

MOS FIELD EFFECT TRANSISTOR μ PA2717AGR

SWITCHING P-CHANNEL POWER MOS FET

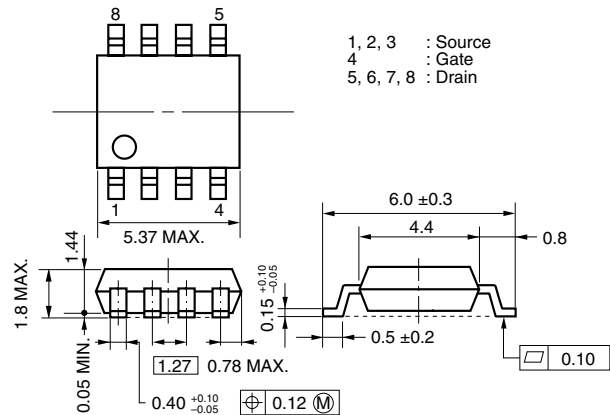
DESCRIPTION

The μ PA2717AGR is P-Channel MOS Field Effect Transistor designed for power management applications of notebook computers and Lithium-Ion battery protection circuit.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 5.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -7.5 \text{ A)}$
 $R_{DS(on)2} = 8.9 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -7.5 \text{ A)}$
- Low input capacitance
 $C_{iss} = 3550 \text{ pF TYP.}$
- Built-in gate protection diode
- Small and surface mount package (Power SOP8)

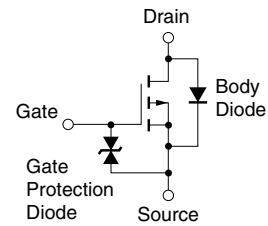
PACKAGE DRAWING (Unit: mm)



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

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{bss}	-30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 20	V
Drain Current (DC)	$I_{D(DC)}$	± 15	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 150	A
Total Power Dissipation ^{Note2}	P_{T1}	2	W
Total Power Dissipation ^{Note3}	P_{T2}	2	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
Single Avalanche Current ^{Note4}	I_{AS}	-15	A
Single Avalanche Energy ^{Note4}	E_{AS}	22.5	mJ

EQUIVALENT CIRCUIT



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

2. Mounted on ceramic substrate of $1200 \text{ mm}^2 \times 2.2 \text{ mm}$
3. Mounted on glass epoxy board of $1 \text{ inch} \times 1 \text{ inch} \times 0.8 \text{ mm}$, $PW = 10 \text{ sec}$
4. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = -15 \text{ V}$, $R_G = 25 \Omega$, $L = 100 \mu\text{H}$, $V_{GS} = -20 \rightarrow 0 \text{ V}$

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.

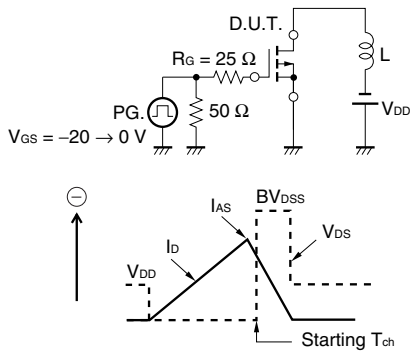
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ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

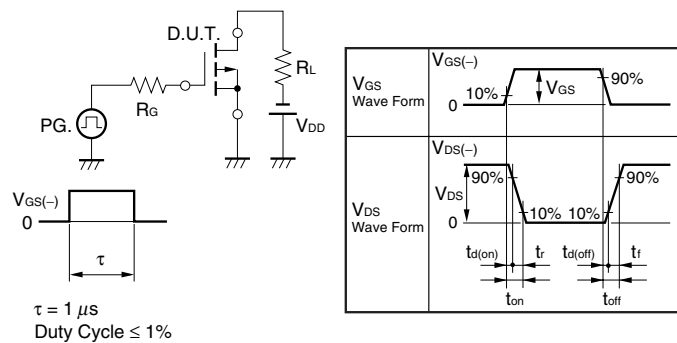
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$	-1.0		-2.5	V
Forward Transfer Admittance ^{Note}	$ y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -7.5\text{ A}$	13			S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = -10\text{ V}, I_D = -7.5\text{ A}$		4.7	5.5	mΩ
	$R_{DS(on)2}$	$V_{GS} = -4.5\text{ V}, I_D = -7.5\text{ A}$		6.1	8.9	mΩ
	$R_{DS(on)3}$	$V_{GS} = -4.0\text{ V}, I_D = -7.5\text{ A}$		6.9	10.4	mΩ
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}$		3550		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V}$		1260		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		600		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, I_D = -7.5\text{ A}$		17		ns
Rise Time	t_r	$V_{GS} = -10\text{ V}$		32		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		920		ns
Fall Time	t_f			510		ns
Total Gate Charge	Q_G	$V_{DD} = -24\text{ V}$		130		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = -10\text{ V}$		11		nC
Gate to Drain Charge	Q_{GD}	$I_D = -15\text{ A}$		36		nC
Body Diode Forward Voltage ^{Note}	$V_{F(S-D)}$	$I_F = 15\text{ A}, V_{GS} = 0\text{ V}$		0.82		V
Reverse Recovery Time	t_{rr}	$I_F = 15\text{ A}, V_{GS} = 0\text{ V}$		500		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 50\text{ A}/\mu\text{s}$		1320		nC

Note Pulsed

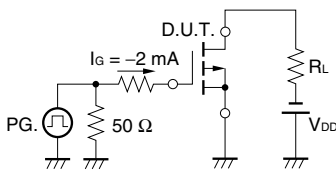
TEST CIRCUIT 1 AVALANCHE CAPABILITY



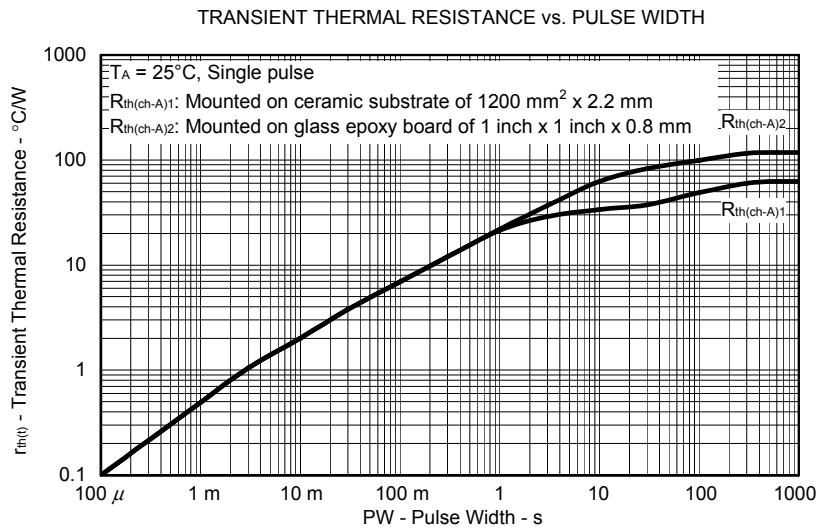
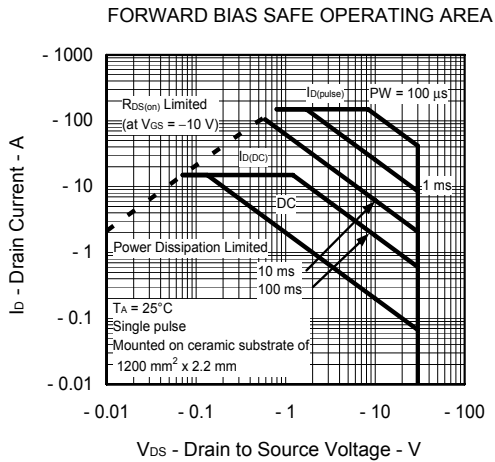
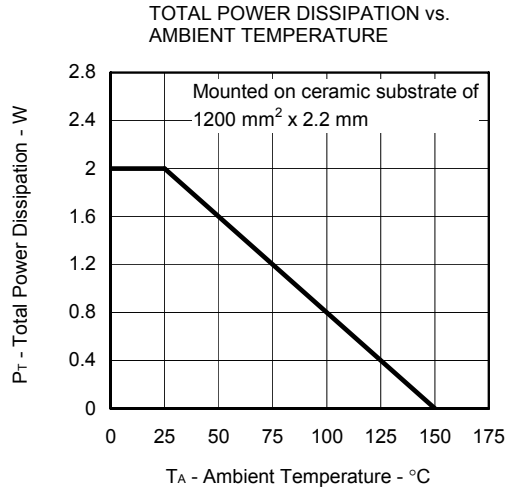
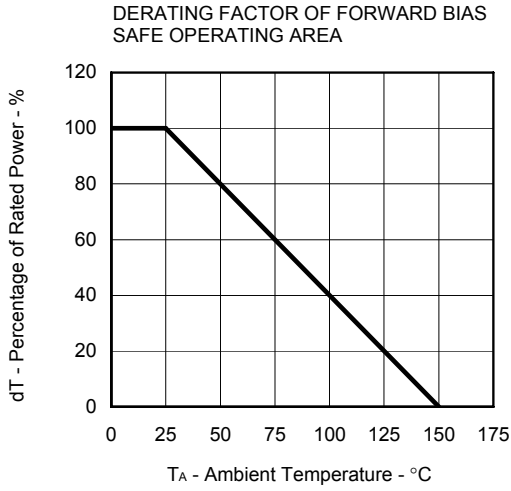
TEST CIRCUIT 2 SWITCHING TIME



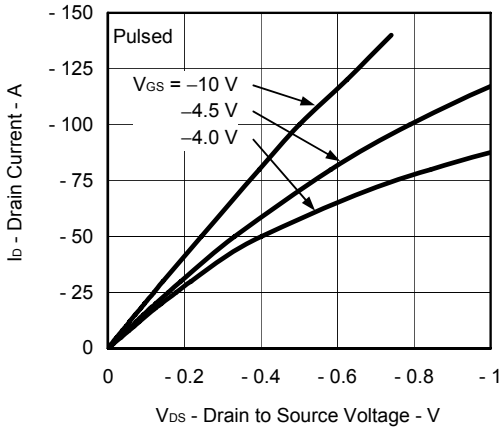
TEST CIRCUIT 3 GATE CHARGE



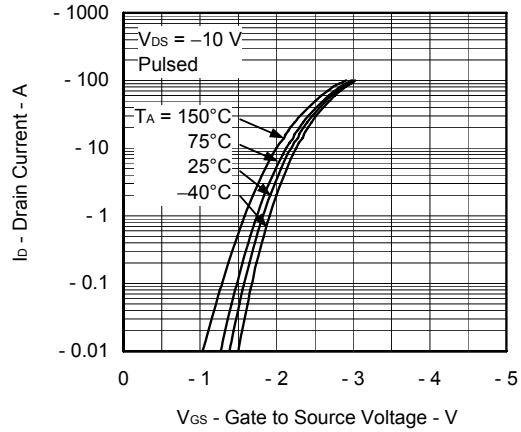
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



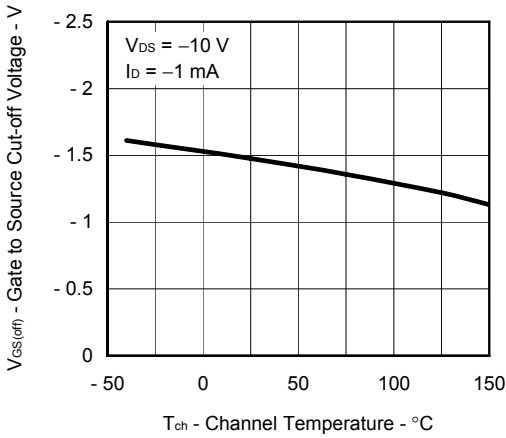
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



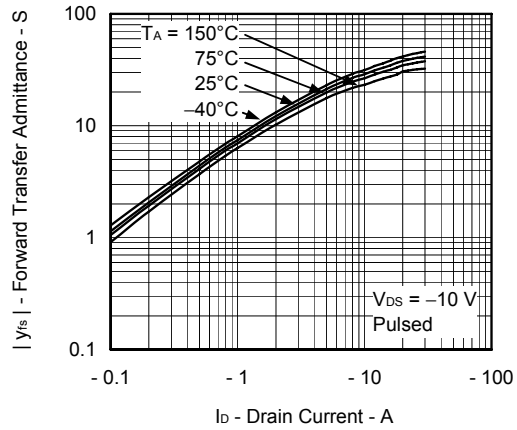
FORWARD TRANSFER CHARACTERISTICS



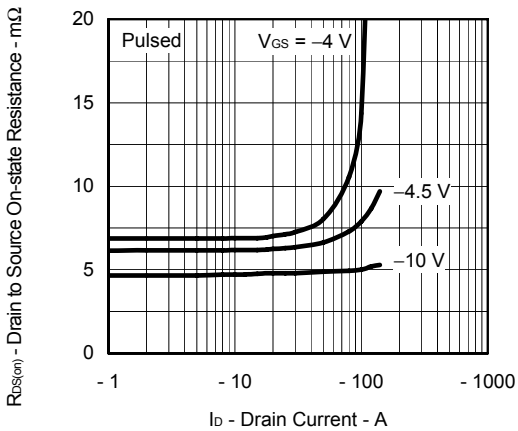
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



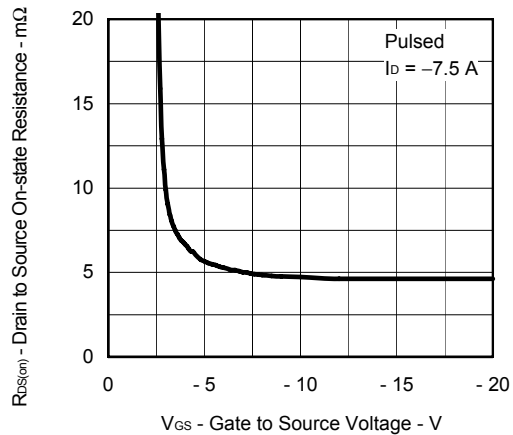
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



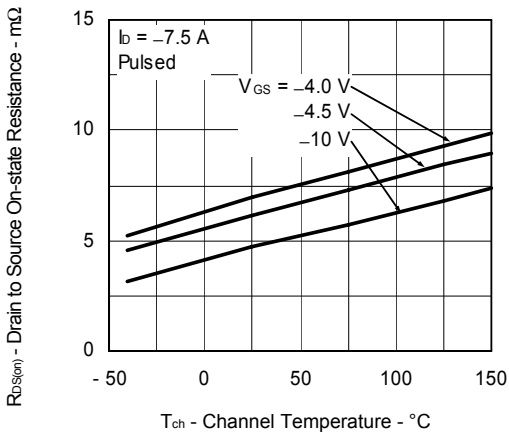
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



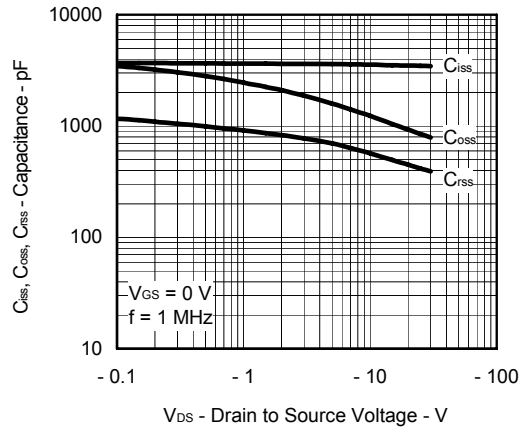
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



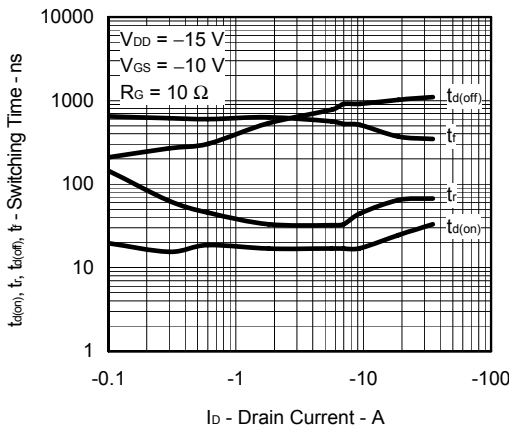
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



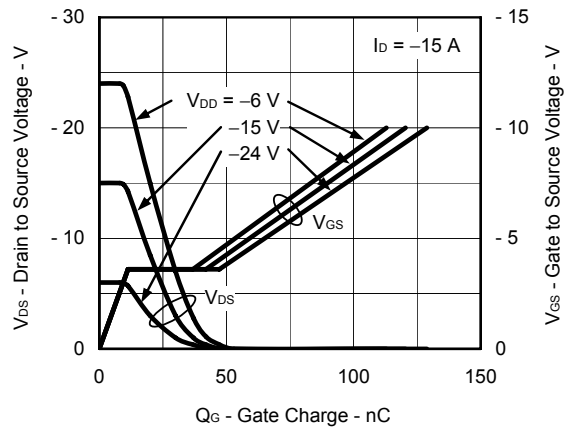
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



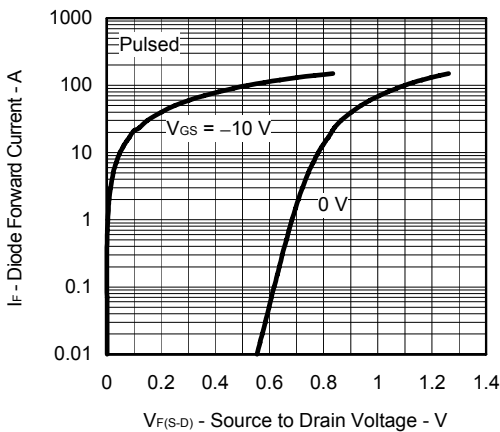
SWITCHING CHARACTERISTICS



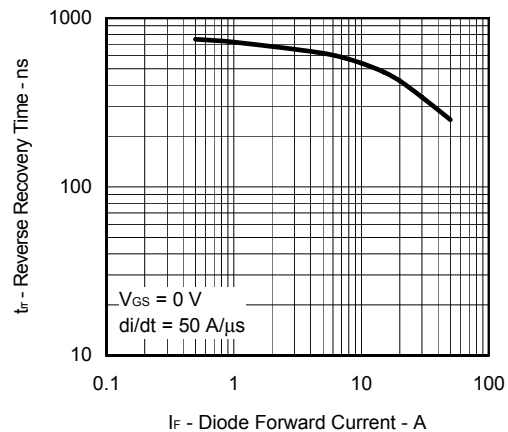
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

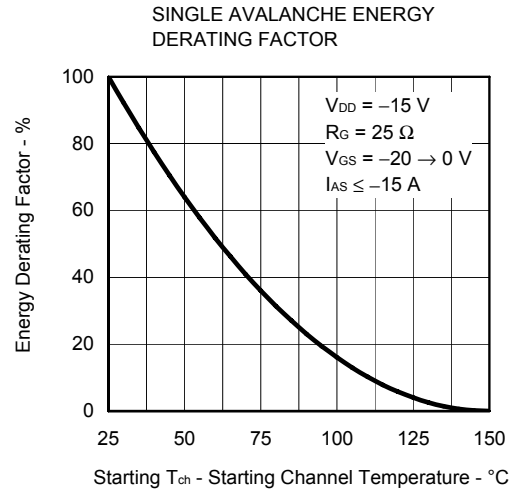
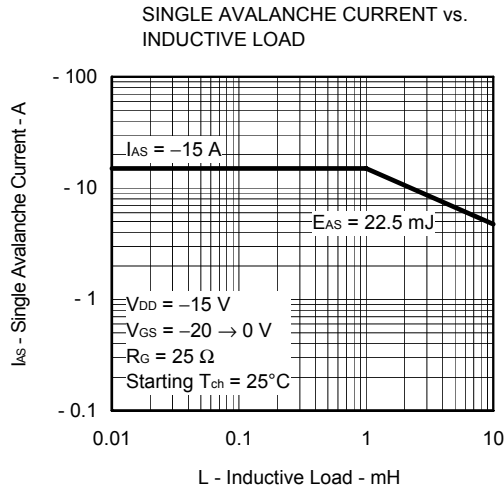


SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT





ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
μPA2717AGR-E1-AT ^{Note}	Pure Sn (Tin)	Tape 2500 p/reel	Power SOP8
μPA2717AGR-E2-AT ^{Note}			0.08 g TYP.

Note Pb-free (This product does not contain Pb in external electrode and other parts.)

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