40V PNP MEDIUM POWER TRANSISTOR IN SOT23

Features

- BV_{CEO} > -40V
- BV_{ECO} > -3V
- I_C = -3A Continuous Collector Current
- $V_{CE(sat)}$ < -85mV @ -1A
- $R_{CE(sat)}$ = 55mΩ typical
- P_D = 1.25W
- High Power Dissipation SOT23 Package
- High Peak Current
- Low Saturation Voltage
- 3V Reverse Blocking Voltage
- Complementary Part Number: ZXTN25040DFH
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

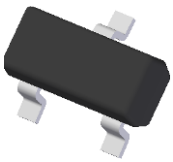
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

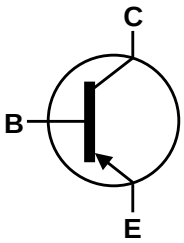
Applications

- MOSFET and IGBT gate driving
- DC-DC converters
- Motor drives
- High-side drivers

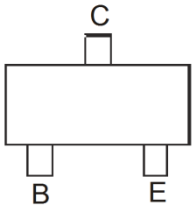
SOT23



Top View



Device Symbol



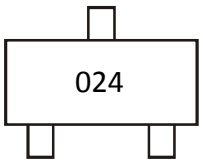
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP25040DFHTA	024	7	8	3,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



024 = Product Type Marking Code

Absolute Maximum Ratings @ T_A = +25°C, unless otherwise specified.

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage (Forward Blocking)	V_{CEO}	-40	V
Emitter-collector voltage (Reverse Blocking)	V_{ECO}	-3	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-3	A
Peak Pulse Current	I_{CM}	-9	A

Thermal Characteristics @ T_A = +25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation Linear derating factor	(Note 5)	P_D	0.73 5.84	W mW/°C
	(Note 6)		0.78 6.24	
	(Note 7)		1.05 8.4	
	(Note 8)		1.25 9.6	
	(Note 9)		1.81 14.5	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	171	°C/W
	(Note 6)		160	
	(Note 7)		119	
	(Note 8)		100	
	(Note 9)		69	
Thermal Resistance, Junction to Lead	(Note 10)	$R_{\theta JL}$	74.95	°C/W
Thermal Resistance, Junction to Case	(Note 11)	$R_{\theta JC}$	45	°C/W
Operating and Storage Temperature Range	—	T_J, T_{STG}	-55 to +150	°C

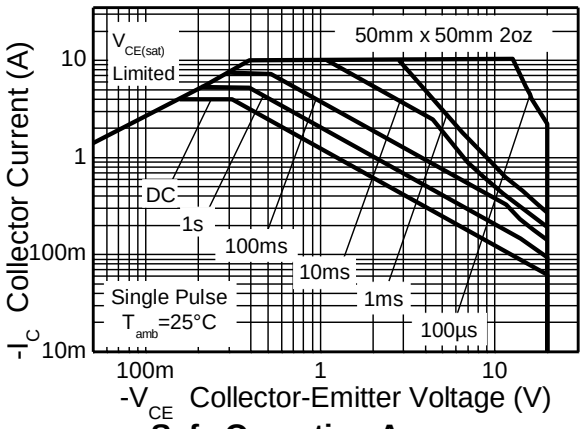
Notes:
5. For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. Same as note (5), except the device is mounted on FR4 substrate PCB layout with minimum recommended pad layout.
7. Same as note (5), except the device is surface mounted on 25mm x 25mm with 2 oz copper.
8. Same as note (5), except the device is surface mounted on 50mm x 50mm with 2 oz copper.
9. Same as note (8), except the device is measured at t<5secs.
10. Thermal resistance from junction to solder-point (at the end of the collector lead).
11. Thermal resistance from junction to the top of the case.

ESD Ratings (Note 12)

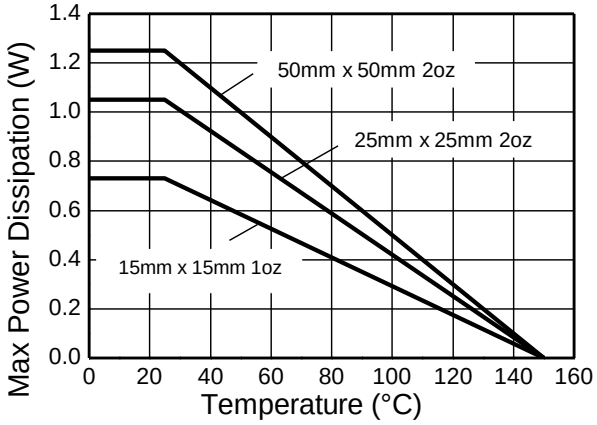
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Note: 12. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

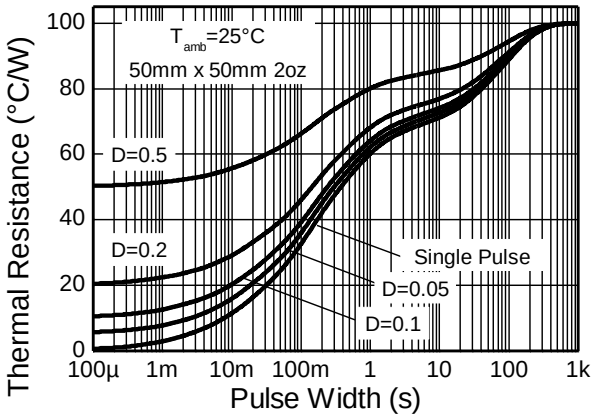
Thermal Characteristics and Derating Information



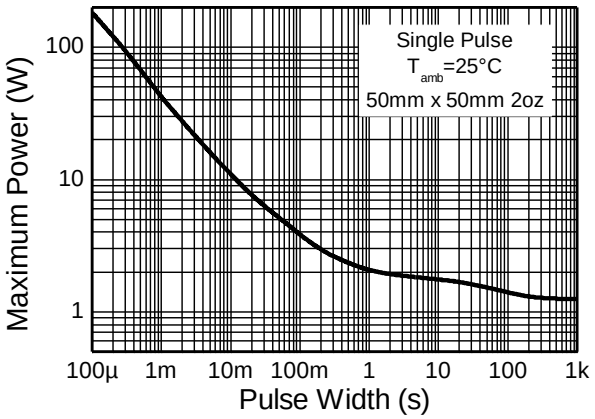
Safe Operating Area



Derating Curve



Transient Thermal Impedance



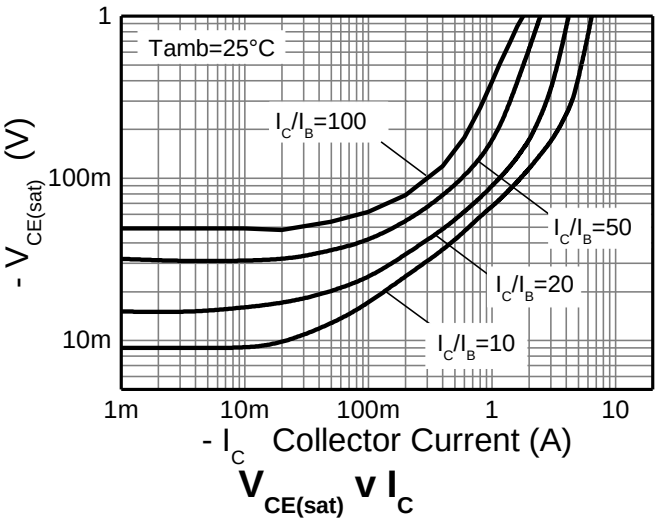
Pulse Power Dissipation

Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

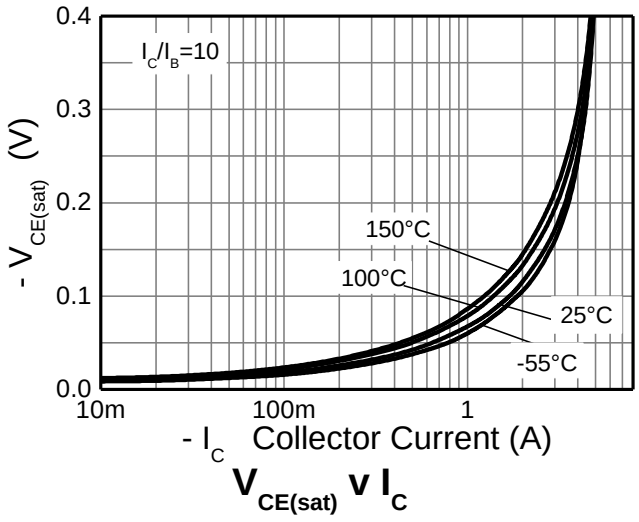
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-45	-75	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 13)	BV_{CEO}	-40	-65	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.2	-	V	I_E = -100µA
Emitter-Collector Breakdown Voltage	BV_{ECO}	-3	-8.7	-	V	I_E = -100µA
Collector-Base Cutoff Current	I_{CBO}	-	< -1	-50	nA	V_{CB} = -45V
		-	-	-0.5	µA	V_{CB} = -45V, T_{amb} = +100°C
Emitter-Base Cutoff Current	I_{EBO}	-	< -1	-50	nA	V_{EB} = -5.6V
Static Forward Current Transfer Ratio (Note 13)	h_{FE}	300	450	900	-	I_C = -10mA, V_{CE} = -2V
		200	300	-		I_C = -1A, V_{CE} = -2V
		30	60	-		I_C = -3A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 13)	$V_{CE(sat)}$	-	-170	-260	mV	I_C = -1A, I_B = -20mA
		-	-65	-85		I_C = -1A, I_B = -100mA
		-	-165	-220		I_C = -3A, I_B = -300mA
Base-Emitter Saturation Voltage (Note 13)	$V_{BE(sat)}$	-	-930	-1000	mV	I_C = -3A, I_B = -300mA
Base-Emitter Saturation Voltage (Note 13)	$V_{BE(on)}$	-	-830	-900	mV	I_C = -3A, V_{CE} = -2V
Output Capacitance	C_{obo}	-	17.4		pF	V_{CB} = -10V, f = 1MHz
Transition Frequency	f_T	-	270	-	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Turn-on Time	$t_{(on)}$	-	75.5	-	ns	V_{CC} = -15V, I_C = -750mA, I_{B1} = -I_{B2} = -15mA
Turn-off Time	$t_{(off)}$	-	320	-	ns	

Note: 13. Measured under pulsed conditions. Pulse width ≤ 300 µs. Duty cycle ≤ 2%.

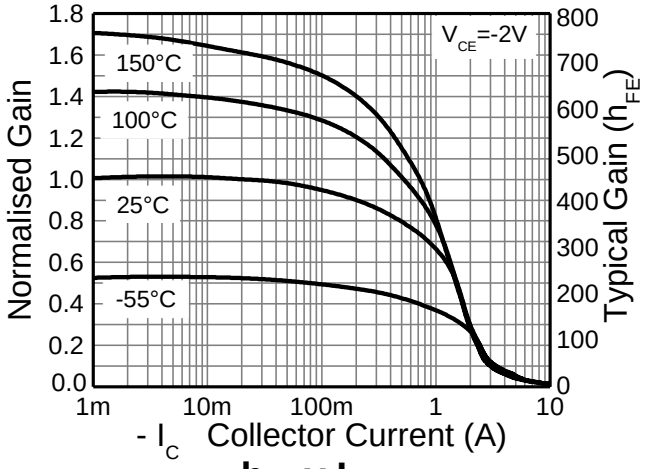
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



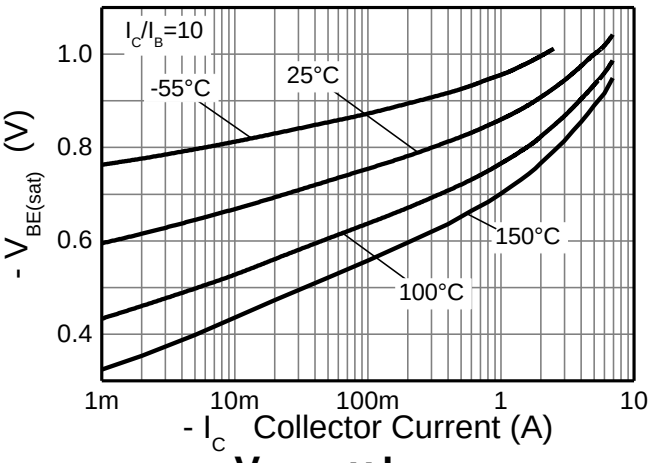
$V_{CE(sat)}$ v I_C



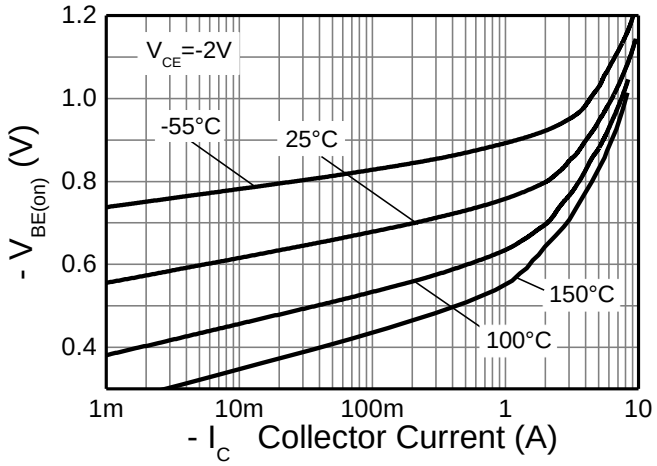
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



$V_{BE(sat)}$ v I_C

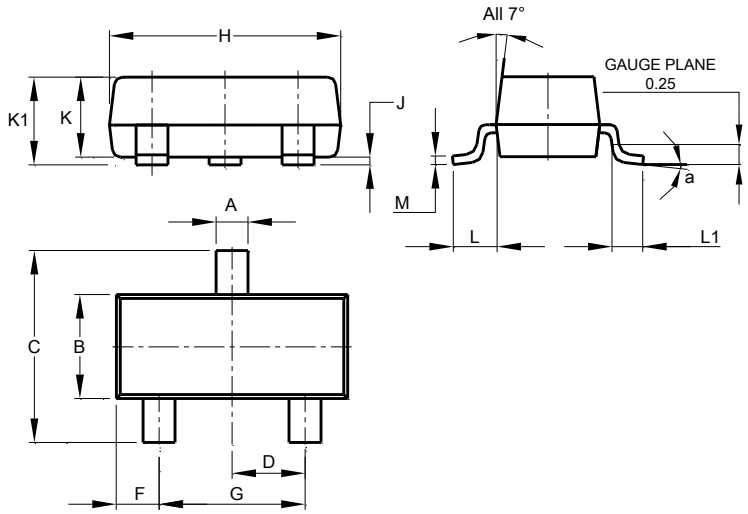


$V_{BE(on)}$ v I_C

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23

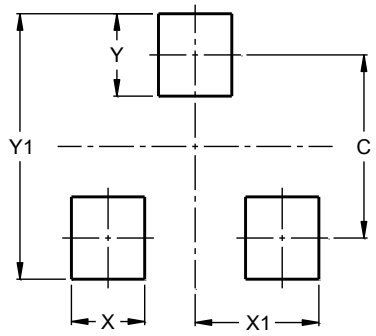


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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