

ZXMN3AM832

MPPS™ Miniature Package Power Solutions DUAL 30V N-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS} = 30V$; $R_{DS(ON)} = 0.12\Omega$; $I_D = 3A$

DESCRIPTION

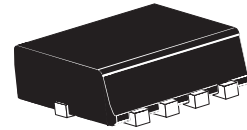
Packaged in the new innovative 3mm x 2mm MLP(Micro Leaded Package) outline this dual 30V N channel Trench MOSFET utilizes a unique structure combining the benefits of Low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage power management applications. Users will also gain several other **key benefits**:

Performance capability equivalent to much larger packages

Improved circuit efficiency & power levels

PCB area and device placement savings

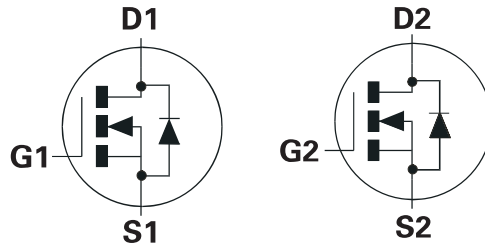
Reduced component count



3x2mm Dual Die MLP

FEATURES

- Low On - Resistance
- Fast switching speed
- Low threshold
- Low gate drive
- 3mm x 2mm MLP



APPLICATIONS

- DC-DC Converters
- Power Management Functions
- Disconnection switches
- Motor Control

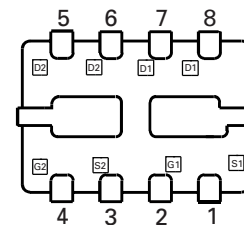
ORDERING INFORMATION

| DEVICE | REEL | TAPE WIDTH | QUANTITY PER REEL |
|--------------|------|------------|-------------------|
| ZXMN3AM832TA | 7" | 8mm | 3000 units |
| ZXMN3AM832TC | 13" | 8mm | 10000 units |

DEVICE MARKING

DNB

PINOUT



3mm x 2mm Dual MLP
underside view

ZXMN3AM832

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | N-Channel | UNIT |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------|------------|
| Drain-Source Voltage | V _{DSS} | 30 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current@V _{GS} =10V; T _A =25°C (b)(f) @V _{GS} =10V; T _A =70°C (b)(f) @V _{GS} =10V; T _A =25°C (a)(f) | I _D | 3.7 | A |
| | | 3.0 | A |
| | | 2.9 | A |
| Pulsed Drain Current | I _{DM} | 13 | A |
| Continuous Source Current (Body Diode)(b)(f) | I _S | 3.2 | A |
| Pulsed Source Current (Body Diode) | I _{SM} | 13 | A |
| Power Dissipation at TA=25°C (a)(f) Linear Derating Factor | P _D | 1.5 12 | W mW/°C |
| Power Dissipation at TA=25°C (b)(f) Linear Derating Factor | P _D | 2.45 19.6 | W mW/°C |
| Power Dissipation at TA=25°C (c)(f) Linear Derating Factor | P _D | 1 8 | W mW/°C |
| Power Dissipation at TA=25°C (d)(f) Linear Derating Factor | P _D | 1.13 9 | W mW/°C |
| Power Dissipation at TA=25°C (d)(g) Linear Derating Factor | P _D | 1.7 13.6 | W mW/°C |
| Power Dissipation at TA=25°C (e)(g) Linear Derating Factor | P _D | 3 24 | W mW/°C |
| Operating and Storage Temperature Range | T _j :T _{stg} | -55 to +150 | °C |

THERMAL RESISTANCE

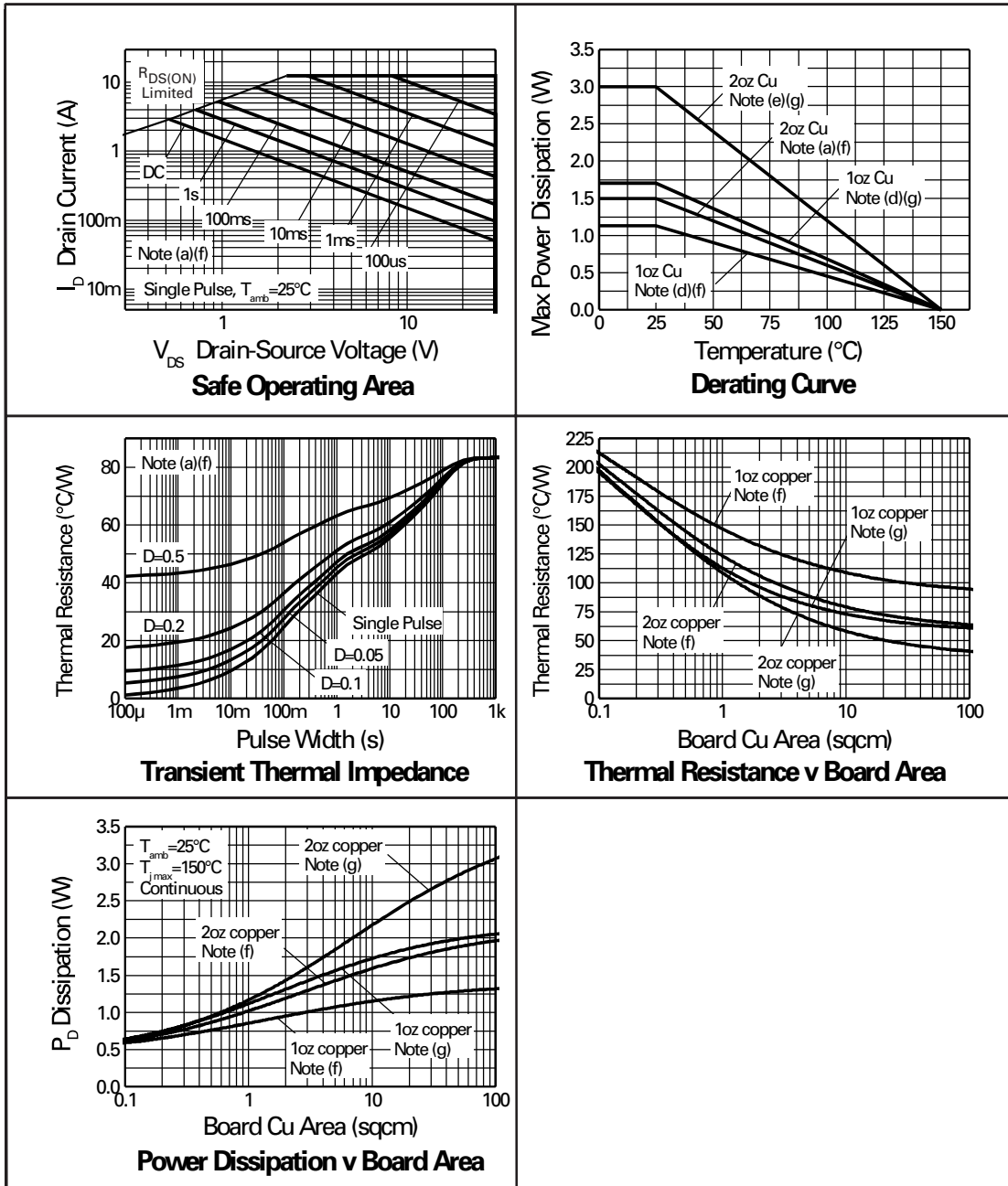
| PARAMETER | SYMBOL | VALUE | UNIT |
|----------------------------|------------------|-------|------|
| Junction to Ambient (a)(f) | R _{θJA} | 83.3 | °C/W |
| Junction to Ambient (b)(f) | R _{θJA} | 51 | °C/W |
| Junction to Ambient (c)(f) | R _{θJA} | 125 | °C/W |
| Junction to Ambient (d)(f) | R _{θJA} | 111 | °C/W |
| Junction to Ambient (d)(g) | R _{θJA} | 73.5 | °C/W |
| Junction to Ambient (e)(g) | R _{θJA} | 41.7 | °C/W |

Notes

- (a) For a dual device surface mounted on 8 sq cm single sided 2oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**. The copper are is split down the centre line into two separate areas with one half connected to each half of the dual device.
- (b) Measured at t<5 secs for a dual device surface mounted on 8 sq cm single sided 2oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**. The copper are is split down the centre line into two separate areas with one half connected to each half of the dual device.
- (c) For a dual device surface mounted on 8 sq cm single sided 2oz copper on FR4 PCB, in still air conditions **with minimal lead connections only**.
- (d) For a dual device surface mounted on 10 sq cm single sided 1oz copper on FR4 PCB, in still air conditions **with all exposed pads attached attached**. The copper are is split down the centre line into two separate areas with one half connected to each half of the dual device.
- (e) For a dual device surface mounted on 85 sq cm single sided 2oz copper on FR4 PCB, in still air conditions **with all exposed pads attached attached**. The copper are is split down the centre line into two separate areas with one half connected to each half of the dual device.
- (f) For a dual device with one active die.
- (g) For dual device with 2 active die running at equal power.
- (h) Repetitive rating - pulse width limited by max junction temperature. Refer to Transient Thermal Impedance graph.
- (i) The minimum copper dimensions required for mounting are no smaller than the exposed metal pads on the base if the device as shown in the package dimensions data. The thermal resistance for a dual device mounted on 1.5mm thick FR4 board using minimum copper 1 oz weight, 1mm wide tracks and one half of the device active is R_{th} = 250°C/W giving a power rating of P_{tot} = 500mW.

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TYPICAL CHARACTERISTICS



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ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

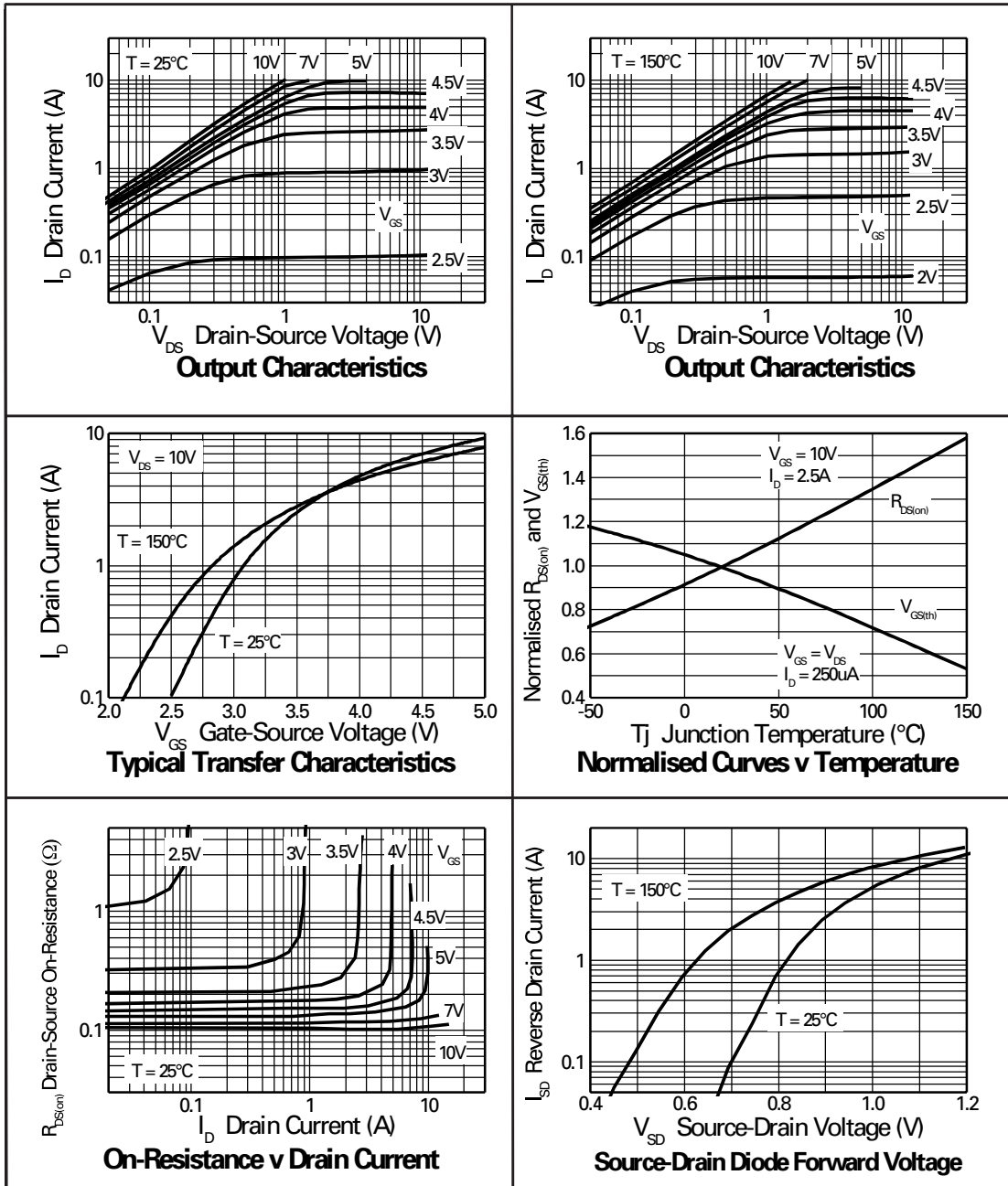
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---------------------------------------------|---------------|------|-------|--------------|---------------|-------------------------------------------------------------------------------|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 30 | | | V | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | | 0.5 | μA | $V_{DS}=30\text{V}, V_{GS}=0\text{V}$ |
| Gate-Body Leakage | I_{GSS} | | | 100 | nA | $V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$ |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 1 | | | V | $I_D=250\mu\text{A}, V_{DS}=V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | 0.106 | 0.12 0.18 | Ω | $V_{GS}=10\text{V}, I_D=2.5\text{A}$ $V_{GS}=4.5\text{V}, I_D=2.0\text{A}$ |
| Forward Transconductance (1)(3) | g_{fs} | | 3.5 | | S | $V_{DS}=4.5\text{V}, I_D=2.5\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 190 | | pF | $V_{DS}=25\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 38 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 20 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 1.7 | | ns | $V_{DD}=15\text{V}, I_D=2.5\text{A}$ $R_G=6.0\Omega, V_{GS}=10\text{V}$ |
| Rise Time | t_r | | 2.3 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 6.6 | | ns | |
| Fall Time | t_f | | 2.9 | | ns | |
| Total Gate Charge | Q_g | | 2.3 | | nC | $V_{DS}=15\text{V}, V_{GS}=5\text{V},$ $I_D=2.5\text{A}$ |
| Total Gate Charge | Q_g | | 3.9 | | nC | $V_{DS}=15\text{V}, V_{GS}=10\text{V},$ $I_D=2.5\text{A}$ |
| Gate-Source Charge | Q_{gs} | | 0.6 | | nC | |
| Gate-Drain Charge | Q_{gd} | | 0.9 | | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | 0.84 | 0.95 | V | $T_J=25^{\circ}\text{C}, I_S=1.7\text{A},$ $V_{GS}=0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 17.7 | | ns | $T_J=25^{\circ}\text{C}, I_F=2.5\text{A},$ $di/dt=100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge (3) | Q_{rr} | | 13.0 | | nC | |

NOTES

- (1) Measured under pulsed conditions. Width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

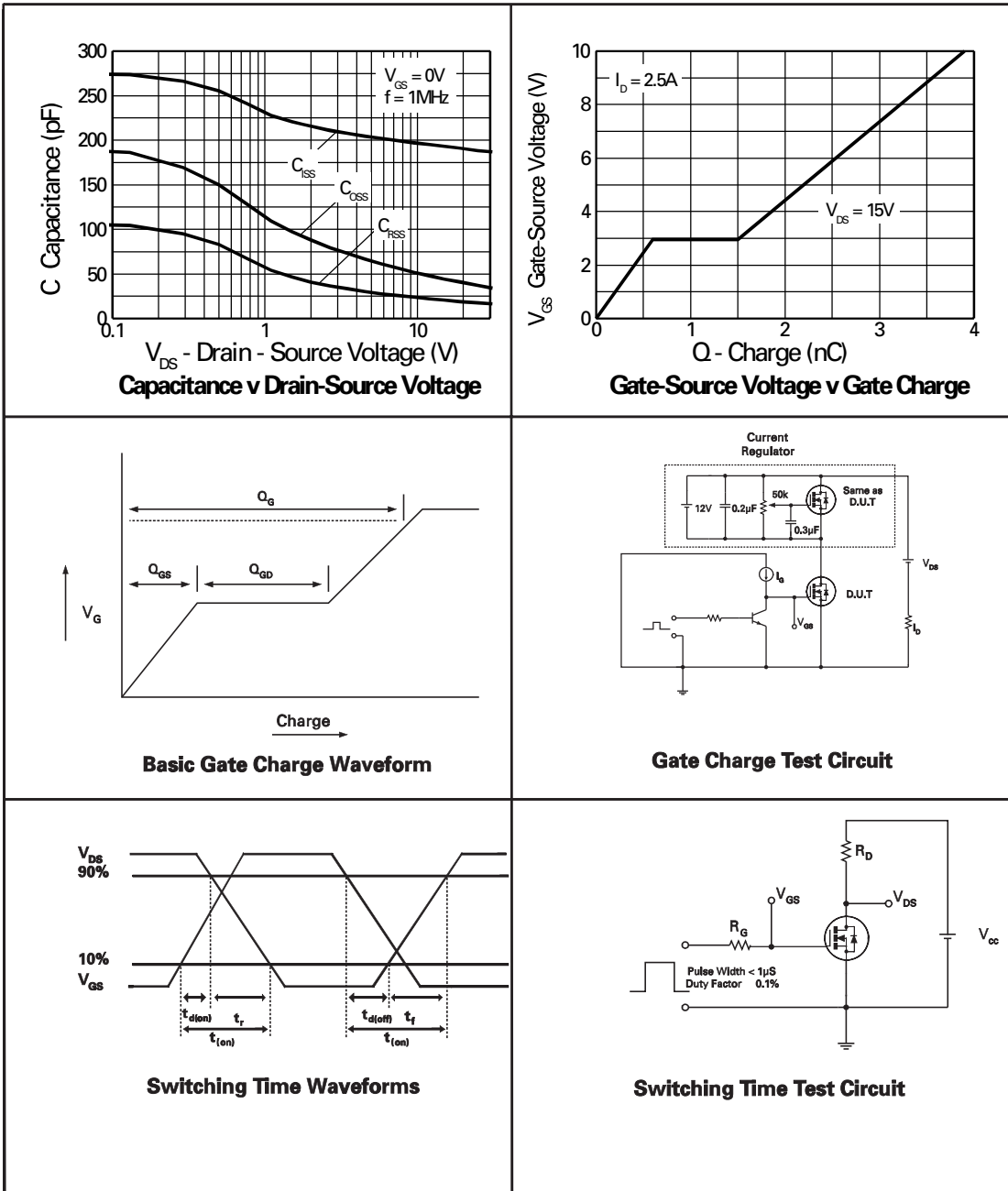
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TYPICAL CHARACTERISTICS



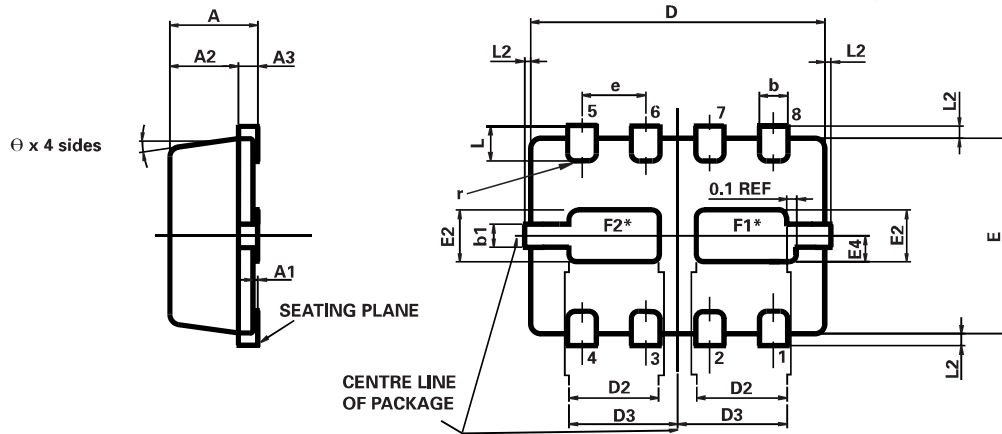
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TYPICAL CHARACTERISTICS



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MLP832 PACKAGE OUTLINE (3mm x 2mm Micro Leaded Package)



*Exposed Flags. Solder connection to improve thermal dissipation is optional.
 F1 at collector 1 potential
 F2 at collector 2 potential

CONTROLLING DIMENSIONS IN MILLIMETRES
 APPROX. CONVERTED DIMENSIONS IN INCHES

MLP832 PACKAGE DIMENSIONS

| DIM | MILLIMETERS | | INCHES | | DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|--------|-----|-------------|-------|------------|--------|
| | MIN. | MAX. | MIN. | MAX. | | MIN. | MAX. | MIN. | MAX. |
| A | 0.80 | 1.00 | 0.031 | 0.039 | e | 0.65 REF | | 0.0256 BSC | |
| A1 | 0.00 | 0.05 | 0.00 | 0.002 | E | 2.00 BSC | | 0.0787 BSC | |
| A2 | 0.65 | 0.75 | 0.0255 | 0.0295 | E2 | 0.43 | 0.63 | 0.017 | 0.0249 |
| A3 | 0.15 | 0.25 | 0.006 | 0.0098 | E4 | 0.16 | 0.36 | 0.006 | 0.014 |
| b | 0.24 | 0.34 | 0.009 | 0.013 | L | 0.20 | 0.45 | 0.0078 | 0.0157 |
| b1 | 0.17 | 0.30 | 0.0066 | 0.0118 | L2 | | 0.125 | 0.00 | 0.005 |
| D | 3.00 BSC | | 0.118 BSC | | r | 0.075 BSC | | 0.0029 BSC | |
| D2 | 0.82 | 1.02 | 0.032 | 0.040 | θ | 0° | 12° | 0° | 12° |

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