

# ZXTP25012EZ

## 20V PNP high gain transistor in SOT89

### Summary

$BV_{CEO} > -12V$

$h_{FE} > 500$

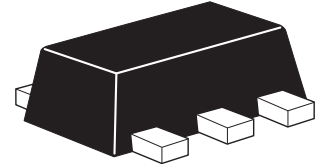
$I_{C(cont)} = 4.5A$

$V_{CE(sat)} < -70mV @ 1A$

$R_{CE(sat)} = 45m\Omega$

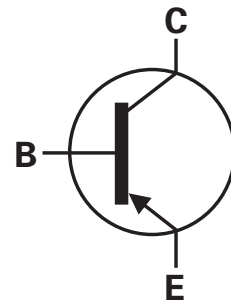
$P_D = 2.4W$

Complementary part number ZXTN25012EZ



### Description

Packaged in the SOT89 outline this new low saturation 12V PNP transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

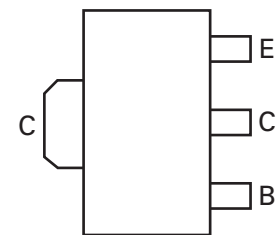


### Features

- 4.5A continuous current
- Up to 10A peak current
- Very low saturation voltages
- High gain

### Applications

- High side switch
- Battery charging
- Regulator circuits
- Buck converters
- MOSFET gate drivers



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP25012EZTA	7	12	1000

### Device marking

- 1L4

# ZXTP25012EZ

## 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	V
Continuous Collector current <sup>(c)</sup>	$I_C$	-4.5	A
Base current	$I_B$	-1	A
Peak pulse current	$I_{CM}$	-10	A
Power dissipation at $T_A = 25^\circ\text{C}^{(a)}$	$P_D$	1.1	W
Linear derating factor		8.8	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(b)}$	$P_D$	1.8	W
Linear derating factor		14.4	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(c)}$	$P_D$	2.4	W
Linear derating factor		19.2	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(d)}$	$P_D$	4.46	W
Linear derating factor		35.7	mW/°C
Power dissipation at $T_A = 25^\circ\text{C}^{(d)}$	$P_D$	19.2	W
Linear derating factor		153	mW/°C
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	°C

## Thermal resistance

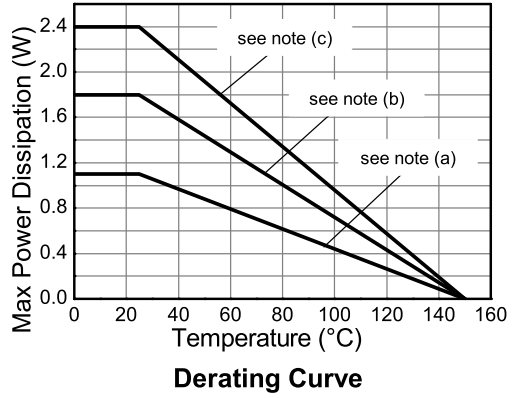
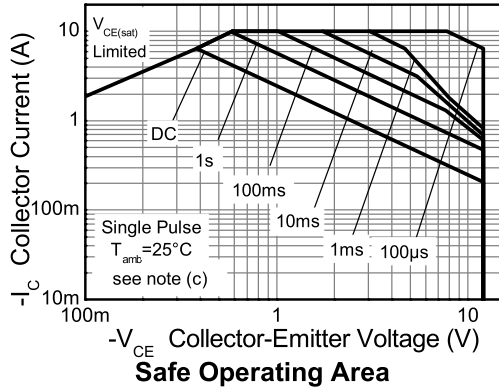
Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	117	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	68	°C/W
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	51	°C/W
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	28	°C/W
Junction to case <sup>(e)</sup>	$R_{\theta JC}$	7.95	°C/W

### NOTES:

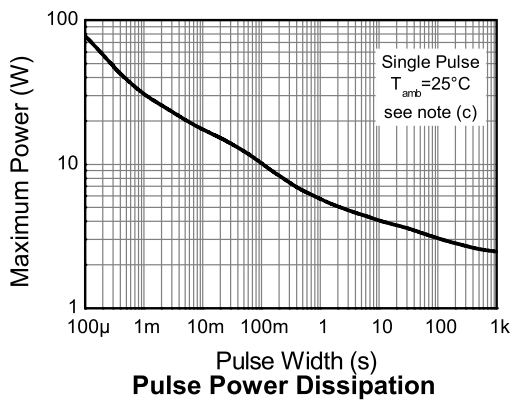
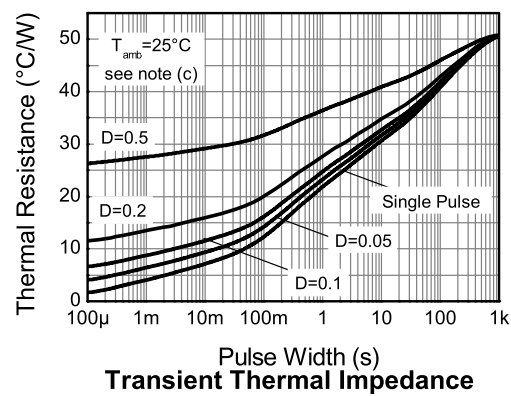
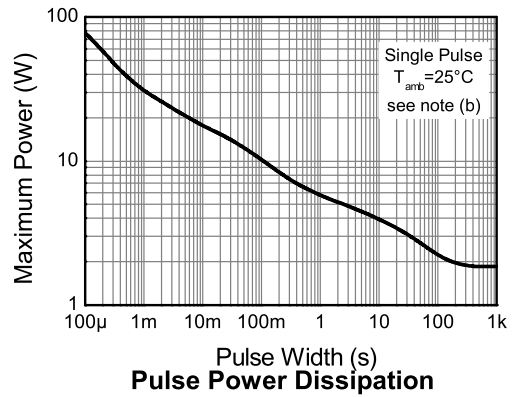
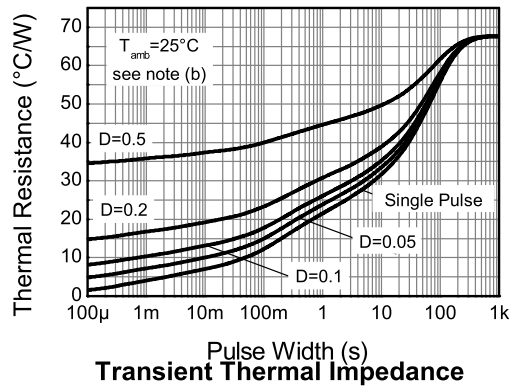
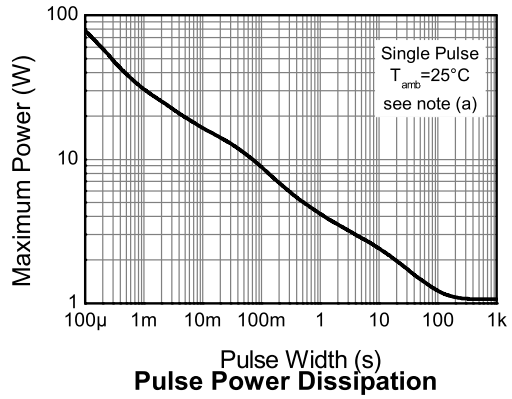
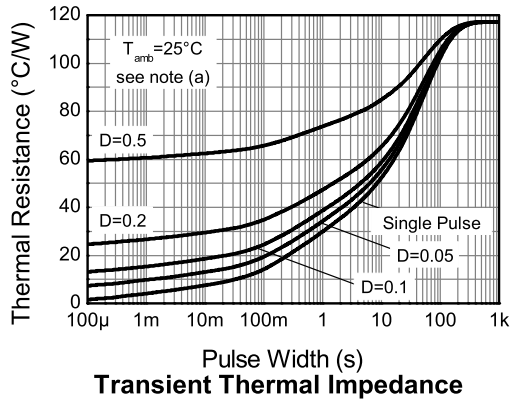
- (a) For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
- (b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
- (c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
- (d) As (c) above measured at  $t < 5$  seconds.
- (e) Junction to case (collector tab). Typical

# ZXTP25012EZ

## Thermal characteristics



## Thermal characteristics



# ZXTP25012EZ

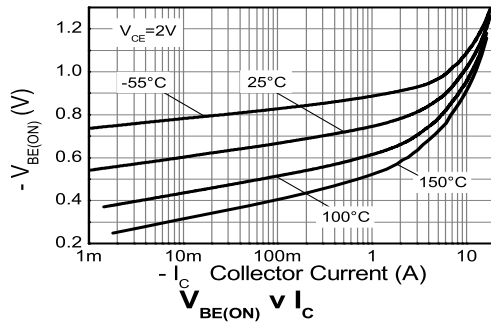
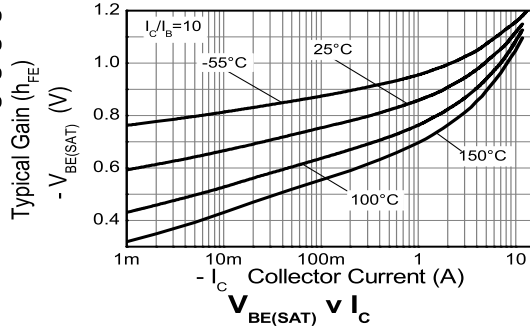
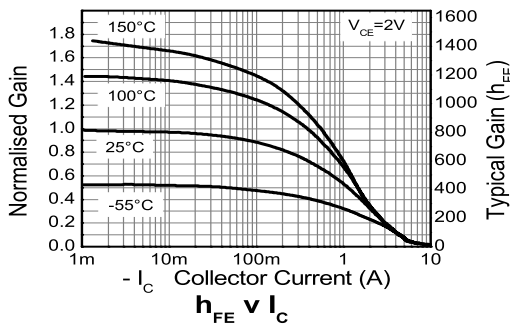
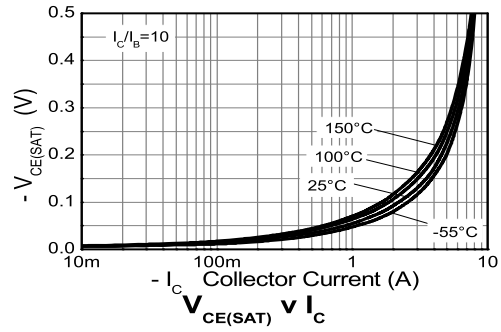
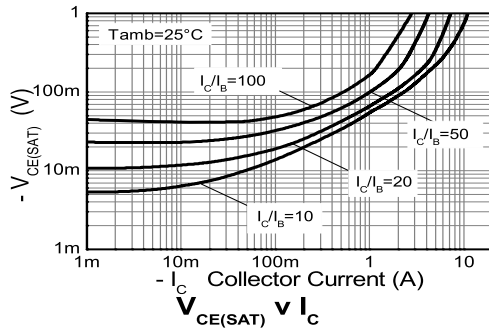
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	$BV_{CBO}$	-12	-35		V	$I_C = -100\mu\text{A}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	-12	-25		V	$I_C = -10\text{mA}^{(*)}$
Emitter-Base breakdown voltage	$BV_{EBO}$	-7	-8.5		V	$I_E = -100\mu\text{A}$
Collector-Base cut-off current	$I_{CBO}$		<-1	-50 -0.5	nA $\mu\text{A}$	$V_{CB} = -12\text{V}$ $V_{CB} = -12\text{V}, T_{amb} = 100^{\circ}\text{C}$
Emitter Base cut-off current	$I_{EBO}$		<-1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-Emitter saturation voltage	$V_{CE(sat)}$		-55 -155 -185 -200	-70 -265 -355 -285	mV mV mV mV	$I_C = -1\text{A}, I_B = -100\text{mA}^{(*)}$ $I_C = -1\text{A}, I_B = -10\text{mA}^{(*)}$ $I_C = -2\text{A}, I_B = -40\text{mA}^{(*)}$ $I_C = -4.5\text{A}, I_B = -450\text{mA}^{(*)}$
Base-Emitter saturation voltage	$V_{BE(sat)}$		-990	-1100	mV	$I_C = -4.5\text{A}, I_B = -450\text{mA}^{(*)}$
Base-Emitter turn-on voltage	$V_{BE(on)}$		-865	-975	mV	$I_C = -4.5\text{A}, V_{CE} = -2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	500 300 40	800 450 85 15	1500		$I_C = -10\text{mA}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -4.5\text{A}, V_{CE} = -2\text{V}^{(*)}$ $I_C = -10\text{A}, V_{CE} = -2\text{V}^{(*)}$
Transition frequency	$f_T$		310		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Input capacitance	$C_{ibo}$		127	250	pF	$V_{EB} = -0.5\text{V}, f = 1\text{MHz}^{(*)}$
Output capacitance	$C_{obo}$		16.9	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}^{(*)}$
Delay time	$t_d$		41		ns	$V_{CC} = -10\text{V}, I_C = -1\text{A},$ $I_{B1} = -I_{B2} = -10\text{mA}$
Rise time	$t_r$		62		ns	
Storage time	$t_s$		179		ns	
Fall time	$t_f$		65		ns	

### NOTES:

(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical characteristics



# ZXTP25012EZ

## Package outline



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	E	2.29	2.60	0.090	0.102
B	0.44	0.56	0.017	0.022	E1	2.13	2.29	0.084	0.090
B1	0.36	0.48	0.014	0.019	e	1.50 BSC		0.059 BSC	
C	0.35	0.44	0.014	0.017	e1	3.00 BSC		0.118 BSC	
D	4.40	4.60	0.173	0.181	H	3.94	4.25	0.155	0.167
D1	1.52	1.83	0.064	0.072	L	0.89	1.20	0.035	0.047

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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