ZXTEM322

MPPS™ Miniature Package Power Solutions
80V NPN LOW SATURATION TRANSISTOR

SUMMARY

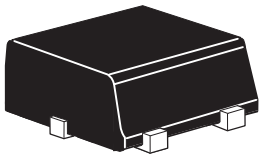
NPN — V_{CEO}= 80V; R_{SAT} = 68mΩ; I_C= 3.5A

DESCRIPTION

Packaged in the new innovative 2mm 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**:

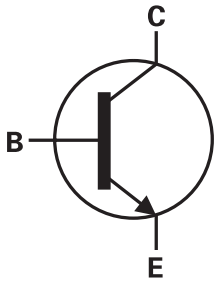
- **Performance capability equivalent to much larger packages**
- **Improved circuit efficiency & power levels**
- **PCB area and device placement savings**
- **Lower Package Height (0.9mm nom)**
- **Reduced component count**



MLP322

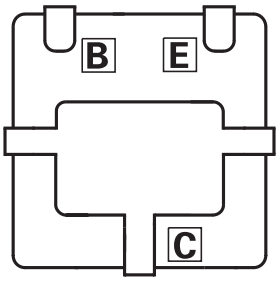
FEATURES

- Low Equivalent On Resistance
- Extremely Low Saturation Voltage **(185mV max @1A)**
- h_{FE} specified up to 5A
- I_C=-3.5A Continuous Collector Current
- 2mm x 2mm MLP



APPLICATIONS

- DC - DC Converters
- DC - DC Modules
- Power switches
- Motor control



Underside View

ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXTEM322TA	7”	8mm	3000
ZXTEM322TC	13”	8mm	10000

DEVICE MARKING

- **SE**

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ZETEX SEMICONDUCTORS

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CEO}	80	V
Emitter-Base Voltage	V_{EBO}	7.5	V
Peak Pulse Current	I_{CM}	5	A
Continuous Collector Current (a)	I_C	3.5	A
Base Current	I_B	1000	mA
Power Dissipation at TA=25°C (a) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation at TA=25°C (b) Linear Derating Factor	P_D	2.45 19.6	W mW/°C
Power Dissipation at TA=25°C (d) Linear Derating Factor	P_D	1 8	W mW/°C
Power Dissipation at TA=25°C (e) Linear Derating Factor	P_D	3 24	W mW/°C
Operating & Storage Temperature Range	T_j:T_{stg}	-55 to +150	°C
Junction Temperature	T_j	150	°C

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\Theta JA}$	83	°C/W
Junction to Ambient (b)	$R_{\Theta JA}$	51	°C/W
Junction to Ambient (d)	$R_{\Theta JA}$	125	°C/W
Junction to Ambient (e)	$R_{\Theta JA}$	42	°C/W

NOTES

(a) For a single device surface mounted on 10 sq cm 1oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**.

(b) For a single device surface mounted on 10 sq cm 1oz copper on FR4 PCB, in still air conditions measured at t≤5 secs **with all exposed pads attached**.

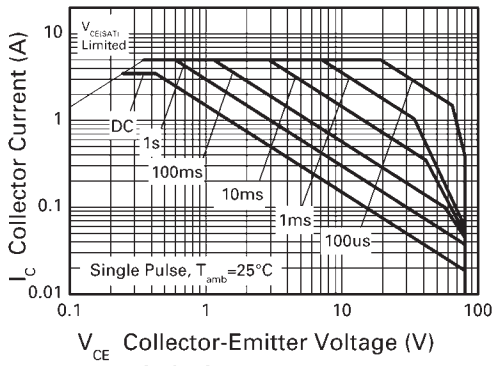
(c) Repetitive rating - pulse width limited by max junction temperature. Refer to Transient Thermal Impedance graph.

(d) For a single device surface mounted on 10 sq cm 1oz copper FR4 PCB, in still air conditions **with minimal lead connections only.**

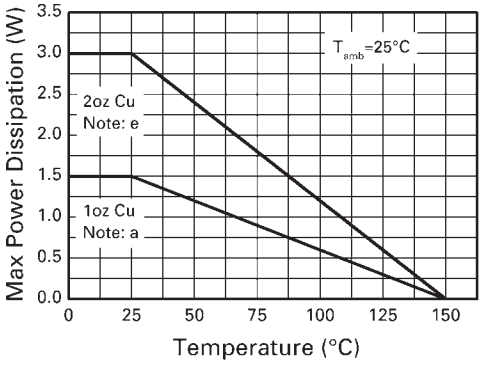
(e) For a single device surface mounted on 65 sq cm 2oz copper FR4 PCB, in still air conditions **with all exposed pads attached**.

(f) 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 device mounted on 1.5mm thick FR4 board using minimum copper of 1oz weight and 1mm wide tracks is Rth= 300°C/W giving a power rating of Ptot=420mW

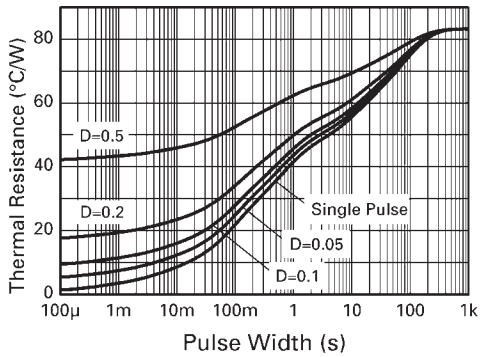
TYPICAL CHARACTERISTICS



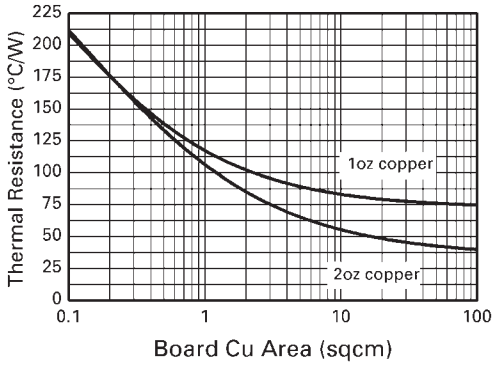
Safe Operating Area



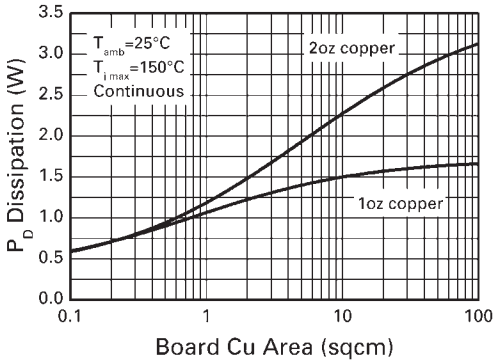
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



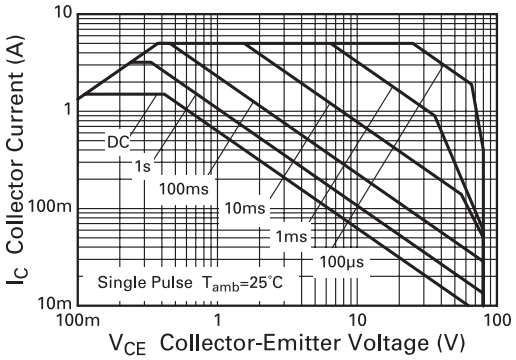
Power Dissipation v Board Area

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

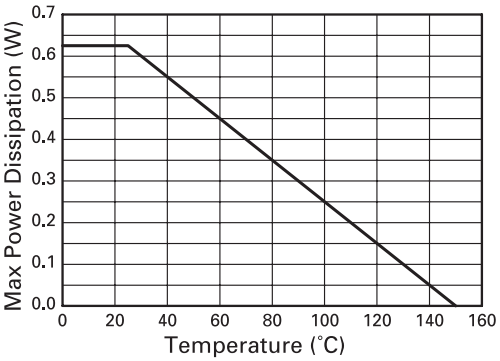
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	100	180		V	I_C=100μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	80	110		V	I_C=10mA*
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	7.5	8.2		V	I_E=100μA
Collector Cut-Off Current	I_{CBO}			25	nA	V_{CB}=80V
Emitter Cut-Off Current	I_{EBO}			25	nA	V_{EB}=6V
Collector Emitter Cut-Off Current	I_{CES}			25	nA	V_{CE}=65V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		15 45 145 160 240	20 60 185 200 325	mV mV mV mV mV	I_C=0.1A, I_B=10mA* I_C=0.5A, I_B=50mA* I_C=1A, I_B=20mA* I_C=1.5A, I_B=50mA* I_C=3.5A, I_B=300mA*
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		1.09	1.175	V	I_C=3.5A, I_B=300mA*
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		0.96	1.05	V	I_C=3.5A, V_{CE}=2V*
Static Forward Current Transfer Ratio	h_{FE}	200 300 110 60 20	450 450 170 90 30 10	900		I_C=10mA, V_{CE}=2V* I_C=200mA, V_{CE}=2V* I_C=1A, V_{CE}=2V* I_C=1.5A, V_{CE}=2V* I_C=3A, V_{CE}=2V* I_C=5A, V_{CE}=2V*
Transition Frequency	f_T	100	160		MHz	I_C=50mA, V_{CE}=10V f=100MHz
Output Capacitance	C_{obo}		11.5	18	pF	V_{CB}=10A, f=1MHz
Turn-On Time	$t_{(on)}$		86		ns	V_{CC}=10V, I_C=1A I_{B1}=I_{B2}=25mA
Turn-Off Time	$t_{(off)}$		1128		ns	

*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2%

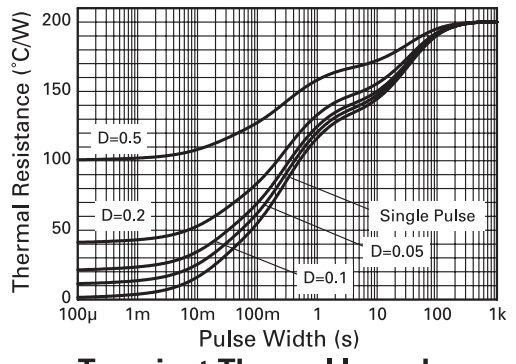
TYPICAL CHARACTERISTICS



Safe Operating Area



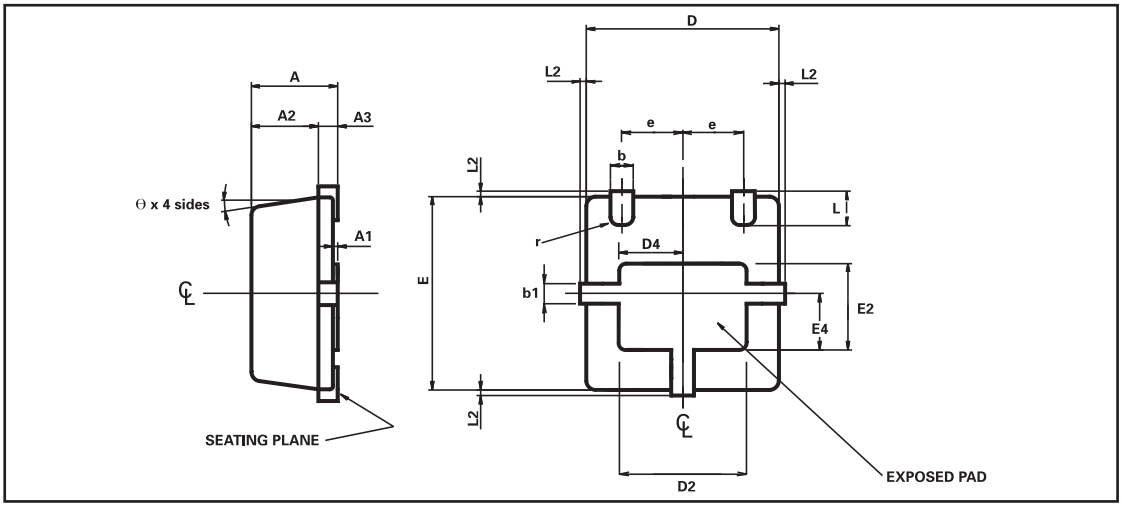
Derating Curve



Transient Thermal Impedance

ZXTEM322

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	0.0315	0.0393	e	0.65 REF		0.0255 REF	
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	0.79	0.99	0.031	0.039
A3	0.15	0.25	0.0059	0.0098	E4	0.48	0.68	0.0188	0.0267
b	0.18	0.28	0.0070	0.0110	L	0.20	0.45	0.0078	0.0177
b1	0.17	0.30	0.0066	0.0118	L2	0.125 MAX.		0.005 REF	
D	2.00 BSC		0.0787 BSC		r	0.075 BSC		0.0029 BSC	
D2	1.22	1.42	0.0480	0.0559	θ	0°	12°	0°	12°
D4	0.56	0.76	0.0220	0.0299					

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