NEC

MOS FIELD EFFECT TRANSISTOR

μPA1758

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

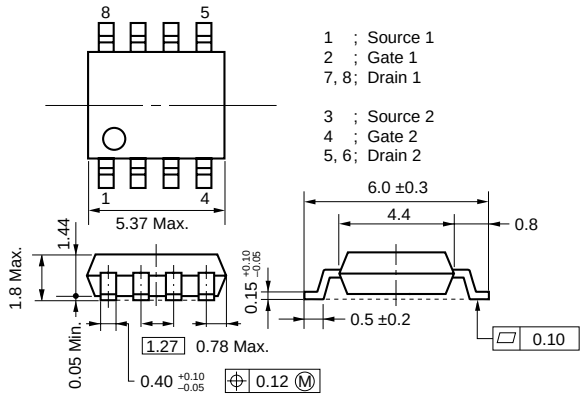
DESCRIPTION

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 mΩ (MAX.) (V_{GS} = 4.5 V, I_D = 3.0 A)
  $R_{DS(on)2}$ = 40 mΩ (MAX.) (V_{GS} = 2.5 V, I_D = 3.0 A)
- Low C_{iss} : C_{iss} = 1100 pF (TYP.)
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit : mm)



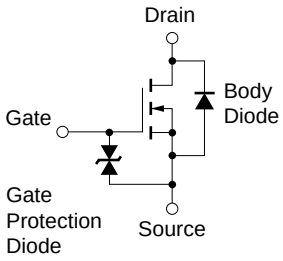
ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1758G	Power SOP8

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 ≤ 10 μs, Duty cycle ≤ 1 %

2. Mounted on ceramic substrate of 2000 mm^2 x 1.1 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.

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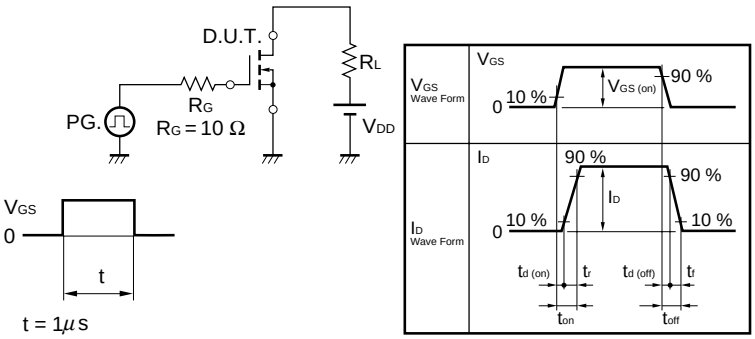
The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

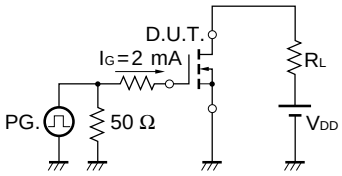
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 4.5 V, I_D = 3.5 A		20	30	mΩ
	$R_{DS(on)2}$	V_{GS} = 2.5 V, I_D = 3.5 A		25	40	mΩ
Gate to Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1.0 mA	0.5	0.8	1.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 3.5 A	5.0	13		S
Drain Leakage Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±12.0 V, V_{DS} = 0			±10	μA
Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz		1100		pF
Output Capacitance	C_{oss}			370		pF
Reverse Transfer Capacitance	C_{rss}			170		pF
Turn-on Delay Time	$t_{d(on)}$	I_D = 3.0 A, $V_{GS(on)}$ = 4.0 V, V_{DD} = 15 V		50		ns
Rise Time	t_r	R_G = 10 Ω		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 A, V_{DD} = 24 V, V_{GS} = 4.0 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 A, V_{GS} = 0		0.8		V

TEST CIRCUIT 1 SWITCHING TIME



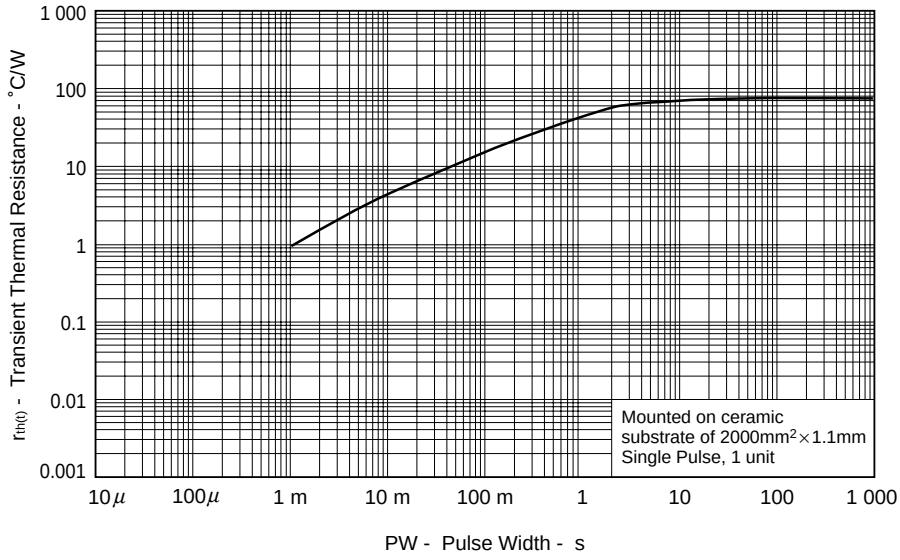
t = 1μs
Duty Cycle ≤ 1 %

TEST CIRCUIT 2 GATE CHARGE

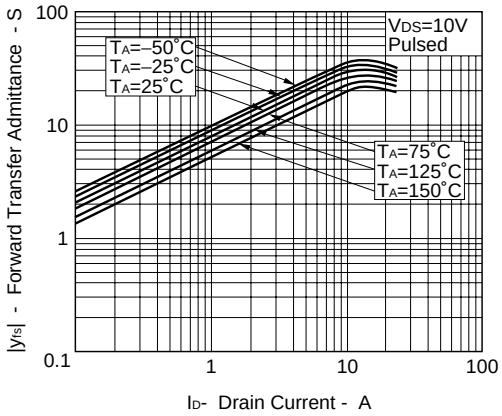


TYPICAL CHARACTERISTICS (T_A = 25 °C)

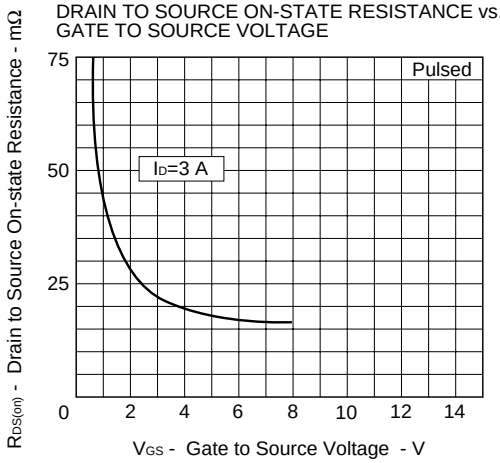
★ TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



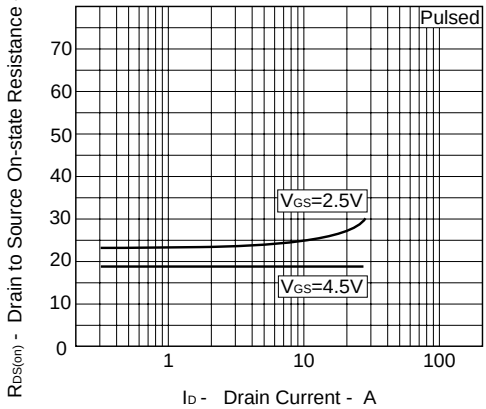
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



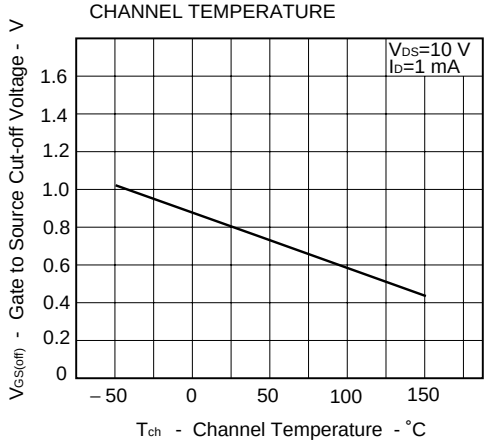
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



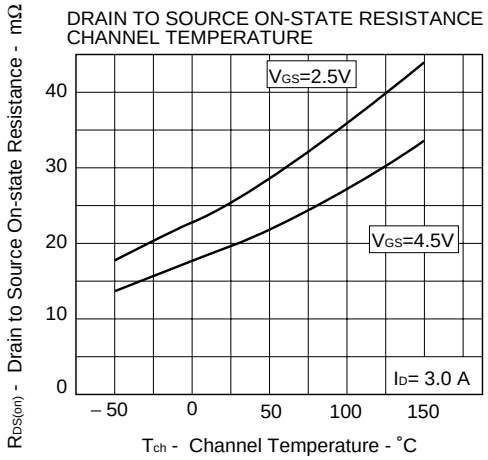
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



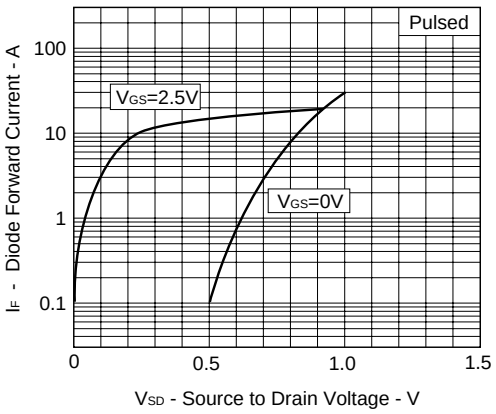
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



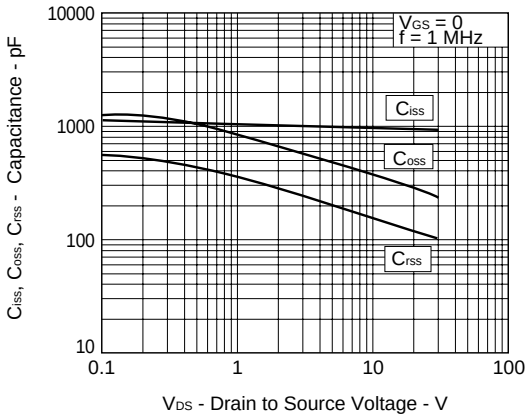
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



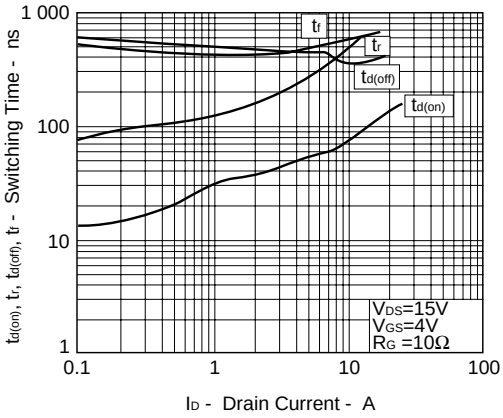
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



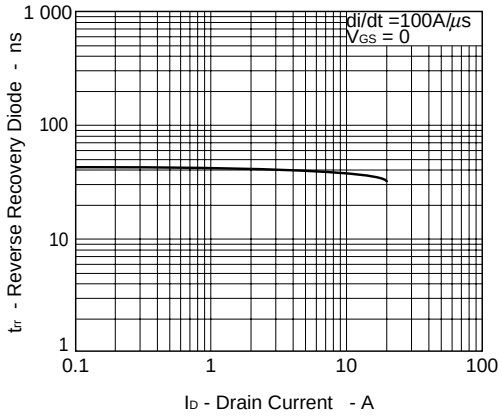
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



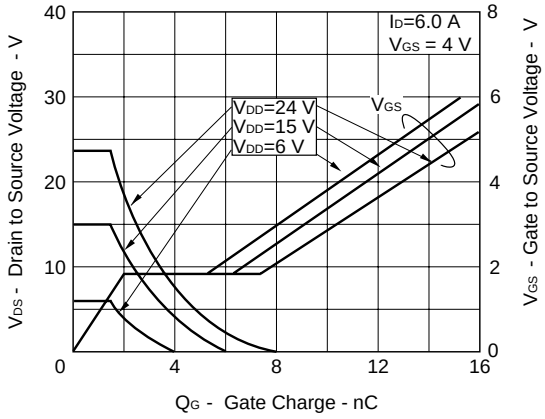
SWITCHING CHARACTERISTICS



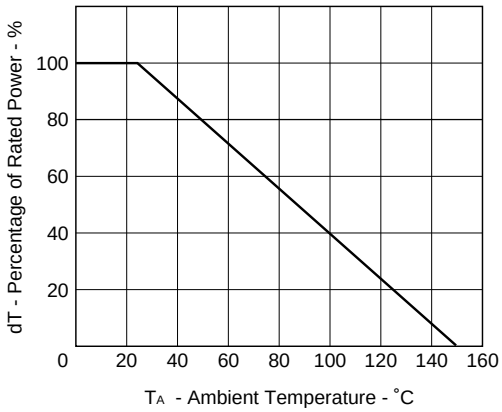
REVERSE RECOVERY DIODE vs. DRAIN CURRENT



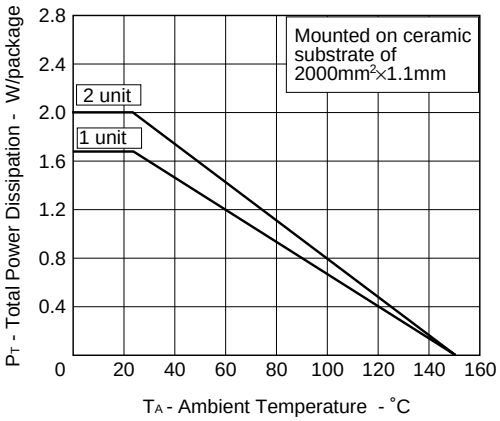
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



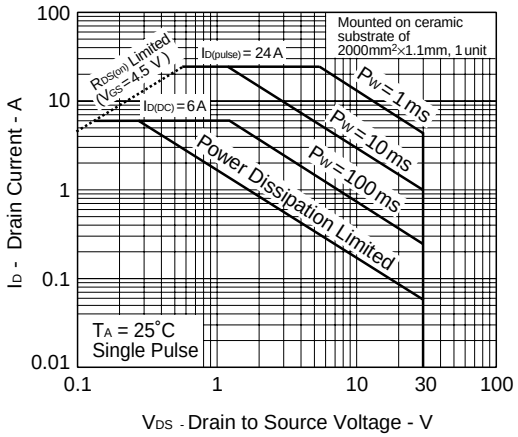
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



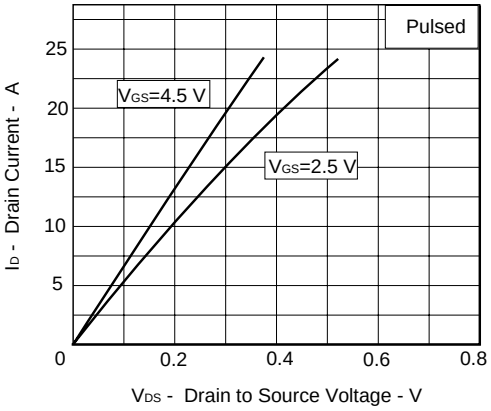
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



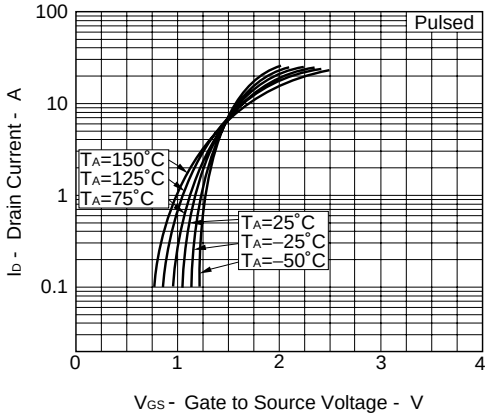
★ FORWARD BIAS SAFE OPERATING AREA



DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



FORWARD TRANSFER CHARACTERISTICS



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