

ZXTD3M832

MPPS™ Miniature Package Power Solutions

DUAL 40V PNP LOW SATURATION TRANSISTOR

SUMMARY

PNP — $V_{CEO} = -40V$; $R_{SAT} = 104m\Omega$; $I_C = -3A$

DESCRIPTION

Packaged in the new innovative 3mm x 2mm MLP (Micro Leaded Package) outline, these new 4th generation low saturation dual PNP 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 (0.9mm nom)
- Reduced component count

FEATURES

- Low Equivalent On Resistance
- Extremely Low Saturation Voltage (-220mV max @1A)
- h_{FE} specified up to -3A
- $I_C = -3A$ Continuous Collector Current
- 3mm x 2mm MLP

APPLICATIONS

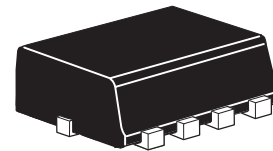
- DC - DC Converters
- Charging circuits
- Power switches
- Motor control
- CCFL Backlighting

ORDERING INFORMATION

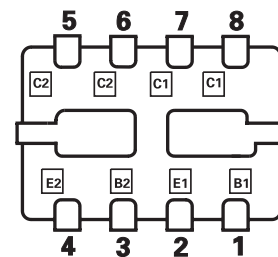
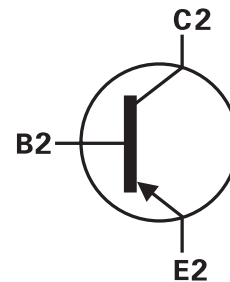
DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXTD3M832TA	7"	8mm	3000
ZXTD3M832TC	13"	8mm	10000

DEVICE MARKING

- D33



MLP832



Underside view

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-7.5	V
Peak Pulse Current	I_{CM}	-4	A
Continuous Collector Current ^(a) ^(f)	I_C	-3	A
Base Current	I_B	-1000	mA
Power Dissipation at $T_A=25^\circ\text{C}$ ^(a) ^(f)	P_D	1.5	W
Linear Derating Factor		12	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ ^(b) ^(f)	P_D	2.45	W
Linear Derating Factor		19.6	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ ^(c) ^(f)	P_D	1	W
Linear Derating Factor		8	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ ^(d) ^(f)	P_D	1.13	W
Linear Derating Factor		9	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ ^(d) ^(g)	P_D	1.7	W
Linear Derating Factor		13.6	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ ^(e) ^(g)	P_D	3	W
Linear Derating Factor		24	mW/ $^\circ\text{C}$
Operating & Storage Temperature Range	$T_j:T_{stg}$	-55 to +150	$^\circ\text{C}$
Junction Temperature	T_j	150	$^\circ\text{C}$

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient ^(a) ^(f)	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Junction to Ambient ^(b) ^(f)	$R_{\theta JA}$	51	$^\circ\text{C}/\text{W}$
Junction to Ambient ^(b) ^(f)	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction to Ambient ^(d) ^(f)	$R_{\theta JA}$	111	$^\circ\text{C}/\text{W}$
Junction to Ambient ^(d) ^(g)	$R_{\theta JA}$	73.5	$^\circ\text{C}/\text{W}$
Junction to Ambient ^(e) ^(g)	$R_{\theta JA}$	41.7	$^\circ\text{C}/\text{W}$

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 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 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.

(e) For a dual device surface mounted on 85 sq cm single sided 2oz copper 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.

(f) For 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.

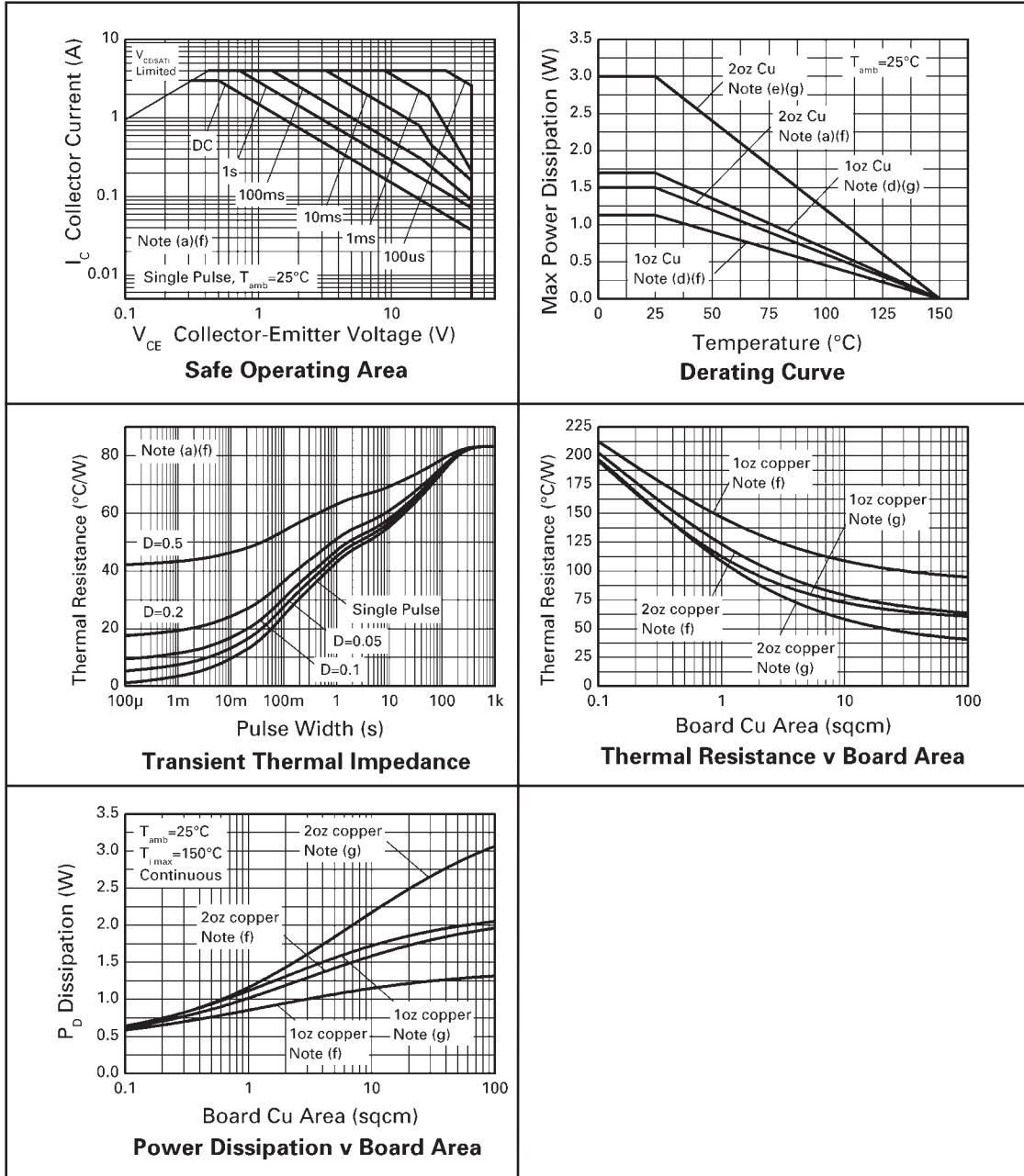
(i) The minimum copper dimensions required for mounting are no smaller than the exposed metal pads on the base of the device as shown in the package dimensions data. The thermal resistance for a dual device mounted on 1.5mm thick FR4 board using minimum copper of 1 oz weight, 1mm wide tracks and one half of the device active is $R_{th} = 250^\circ\text{C}/\text{W}$ giving a power rating of $P_{tot} = 500\text{mW}$



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TYPICAL CHARACTERISTICS



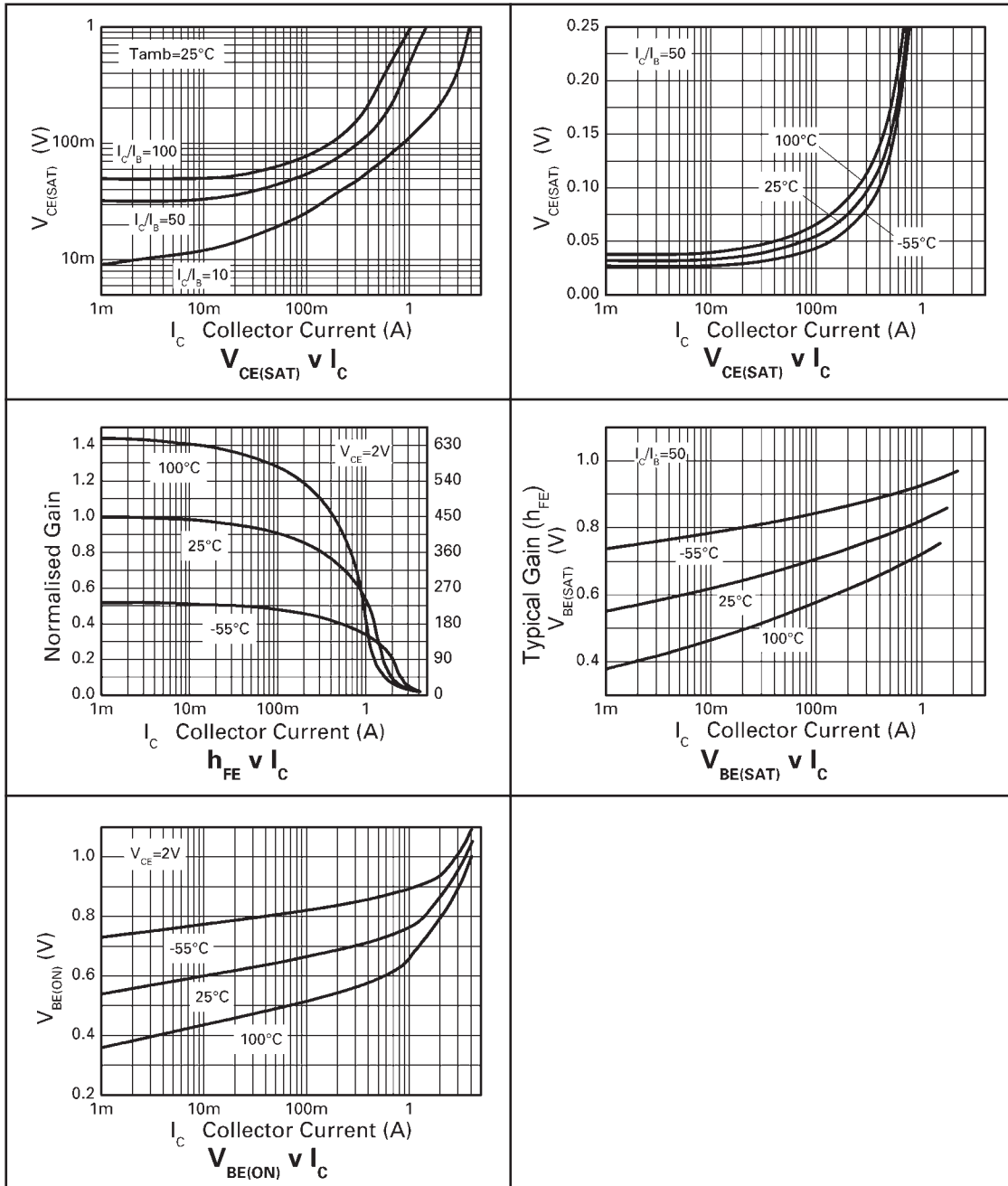
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PNP TRANSISTOR ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50	-80		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-40	-70		V	$I_C = -10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-7.5	-8.5		V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}			-25	nA	$V_{CB} = -40\text{V}$
Emitter Cut-Off Current	I_{EBO}			-25	nA	$V_{EB} = -6\text{V}$
Collector Emitter Cut-Off Current	I_{CES}			-25	nA	$V_{CES} = -32\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-25 -150 -195 -210 -260	-40 -220 -300 -300 -370	mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -50\text{mA}^*$ $I_C = -1.5\text{A}, I_B = -100\text{mA}^*$ $I_C = -2\text{A}, I_B = -200\text{mA}^*$ $I_C = -2.5\text{A}, I_B = -250\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-0.97	-1.05	V	$I_C = -2.5\text{A}, I_B = -250\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-0.89	-0.95	V	$I_C = -2.5\text{A}, V_{CE} = -2\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	300 300 180 60 12	480 450 290 130 22			$I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -0.1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -1.5\text{A}, V_{CE} = 2\text{V}^*$ $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$
Transition Frequency	f_T	150	190		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	C_{obo}		19	25	pF	$V_{CB} = -10\text{A}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		40		ns	$V_{CC} = -15\text{V}, I_C = -0.75\text{A}$
Turn-Off Time	$t_{(off)}$		435		ns	$I_{B1} = I_{B2} = -15\text{mA}$

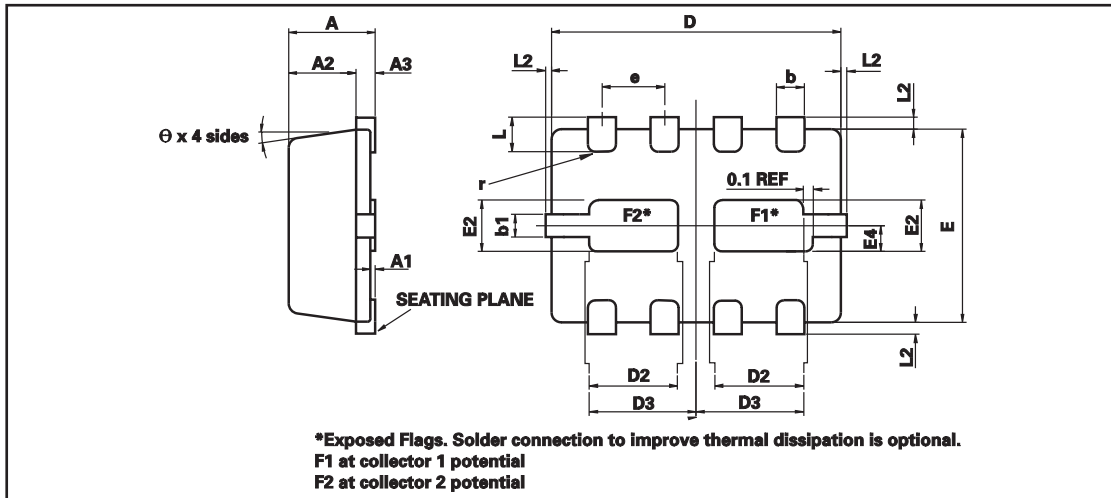
*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

TYPICAL CHARACTERISTICS



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PACKAGE OUTLINE



Controlling dimensions are in millimetres. Approximate conversions are given in inches

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		0.0256 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	
D2	0.82	1.02	0.032	0.040	Ø	0°	12°	0°	12°
D3	1.01	1.21	0.0397	0.0476					

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