40V PNP LOW SATURATION TRANSISTOR IN SOT23

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of automotive applications.

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 2086 (e3)
- Weight: 0.008 grams (Approximate)

Features

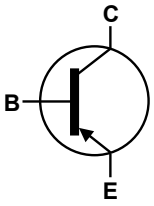
- BV_{CEO} > -40V
- BV_{ECO} > -3V
- Maximum Continuous Collector Current I_C = -3A
- $R_{CE(sat)}$ = 55mΩ
- $V_{CE(sat)}$ < -85mV @ -1A
- High Power Dissipation SOT23 Package
- High Peak Current
- Low Saturation Voltage
- -3V Reverse Blocking Voltage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. “Green” Device (Note 3)**
- **The ZTP25040DFHQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Applications

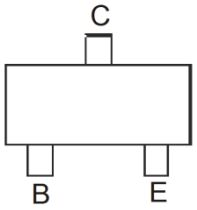
- MOSFET and IGBT Gate Driving
- DC - DC Converters
- Motor Drives
- High-Side Drivers

SOT23 (Type

Top View



Device Symbol



Top View
Pin-Out

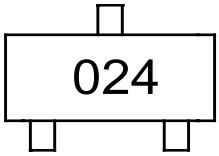
Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZTP25040DFHQTA	Automotive	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

SOT23 (Type DN)



024 = Product Type Marking Code

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

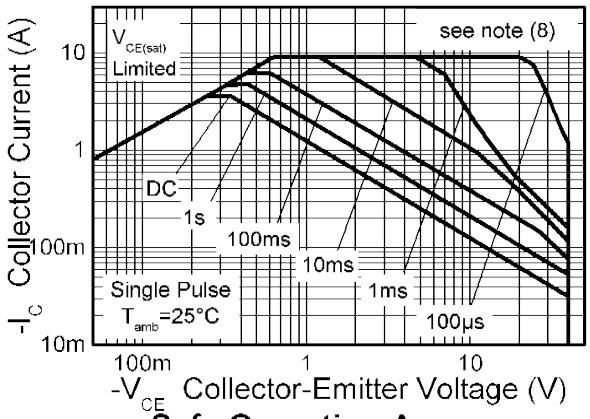
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Collector Voltage	V_{ECO}	-3	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-3	A
Peak Pulse Current	I_{CM}	-9	A

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

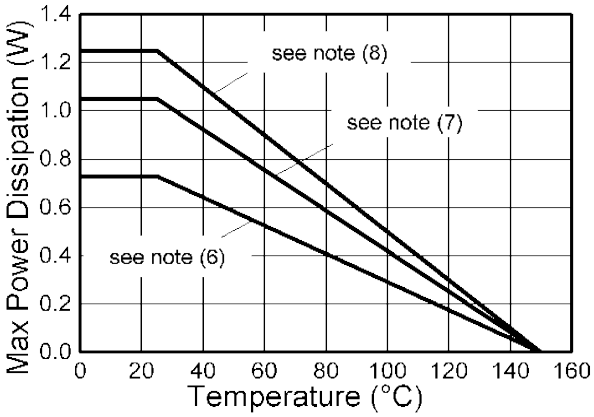
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	0.73 5.84	W mW/°C
	(Note 6)		1.05 8.4	
	(Note 7)		1.25 9.6	
	(Note 8)		1.81 14.5	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	171	°C/W
	(Note 6)		119	
	(Note 7)		100	
	(Note 8)		69	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device mounted with the collector lead on 15mm × 15mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Mounted on 25mm × 25mm 1.6mm FR-4 PCB with a high coverage of single sided 2oz copper in still air conditions.
7. Mounted on 50mm × 50mm 1.6mm FR-4 PCB with a high coverage of single sided 2oz copper in still air conditions.
8. Same as note (7), except measured at t < 5 seconds.

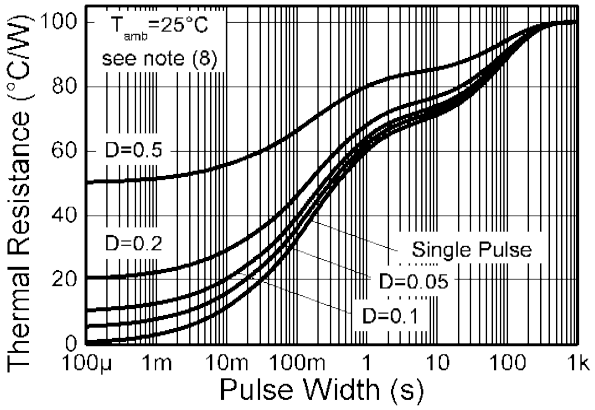
Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)



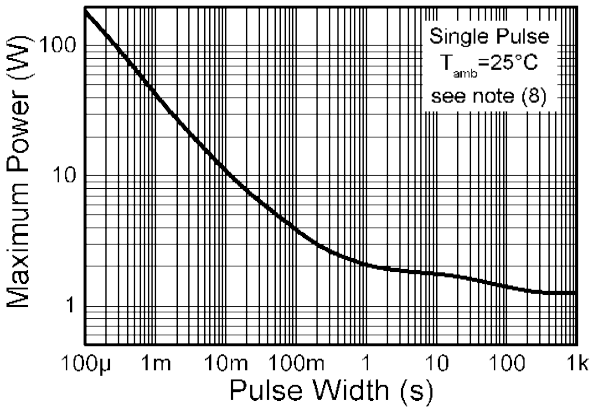
Safe Operating Area



Derating Curve



Transient Thermal Impedance



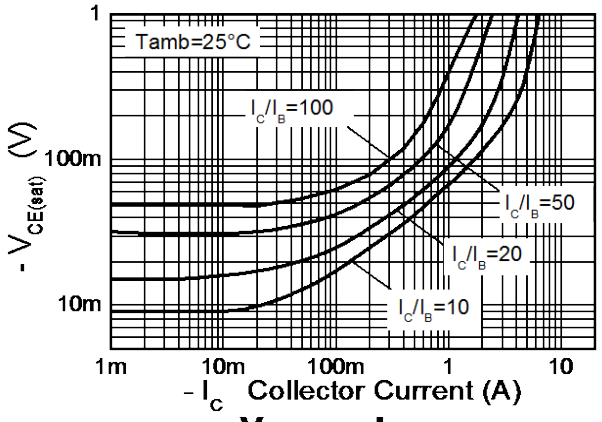
Pulse Power Dissipation

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

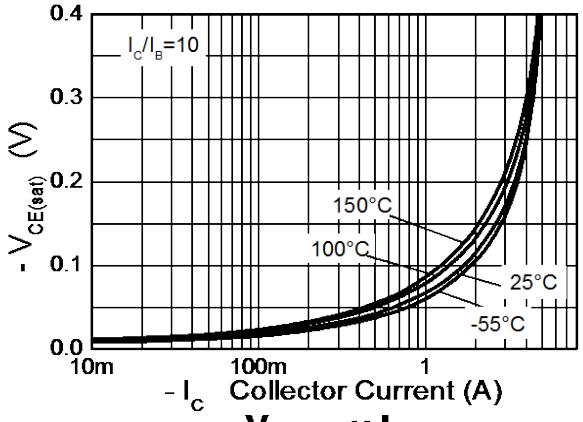
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-45	-75	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-40	-65	—	V	I_C = -10mA
Collector-Emitter Breakdown Voltage	BV_{ECO}	-3	-8.7	—	V	I_E = -100µA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.2	—	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 9)	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 9)	$V_{CE(sat)}$	—	-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 9)	$V_{BE(sat)}$	—	-930	-1000	mV	I_C = -3A, I_B = -300mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(on)}$	—	-830	-900	mV	I_C = -3A, V_{CE} = -2V
Output Capacitance (Note 9)	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	—		

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

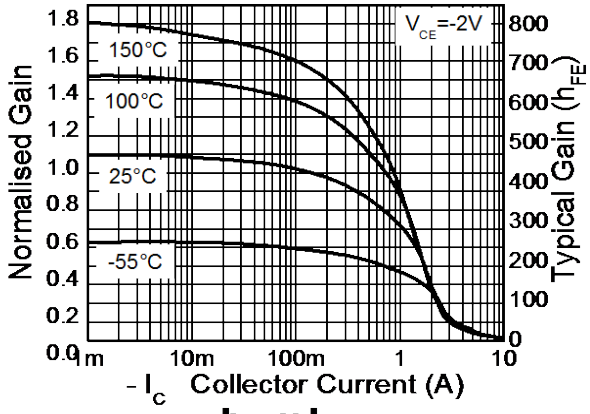
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



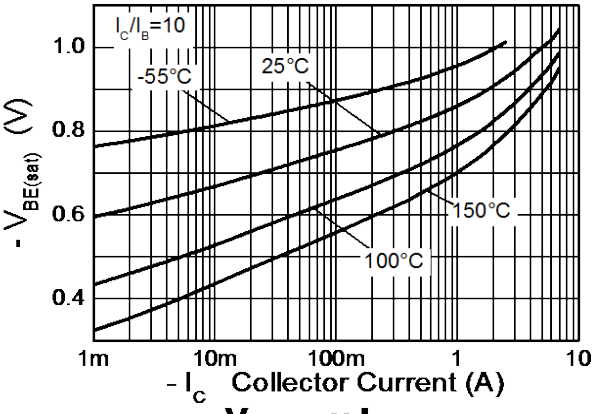
$V_{CE(sat)}$ v I_C



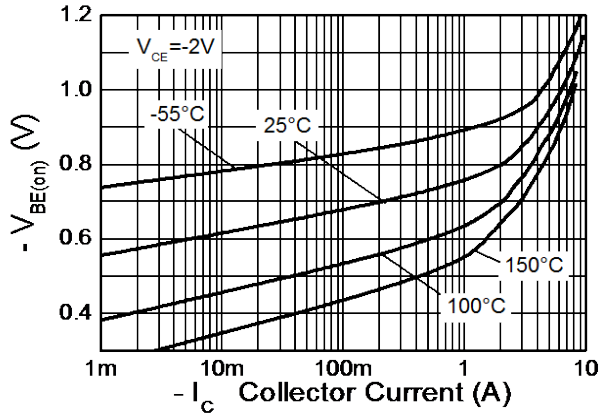
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



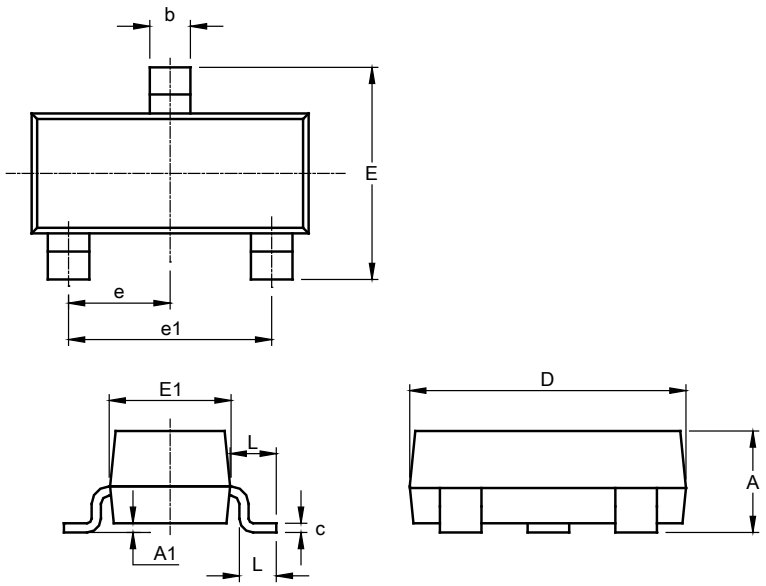
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

Package Outline Dimensions

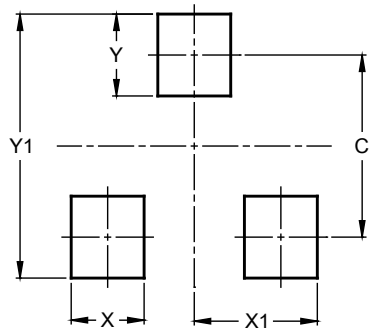
Please see http://www.diodes.com/package-outlines.html for the latest version.



SOT23 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

Suggested Pad Layout

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



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

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