μPA1932TE

MOS FIELD EFFECT TRANSISTOR

R07DS0001EJ0100
Rev.1.00
May 31, 2010

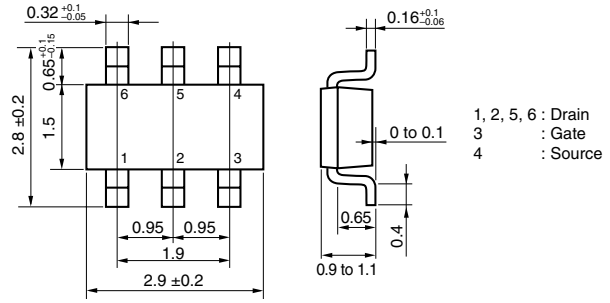
Description

The μPA1932TE is a switching device, which can be driven directly by a 4.5 V power source.
The μPA1932TE features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

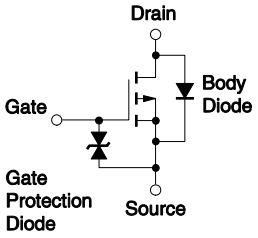
Features

- V_{DS} Maximum ratings -30 V (T_A = 25°C)
- 4.5 V drive available
- Low on-state resistance
  - $R_{DS(on)1}$ = 38 mΩ MAX. (V_{GS} = -10 V, I_D = -3.0 A)
  - $R_{DS(on)2}$ = 59 mΩ MAX. (V_{GS} = -4.5 V, I_D = -3.0 A)

Package Drawing (Unit: mm)



Equivalent Circuit



Ordering Information

Part No.	Package
μPA1932TE-T1-AT[Note]	SC-95 (Mini Mold Thin Type)
μPA1932TE-T2-AT[Note]	

Note: 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 p/reel).

Marking: UD

Absolute Maximum Ratings (T_A = 25°C)

Item	Symbol	Ratings	Unit
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)	$I_{D(DC)}$	∓6.0	A
Drain Current (pulse) [Note1]	$I_{D(pulse)}$	∓24	A
Total Power Dissipation	P_{T1}	0.2	W
Total Power Dissipation [Note2]	P_{T2}	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to + 150	°C
Single Avalanche Current [Note3]	I_{AS}	6.0	A
Single Avalanche Energy [Note3]	E_{AS}	3.6	mJ

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on a glass epoxy board of 2500 mm^2 x 1.6 mm , t ≤ 5 sec
3. Starting T_{ch} = 25°C, V_{DD} = -15 V, R_G = 25 Ω, L = 100 μH, V_{GS} = -20→0 V

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 for Electrostatic Discharge

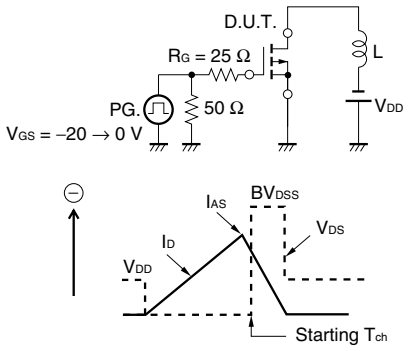
This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge. V_{ESD} ± 200 V TYP. (C = 200 pF, R = 0 Ω, Single pulse)

Electrical Characteristics (T_A = 25°C)

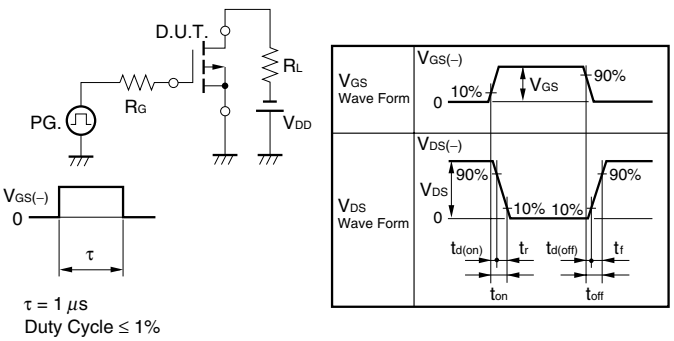
Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I_{DSS}			–1	μA	V_{DS} = –30 V, V_{GS} = 0 V
Gate Leakage Current	I_{GSS}			∓10	μA	V_{GS} = ∓16 V, V_{DS} = 0 V
Gate to Source Cut-off Voltage	$V_{GS(off)}$	–1.0	–1.6	–2.5	V	V_{DS} = –10 V, I_D = –1.0 mA
Forward Transfer Admittance Note	$\|y_{fs}\|$	2.5	5.0		S	V_{DS} = –10 V, I_D = –3.0 A
Drain to Source On-state Resistance Note	$R_{DS(on)1}$		30	38	mΩ	V_{GS} = –10 V, I_D = –3.0 A
	$R_{DS(on)2}$		36	59	mΩ	V_{GS} = –4.5 V, I_D = –3.0 A
Input Capacitance	C_{iss}		950		pF	V_{DS} = –10 V V_{GS} = 0 V f = 1.0 MHz
Output Capacitance	C_{oss}		210		pF	
Reverse Transfer Capacitance	C_{rss}		170		pF	
Turn-on Delay Time	$t_{d(on)}$		11		ns	V_{DD} = –15 V, I_D = –3.0 A, V_{GS} = –10 V, R_G = 6 Ω
Rise Time	t_r		10		ns	
Turn-off Delay Time	$t_{d(off)}$		73		ns	
Fall Time	t_f		30		ns	
Total Gate Charge	Q_G		20		nC	V_{DD} = –24 V, V_{GS} = –10 V, I_D = –6.0 A
Gate to Source Charge	Q_{GS}		2		nC	
Gate to Drain Charge	Q_{GD}		6		nC	
Body Diode Forward Voltage Note	$V_{F(S-D)}$		0.9		V	I_F = –6.0 A, V_{GS} = 0 V
Reverse Recovery Time	t_{rr}		36		ns	I_F = –6.0A, V_{GS} = 0 V, di/dt = –100A/μ s
Reverse Recovery Charge	Q_{rr}		23		nC	

Note: Pulsed

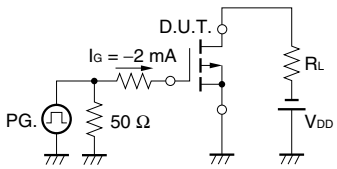
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

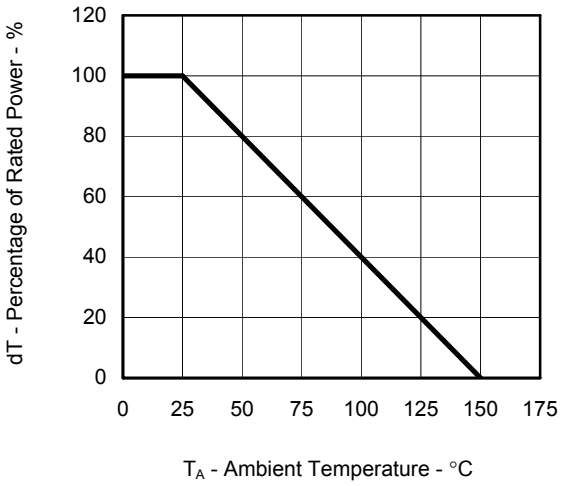


TEST CIRCUIT 3 GATE CHARGE

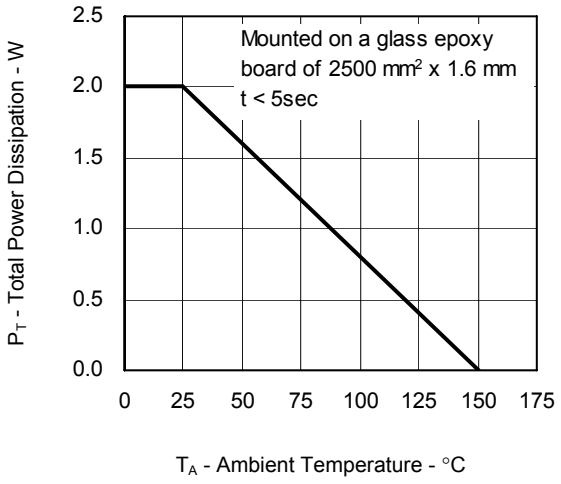


Typical Characteristics (T_A = 25°C)

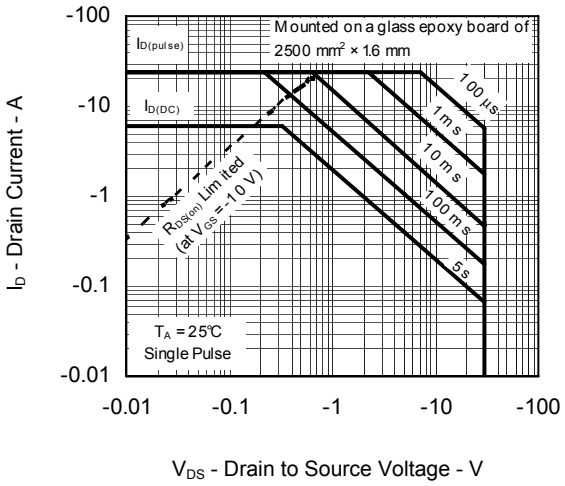
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



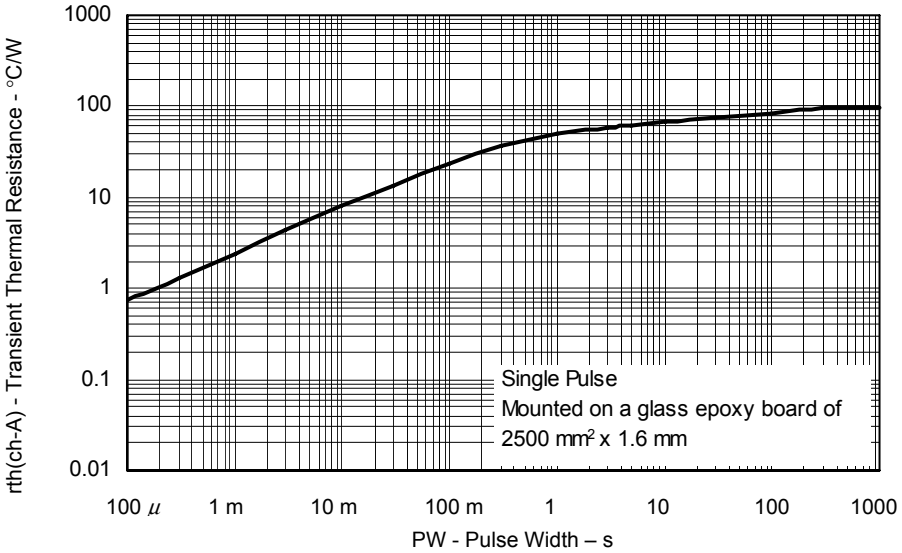
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



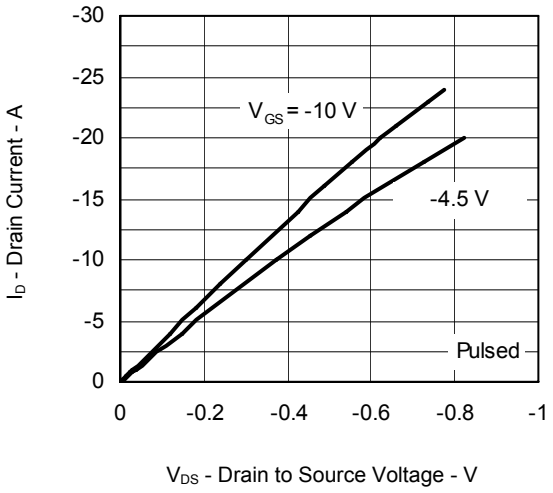
FORWARD BIAS SAFE OPERATING AREA



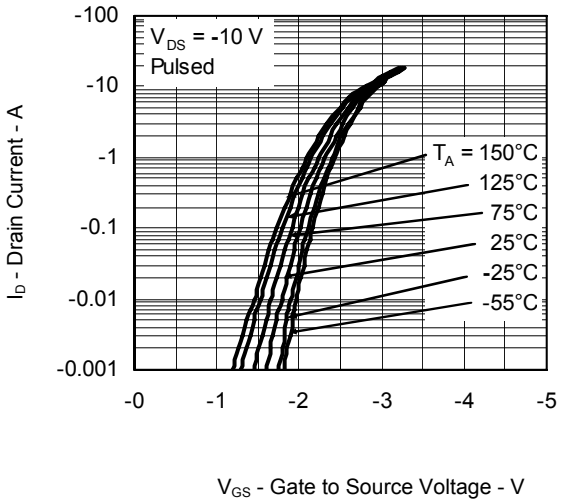
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



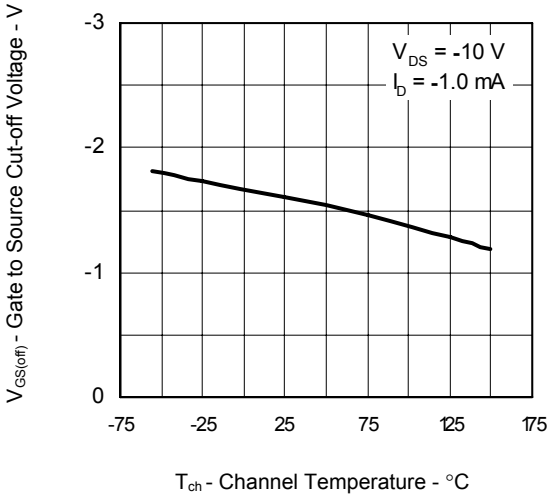
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



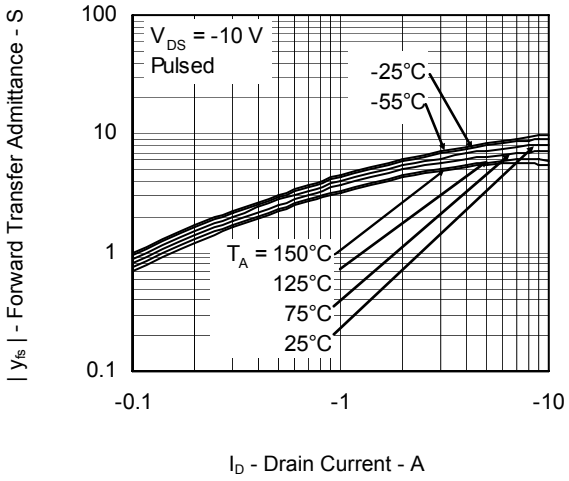
FORWARD TRANSFER CHARACTERISTICS



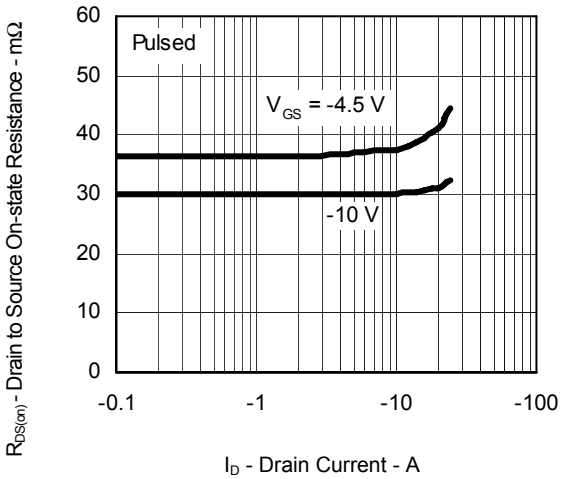
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



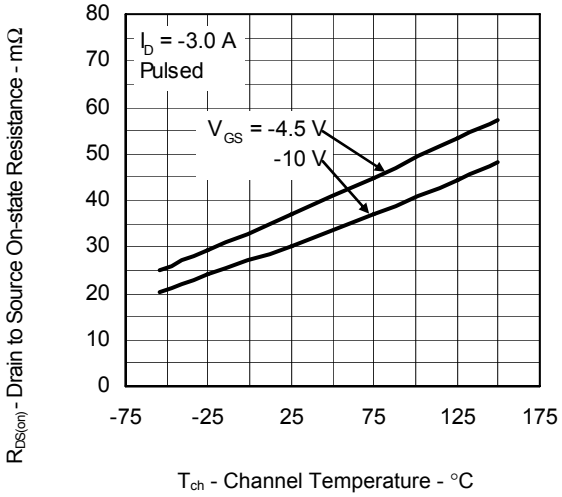
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



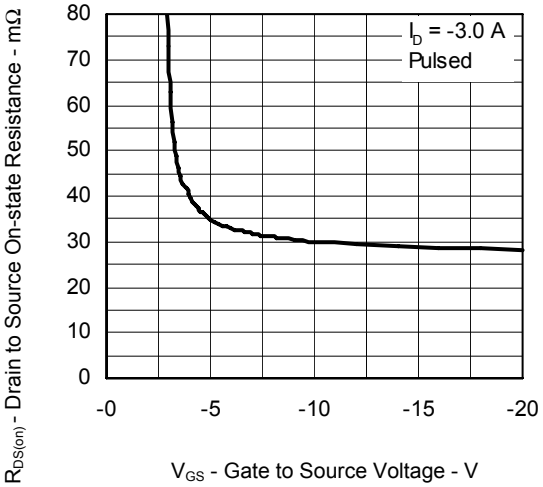
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



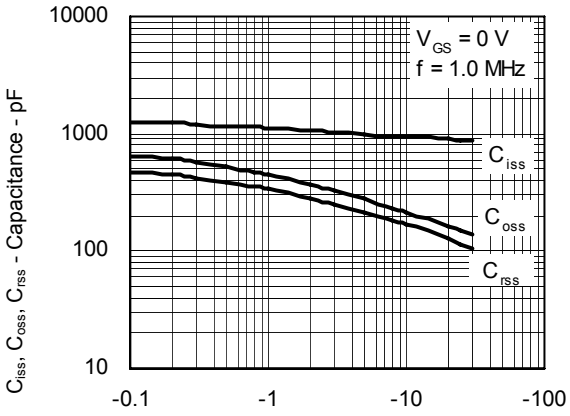
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



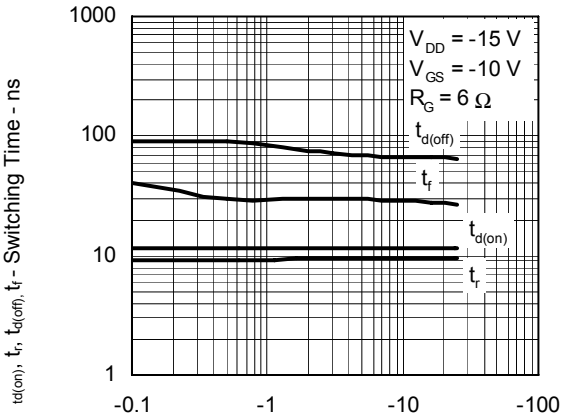
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



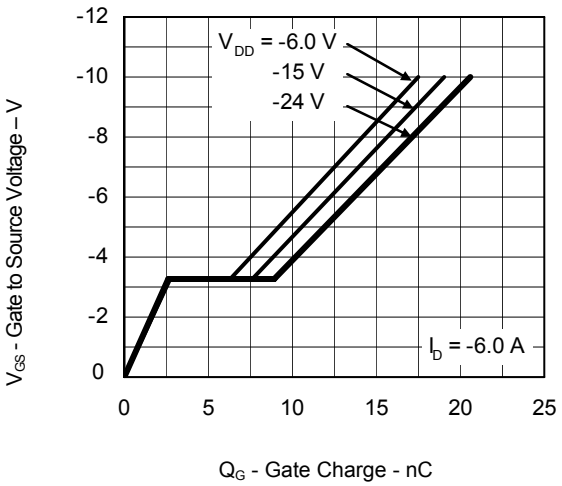
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



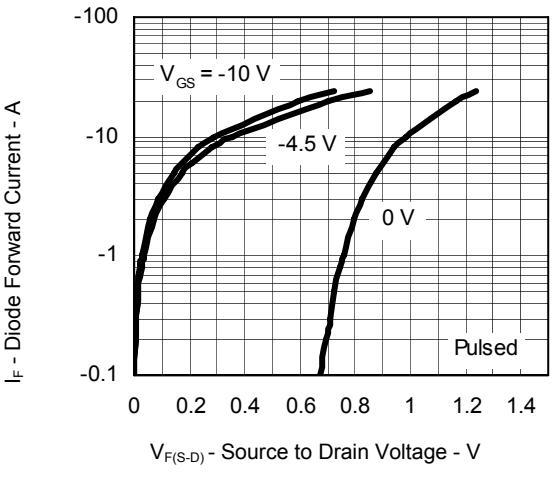
SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



Rev.	Date	Description	
		Page	Summary
1.00	May 31, 2010	-	First Edition issued

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