MPPS™ Miniature Package Power Solutions DUAL 20V PNP LOW SATURATION SWITCHING TRANSISTOR

SUMMARY

 $V_{CEO} = -20V$; $R_{SAT} = 64m\Omega$; $I_{C} = -3.5A$

DESCRIPTION

Packaged in the innovative 3mm x 2mm MLP (Micro Leaded Package) outline, these new 4th generation low saturation dual transistors offer extremely low on state losses making them ideal for use in DC-DC circuits and various driving and power management functions.

Additionally users gain several other key benefits:

Performance capability equivalent to much larger packages

Improved circuit efficiency & power levels

PCB area and device placement savings

Lower package height (nom 0.9mm)

Reduced component count

FEATURES

- Low Equivalent On Resistance
- Extremely Low Saturation Voltage (-220mV @ -1A)
- hFF characterised up to -6A
- I_C = -3.5A Continuous Collector Current
- 3mm x 2mm MLP

APPLICATIONS

- DC DC Converters (FET Drivers)
- · Charging circuits
- Power switches
- Motor control
- LED Backlighting circuits

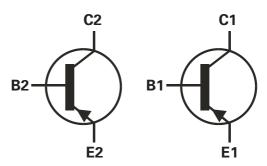
ORDERING INFORMATION

DEVICE	REEL	TAPE WIDTH	QUANTITY PER REEL
ZXTD2M832TA	7''	8mm	3000
ZXTD2M832TC	13′′	8mm	10000

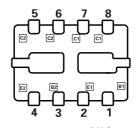
DEVICE MARKING D22



3mm x 2mm (Dual die) MLP



PINOUT



3mm x 2mm MLP underside view



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ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V _{CBO}	-25	V
Collector-Emitter Voltage	V _{CEO}	-20	V
Emitter-Base Voltage	V _{EBO}	-7.5	V
Peak Pulse Current	I _{CM}	-6	А
Continuous Collector Current (a)(f)	I _C	-3.5	А
Base Current	I _B	-1000	mA
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)	$R_{\theta JA}$	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 area 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 area 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 area 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 area 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.

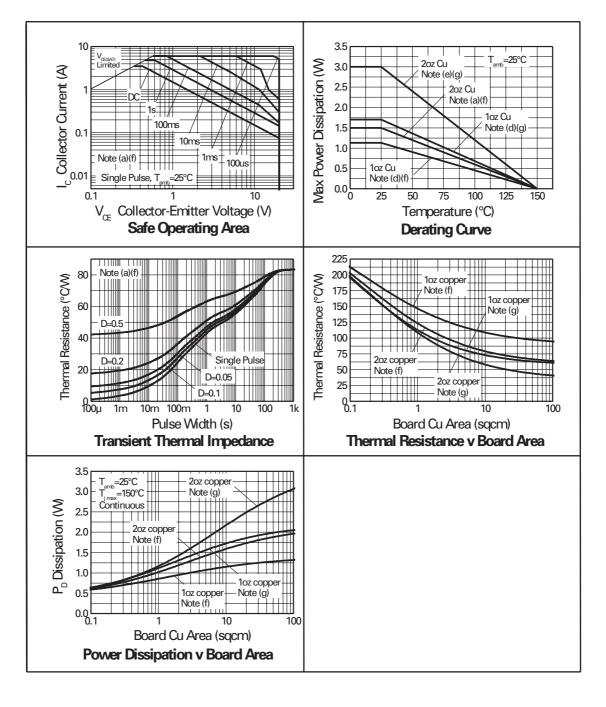
(g) For dual device with 2 active die running at equal power.

(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 of 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





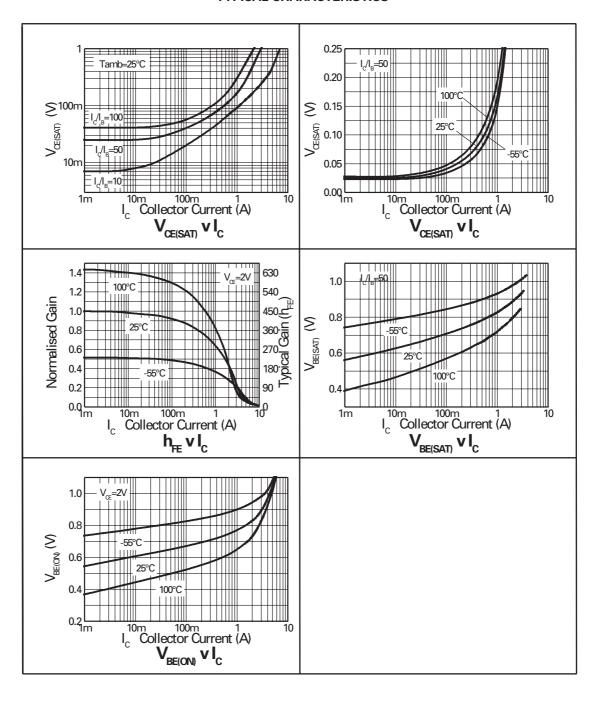
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	V _{(BR)CBO}	-25	-35		V	Ι _C =-100μΑ
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	-20	-25		V	I _C =-10mA*
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	-7.5	8.5		V	I _E =-100μA
Collector Cut-Off Current	I _{CBO}			-25	nA	V _{CB} =-20V
Emitter Cut-Off Current	I _{EBO}			-25	nA	V _{EB} =-6V
Collector Emitter Cut-Off Current	I _{CES}			-25	nA	V _{CES} =-16V
Collector-Emitter Saturation	V _{CE(sat)}		-19	-30	mV	I _C =-0.1A, I _B =-10mA*
Voltage			-170	-220	mV	I _C =-1A, I _B =-20mA*
			-190	-250	mV	I _C =-1.5A, I _B =-50mA*
			-240	-350	mV	I _C =-2.5A, I _B =-150mA*
			-225	-300	mV	I _C =-3.5A, I _B =-350mA*
Base-Emitter Saturation Voltage	V _{BE(sat)}		-1.10	-1.075	V	I _C =-3.5A, I _B =350mA*
Base-Emitter Turn-On Voltage	V _{BE(on)}		-0.87	-0.95	V	I _C =-3.5A, V _{CE} =-2V*
Static Forward Current Transfer	h _{FE}	300	475			I _C =-10mA, V _{CE} =-2V*
Ratio		300	450			I _C =-0.1A, V _{CE} =-2V*
		150	230			I _C =-2A, V _{CE} =-2V*
		15	30			I _C =-6A, V _{CE} =-2V*
Transition Frequency	f _T	150	180		MHz	I _C =-50mA, V _{CE} =-10V f=100MHz
Output Capacitance	C _{obo}		21	30	pF	V _{CB} =10V, f=1MHz
Turn-On Time	t _(on)		40		ns	V _{CC} =-10V, I _C =1A
Turn-Off Time	t _(off)		670		ns	I _{B1} =I _{B2} =20mA

^{*}Measured under pulsed conditions. Pulse width=300 μ s. Duty cycle $\leq 2\%$



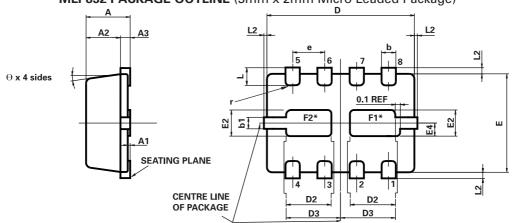
TYPICAL CHARACTERISTICS



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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

	MILLIN	IETRES	INC	HES		MILLIMETRES		INCHES	
DIM	MIN.	MAX.	MIN.	MAX.	DIM	MIN.	MAX.	MIN.	MAX.
Α	0.80	1.00	0.031	0.039	е	0.65	REF	0.025	6 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
А3	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°
D3	1.01	1.21	0.0397	0.0476					

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