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ZDT1053

75V DUAL NPN HIGH GAIN MEDIUM POWER TRANSISTOR IN SM-8

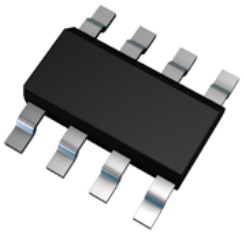
Features

- BV_{CEO} > 75V
- I_C = 5A High Collector Current
- I_{CM} = 20A Peak Pulse Current
- High Gain h_{FE} > 300 @ 1A
- Low Saturation Voltage $V_{CE(SAT)}$ < 150mV @ 1A
- **Lead-Free Finish; 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-Q100/101/104/200, 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/**

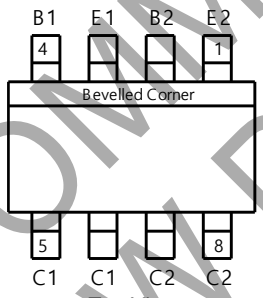
Mechanical Data

- Package: SM-8
- Package 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: 0.117 grams (Approximate)

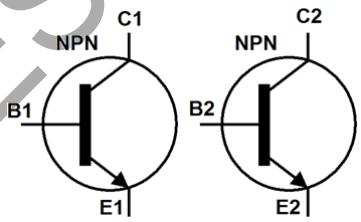
SM-8



Top View



Top View
Pinout



Equivalent Circuit

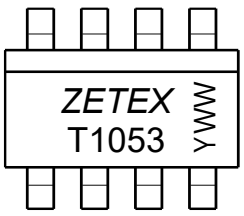
Ordering Information (Note 4)

Orderable Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
				Qty.	Carrier
ZDT1053TA	T1053	7	12	1,000	Reel

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html 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

SM-8



T1053 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 6 = 2026)
WW or $\overline{WW}$ = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	75	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Peak Pulse Current	I_{CM}	20	A
Base Current	I_B	500	mA

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

Characteristic		Symbol	Value	Unit
Collector Power Dissipation	(Note 5)	P_D	2.25	W
	(Note 6)		2.75	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	55.6	°C/W
	(Note 6)		45.5	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	30.7	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

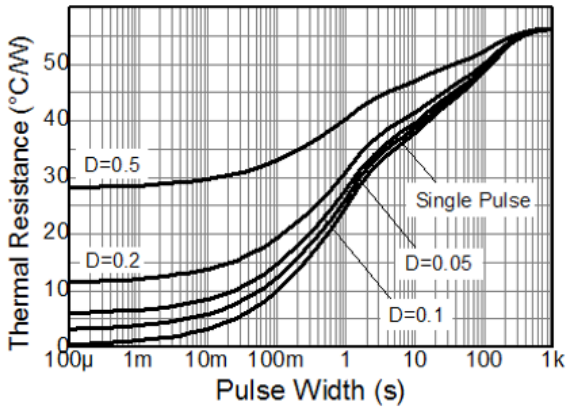
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device with any single die active and mounted with the collector lead on 25mm x 25mm 2oz 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. Same as Note 5, except both dies are active and equally sharing power.
7. Thermal resistance from junction to solder point (at the end of the collector lead).
8. Refer to JEDEC specifications JESD22-A114 and JESD22-A115.

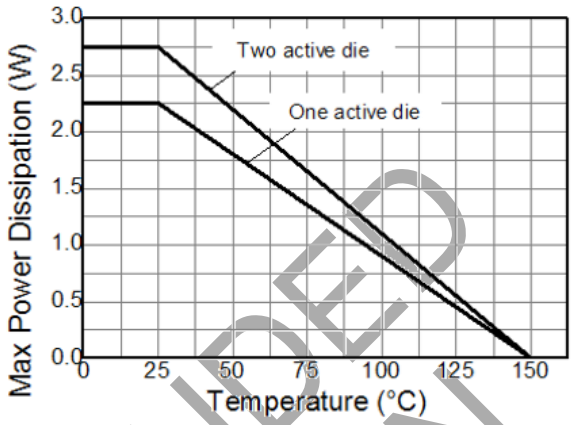
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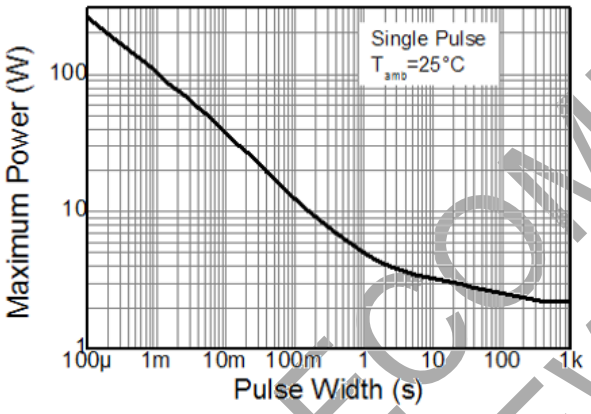
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation

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

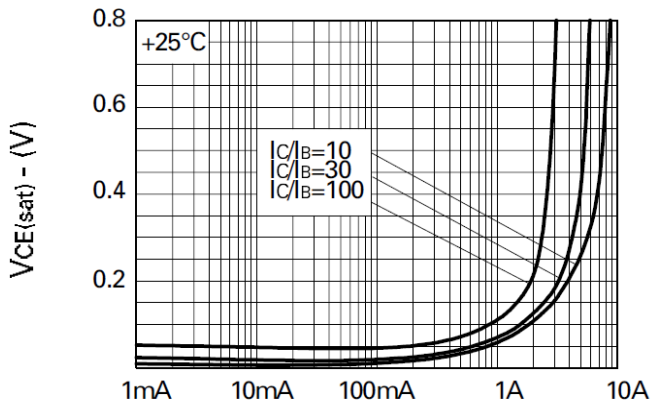
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	245	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	75	100	—	V	I_C = 10mA
Collector-Emitter Breakdown Voltage	BV_{CES}	150	245	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CEV}	150	245	—	V	I_C = 100µA, V_{EB} = 1V
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.8	—	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	—	< 1	10	nA	V_{CB} = 120V
Emitter Cut-Off Current	I_{EBO}	—	< 1	10	nA	V_{EB} = 5.6V
Collector-Emitter Cut-Off Current	I_{CES}	—	< 1	10	nA	V_{CES} = 120V
DC Current Transfer Static Ratio (Note 9)	h_{FE}	260	420	—	—	I_C = 10mA, V_{CE} = 2V
		300	450	1200		I_C = 1A, V_{CE} = 2V
		150	220	—		I_C = 2A, V_{CE} = 2V
		30	50	—		I_C = 5A, V_{CE} = 2V
		—	15	—		I_C = 10A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	17	25	mV	I_C = 0.2A, I_B = 20mA
		—	70	100		I_C = 1A, I_B = 50mA
		—	120	150		I_C = 1A, I_B = 10mA
		—	150	200		I_C = 2A, I_B = 50mA
		—	300	440		I_C = 5A, I_B = 250mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	1100	1200	mV	I_C = 5A, I_B = 250mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	1000	1100	mV	I_C = 5A, V_{CE} = 2V
Transitional Frequency	f_T	—	140	—	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Output Capacitance	C_{OBO}	—	21	30	pF	V_{EB} = 10V, f = 1MHz
Switching Time	t_{ON}	—	90	—	ns	V_{CC} = 50V, I_C = 2A,
	t_{OFF}		750		ns	I_{B1} = -I_{B2} = 20mA

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

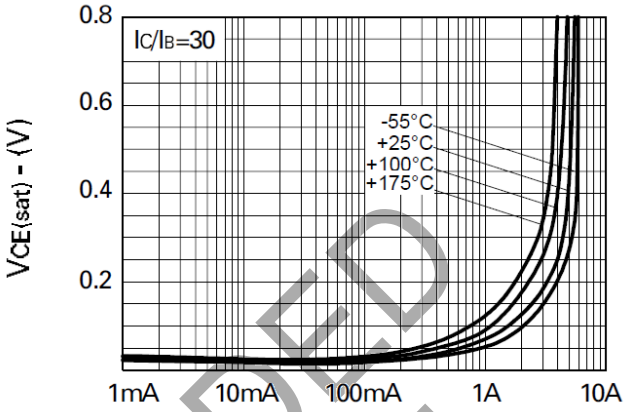
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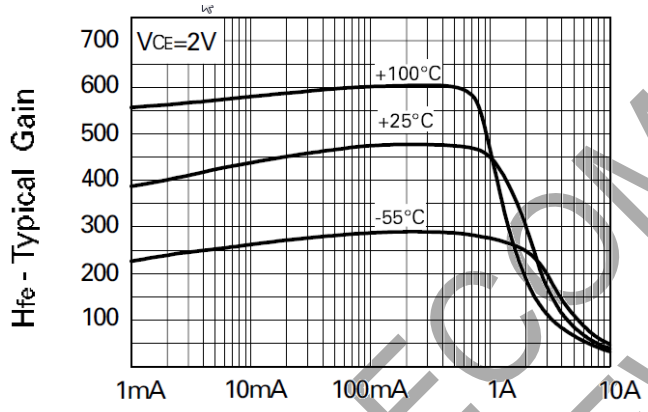
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



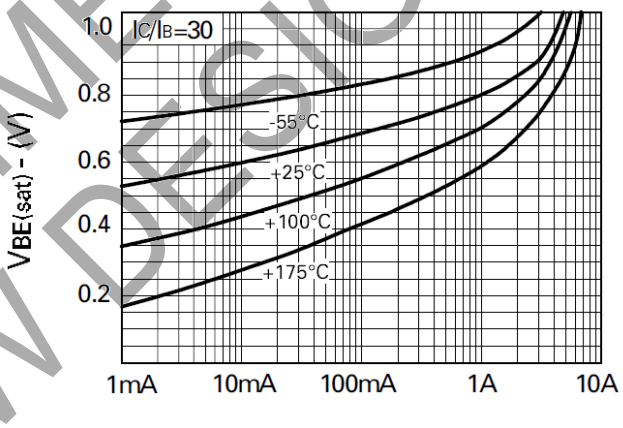
$V_{CE(sat)}$ v I_C



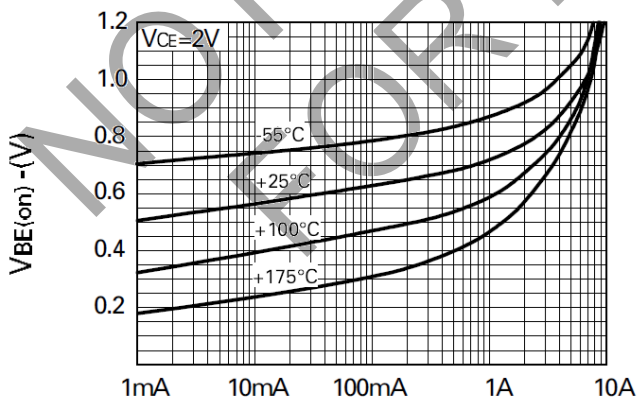
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

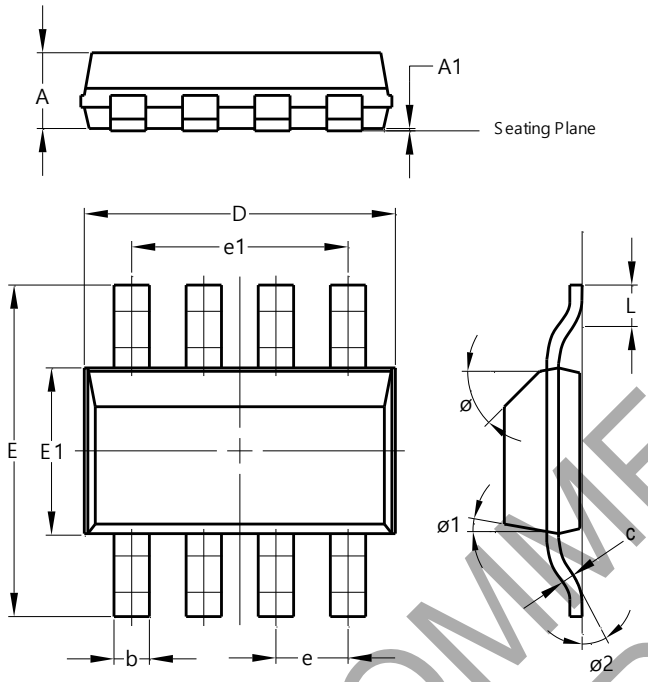
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Package Outline Dimensions

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SM-8

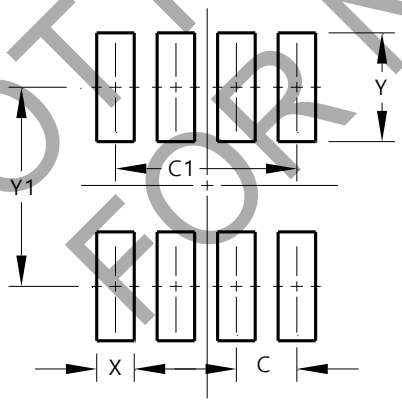


SM-8			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	1.60
A1	0.02	0.10	0.04
b	0.70	0.90	0.80
c	0.24	0.32	0.28
D	6.30	6.70	6.60
e	1.53 REF		
e1	4.59 REF		
E	6.70	7.30	7.00
E1	3.30	3.70	3.50
L	0.75	1.00	0.90
Ø	--	--	45°
Ø1	--	15°	--
Ø2	--	--	10°
All Dimensions in mm			

Suggested Pad Layout

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

SM-8



Dimensions	Value (in mm)
C	1.52
C1	4.60
X	0.95
Y	2.80
Y1	6.80

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