MPPS™ Miniature Package Power Solutions
15V NPN LOW SATURATION TRANSISTOR

SUMMARY
V_{CEO}= 15V; R_{SAT} = 45mΩ; I_C= 4.5A

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**:

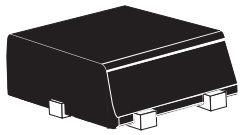
Performance capability equivalent to much larger packages

Improved circuit efficiency & power levels

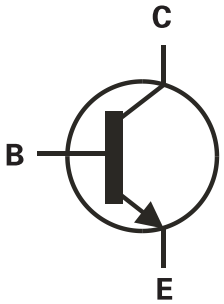
Lower package height (nom. 0.9mm)

PCB area and device placement savings

Reduced component count



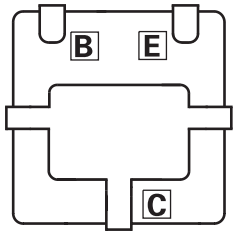
2mm x 2mm MLP
(single die)



FEATURES
- Low Equivalent On Resistance
- Extremely Low Saturation Voltage **(100mVmax @1A)**
- h_{FE} specified up to 12A
- I_C= 4.5A Continuous Collector Current
- 2mm x 2mm MLP

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

PINOUT



2mm x 2mm Single MLP
underside view

ORDERING INFORMATION

DEVICE	REEL	TAPE WIDTH	QUANTITY PER REEL
ZXTAM322TA	7″	8mm	3000 units
ZXTAM322TC	13″	8mm	10000 units

DEVICE MARKING
SA

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT	UNIT
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	15	V
Emitter-Base Voltage	V_{EBO}	7.5	V
Peak Pulse Current (c)	I_{CM}	15	A
Continuous Collector Current (a)	I_C	4.5	A
Continuous Collector Current (b)	I_C	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 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.**

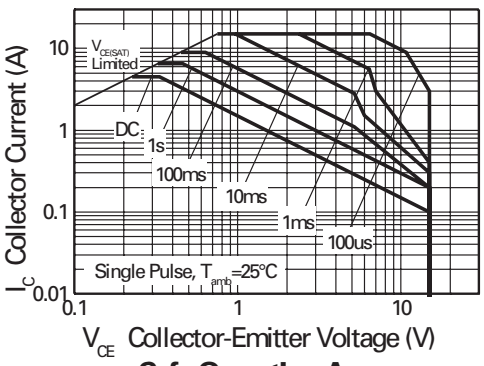
(c) Repetitive rating - pulse width limited by max junction temperature. refer to Transient Thermal Impedance graph.

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

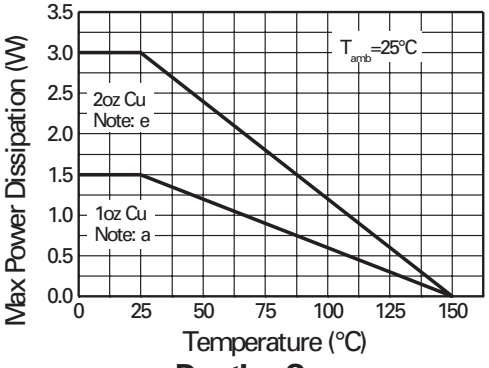
(e) For a single device surface mounted on 65sq cm2oz copper on FR4 PCB in still air conditions **with all exposed pads attached**.

(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 and 1mm wide track is Rth=300°C/W giving a power rating of Ptot=420mW.

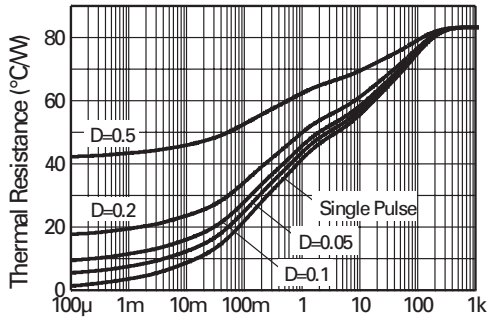
TYPICAL CHARACTERISTICS



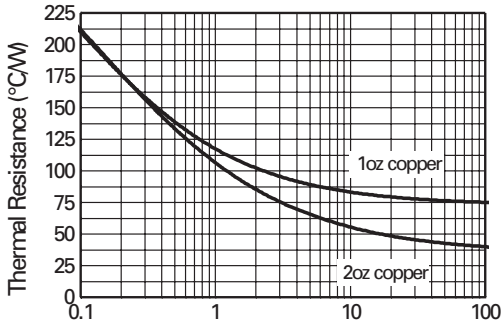
Safe Operating Area



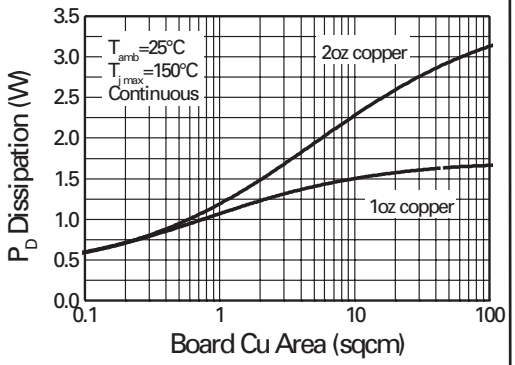
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



Power Dissipation v Board Area

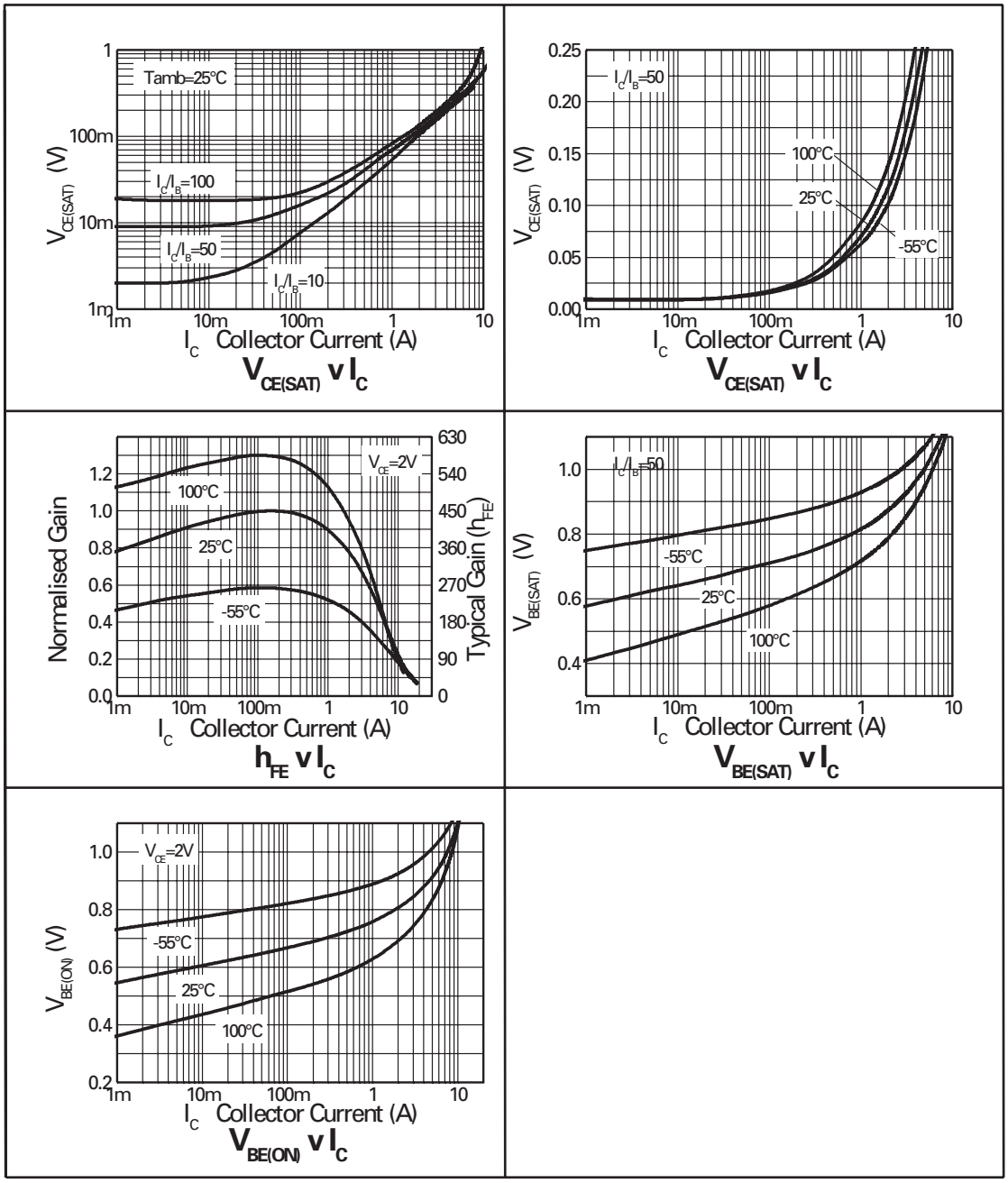
ZXTAM322

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	40	70		V	I_C=100μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15	18		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}=32V
Emitter Cut-Off Current	I_{EBO}			25	nA	V_{EB}=6V
Collector Emitter Cut-Off Current	I_{CES}			25	nA	V_{CES}=12V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		8	14	mV	I_C=0.1A, I_B=10mA*
			70	100	mV	I_C=1A, I_B=10mA*
			165	200	mV	I_C=3A, I_B=50mA*
			240	280	mV	I_C=4.5A, I_B=50mA*
			200		mV	I_C=4.5A, I_B=100mA*
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		0.94	1.0	V	I_C=4.5A, I_B=50mA*
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		0.88	0.95	V	I_C=4.5A, V_{CE}=2V*
Static Forward Current Transfer Ratio	h_{FE}	200	415			I_C=10mA, V_{CE}=2V*
		300	450			I_C=0.2A, V_{CE}=2V*
		200	320			I_C=3A, V_{CE}=2V*
		150	240			I_C=5A, V_{CE}=2V*
			80			I_C=12A, V_{CE}=2V*
Transition Frequency	f_T	80	120		MHz	I_C=50mA, V_{CE}=10V f=100MHz
Output Capacitance	C_{obo}		30	40	pF	V_{CB}=10V, f=1MHz
Turn-On Time	$t_{(on)}$		120		ns	V_{CC}=10V, I_C=1A I_{B1}=I_{B2}=10mA
Turn-Off Time	$t_{(off)}$		160		ns	

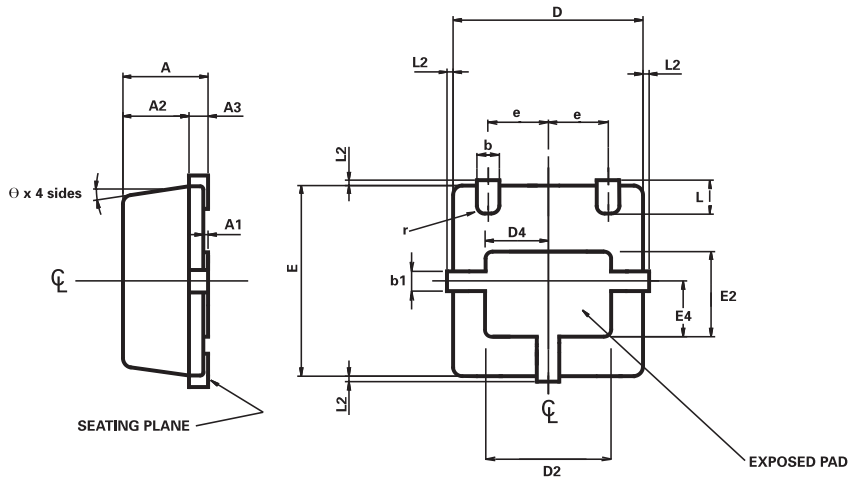
*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2%

TYPICAL CHARACTERISTICS



ZXTAM322

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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