

**SWITCHING  
N-CHANNEL POWER MOS FET  
INDUSTRIAL USE**

**DESCRIPTION**

This product is Dual N-channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

**FEATURES**

- Dual chip type
- Low on-resistance  
 $R_{DS(on)1} = 32 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 3.5 \text{ A)}$   
 $R_{DS(on)2} = 45 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 3.5 \text{ A)}$
- Low input capacitance  $C_{iss} = 895 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

**ORDERING INFORMATION**

PART NUMBER	PACKAGE
$\mu$ PA1755G	Power SOP8

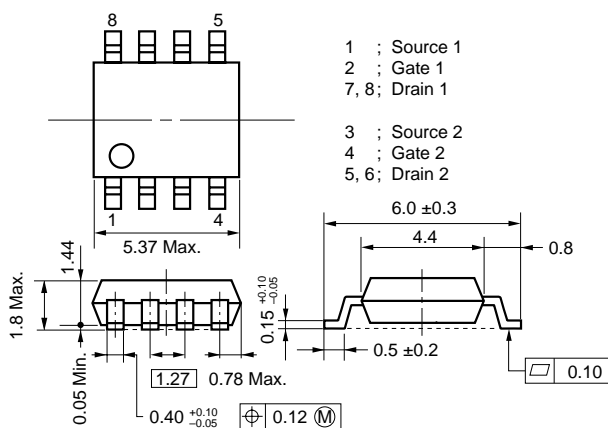
**ABSOLUTE MAXIMUM RATINGS ( $T_A = 25 \text{ }^\circ\text{C}$ , All terminals are connected.)**

Drain to Source Voltage ( $V_{GS} = 0$ )	$V_{DSS}$	30	V
Gate to Source Voltage ( $V_{DS} = 0$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 7.0$	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 28$	A
Total Power Dissipation (1 unit) <sup>Note2</sup>	$P_T$	1.7	W
Total Power Dissipation (2 unit) <sup>Note2</sup>	$P_T$	2.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to + 150	$^\circ\text{C}$

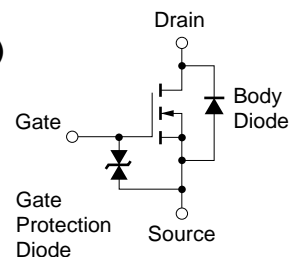
- Notes**
1.  $PW \leq 10 \text{ } \mu\text{s}$ , Duty cycle  $\leq 1 \%$
  2.  $T_A = 25 \text{ }^\circ\text{C}$ , Mounted on ceramic substrate of  $2000 \text{ mm}^2 \times 1.1 \text{ mm}$

**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.

**PACKAGE DRAWING (Unit : mm)**



**EQUIVALENT CIRCUIT  
(1/2 Circuit)**

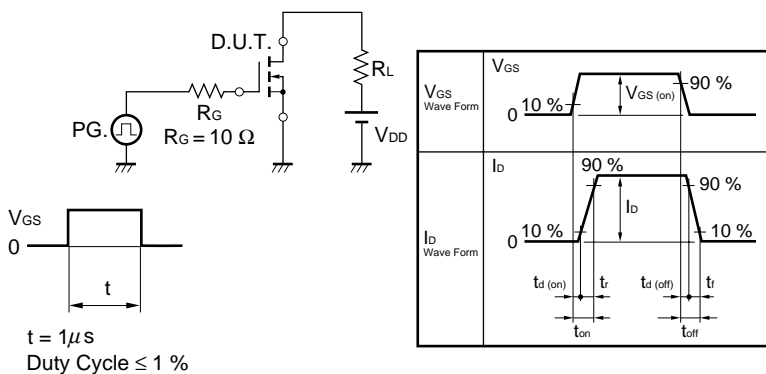


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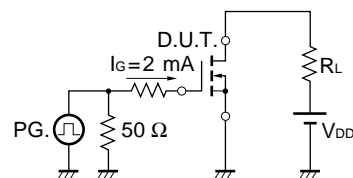
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, All terminals are connected.)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.5 A		22	32	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3.5 A		32	45	mΩ
Gate to Source Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3.5 A	4.0	8.0		S
Drain Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0			10	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0			±10	μA
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		895		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0		335		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		150		pF
Turn-on Delay Time	t <sub>d(on)</sub>	I <sub>D</sub> = 3.5 A		16		ns
Rise Time	t <sub>r</sub>	V <sub>GS(on)</sub> = 10 V		130		ns
Turn-off Delay Time	t <sub>d(off)</sub>	V <sub>DD</sub> = 15 V		55		ns
Fall Time	t <sub>f</sub>	R <sub>G</sub> = 10 Ω		30		ns
Total Gate Charge	Q <sub>G</sub>	I <sub>D</sub> = 7.0 A		19		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>DD</sub> = 24 V		2.2		nC
Gate to Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = 10 V		5.4		nC
Body Diode forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 7.0 A, V <sub>GS</sub> = 0		0.8		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 7.0 A, V <sub>GS</sub> = 0		45		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		62		nC

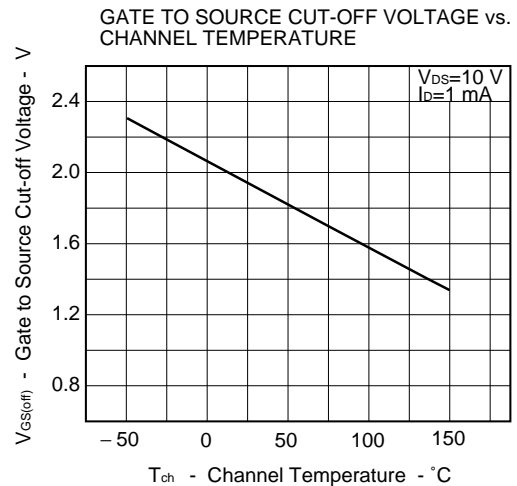
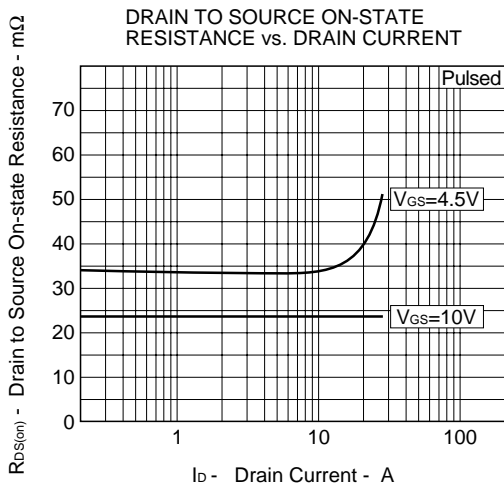
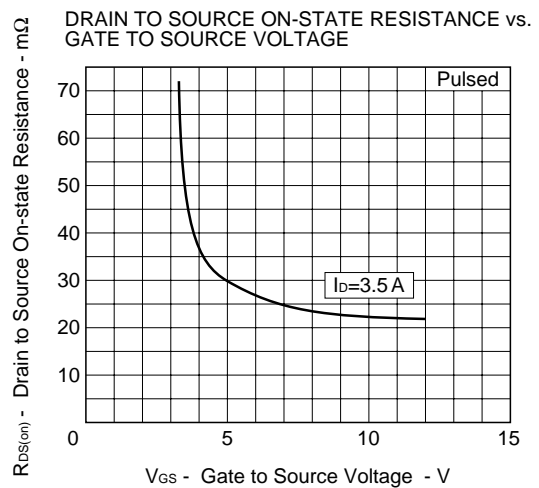
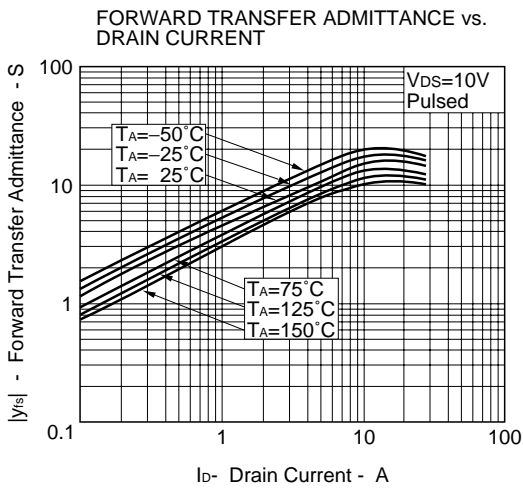
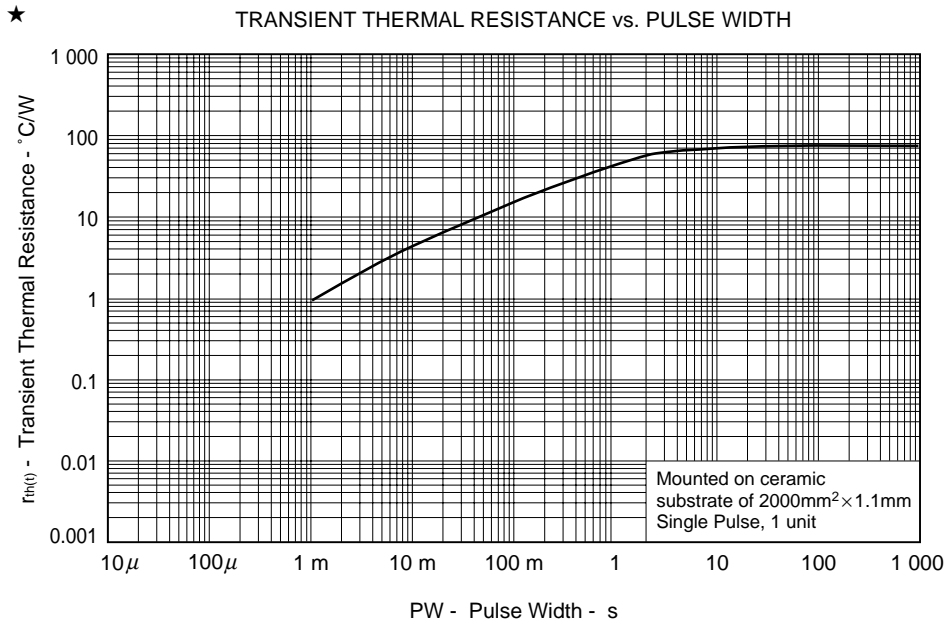
**TEST CIRCUIT 1 SWITCHING TIME**



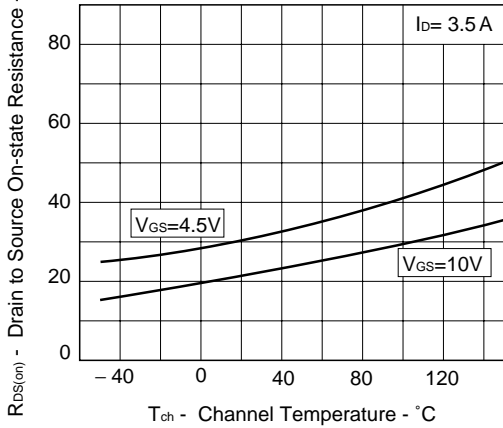
**TEST CIRCUIT 2 GATE CHARGE**



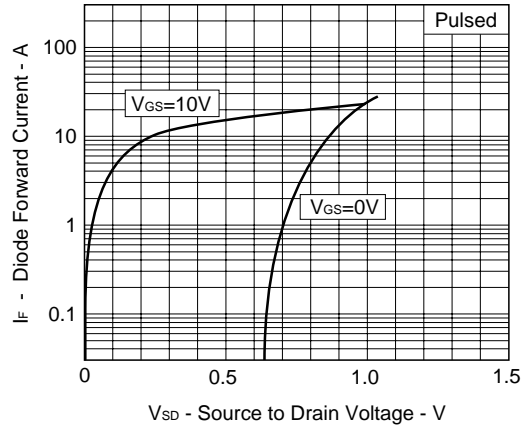
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)



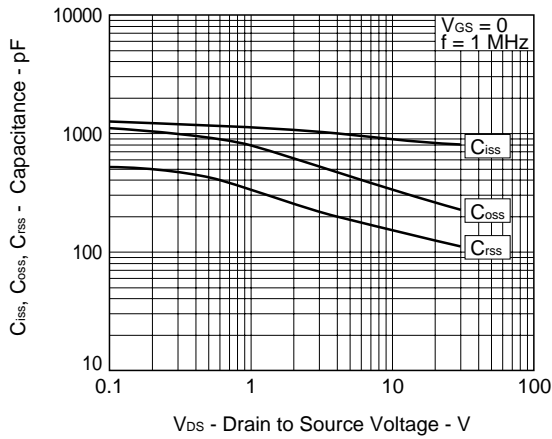
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



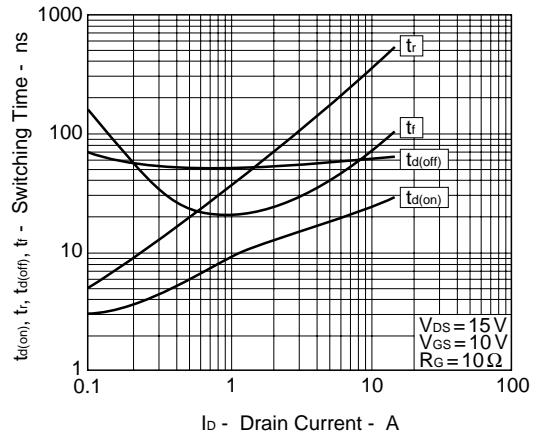
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



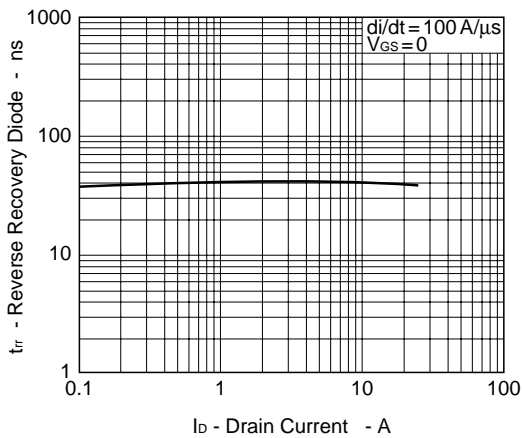
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



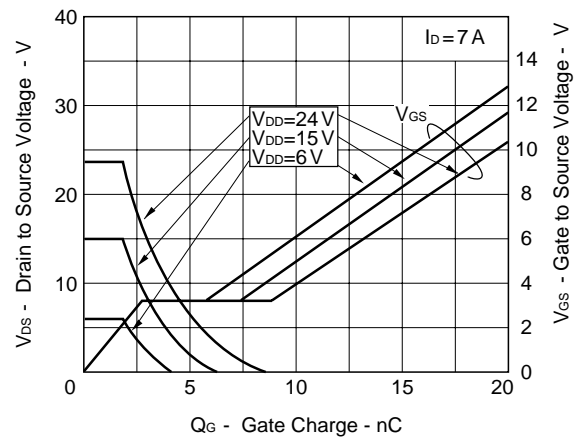
SWITCHING CHARACTERISTICS

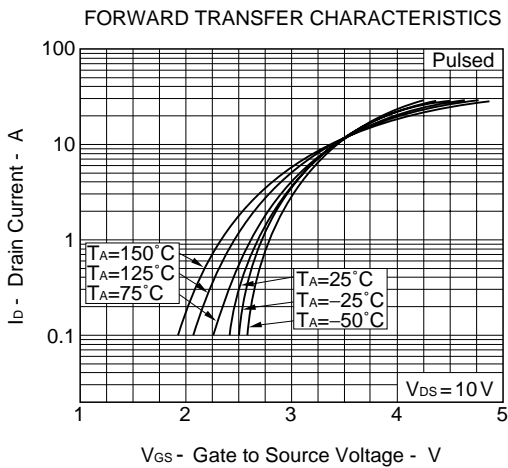
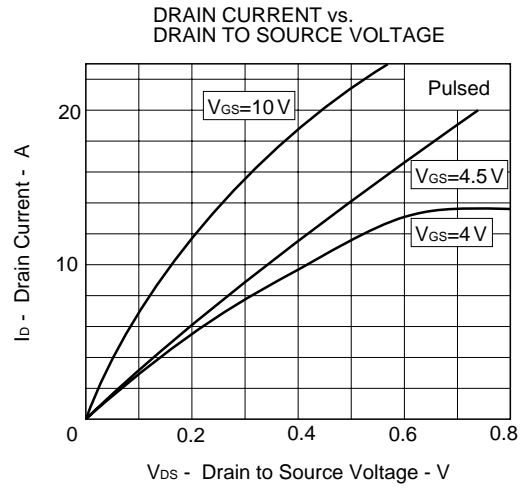
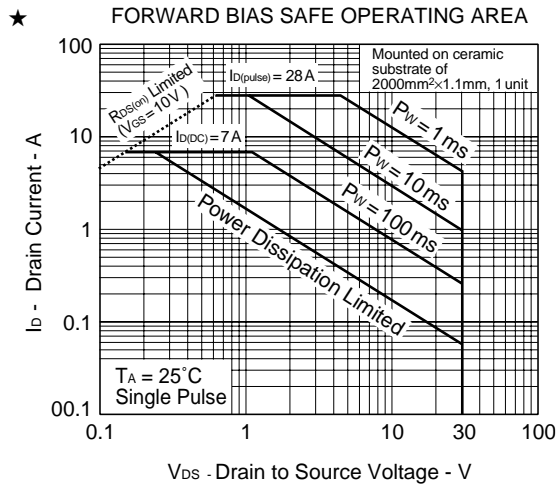
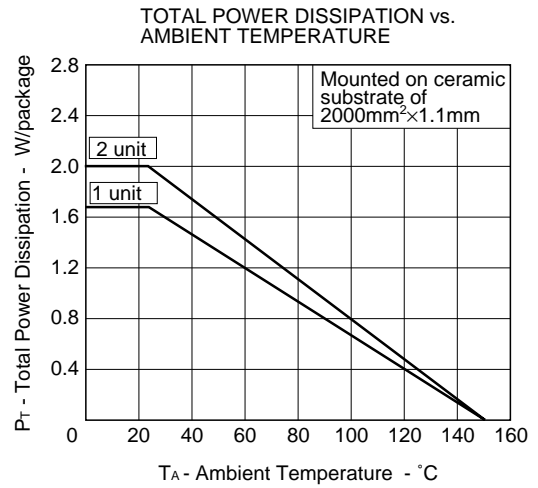
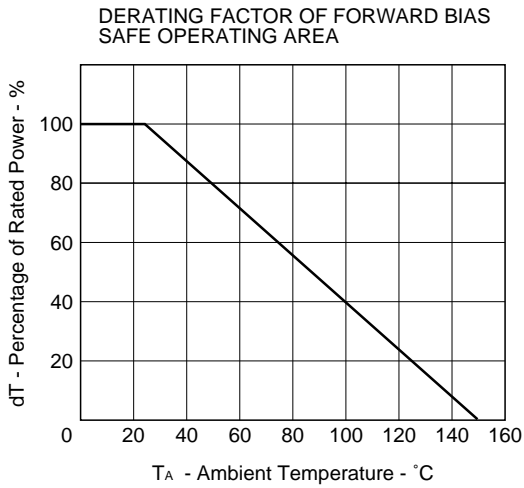


REVERSE RECOVERY TIME vs. DRAIN CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS





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