NEC

MOS FIELD EFFECT TRANSISTOR

μPA1733

SWITCHING
P-CHANNEL POWER MOS FET
INDUSTRIAL USE

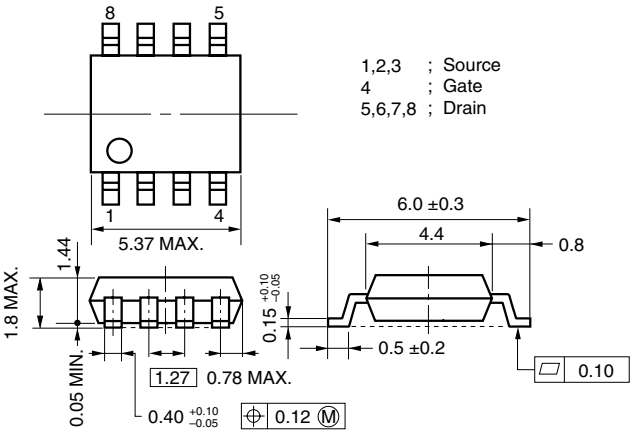
DESCRIPTION

The μPA1733 is P-Channel MOS Field Effect Transistor designed for power management applications of notebook computers and Li-ion battery protection circuit.

FEATURES

- Low on-resistance
  $R_{DS(on)1}$ = 10.3 mΩ TYP. (V_{GS} = –10 V, I_D = –5.0 A)
  $R_{DS(on)2}$ = 14.6 mΩ TYP. (V_{GS} = –4.5 V, I_D = –5.0 A)
  $R_{DS(on)3}$ = 16.5 mΩ TYP. (V_{GS} = –4.0 V, I_D = –5.0 A)
- Low C_{iss} : C_{iss} =2600 pF TYP.
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit: mm)



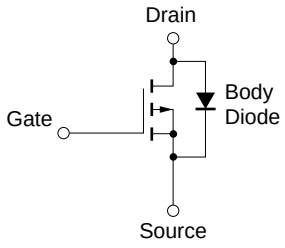
ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1733G	Power SOP8

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected.)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	–30	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	∓ 20	V
Drain Current (DC)	$I_{D(DC)}$	∓ 10	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	∓ 40	A
Total Power Dissipation (T_A = 25°C) 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 1200 mm^2 x 2.2 mm

Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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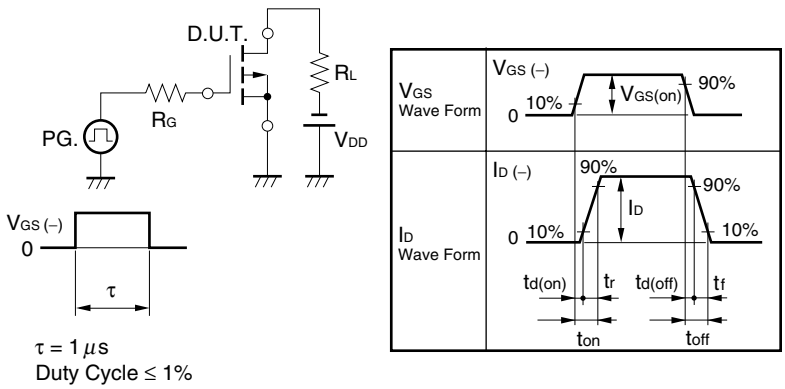
The mark ★ shows major revised points.

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

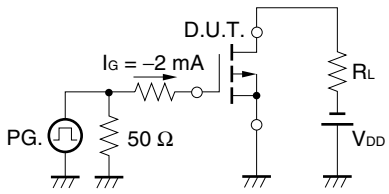
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = –10 V, I_D = –5.0 A		10.3	13.0	mΩ
	$R_{DS(on)2}$	V_{GS} = –4.5 V, I_D = –5.0 A		14.6	19.5	mΩ
	$R_{DS(on)3}$	V_{GS} = –4.0 V, I_D = –5.0 A		16.5	22.0	mΩ
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = –1 mA	–1.0	–1.6	–2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –5.0 A	8.0	18.0		S
Drain Leakage Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			–1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ∓ 20 V, V_{DS} = 0 V			∓ 100	nA
Input Capacitance	C_{iss}	V_{DS} = –10 V		2600		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		810		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		350		pF
Turn-on Delay Time	$t_{d(on)}$	I_D = –5.0 A		32		ns
Rise Time	t_r	$V_{GS(on)}$ = –10 V		185		ns
Turn-off Delay Time	$t_{d(off)}$	V_{DD} = –15 V		155		ns
Fall Time	t_f	R_G = 10 Ω		110		ns
Total Gate Charge	Q_G	I_D = –10 A		46		nC
Gate to Source Charge	Q_{GS}	V_{DD} = –24 V		6.5		nC
Gate to Drain Charge	Q_{GD}	V_{GS} = –10 V		12		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 10 A, V_{GS} = 0 V		0.80		V
Reverse Recovery Time	t_{rr}	I_F = 10 A, V_{GS} = 0 V		50		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/ μs		46		nC

TEST CIRCUIT 1 SWITCHING TIME



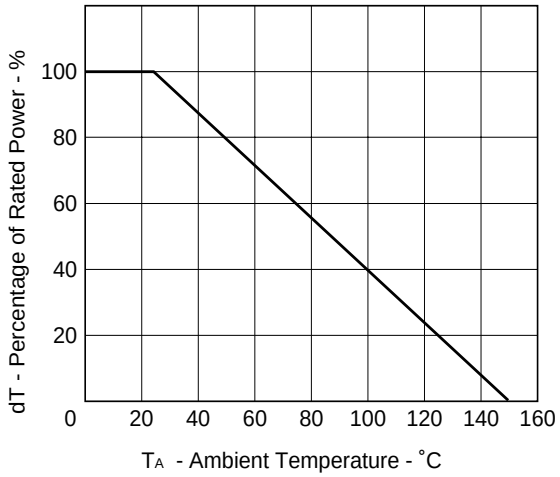
τ = 1 μs
Duty Cycle ≤ 1%

TEST CIRCUIT 2 GATE CHARGE

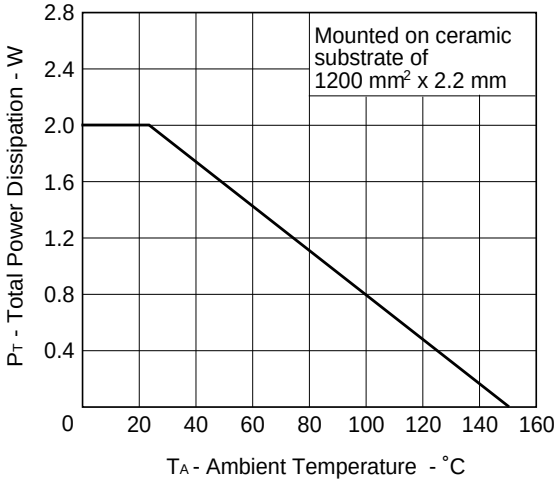


TYPICAL CHARACTERISTICS (T_A = 25°C)

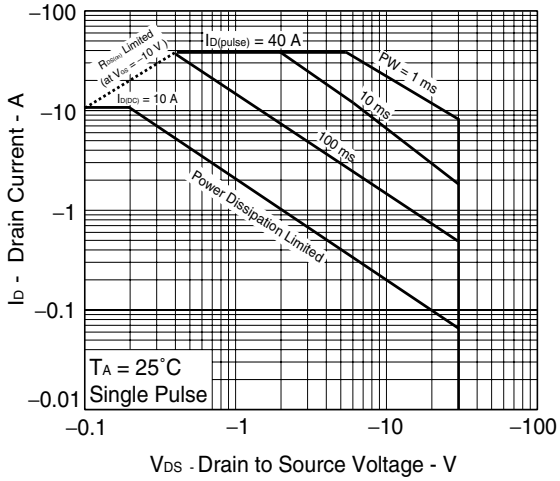
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

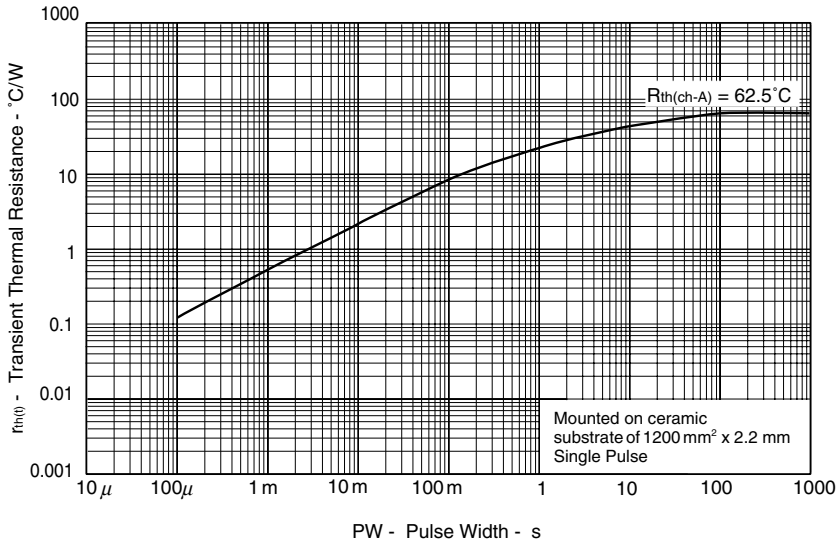


★ FORWARD BIAS SAFE OPERATING AREA

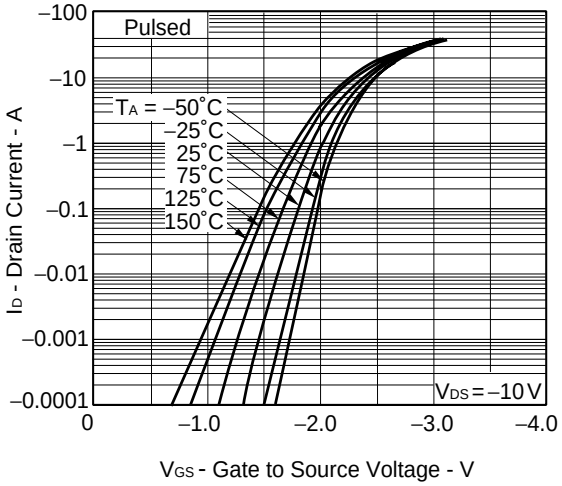


Remark Mounted on ceramic substrate of 1200 mm^2 x 2.2 mm

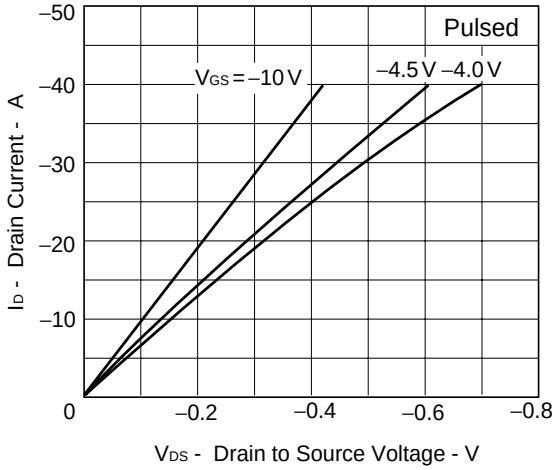
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



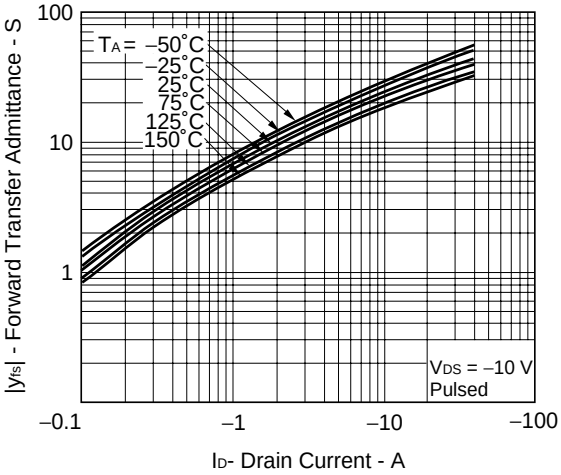
FORWARD TRANSFER CHARACTERISTICS



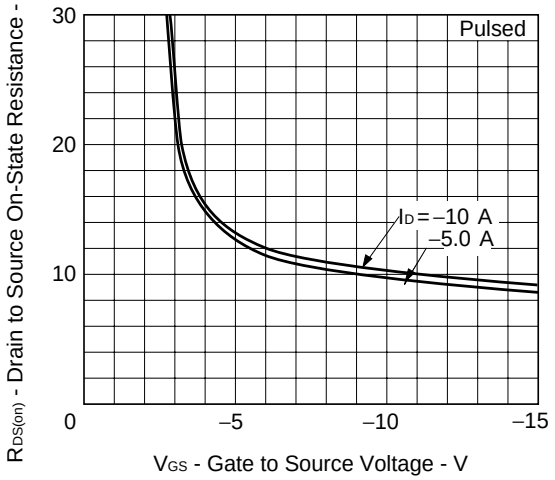
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



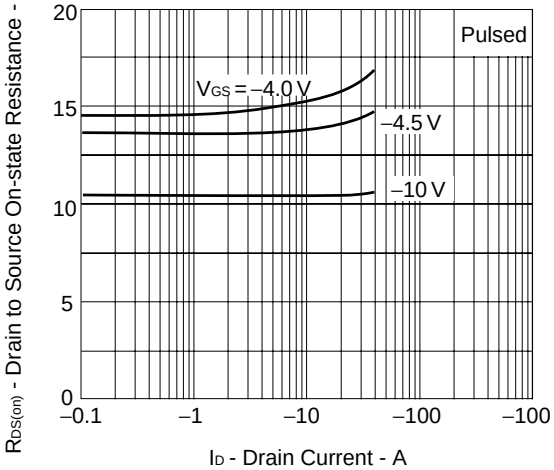
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



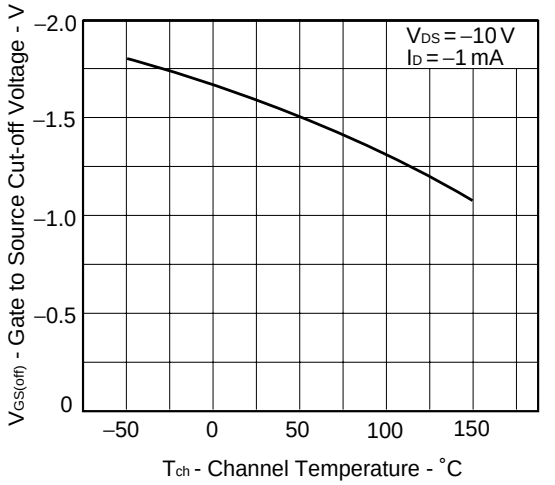
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



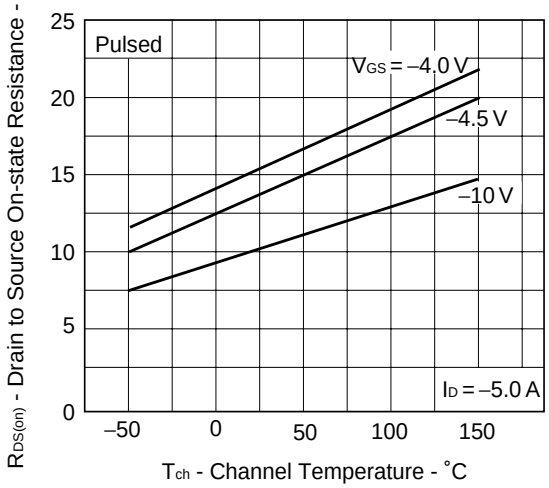
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



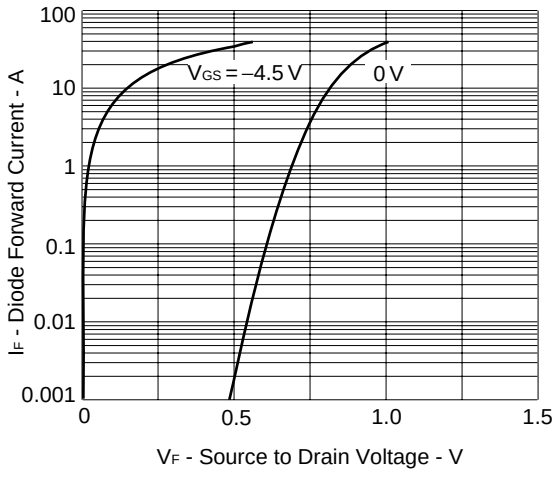
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



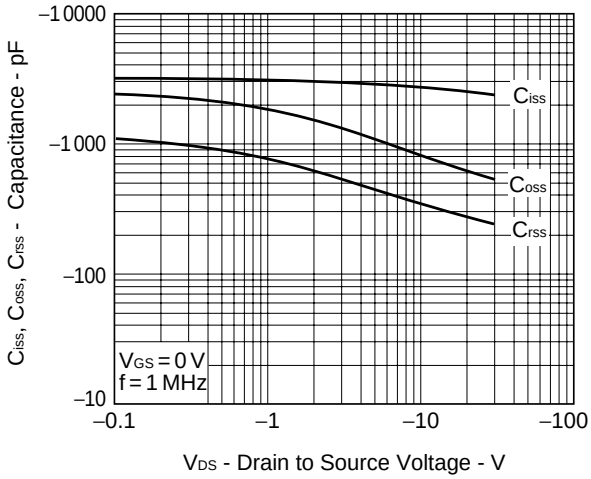
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



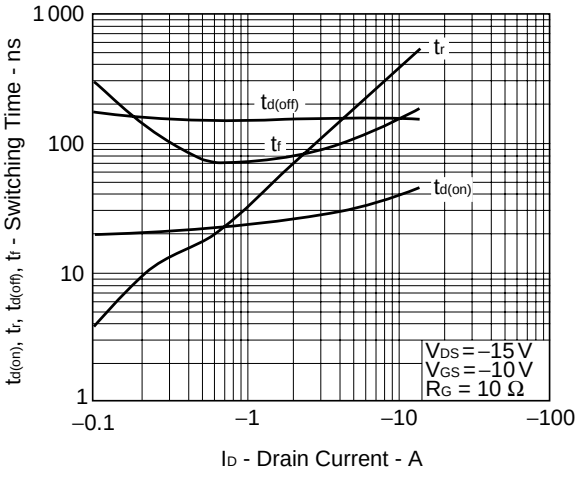
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



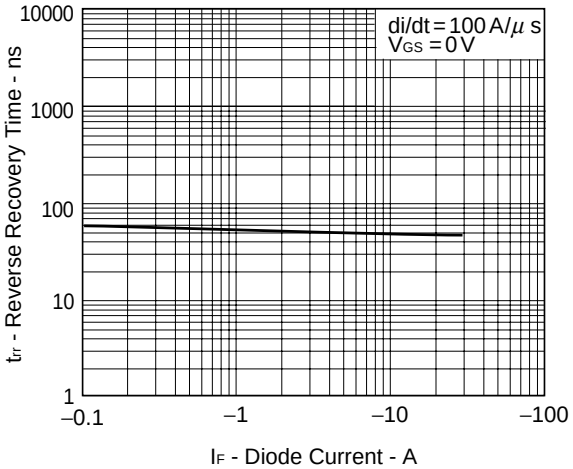
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



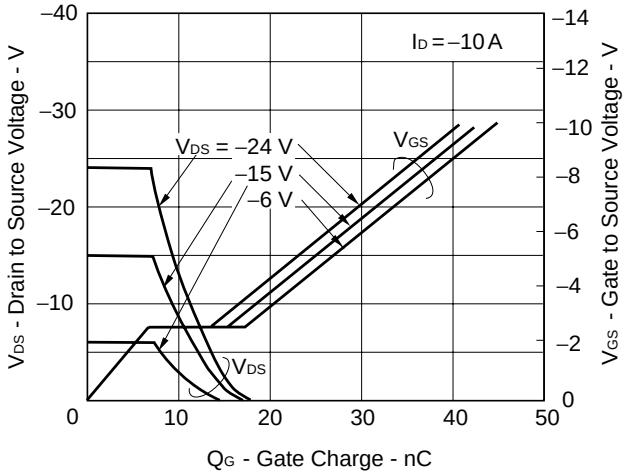
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



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