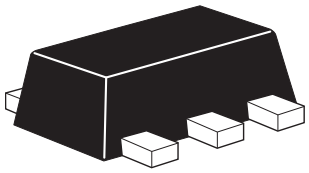
ZXTN25012EZ
12V NPN high gain transistor in SOT89

Summary



BV_{CEO} > 12V

BV_{ECX} > 6V

h_{FE} > 500

$I_{C(cont)}$ = 6.5A

$V_{CE(sat)}$ < 38mV @ 1A

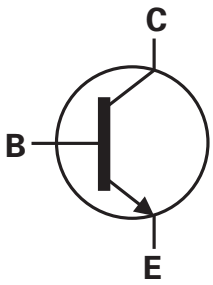
$R_{CE(sat)}$ = 25mΩ

P_D = 2.4W

Complementary part number ZXTP25012EZ

Description

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

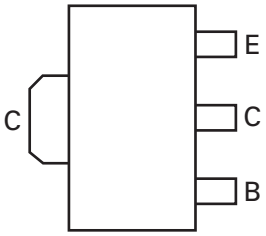


Features

- 6.5A continuous current
- Up to 15A peak current
- Very low saturation voltages
- 6V reverse blocking voltage

Applications

- LED driving
- Motor driving
- Boost converters
- Royer converters
- Camera strobe
- MOSFET gate drivers



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25012EZTA	7	12	1000

Device marking

1K7

Absolute maximum and thermal ratings

Parameter	Symbol	Limit	Unit
Collector-Base voltage	V_{CBO}	20	V
Collector-Emitter voltage	V_{CEO}	12	V
Emitter-Collector voltage (reverse blocking)	V_{ECX}	6	V
Emitter-Base voltage	V_{EBO}	7	V
Continuous Collector current[c]	I_C	6.5	A
Base current	I_B	1	A
Peak pulse current	I_{CM}	15	A
Power dissipation at T_A =25°C[a] Linear derating factor	P_D	1.1 8.8	W mW/°C
Power dissipation at T_A =25°C[b] Linear derating factor	P_D	1.8 14.4	W mW/°C
Power dissipation at T_A =25°C[c] Linear derating factor	P_D	2.4 19.2	W mW/°C
Power dissipation at T_A =25°C[d] Linear derating factor	P_D	4.46 35.7	W mW/°C
Power dissipation at T_C =25°C[e] Linear derating factor	P_D	19.2 153	W mW/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient[a]	$R_{\Theta JA}$	117	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	68	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	51	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	28	°C/W
Junction to case[e]	$R_{\Theta JC}$	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.

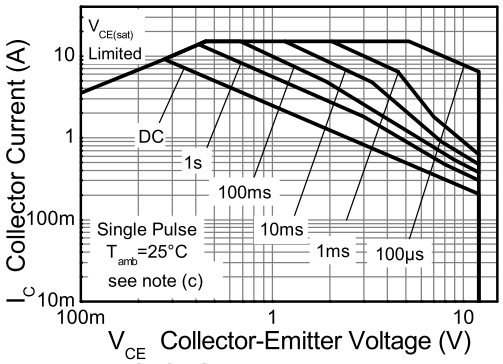
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

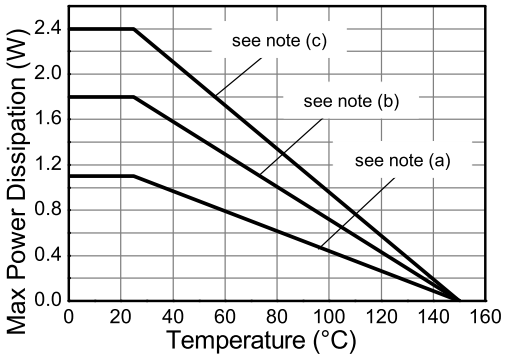
(d) As (c) above measured at t<5 seconds.

(e) Junction to case (collector tab). Typical

Thermal characteristics

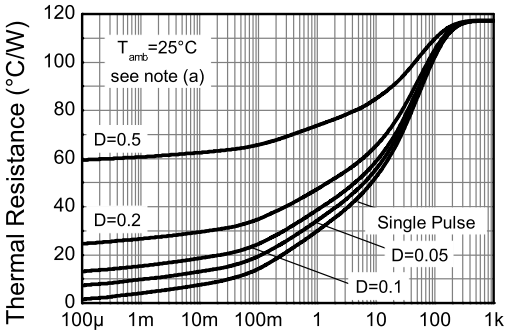


Safe Operating Area

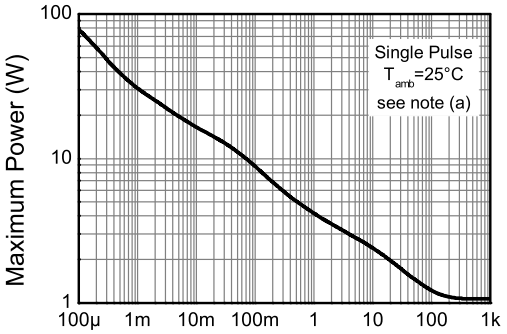


Derating Curve

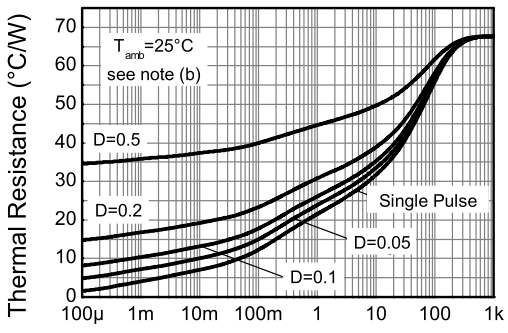
Thermal characteristics



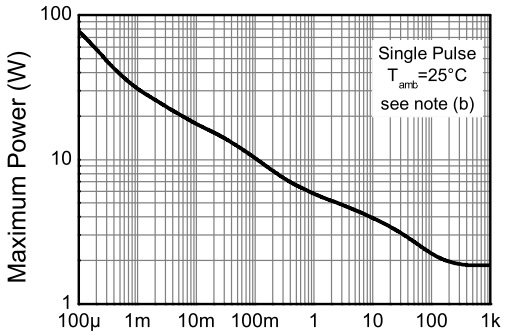
Transient Thermal Impedance



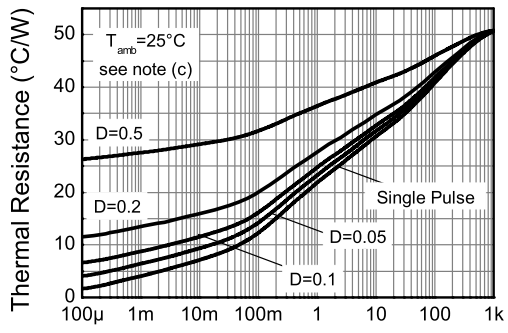
Pulse Power Dissipation



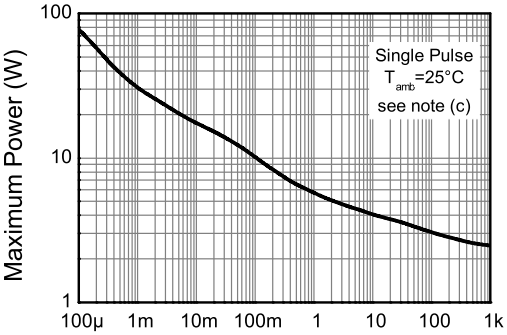
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



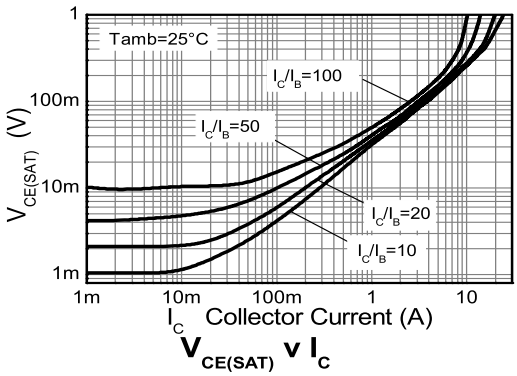
Pulse Power Dissipation

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

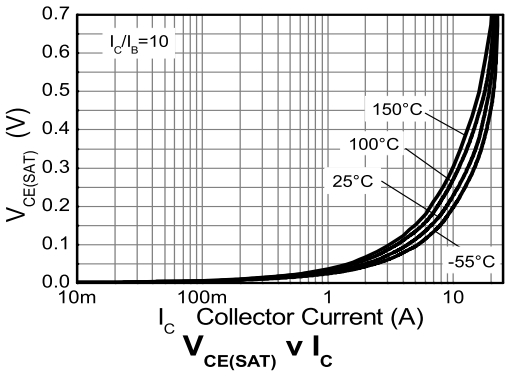
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Base breakdown voltage	BV_{CBO}	20	40		V	I_C = 100μA
Collector-Emitter breakdown voltage	BV_{CEO}	12	17		V	I_C = 10mA (*)
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8		V	I_E = 100mA, R_{BC} < 1kΩ or 0.25V > V_{BC} > -0.25V
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECO}	4.5	5.5		V	I_E = 100μA
Emitter-Base breakdown voltage	BV_{EBO}	7	8.3		V	I_E = 100μA
Collector-Base cut-off current	I_{CBO}		<1	50 0.5	nA μA	V_{CB} = 20V V_{CB} = 20V, T_{amb}= 100°C
Collector-Emitter cut-off current	I_{CEX}			100	nA	V_{CE} = 20V, R_{BE} < 1kΩ or -1V < V_{BE} < 0.25V
Emitter cut-off current	I_{EBO}		<1	50	nA	V_{EB} = 5.6V
Collector-Emitter saturation voltage	$V_{CE(sat)}$		31 50 70 90 200	38 60 85 130 270	mV mV mV mV mV	I_C = 1A, I_B = 100mA(*) I_C = 1A, I_B = 10mA(*) I_C = 2A, I_B = 40mA(*) I_C = 2A, I_B = 20mA(*) I_C = 6.5A, I_B = 130mA(*)
Base-Emitter saturation voltage	$V_{BE(sat)}$		950	1050	mV	I_C = 6.5A, I_B = 130mA(*)
Base-Emitter turn-on voltage	$V_{BE(on)}$		840	950	mV	I_C = 6.5A, V_{CE} = 2V(*)
Static forward current transfer ratio	h_{FE}	500 500 185 30	800 750 250 50	1500		I_C = 10mA, V_{CE} = 2V(*) I_C = 1A, V_{CE} = 2V(*) I_C = 6.5A, V_{CE} = 2V(*) I_C = 15A, V_{CE} = 2V(*)
Transition frequency	f_T		260		MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Input capacitance	C_{ibo}		137	250	pF	V_{EB} = 0.5V, f = 1MHz(*)
Output capacitance	C_{obo}		25	35	pF	V_{CB} = 10V, f = 1MHz(*)
Delay time	t_d		71		ns	I_C = 1A, V_{CC} = 10V, I_{B1} =-I_{B2} = 10mA
Rise time	t_r		70		ns	
Storage time	t_s		233		ns	
Fall time	t_f		72		ns	

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.

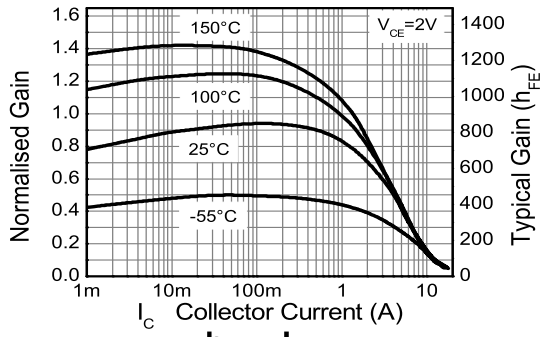
Typical characteristics



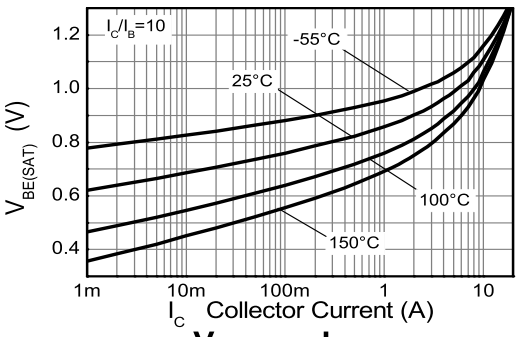
$V_{CE(SAT)}$ v I_C



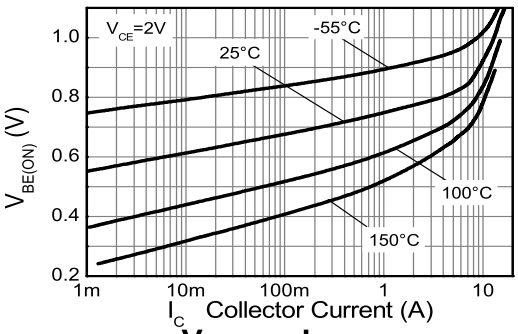
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

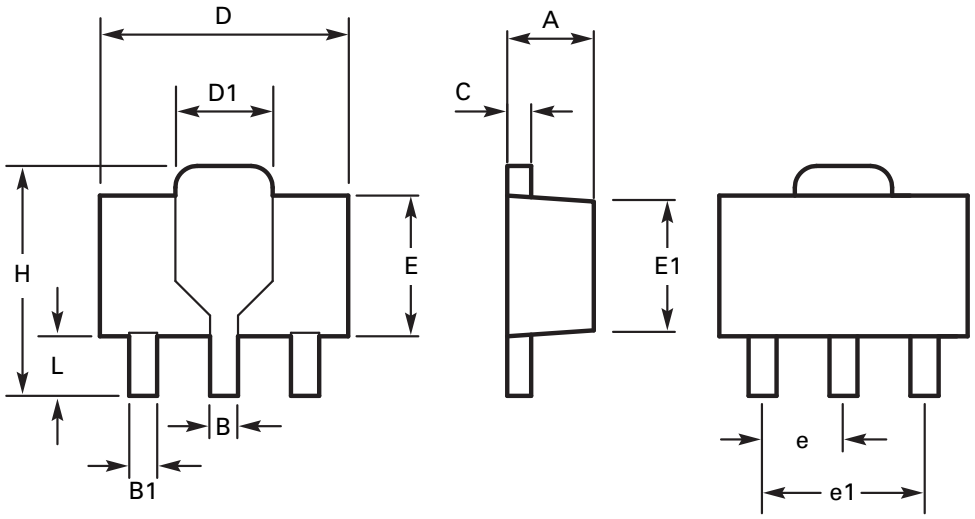


$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package outline - SOT89



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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