# 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**:



3x2mm Dual Die MLP

Performance capability equivalent to much larger packages

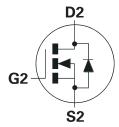
Improved circuit efficiency & power levels PCB area and device placement savings

Reduced component count

### **FEATURES**

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

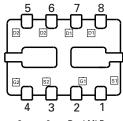
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### **APPLICATIONS**

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

### **PINOUT**



3mm x 2mm Dual MLP underside view

### **ORDERING INFORMATION**

DEVICE	REEL	TAPE WIDTH	QUANTITY PER REEL
ZXMN3AM832TA	7''	8mm	3000 units
ZXMN3AM832TC	13''	8mm	10000 units

### **DEVICE MARKING**

DNB



### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	N-Channel	UNIT
Drain-Source Voltage	V <sub>DSS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±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 <sub>D</sub>	3.7 3.0 2.9	A A A
Pulsed Drain Current	I <sub>DM</sub>	13	А
Continuous Source Current (Body Diode)(b)(f)	IS	3.2	А
Pulsed Source Current (Body Diode)	I <sub>SM</sub>	13	А
Power Dissipation at TA=25°C (a)(f) Linear Derating Factor	P <sub>D</sub>	1.5 12	W mW/°C
Power Dissipation at TA=25°C (b)(f) Linear Derating Factor	P <sub>D</sub>	2.45 19.6	W mW/°C
Power Dissipation at TA=25°C (c)(f) Linear Derating Factor	P <sub>D</sub>	1 8	W mW/°C
Power Dissipation at TA=25°C (d)(f) Linear Derating Factor	P <sub>D</sub>	1.13 9	W mW/°C
Power Dissipation at TA=25°C (d)(g) Linear Derating Factor	P <sub>D</sub>	1.7 13.6	W mW/°C
Power Dissipation at TA=25°C (e)(g) Linear Derating Factor	P <sub>D</sub>	3 24	W mW/°C
Operating and Storage Temperature Range	T <sub>j</sub> :T <sub>stg</sub>	-55 to +150	°C

### THERMAL RESISTANCE

THERWAL REGIOTATE			
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

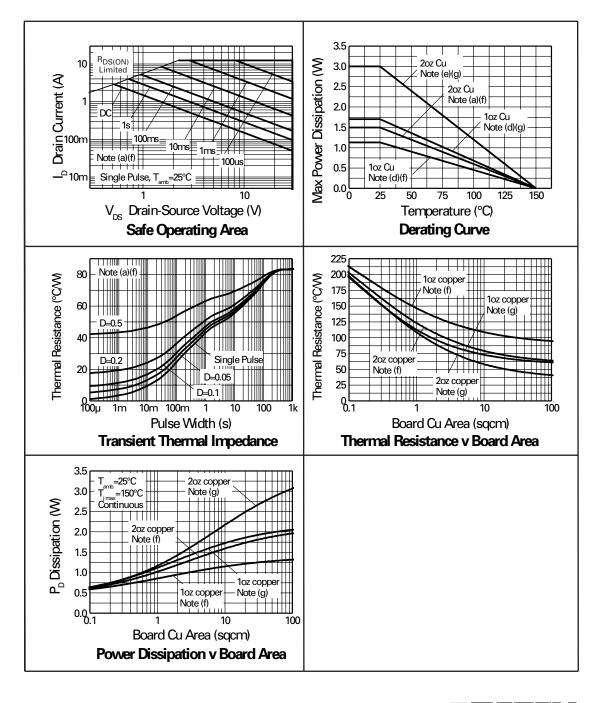
### Notes

- (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**





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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.	
STATIC							
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	30			V	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			0.5	μА	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	
Gate-Body Leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	1			V	$I_D = 250 \mu A$ , $V_{DS} = V_{GS}$	
Static Drain-Source On-State Resistance (1)	R <sub>DS(on)</sub>		0.106	0.12 0.18	Ω Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.0A	
Forward Transconductance (1)(3)	9fs		3.5		S	V <sub>DS</sub> =4.5V,I <sub>D</sub> =2.5A	
DYNAMIC (3)							
Input Capacitance	C <sub>iss</sub>		190		pF		
Output Capacitance	Coss		38		pF	V <sub>DS</sub> =25 V, V <sub>GS</sub> =0V, f=1MHz	
Reverse Transfer Capacitance	C <sub>rss</sub>		20		pF		
SWITCHING(2) (3)							
Turn-On Delay Time	t <sub>d(on)</sub>		1.7		ns	$V_{DD} = 15V, I_{D} = 2.5A$ $R_{G} = 6.0\Omega, V_{GS} = 10V$	
Rise Time	t <sub>r</sub>		2.3		ns		
Turn-Off Delay Time	t <sub>d(off)</sub>		6.6		ns		
Fall Time	t <sub>f</sub>		2.9		ns		
Total Gate Charge	Qg		2.3		nC	V <sub>DS</sub> =15V,V <sub>GS</sub> =5V, I <sub>D</sub> =2.5A	
Total Gate Charge	Qg		3.9		nC		
Gate-Source Charge	Q <sub>gs</sub>		0.6		nC	V <sub>DS</sub> =15V,V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A	
Gate-Drain Charge	Q <sub>gd</sub>		0.9		nC	1.00	
SOURCE-DRAIN DIODE							
Diode Forward Voltage (1)	V <sub>SD</sub>		0.84	0.95	V	T <sub>J</sub> =25°C, I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V	
Reverse Recovery Time (3)	t <sub>rr</sub>		17.7		ns	T <sub>J</sub> =25°C, I <sub>F</sub> =2.5A,	
Reverse Recovery Charge (3)	Q <sub>rr</sub>		13.0		nC	di/dt= 100A/μs	

### NOTES

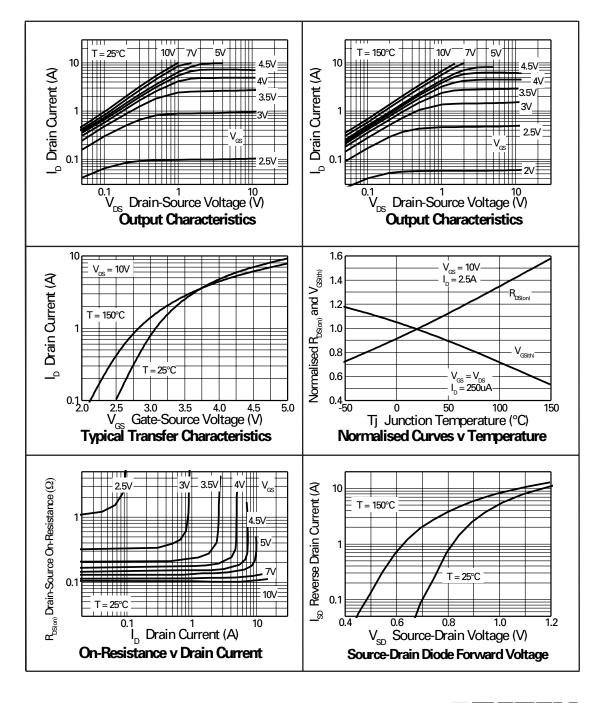


<sup>(1)</sup> Measured under pulsed conditions. Width  $\leq\!\!300\mu s.$  Duty cycle  $\leq\!2\%$  .

<sup>(2)</sup> Switching characteristics are independent of operating junction temperature.

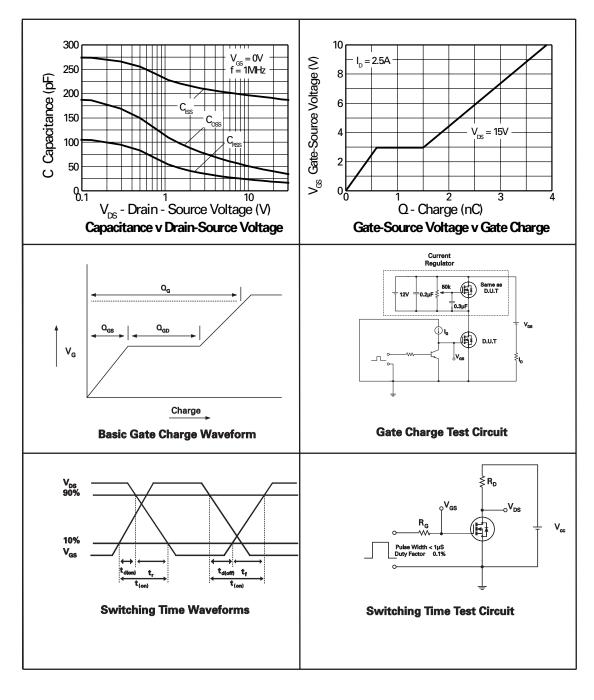
<sup>(3)</sup> For design aid only, not subject to production testing.

### **TYPICAL CHARACTERISTICS**



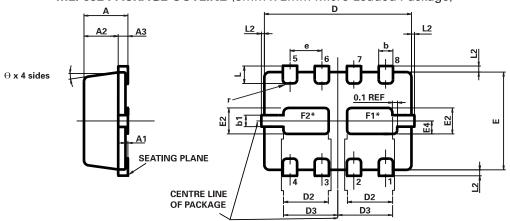


### **TYPICAL CHARACTERISTICS**





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



<sup>\*</sup>Exposed Flags. Solder connection to improve thermal dissipation is optional.

CONTROLLING DIMENSIONS IN MILLIMETRES APPROX. CONVERTED DIMENSIONS IN INCHES

### **MLP832 PACKAGE DIMENSIONS**

	MILLIN	IETERS	INC	HES		MILLIN	MILLIMETERS		INCHES	
DIM	MIN.	MAX.	MIN.	MAX.	DIM	MIN.	MAX.	MIN.	MAX.	
Α	0.80	1.00	0.031	0.039	е	0.65 REF		0.0256 BSC		
A1	0.00	0.05	0.00	0.002	Е	2.00 BSC		0.0787 BSC		
A2	0.65	0.75	0.0255	0.0295	E2	0.43	0.63	0.017	0.0249	
АЗ	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		0.002	9 BSC	
D2	0.82	1.02	0.032	0.040	Θ	0°	12°	0°	12°	

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F1 at collector 1 potential

F2 at collector 2 potential