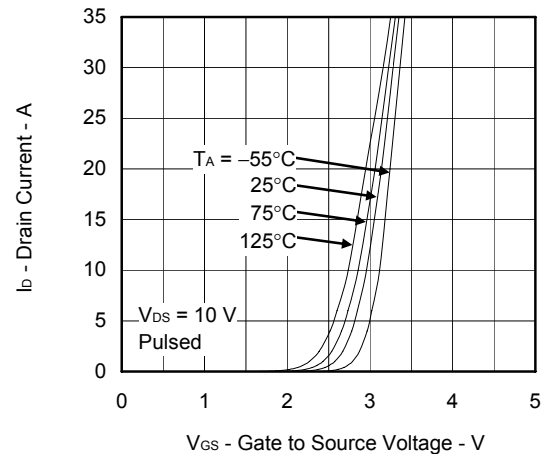
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

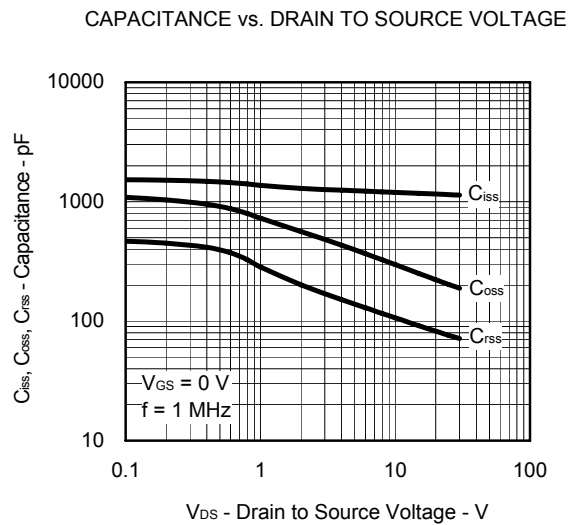
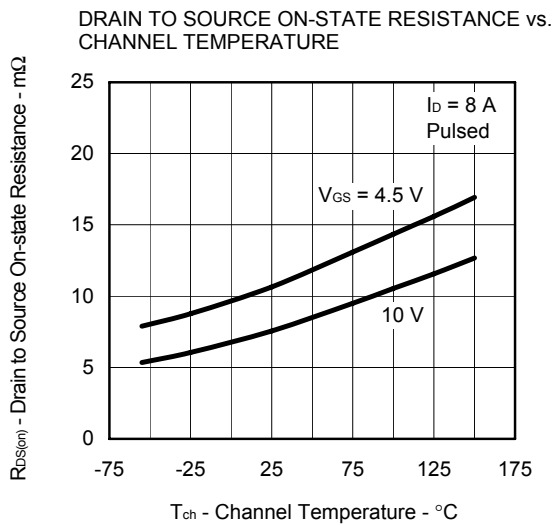
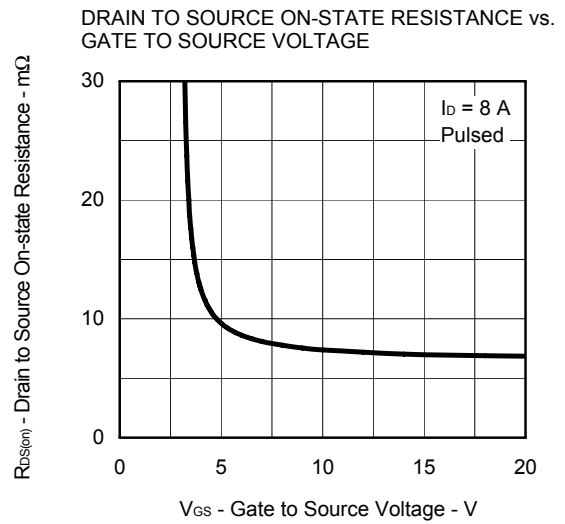
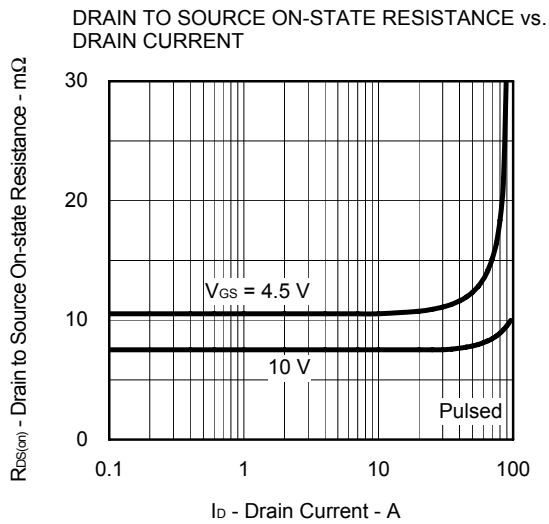
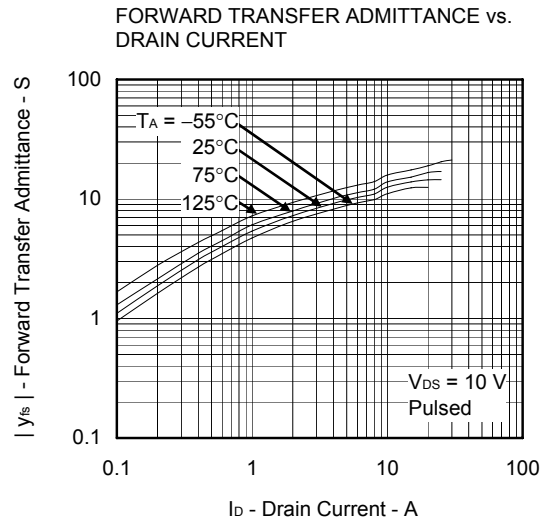
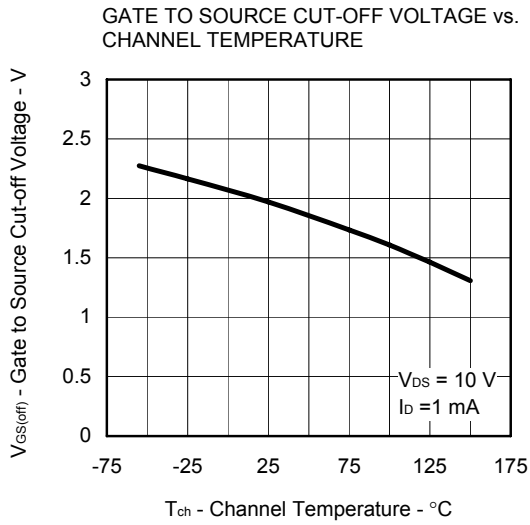


DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

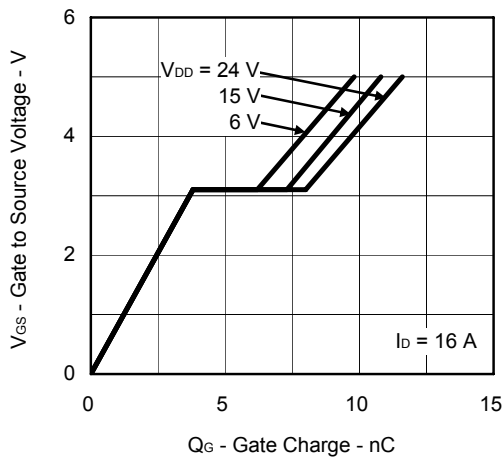


FORWARD TRANSFER CHARACTERISTICS

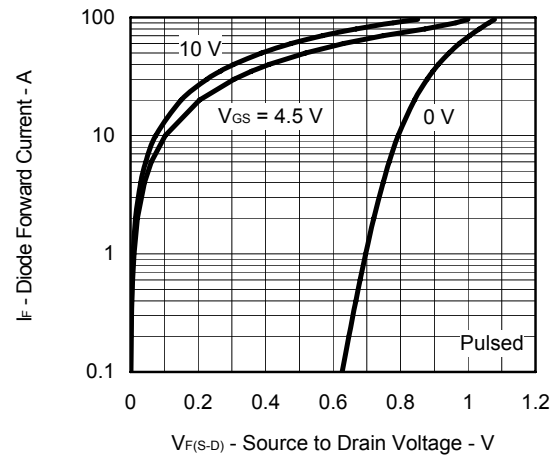




DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
μPA2727T1A-E1-AZ ^{Note}	Sn-Bi	Tape 3000 p/reel	8-pin HVSON 0.10 g TYP.
μPA2727T1A-E2-AZ ^{Note}			
μPA2727T1A-E1-AY ^{Note}	Pure Sn		
μPA2727T1A-E2-AY ^{Note}			

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

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