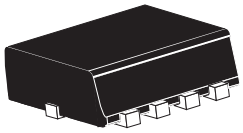
# ZXMP62M832

## MPPS™ Miniature Package Power Solutions
## DUAL 20V P-CHANNEL ENHANCEMENT MODE MOSFET

### SUMMARY
**P-Channel $V_{(BR)DSS}$ = -20V; $R_{DS(ON)}$ = 0.6Ω; $I_D$= -1.0A**

### 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**:



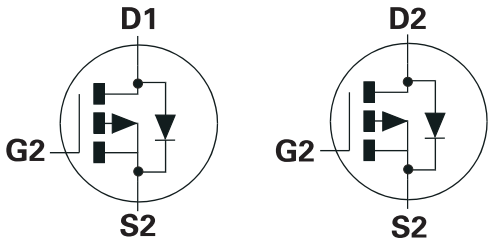
3mm x 2mm Dual Die MLP

**Performance capability equivalent to much larger packages**

**Improved circuit efficiency & power levels**

**PCB area and device placement savings**

**Reduced component count**



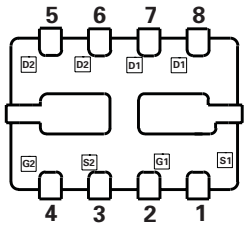

### FEATURES

- 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

### PINOUT




3 x 2 Dual MLP
underside view

### ORDERING INFORMATION

| DEVICE | REEL | TAPE WIDTH | QUANTITY PER REEL |
|---|---|---|---|
| ZXMP62M832TA | 7'' | 8mm | 3000 units |

### DEVICE MARKING
DPA

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | P-Channel | UNIT |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Continuous Drain Current@$V_{GS}$=10V; $T_A$=25°C (b)(f)<br>@$V_{GS}$=10V; $T_A$=70°C (b)(f)<br>@$V_{GS}$=10V; $T_A$=25°C (a)(f) | $I_D$ | -1.6<br>-1.3<br>-1.3 | A<br>A<br>A |
| Pulsed Drain Current | $I_{DM}$ | -5.6 | A |
| Continuous Source Current (Body Diode)(b)(f) | $I_S$ | -2.7 | A |
| Pulsed Source Current (Body Diode) | $I_{SM}$ | -5.6 | A |
| Power Dissipation at TA=25°C (a)(f)<br>Linear Derating Factor | $P_D$ | 1.5<br>12 | W<br>mW/°C |
| Power Dissipation at TA=25°C (b)(f)<br>Linear Derating Factor | $P_D$ | 2.45<br>19.6 | W<br>mW/°C |
| Power Dissipation at TA=25°C (c)(f)<br>Linear Derating Factor | $P_D$ | 1<br>8 | W<br>mW/°C |
| Power Dissipation at TA=25°C (d)(f)<br>Linear Derating Factor | $P_D$ | 1.13<br>8 | W<br>mW/°C |
| Power Dissipation at TA=25°C (d)(g)<br>Linear Derating Factor | $P_D$ | 1.7<br>13.6 | W<br>mW/°C |
| Power Dissipation at TA=25°C (e)(g)<br>Linear Derating Factor | $P_D$ | 3<br>24 | W<br>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) | $R_{\theta JA}$ | 83.3 | °C/W |
| Junction to Ambient (b)(f) | $R_{\theta JA}$ | 51 | °C/W |
| Junction to Ambient (c)(f) | $R_{\theta JA}$ | 125 | °C/W |
| Junction to Ambient (d)(f) | $R_{\theta JA}$ | 111 | °C/W |
| Junction to Ambient (d)(g) | $R_{\theta JA}$ | 73.5 | °C/W |
| Junction to Ambient (e)(g) | $R_{\theta JA}$ | 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.

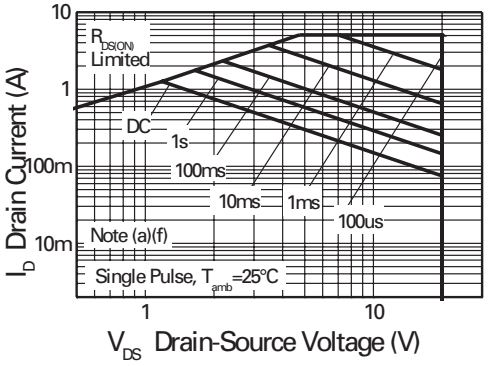
(f) For a dual device with one active die.

(g) For dual device with 2 active die running at equal power.

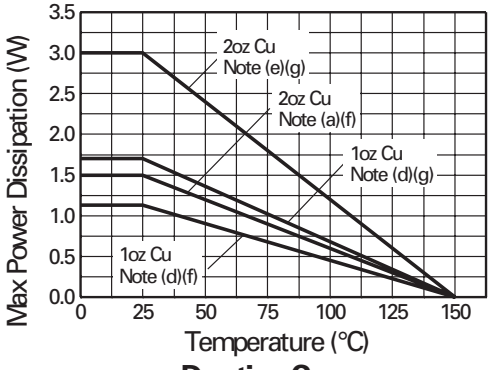
(h) Repetitive rating - pulse width limited by max junction temperature. Refer to Transient Thermal Impedance graph.

(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 Rth = 250°C/W giving a power rating of Ptot = 500mW.

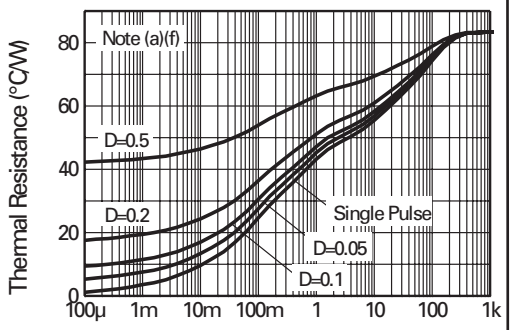
## TYPICAL CHARACTERISTICS



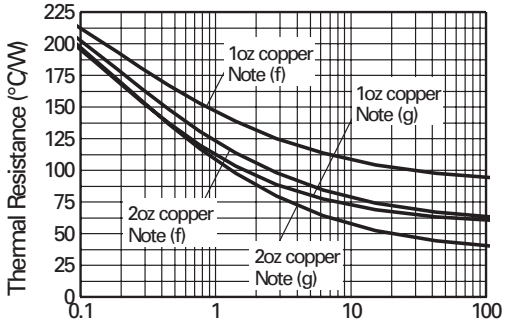

**Safe Operating Area**



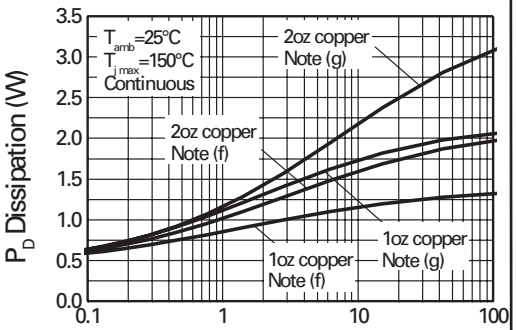

**Derating Curve**




**Transient Thermal Impedance**




**Thermal Resistance v Board Area**




**Power Dissipation v Board Area**

**ELECTRICAL CHARACTERISTICS** (at $T_{amb}$ = 25°C unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | -20 | | | V | $I_D$=-250μA, $V_{GS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | | -1 | μA | $V_{DS}$=-20V, $V_{GS}$=0V |
| Gate-Body Leakage | $I_{GSS}$ | | | ±100 | nA | $V_{GS}$=±12V, $V_{DS}$=0V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | -0.7 | | | V | $I_D$=-250μA, $V_{DS}$= $V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | | 0.6<br>0.9 | Ω<br>Ω | $V_{GS}$=-4.5V, $I_D$=-0.61A<br>$V_{GS}$=-2.7V, $I_D$=-0.31A |
| Forward Transconductance (1)(3) | $g_{fs}$ | 0.56 | | | S | $V_{DS}$=-10V,$I_D$=-0.31A |
| **DYNAMIC** (3) | | | | | | |
| Input Capacitance | $C_{iss}$ | | 150 | | pF | $V_{DS}$=-15V, $V_{GS}$=0V, f=1MHz |
| Output Capacitance | $C_{oss}$ | | 70 | | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | | 30 | | pF | |
| **SWITCHING**(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 2.9 | | ns | $V_{DD}$ =-10V, $I_D$=-0.93A $R_G$=6.0Ω, $R_{D=11\Omega}$ (Refer to test circuit) |
| Rise Time | $t_r$ | | 6.7 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 11.2 | | ns | |
| Fall Time | $t_f$ | | 10.2 | | ns | |
| Total Gate Charge | $Q_g$ | | 5.2 | 3.5 | nC | $V_{DS}$=-16V,$V_{GS}$=-4.5V, $I_D$=-0.61A (Refer to test circuit) |
| Gate-Source Charge | $Q_{gs}$ | | | 0.5 | nC | |
| Gate-Drain Charge | $Q_{gd}$ | | | 1.5 | nC | |
| **SOURCE-DRAIN DIODE** | | | | | | |
| Diode Forward Voltage (1) | $V_{SD}$ | | | -0.95 | V | $T_J$=25°C, $I_S$=-0.61A, $V_{GS}$=0V |
| Reverse Recovery Time (3) | $t_{rr}$ | | 14.9 | | ns | $T_J$=25°C, $I_F$=-0.61A, di/dt= 100A/μs |
| Reverse Recovery Charge (3) | $Q_{rr}$ | | 5.6 | | nC | |

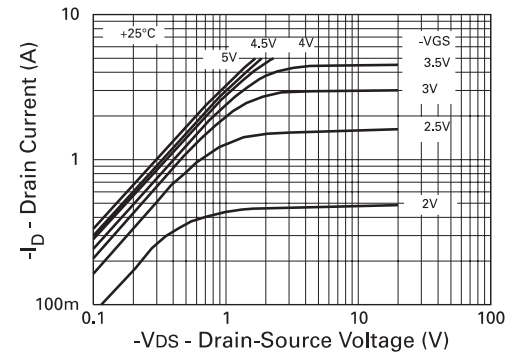
NOTES

(1) Measured under pulsed conditions. Width ≤300μs. Duty cycle ≤ 2% .

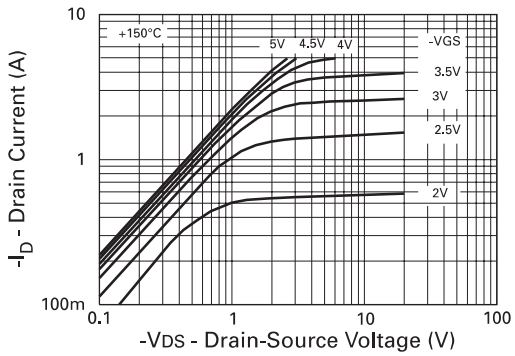
(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

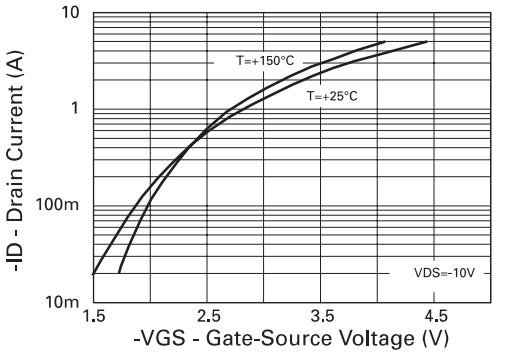
## TYPICAL CHARACTERISTICS



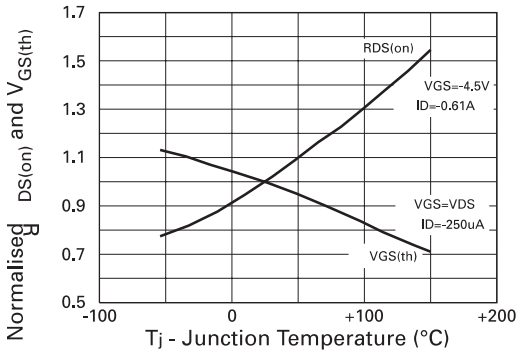

**Output Characteristics**



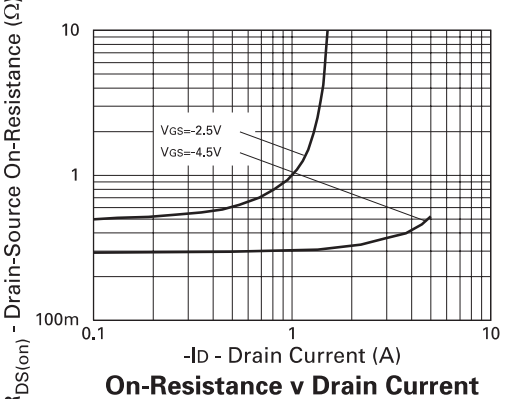

**Output Characteristics**



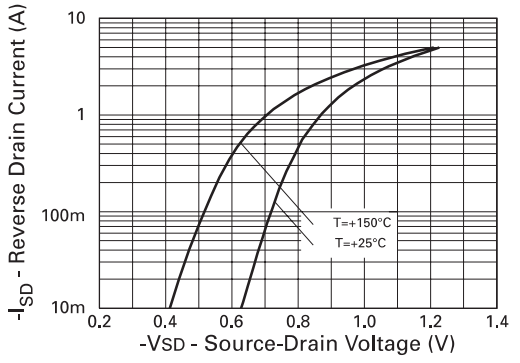

**Typical Transfer Characteristics**




**Normalised $R_{DS(on)}$ and $V_{GS(th)}$ v Temperature**

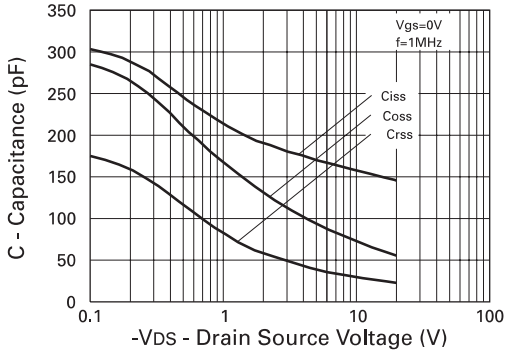



**On-Resistance v Drain Current**

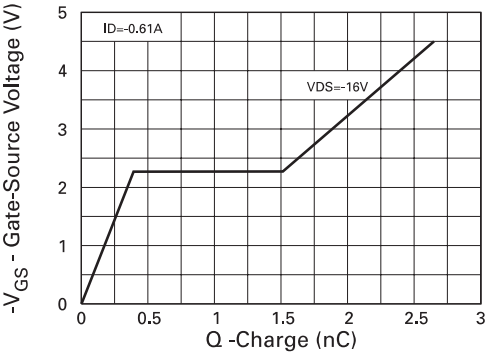



**Source-Drain Diode Forward Voltage**

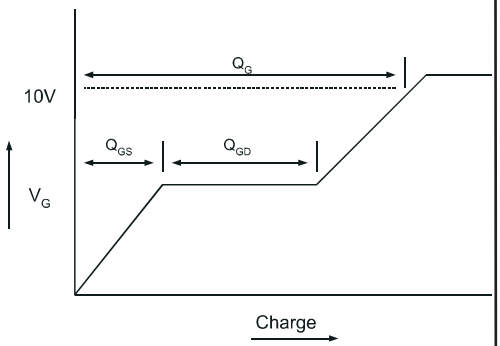
## TYPICAL CHARACTERISTICS



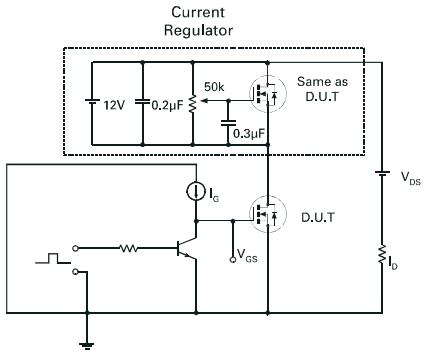

**Capacitance v Drain-Source Voltage**



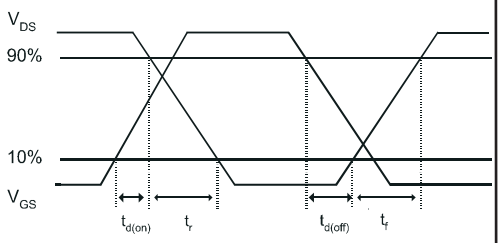

**Gate-Source Voltage v Gate Charge**



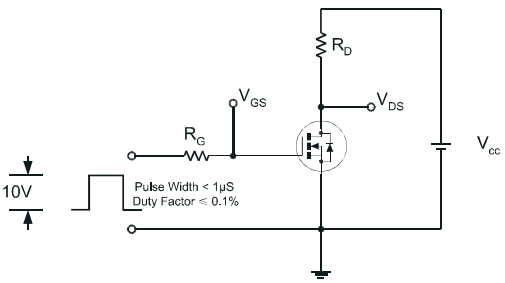

**Basic Gate Charge Waveform**




**Gate Charge Test Circuit**

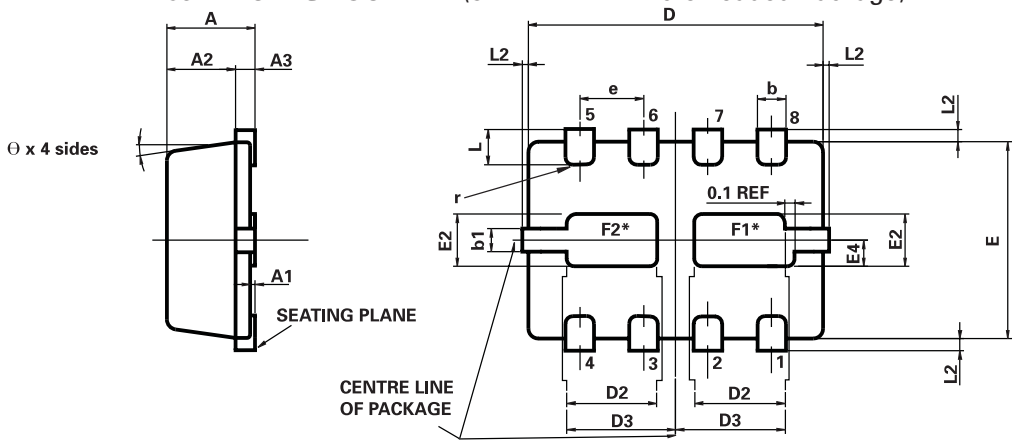



**Switching Time Waveforms**




**Switching Time Test Circuit**

## 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 | MILLIMETRES | | INCHES | | DIM | MILLIMETRES | | INCHES | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. | | MIN. | MAX. | MIN. | MAX. |
| A | 0.80 | 1.00 | 0.031 | 0.039 | e | 0.65 REF | | 0.0787 BSC | |
| A1 | 0.00 | 0.05 | 0.00 | 0.002 | E | 2.00 BSC | | 0.0256 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 | | | 0.075 BSC | | 0.0029 BSC | |
| D2 | 0.82 | 1.02 | 0.032 | 0.040 | Θ | 0° | 12° | 0° | 12° |
| D3 | 1.01 | 1.21 | 0.0397 | 0.0476 | | | | | |



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