

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

This product is Dual N-Channel MOS Field Effect Transistor designed for power management application of notebook computers, and Li-ion battery application.

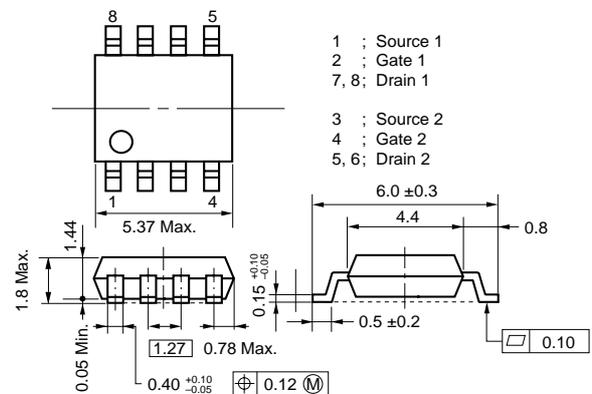
FEATURES

- Dual MOS FET chips in small package
- 2.5 V gate drive type low on-state resistance
 $R_{DS(on)1} = 30 \text{ m}\Omega$ (MAX.) ($V_{GS} = 4.5 \text{ V}$, $I_D = 3.0 \text{ A}$)
 $R_{DS(on)2} = 40 \text{ m}\Omega$ (MAX.) ($V_{GS} = 2.5 \text{ V}$, $I_D = 3.0 \text{ A}$)
- Low C_{iss} : $C_{iss} = 1100 \text{ pF}$ (TYP.)
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1758G	Power SOP8

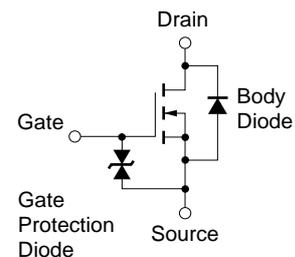
PACKAGE DRAWING (Unit : mm)



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage ($V_{GS} = 0$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0$)	V_{GSS}	±12.0	V
Drain Current (DC)	$I_{D(DC)}$	±6.0	A
Drain Current (Pulse) ^{Note1}	$I_{D(pulse)}$	±24	A
Total Power Dissipation (1 unit) ^{Note2}	P_T	1.7	W
Total Power Dissipation (2 unit) ^{Note2}	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to + 150	°C

EQUIVALENT CIRCUIT



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

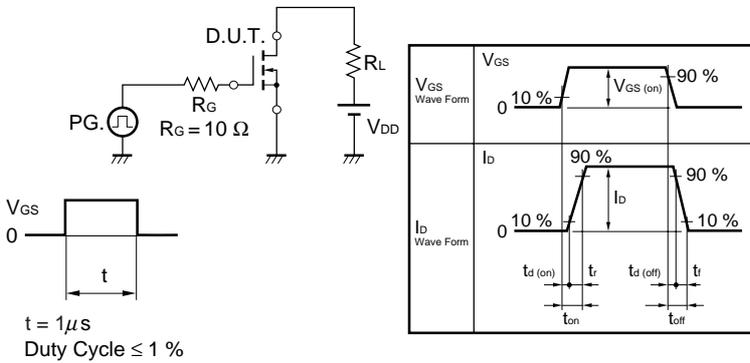
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

The information in this document is subject to change without notice.

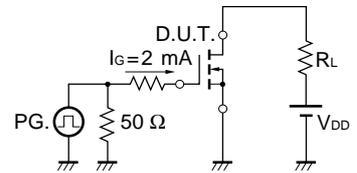
ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = 4.5\text{ V}, I_D = 3.5\text{ A}$		20	30	mΩ
	$R_{DS(on)2}$	$V_{GS} = 2.5\text{ V}, I_D = 3.5\text{ A}$		25	40	mΩ
Gate to Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1.0\text{ mA}$	0.5	0.8	1.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 3.5\text{ A}$	5.0	13		S
Drain Leakage Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0$			10	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 12.0\text{ V}, V_{DS} = 0$			±10	μA
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$		1100		pF
Output Capacitance	C_{oss}			370		pF
Reverse Transfer Capacitance	C_{riss}			170		pF
Turn-on Delay Time	$t_{d(on)}$	$I_D = 3.0\text{ A}, V_{GS(on)} = 4.0\text{ V}, V_{DD} = 15\text{ V}$ $R_G = 10\ \Omega$		50		ns
Rise Time	t_r			190		ns
Turn-off Delay Time	$t_{d(off)}$			550		ns
Fall Time	t_f			490		ns
Total Gate Charge	Q_G	$I_D = 6.0\text{ A}, V_{DD} = 24\text{ V}, V_{GS} = 4.0\text{ V}$		15.0		nC
Gate to Source Charge	Q_{GS}			2.0		nC
Gate to Drain Charge	Q_{GD}			6.5		nC
Body Diode forward Voltage	$V_{F(S-D)}$	$I_F = 6.0\text{ A}, V_{GS} = 0$		0.8		V

TEST CIRCUIT 1 SWITCHING TIME

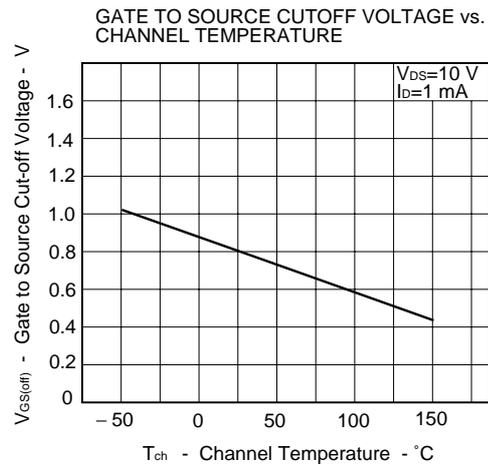
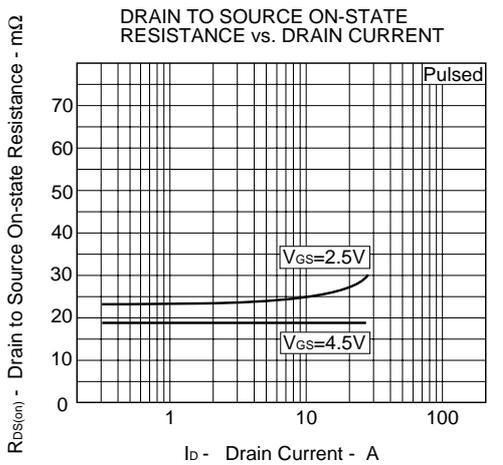
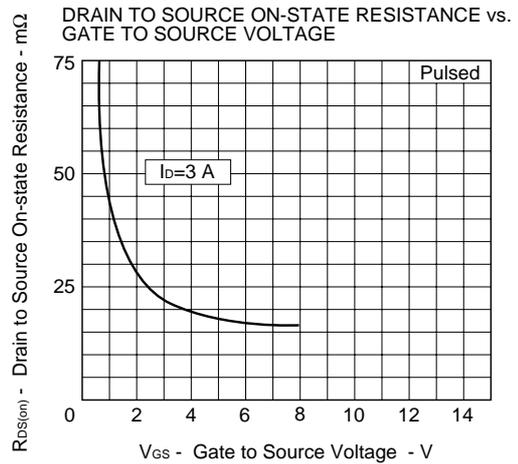
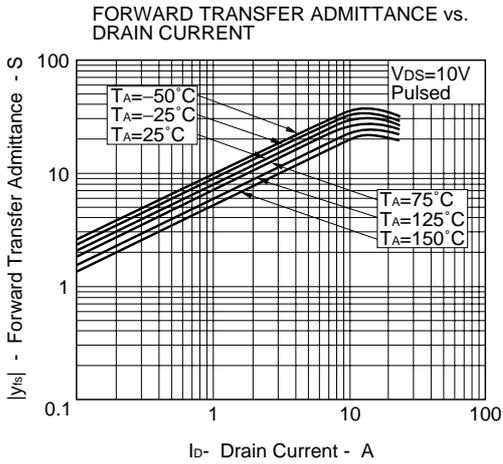
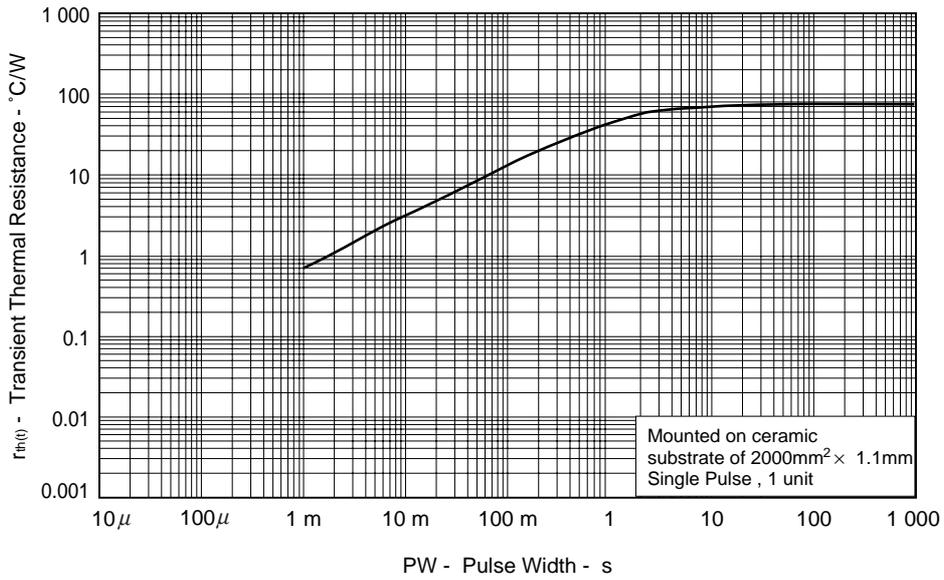


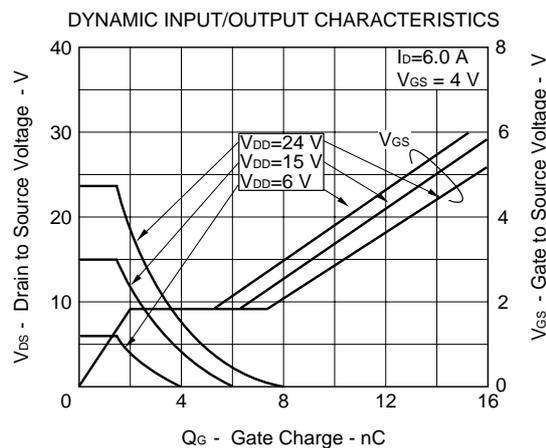
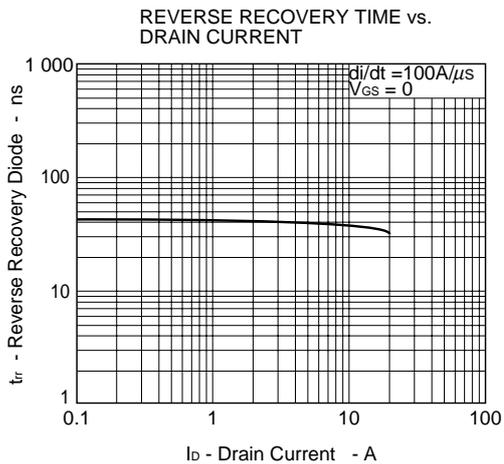
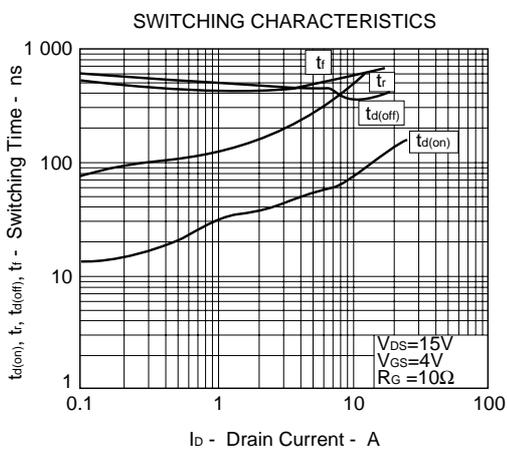
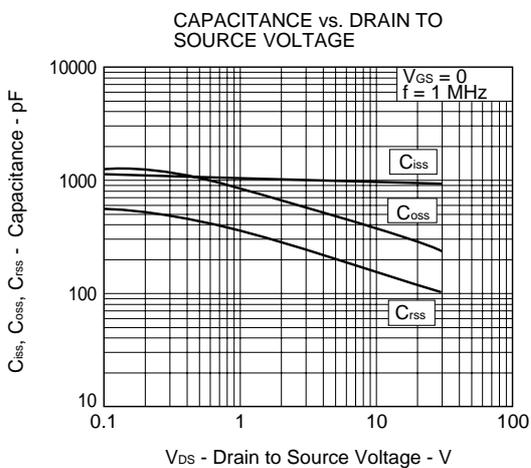
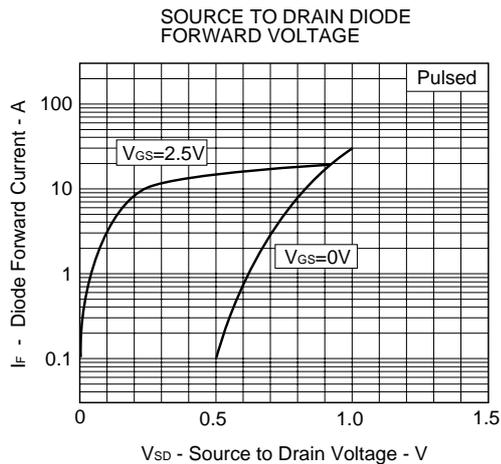
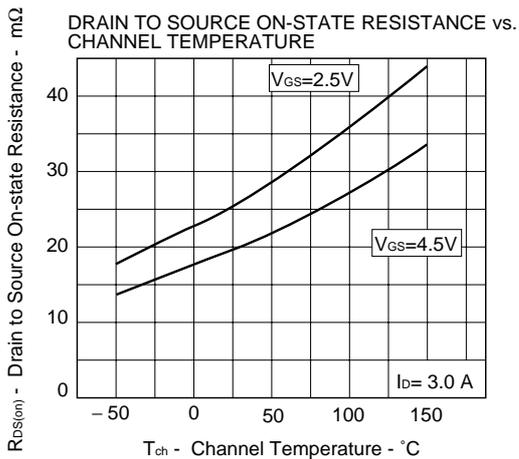
TEST CIRCUIT 2 GATE CHARGE



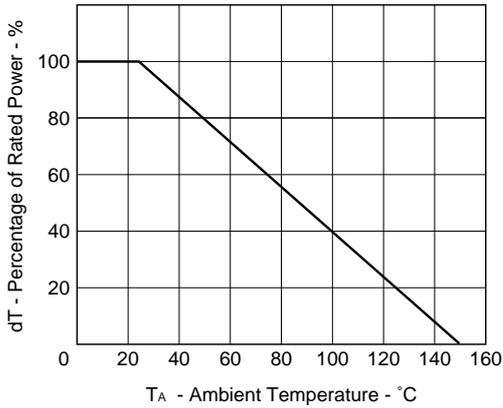
TYPICAL CHARACTERISTICS (T_A = 25 °C)

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

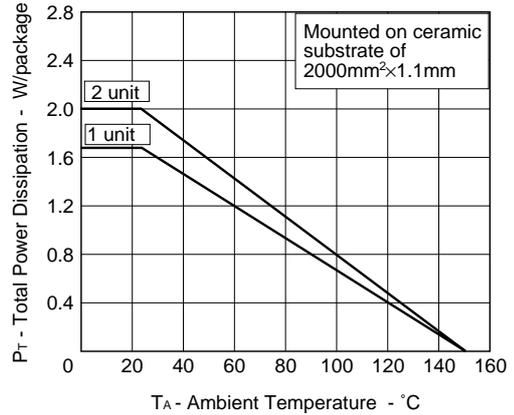




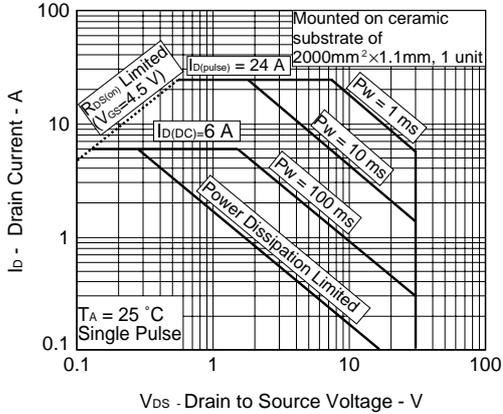
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



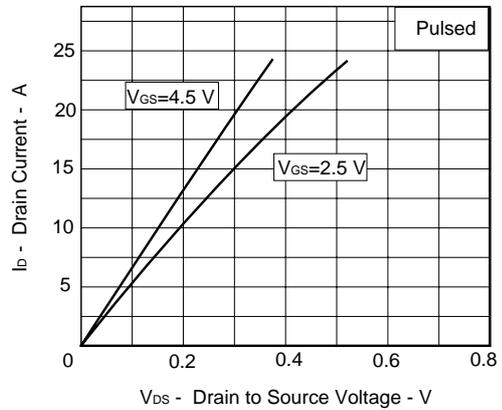
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



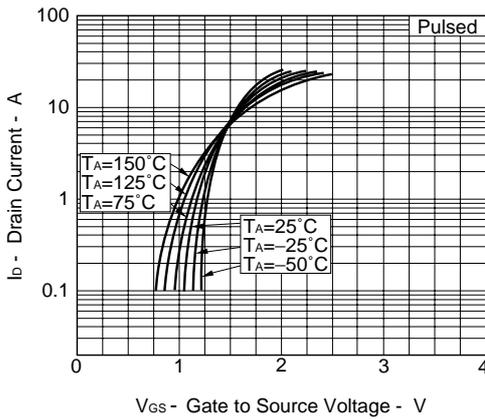
FORWARD BIAS SAFE OPERATING AREA



DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



FORWARD TRANSFER CHARACTERISTICS



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Anti-radioactive design is not implemented in this product.