DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR

μPA1930

P-CHANNEL MOSFET FOR SWITCHING

DESCRIPTION

The μPA1930 is a P-channel MOSFET designed for power switch of portable machine and so on.

FEATURES

–4.5 V drive available

$R_{DS(on)1}$ = 77 mΩ MAX. (V_{GS} = –10 V, I_D = –2.5 A)

$R_{DS(on)2}$ = 100 mΩ MAX. (V_{GS} = –4.5 V, I_D = –2.5 A)

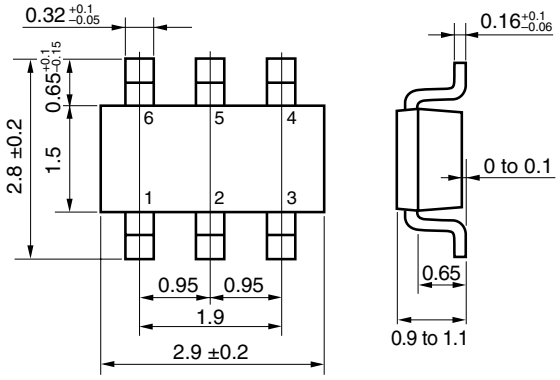
ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1930TE-T1-A μPA1930TE-T2-A	SC-95 (Mini Mold Thin Type)

Remark "-A" indicates Pb-free (This product does not contain Pb in external electrode and other parts).
"-T1", "-T2" indicates the unit orientation (8 mm embossed carrier tape, 3,000 pcs/reel).

Marking : UA

PACKAGE DRAWING (Unit : mm)

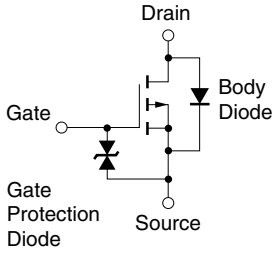


1, 2, 5, 6 : Drain
3 : Gate
4 : Source

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0V)	V_{DSS}	–30	V
Gate to Source Voltage (V_{DS} = 0V)	V_{GSS}	∓20	V
Drain Current (DC) Note1	$I_{D(DC)}$	∓4.5	A
Drain Current (pulse) Note2	$I_{D(pulse)}$	∓18	A
Total Power Dissipation	P_{T1}	0.2	W
Total Power Dissipation Note1	P_{T2}	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

EQUIVALENT CIRCUIT



Notes 1. Mounted on FR-4 Board 2500 mm² × 1.6 mm, t ≤ 5 sec

2. PW ≤ 10 μs, Duty Cycle ≤ 1%

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.

Caution This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge. V_{ESD} ± 150 V TYP. (C = 200 pF, R = 0 Ω, Single pulse)

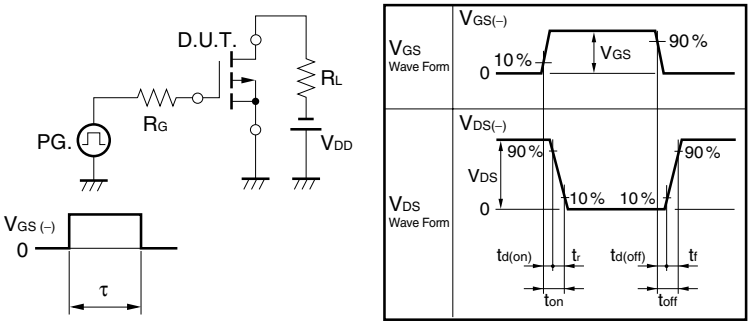
Document No. G18030EJ1V0DS00 (1st edition)
Date Published April 2006 NS CP(K)
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = −30 V, V_{GS} = 0 V			−1	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ∓16 V, V_{DS} = 0 V			∓10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = −10 V, I_D = −1.0 mA	−1.0		−2.5	V
Forward Transfer Admittance Note	$\|y_{fs}\|$	V_{DS} = −10 V, I_D = −2.5 A	1			S
Drain to Source On-state Resistance Note	$R_{DS(on)1}$	V_{GS} = −10 V, I_D = −2.5 A		58	77	mΩ
	$R_{DS(on)2}$	V_{GS} = −4.5 V, I_D = −2.5 A		77	100	mΩ
Input Capacitance	C_{iss}	V_{DS} = −10 V		325		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		78		pF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		65		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = −15 V, I_D = −2.5 A,		8.5		ns
Rise Time	t_r	V_{GS} = −10 V,		3.5		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 6 Ω		33		ns
Fall Time	t_f			19.5		ns
Total Gate Charge	Q_G	V_{DD} = −24 V,		7.5		nC
Gate to Source Charge	Q_{GS}	V_{GS} = −10 V,		1.1		nC
Gate to Drain Charge	Q_{GD}	I_D = −4.5 A		2.3		nC
Diode Forward Voltage Note	$V_{F(S-D)}$	I_F = 4.5 A, V_{GS} = 0 V		0.93		V

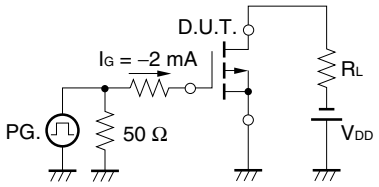
Note Pulsed

TEST CIRCUIT 1 SWITCHING TIME



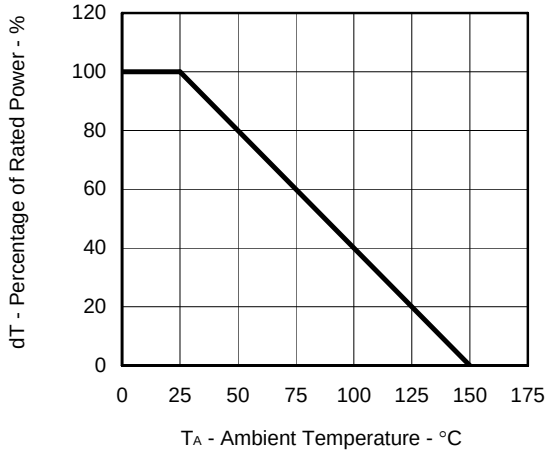
τ = 1 μs
Duty Cycle ≤ 1%

TEST CIRCUIT 2 GATE CHARGE

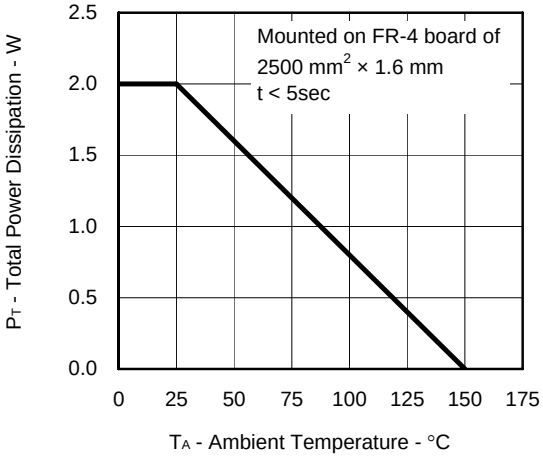


TYPICAL CHARACTERISTICS (T_A = 25°C)

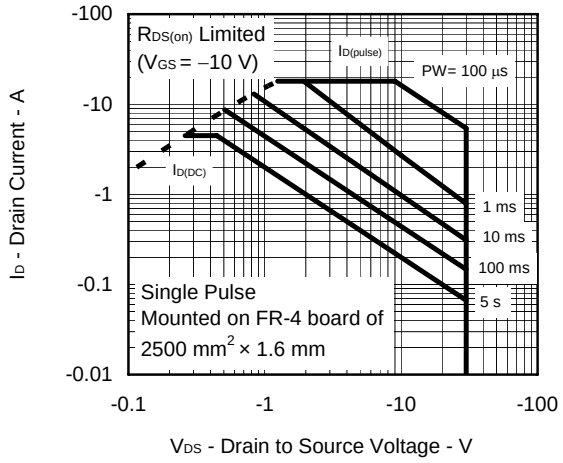
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



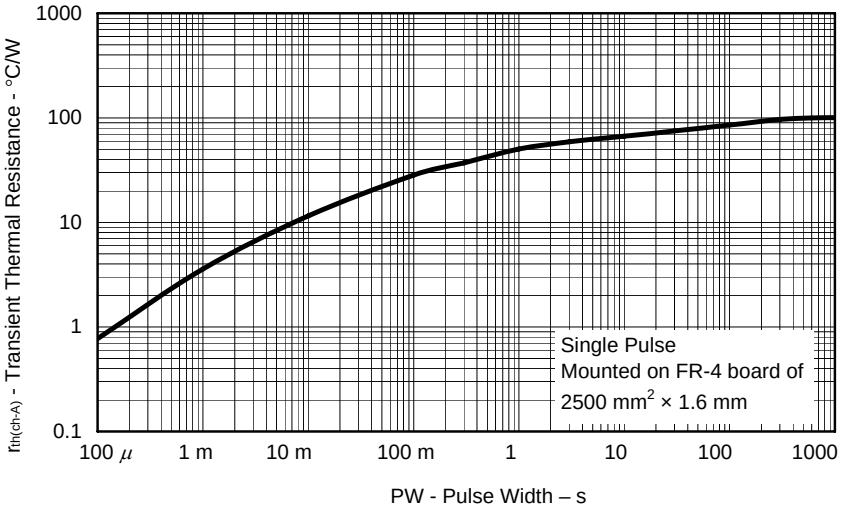
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



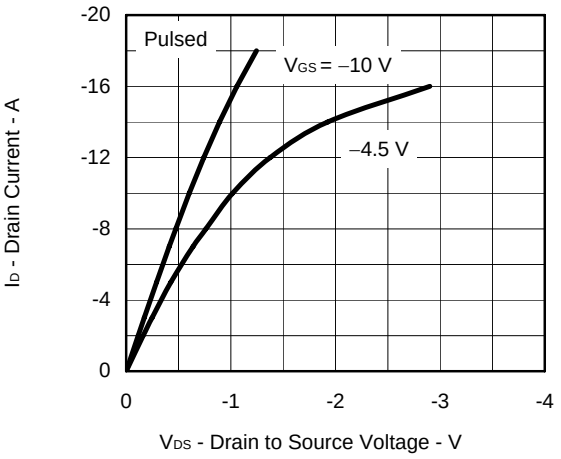
FORWARD BIAS SAFE OPERATING AREA



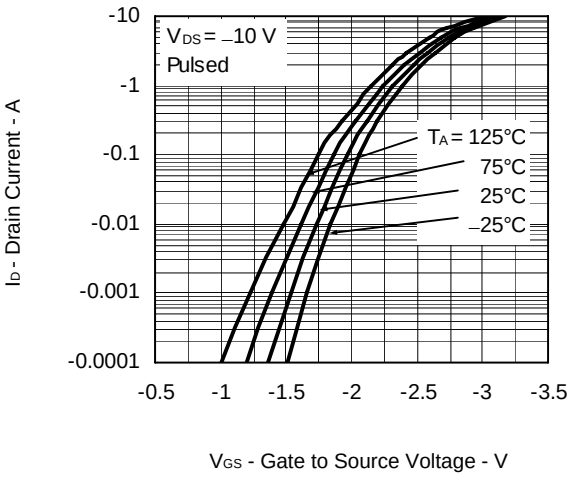
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



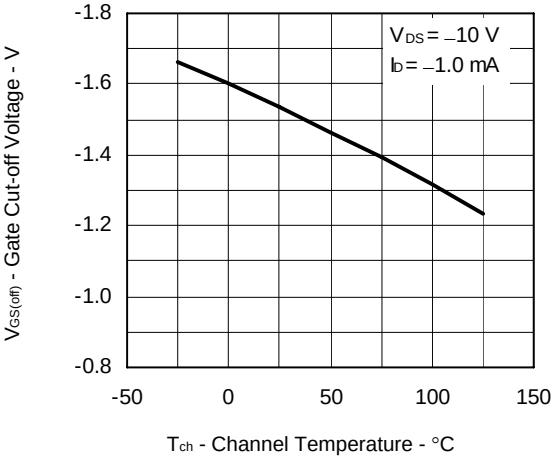
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



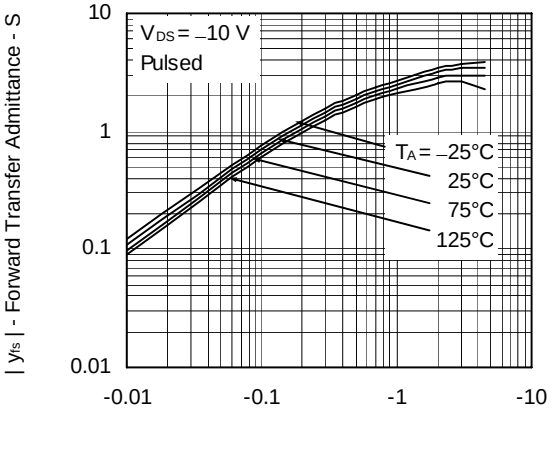
FORWARD TRANSFER CHARACTERISTICS



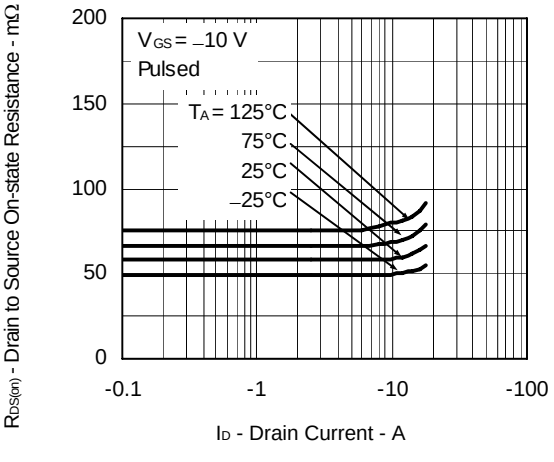
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



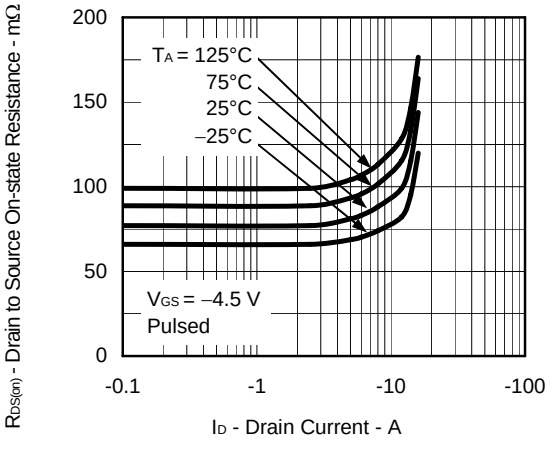
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



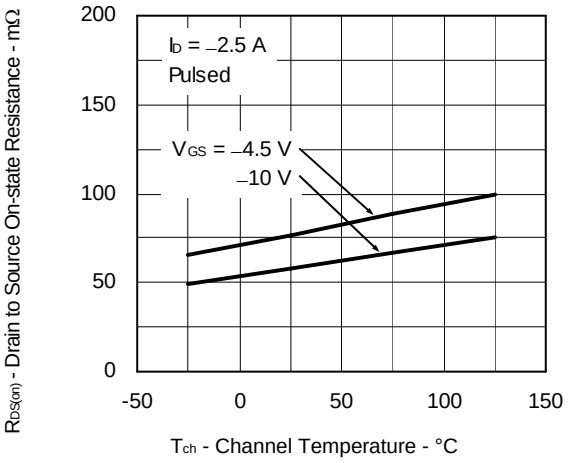
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



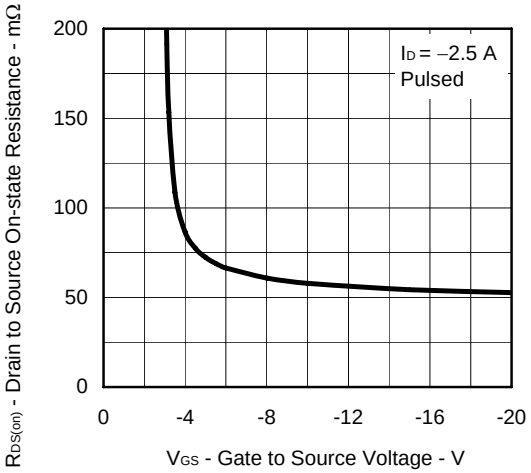
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



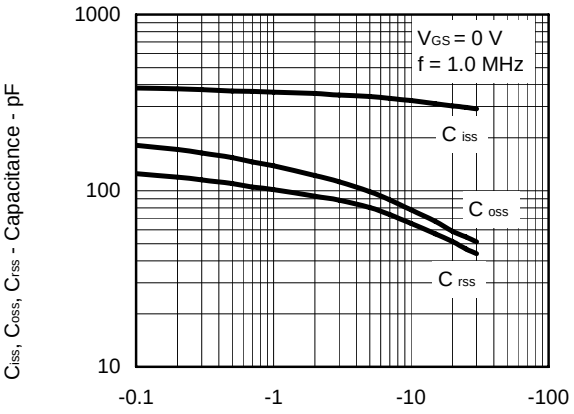
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. CHANNEL TEMPERATURE



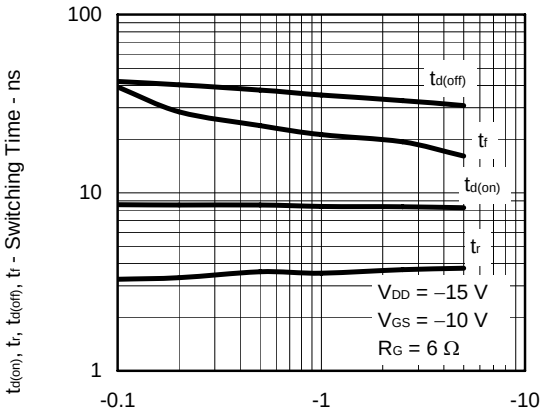
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. GATE TO SOURCE VOLTAGE



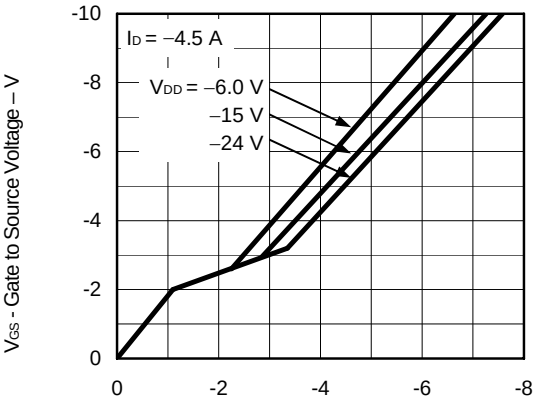
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



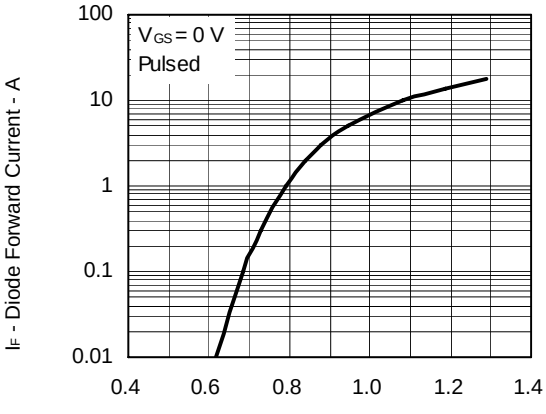
SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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