

MOS FIELD EFFECT TRANSISTOR

μ PA2722UT1A

SWITCHING

N-CHANNEL POWER MOSFET

DESCRIPTION

The μ PA2722UT1A is N-channel MOSFET designed for DC/DC converter applications.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 3.3 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 15 \text{ A)}$
 $R_{DS(on)2} = 4.6 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 15 \text{ A)}$
- Thin type surface mount package with heat spreader (8-pin HVSON)
- RoHS Compliant

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

| | | | |
|--|----------------|------------------------|------------------|
| Drain to Source Voltage ($V_{GS} = 0 \text{ V}$) | V_{DSS} | 30 | V |
| Gate to Source Voltage ($V_{DS} = 0 \text{ V}$) | V_{GSS} | ± 20 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ± 29 | A |
| Drain Current (pulse) ^{Note1} | $I_{D(pulse)}$ | ± 170 | A |
| Total Power Dissipation ^{Note2} | P_{T1} | 1.5 | W |
| Total Power Dissipation ($PW = 10 \text{ sec}$) ^{Note2} | P_{T2} | 4.6 | W |
| Channel Temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | $-55 \text{ to } +150$ | $^\circ\text{C}$ |
| Single Avalanche Current ^{Note3} | I_{AS} | 29 | A |
| Single Avalanche Energy ^{Note3} | E_{AS} | 84 | mJ |

THERMAL RESISTANCE

| | | | |
|--|----------------|------|--------------------|
| Channel to Ambient Thermal Resistance ^{Note2} | $R_{th(ch-A)}$ | 83.3 | $^\circ\text{C/W}$ |
| Channel to Case (Drain) Thermal Resistance | $R_{th(ch-C)}$ | 1.5 | $^\circ\text{C/W}$ |

Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

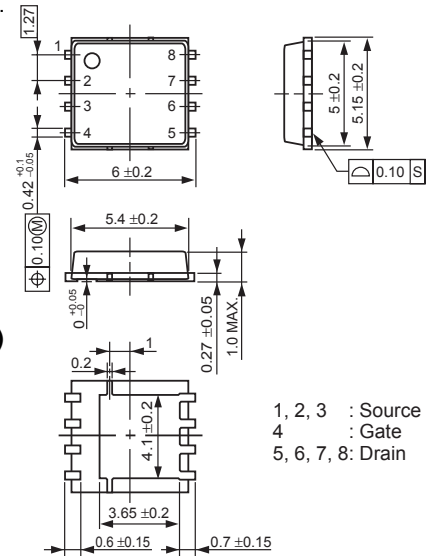
2. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

3. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 15 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 20 \rightarrow 0 \text{ V}$, $L = 100 \mu\text{H}$

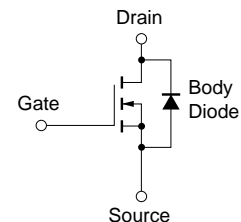
Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

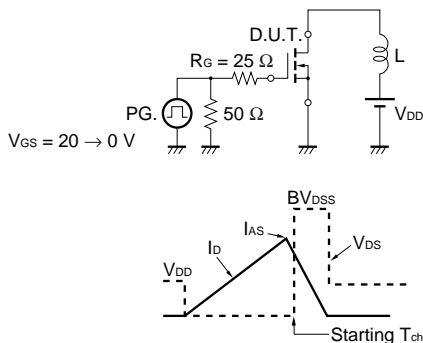


ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

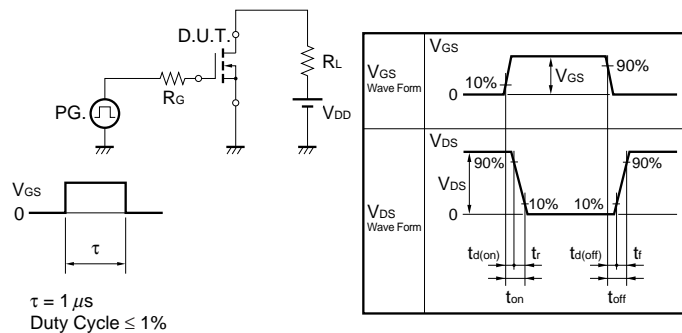
| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|----------------------|--|------|------|------|------|
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | | | 10 | μA |
| Gate Leakage Current | I _{GSS} | V _{GS} = ±20 V, V _{DS} = 0 V | | | ±100 | nA |
| Gate to Source Cut-off Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 mA | 1.0 | | 2.5 | V |
| Forward Transfer Admittance ^{Note} | y _{fs} | V _{DS} = 10 V, I _D = 15 A | 13 | | | S |
| Drain to Source On-state Resistance ^{Note} | R _{DS(on)1} | V _{GS} = 10 V, I _D = 15 A | | 2.4 | 3.3 | mΩ |
| | R _{DS(on)2} | V _{GS} = 4.5 V, I _D = 15 A | | 3.4 | 4.6 | mΩ |
| Input Capacitance | C _{iss} | V _{DS} = 15 V, | | 6200 | | pF |
| Output Capacitance | C _{oss} | V _{GS} = 0 V, | | 800 | | pF |
| Reverse Transfer Capacitance | C _{rss} | f = 1 MHz | | 410 | | pF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} = 15 V, I _D = 15 A, | | 31 | | ns |
| Rise Time | t _r | V _{GS} = 10 V, | | 20 | | ns |
| Turn-off Delay Time | t _{d(off)} | R _G = 10 Ω | | 129 | | ns |
| Fall Time | t _f | | | 40 | | ns |
| Total Gate Charge | Q _G | V _{DD} = 15 V, | | 46 | | nC |
| Gate to Source Charge | Q _{GS} | V _{GS} = 5 V, | | 17 | | nC |
| Gate to Drain Charge | Q _{GD} | I _D = 29 A | | 18 | | nC |
| Body Diode Forward Voltage ^{Note} | V _{F(S-D)} | I _F = 29 A, V _{GS} = 0 V | | 0.8 | | V |
| Reverse Recovery Time | t _{rr} | I _F = 29 A, V _{GS} = 0 V, | | 44 | | ns |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100 A/μs | | 44 | | nC |
| Gate Resistance | R _G | f = 1 MHz | | 1.4 | | Ω |

Note Pulsed

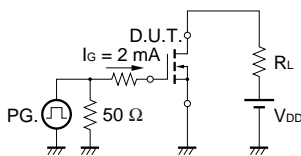
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

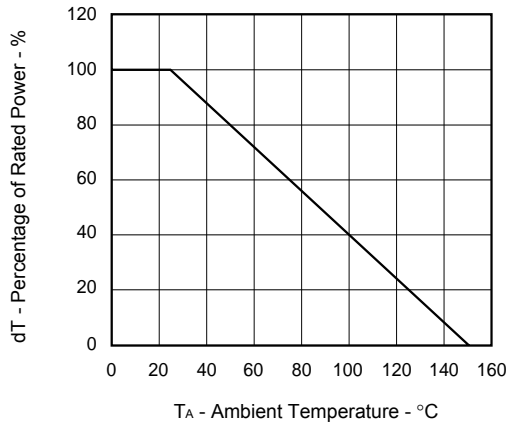


TEST CIRCUIT 3 GATE CHARGE

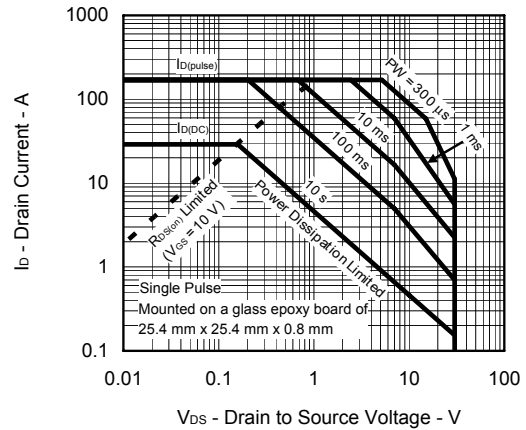


<R> TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

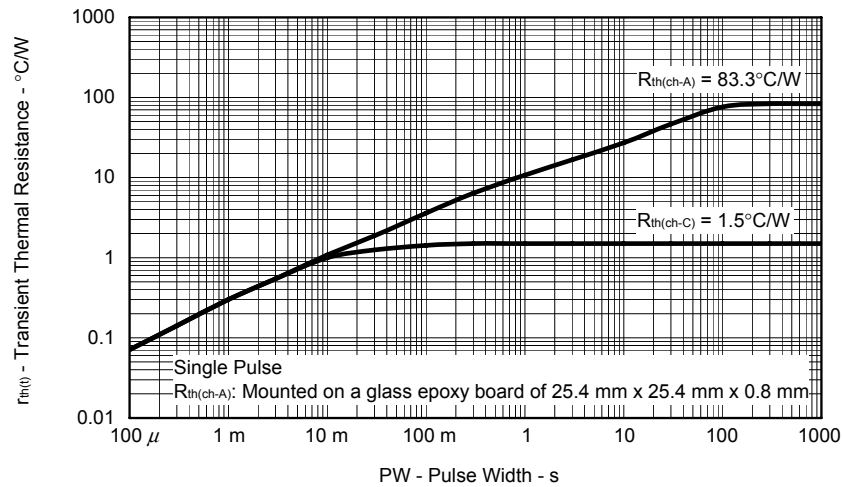
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



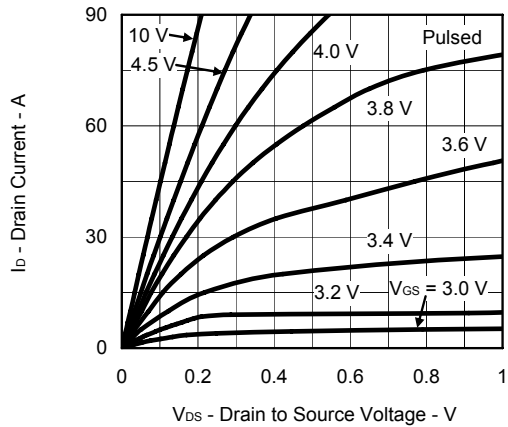
FORWARD BIAS SAFE OPERATING AREA



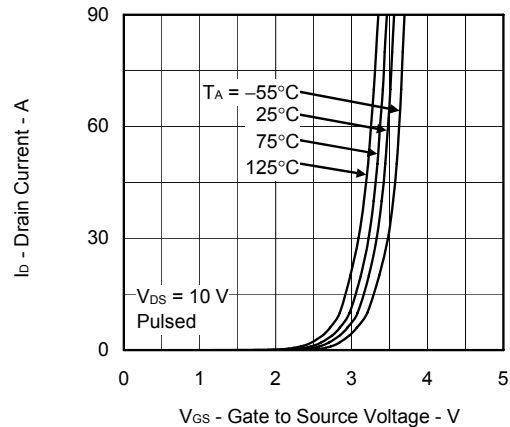
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

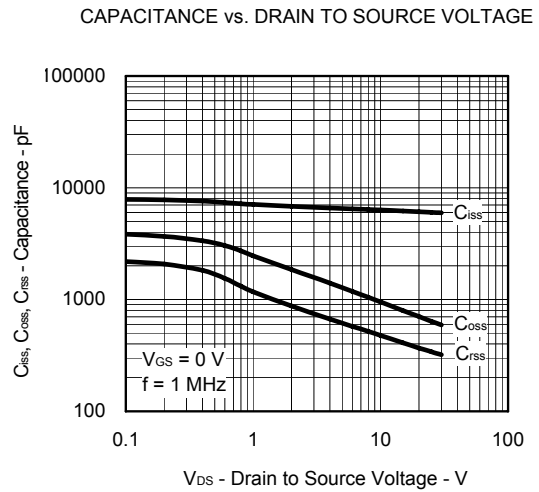
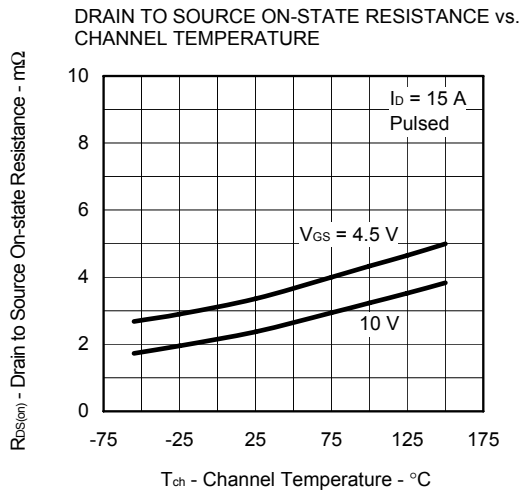
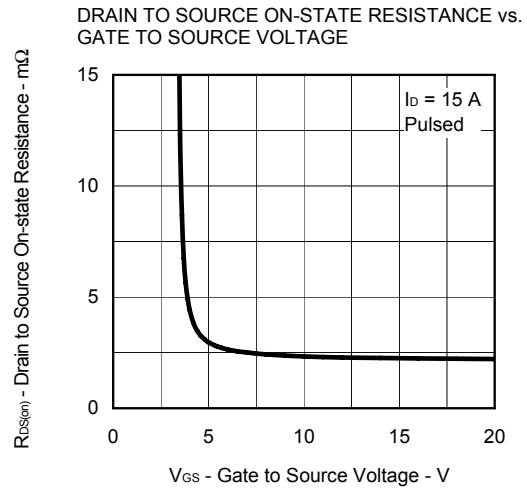
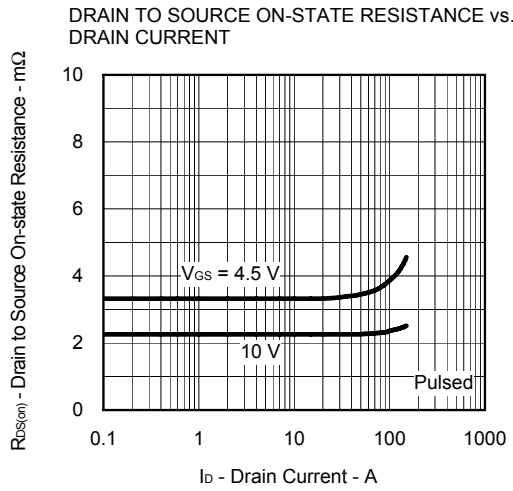
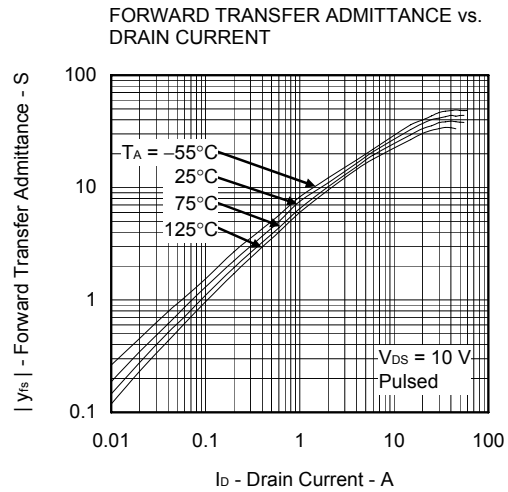
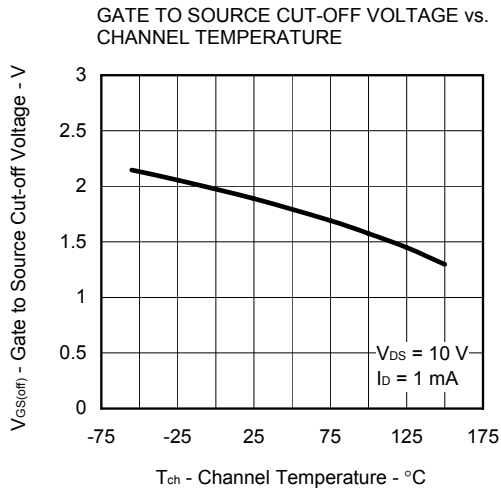


DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

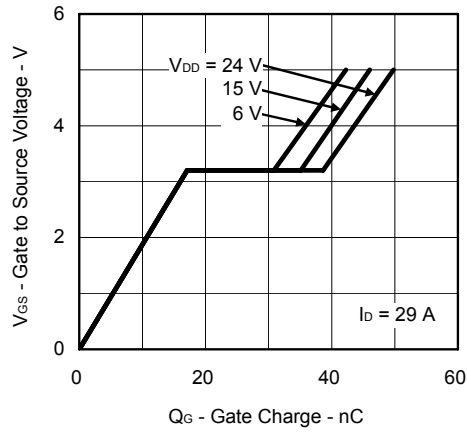


FORWARD TRANSFER CHARACTERISTICS

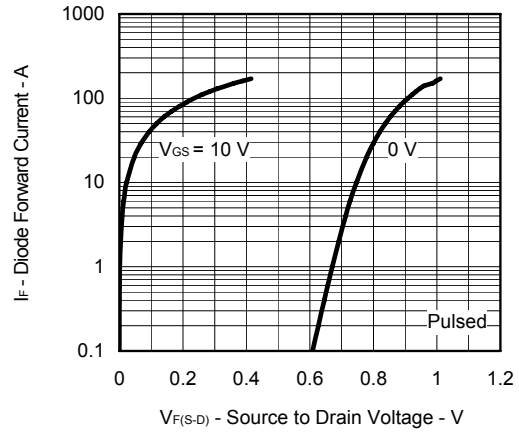




DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



ORDERING INFORMATION

| PART NUMBER | LEAD PLATING | PACKING | PACKAGE |
|--|--------------|------------------|----------------------------|
| μ PA2722UT1A-E1-AZ ^{Note} | Sn-Bi | Tape 3000 p/reel | 8-pin HVSON 0.10 g TYP. |
| μ PA2722UT1A-E2-AZ ^{Note} | | | |
| μ PA2722UT1A-E1-AY ^{Note} | Pure Sn | | |
| μ PA2722UT1A-E2-AY ^{Note} | | | |

Note Pb-free (This product does not contain Pb in the external electrode.)

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