ZXT1M322

MPPS™ Miniature Package Power Solutions
12V PNP LOW SATURATION SWITCHING TRANSISTOR

SUMMARY
V_{CEO}= -12V; R_{SAT} = 60mΩ; I_C= -4A

DESCRIPTION

Packaged in the innovative 2mm x 2mm MLP (Micro Leaded Package) outline, this new 4th generation low saturation transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

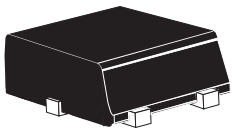
Additionally users will also gain several other **key benefits**:

Performance capability equivalent to much larger packages

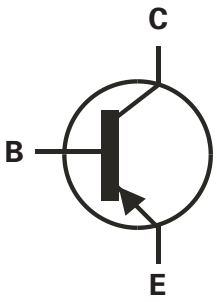
Improved circuit efficiency & power levels

PCB area and device placement savings

Lower package height (nom 0.9mm)



2mm x 2mm MLP
(single die)



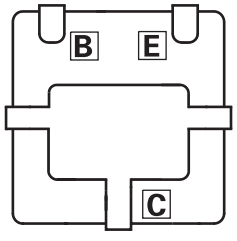
FEATURES

- Low Equivalent On Resistance
- Extremely Low Saturation Voltage **(-140mV@ -1A)**
- h_{FE} specified up to -10A
- I_C= -4A Continuous Collector Current
- 2mm x 2mm MLP

APPLICATIONS

- DC - DC Converters (FET Driving)
- Charging Circuits
- Power switches
- Motor control

PINOUT



2mm x 2mm Single MLP
underside view

ORDERING INFORMATION

DEVICE	REEL	TAPE WIDTH	QUANTITY PER REEL
ZXT1M322TA	7''	8mm	3000
ZXT1M322TC	13''	8mm	10000

DEVICE MARKING
S1

ZXT1M322

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V_{CBO}	-20	V
Collector-Emitter Voltage	V_{CEO}	-12	V
Emitter-Base Voltage	V_{EBO}	-7.5	V
Peak Pulse Current	I_{CM}	-12	A
Continuous Collector Current (a)	I_C	-4	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 and Storage Temperature Range	T_j:T_{stg}	-55 to +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 10sq cm1oz copper on FR4 PCB in still air conditions **with all exposed pads attached**.

(b) For a single device surface mounted on 10sq cm1oz copper on FR4 PCB in still air conditions measured at t≤5 secs **with all exposed pads attached**.

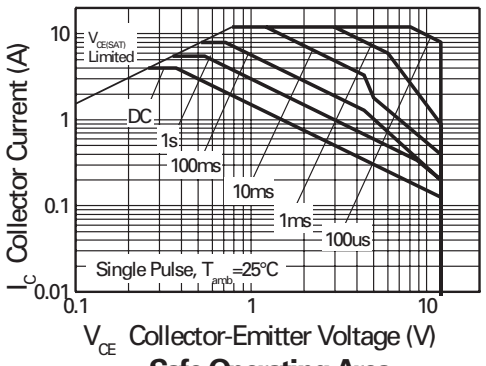
(c) Repetitive rating - pulse width limited by max junction temperature. refer to Transient Thermal Impedance graph.

(d) For a single device surface mounted on 10sq cm1oz copper on FR4 PCB in still air conditions **with minimal lead connections only**.

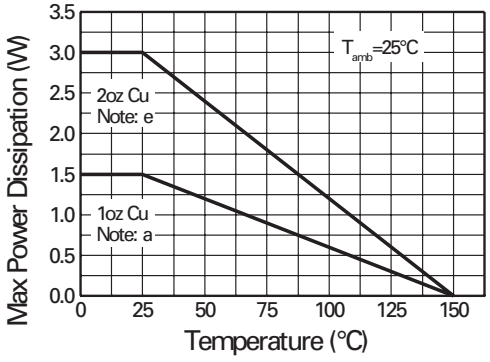
(e) For a single device surface mounted on 65sq cm2oz copper on FR4 PCB in still air conditions **with all exposed pads attached**.

(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 is Rth=300°C/W giving a power rating of Ptot=420mW.

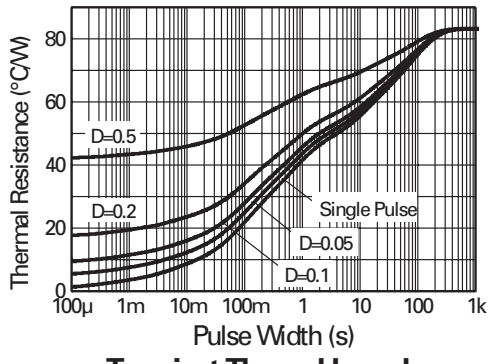
CHARACTERISTICS



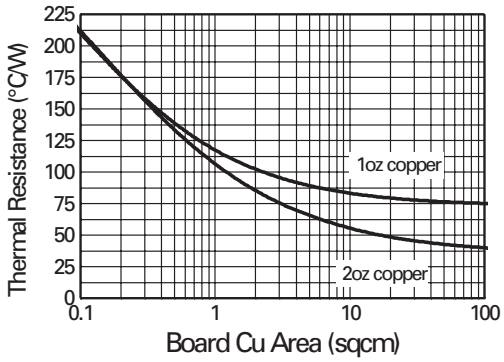
Safe Operating Area



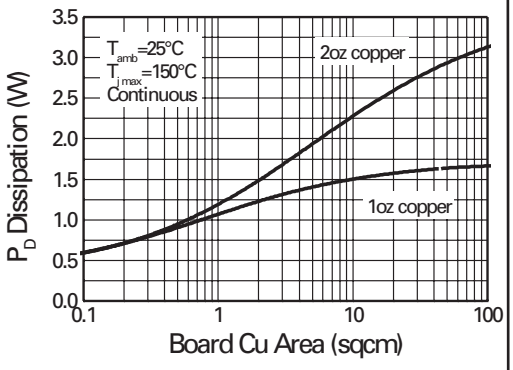
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



Power Dissipation v Board Area

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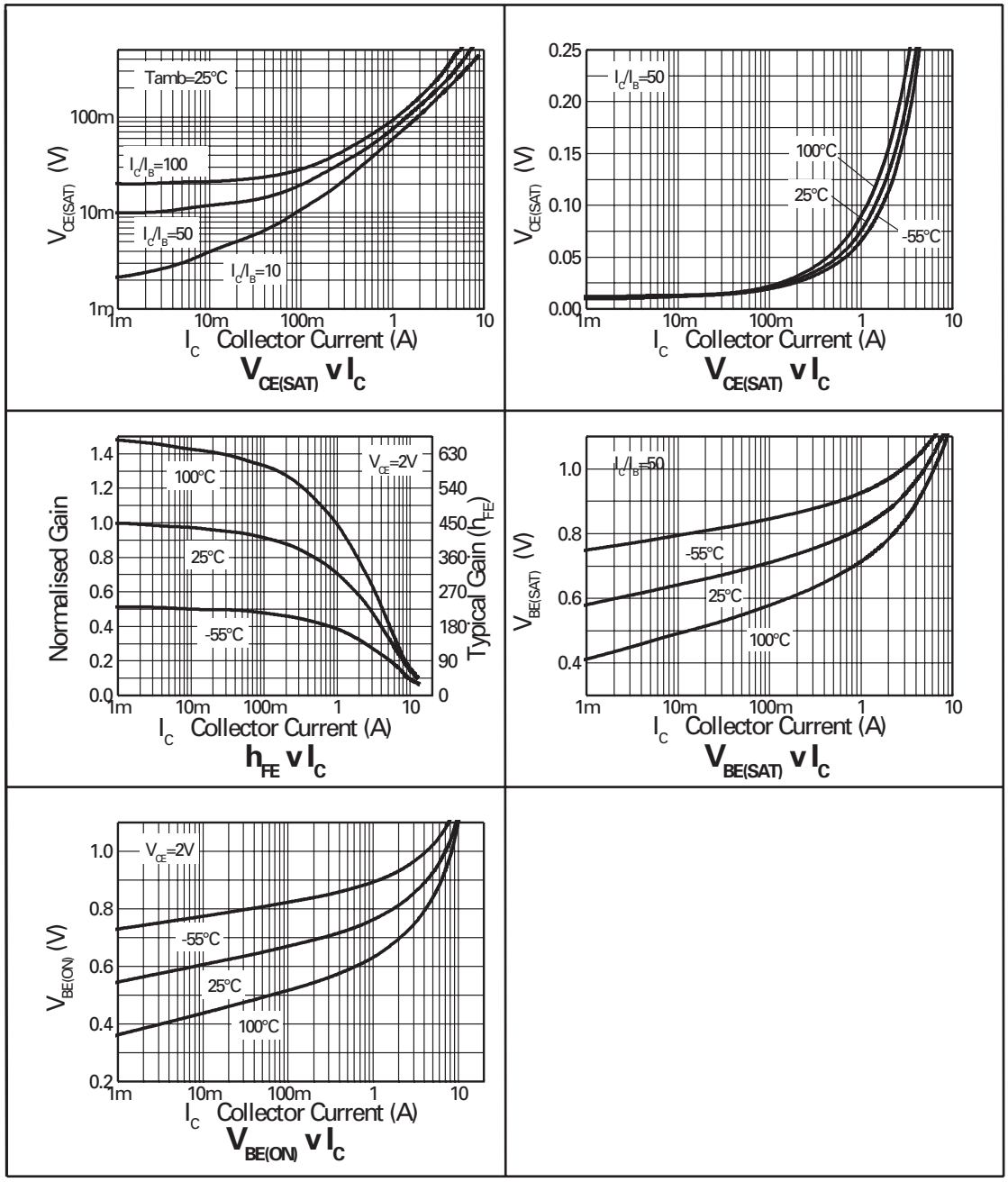
ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-20	-35		V	I_C=-100μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-12	-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}=-16V
Emitter Cut-Off Current	I_{EBO}			-25	nA	V_{EB}=-6V
Collector Emitter Cut-Off Current	I_{CES}			-25	nA	V_{CES}=-10V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-10	-17	mV	I_C=-0.1A, I_B=-10mA*
			-100	-140	mV	I_C=-1A, I_B=-10mA*
			-100	-150	mV	I_C=-1.5A, I_B=-50mA*
			-195	-300	mV	I_C=-3A, I_B=-50mA*
			-240	-300	mV	I_C=-4A, I_B=-150mA*
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-0.97	-1.05	V	I_C=-4A, I_B=-150mA*
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-0.87	-0.95	V	I_C=-4A, V_{CE}=-2V*
Static Forward Current Transfer Ratio	h_{FE}	300	475			I_C=-10mA, V_{CE}=-2V*
		300	450			I_C=-0.1A, V_{CE}=-2V*
		180	275			I_C=-2.5A, V_{CE}=-2V*
		60	100			I_C=-8A, V_{CE}=-2V*
		45	70			I_C=-10A, V_{CE}=-2V*
Transition Frequency	f_T	100	110		MHz	I_C=-50mA, V_{CE}=-10V f=100MHz
Output Capacitance	C_{obo}		21	30	pF	V_{CB}=-10V, f=1MHz
Turn-On Time	$t_{(on)}$		70		ns	V_{CC}=-6V, I_C=-2A I_{B1}=I_{B2}=-50mA
Turn-Off Time	$t_{(off)}$		130		ns	

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

CHARACTERISTICS



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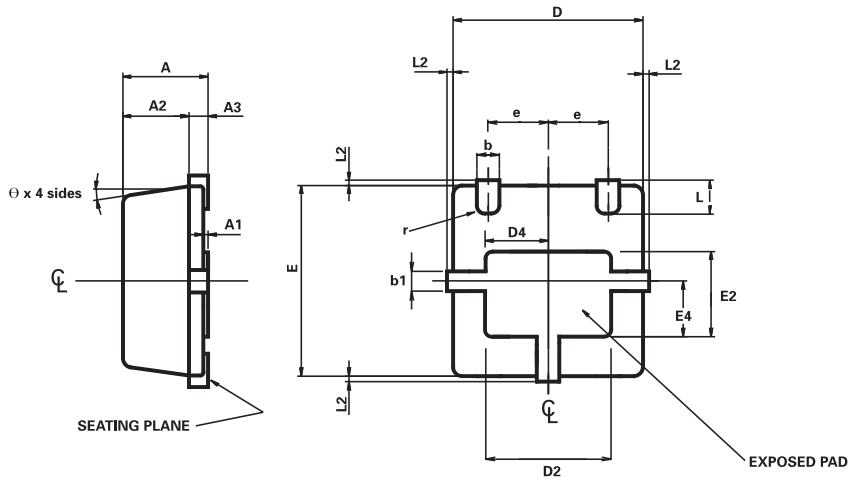
MLP322 PACKAGE OUTLINE (2mm x 2mm Micro Leaded Package)



CONTROLLING DIMENSIONS IN MILLIMETRES
APPROX. CONVERTED DIMENSIONS 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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