

SWITCHING N-CHANNEL POWER MOSFET

DESCRIPTION

The μ PA2800 is N-channel MOSFET designed for DC/DC converter and power management applications of portable equipments.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 7.3 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 17 \text{ A)}$
 $R_{DS(on)2} = 10 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 8.5 \text{ A)}$
- Built-in gate protection diode
- Thin type surface mount package with heat spreader
- 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)	$I_{D(DC)}$	± 17	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 102	A
Total Power Dissipation ^{Note2}	P_{T1}	1.5	W
Total Power Dissipation ($PW = 10 \text{ sec}$) ^{Note2}	P_{T2}	3.8	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \text{ to } +150$	$^\circ\text{C}$
Single Avalanche Current ^{Note3}	I_{AS}	17	A
Single Avalanche Energy ^{Note3}	E_{AS}	28.9	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	$R_{th(ch-C)}$	2.4	$^\circ\text{C/W}$

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

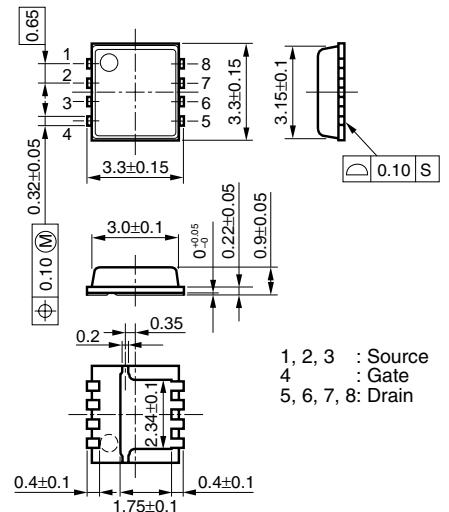
2. Mounted on FR-4 board of 25.4 mm x 25.4 mm x 0.8 mm

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.

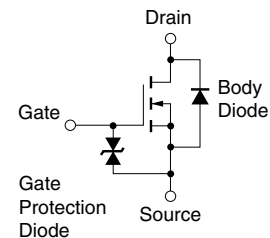
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PACKAGE DRAWING (Unit: mm)



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

EQUIVALENT CIRCUIT

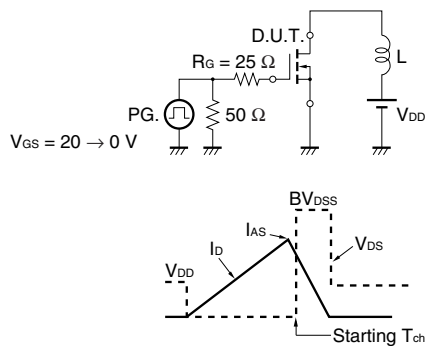


ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

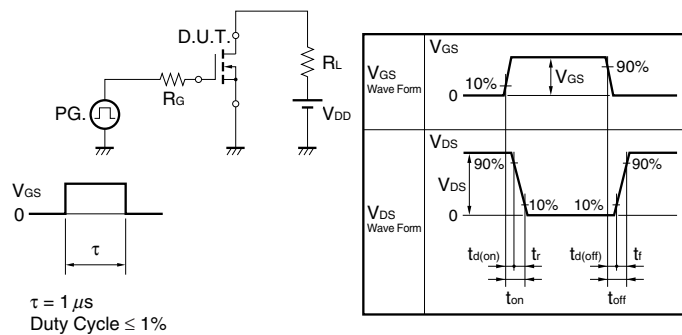
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.0		2.5	V
Forward Transfer Admittance ^{Note}	$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 8.5\text{ A}$	7			S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 17\text{ A}$		6.0	7.3	mΩ
	$R_{DS(on)2}$	$V_{GS} = 4.5\text{ V}, I_D = 8.5\text{ A}$		7.8	10	mΩ
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V},$		1770		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V},$		260		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		150		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, I_D = 8.5\text{ A},$		12		ns
Rise Time	t_r	$V_{GS} = 10\text{ V},$		19		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		54		ns
Fall Time	t_f			13		ns
Total Gate Charge	Q_G	$V_{DD} = 15\text{ V},$		17		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 5\text{ V},$		5.1		nC
Gate to Drain Charge	Q_{GD}	$I_D = 17\text{ A}$		6.7		nC
Body Diode Forward Voltage ^{Note}	$V_{F(S-D)}$	$I_F = 17\text{ A}, V_{GS} = 0\text{ V}$		0.83		V
Reverse Recovery Time	t_{rr}	$I_F = 17\text{ A}, V_{GS} = 0\text{ V},$		25		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		18		nC
Gate Resistance	R_G	$f = 1\text{ MHz}$		1.5		Ω

Note Pulsed

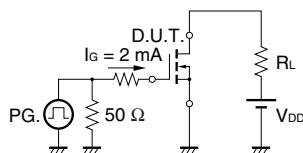
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

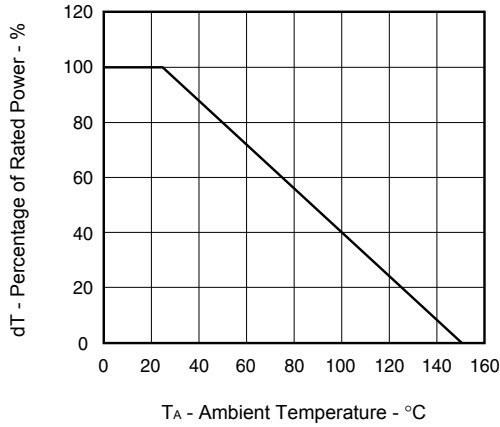


TEST CIRCUIT 3 GATE CHARGE

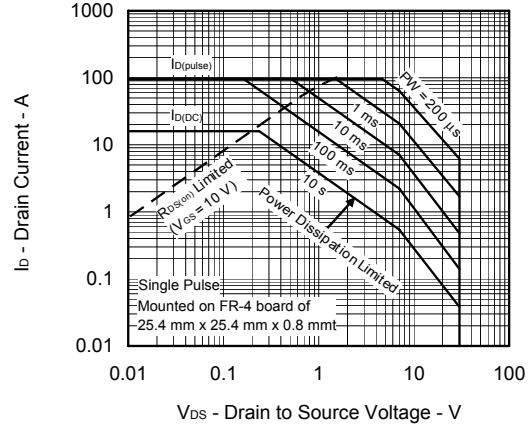


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

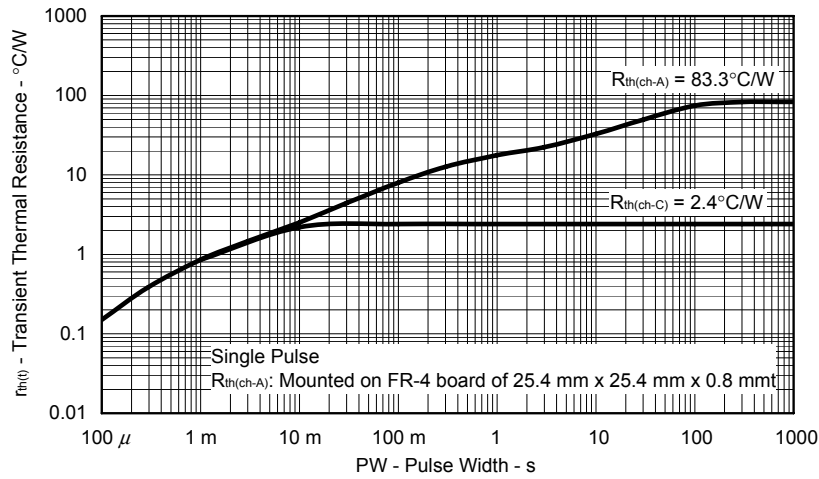
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



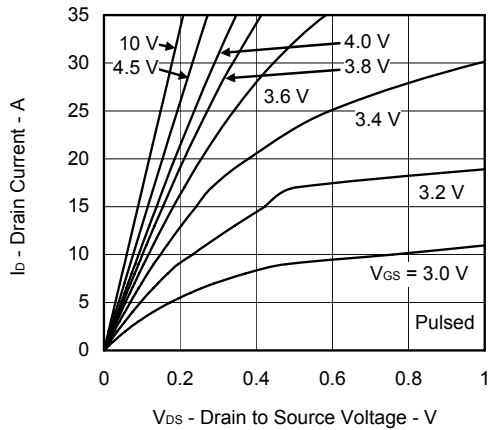
FORWARD BIAS SAFE OPERATING AREA



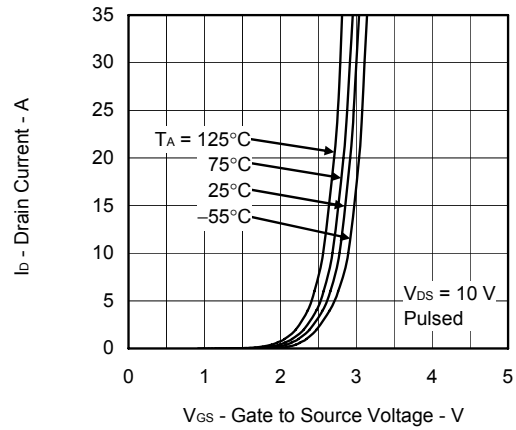
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



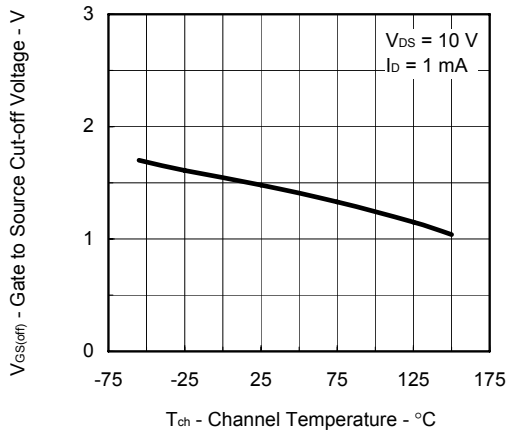
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



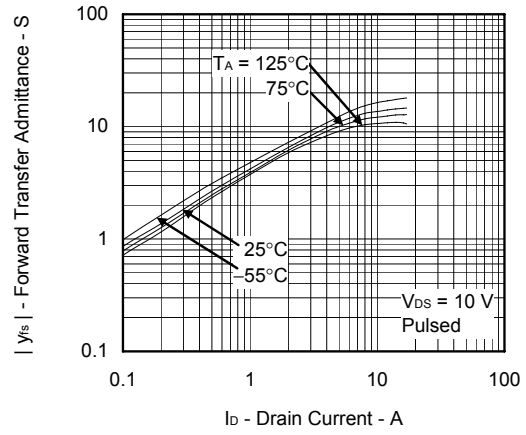
FORWARD TRANSFER CHARACTERISTICS



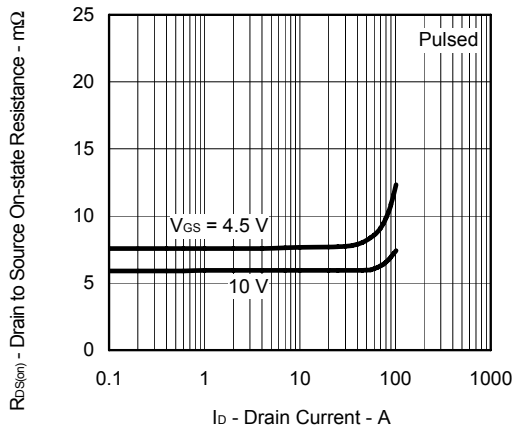
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



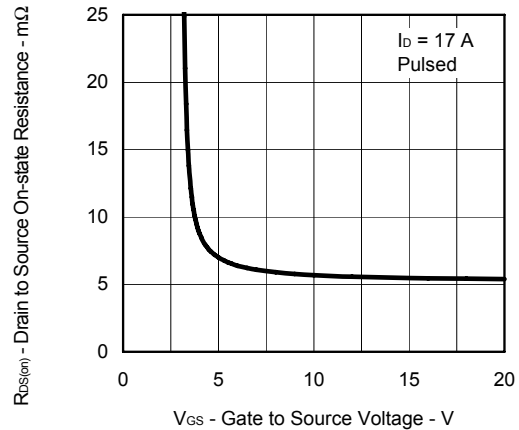
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



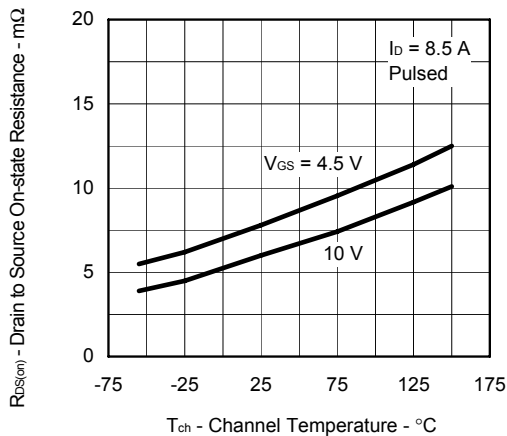
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



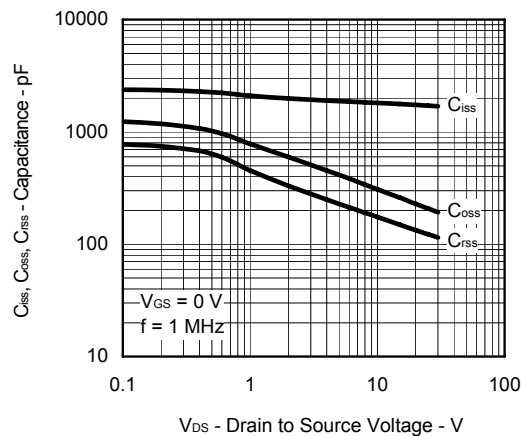
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



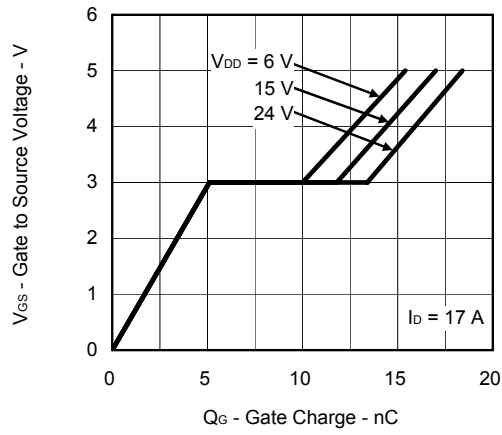
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



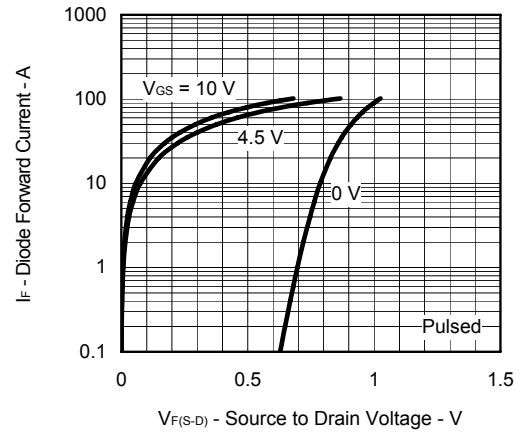
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
μ PA2800T1L-E1-AY ^{Note}	Pure Sn	Tape 3000 p/reel	8-pin HVSON (3333) 0.028 g TYP.
μ PA2800T1L-E2-AY ^{Note}			

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

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