

40V PNP HIGH GAIN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89
Features

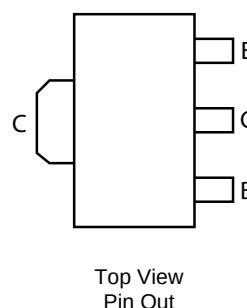
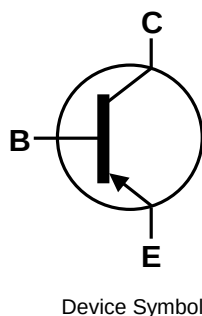
- $BV_{CEO} > -40V$
- $I_C = -5.5A$ High Continuous Current
- $I_{CM} = -15A$ Peak Pulse Current
- $R_{CE(SAT)} = 29m\Omega$ for a low equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)} < -60mV @ -1A$
- h_{FE} Specified Up to $-10A$ for High Current Gain Hold Up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

- Case: SOT89
- 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 208 
- Weight: 0.05 grams (Approximate)

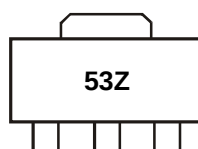
Applications

- Charging Circuits
- DC-DC Converters
- MOSFET and IGBT Gate Driving
- Power Switches
- Motor Control


Ordering Information (Note 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZX5T3ZTA	AEC-Q101	53Z	7	12	1,000
ZX5T3ZQTA	Automotive	53Z	7	12	1,000
ZX5T3ZTC	AEC-Q101	53Z	13	12	4,000
ZX5T3ZQTC	Automotive	53Z	13	12	4,000

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


53Z = Product Type Marking Code

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

Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Base Voltage	V _{CBS}	-50	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-7.5	V
Continuous Collector Current	I _C	-5.5	A
Peak Pulse Current	I _{CM}	-15	A

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

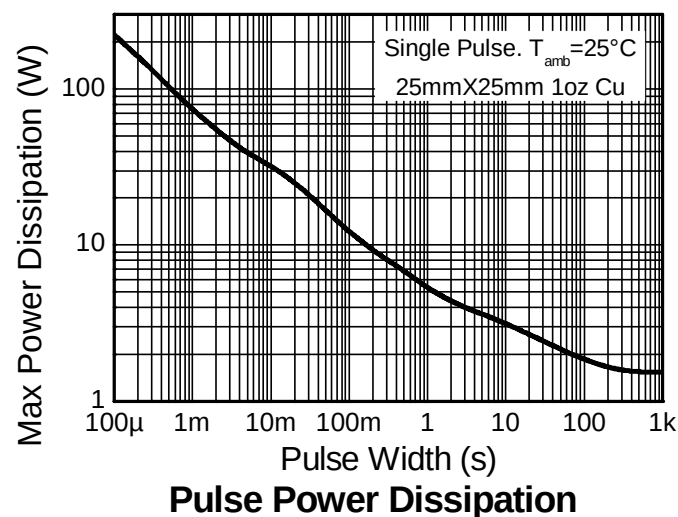
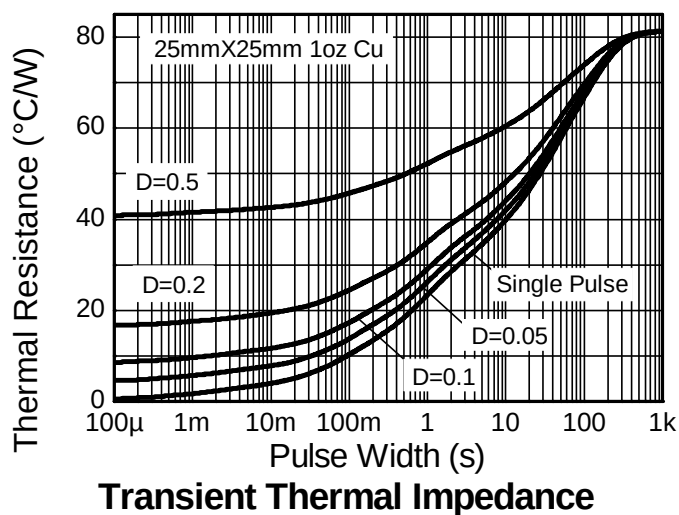
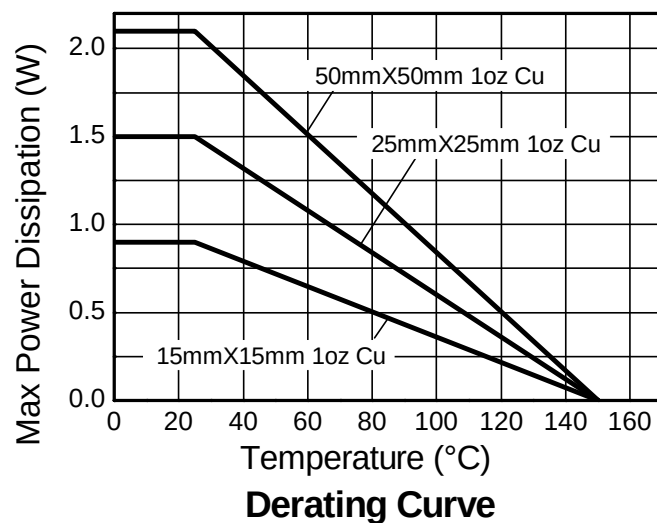
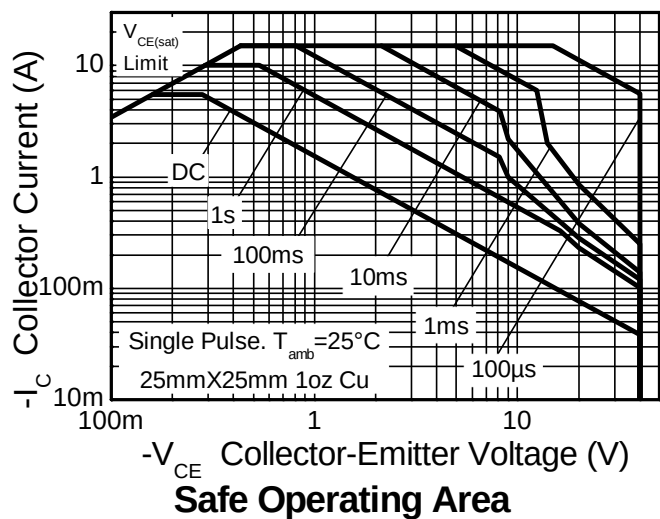
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	0.9	W
		1.5	
		2.1	
		3.0	
Thermal Resistance, Junction to Ambient Air	R _{θJA}	139	°C/W
		83	
		60	
		42	
Thermal Resistance, Junction to Lead	R _{θJL}	2.81	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 11)

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:
- For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as note (6), except the device is mounted on 25mm x 25mm 1oz copper.
 - Same as note (6), except the device is mounted on 50mm x 50mm 1oz copper.
 - Same as note (6), except the device is mounted on 25mm x 25mm 1oz copper and measured at t<5secs.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

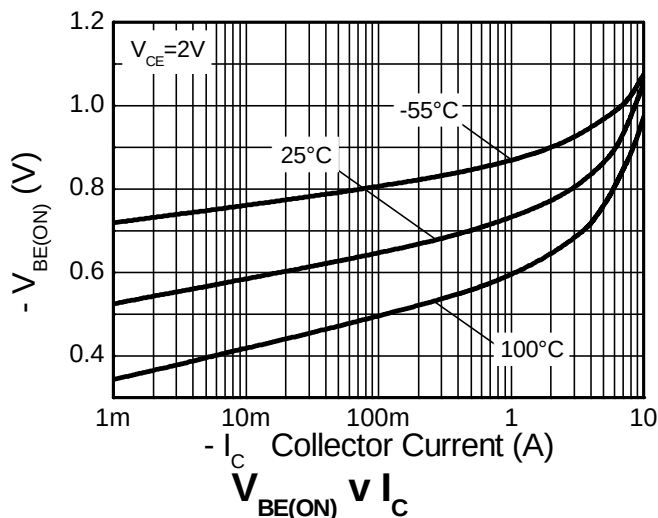
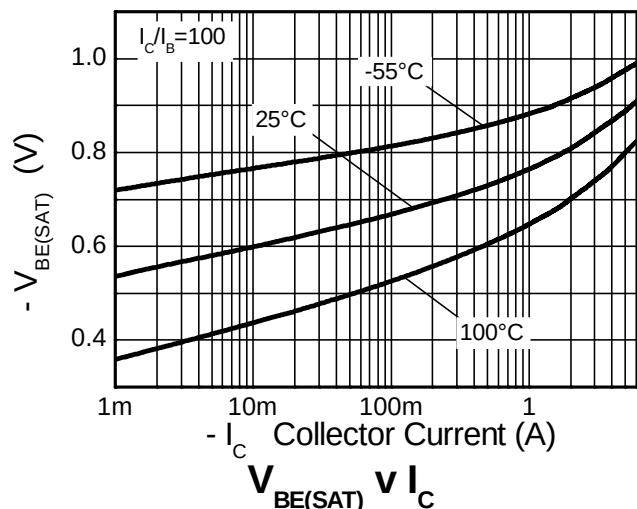
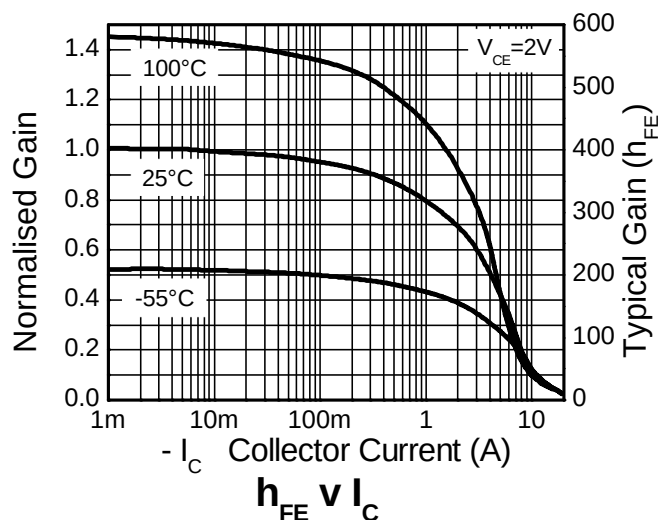
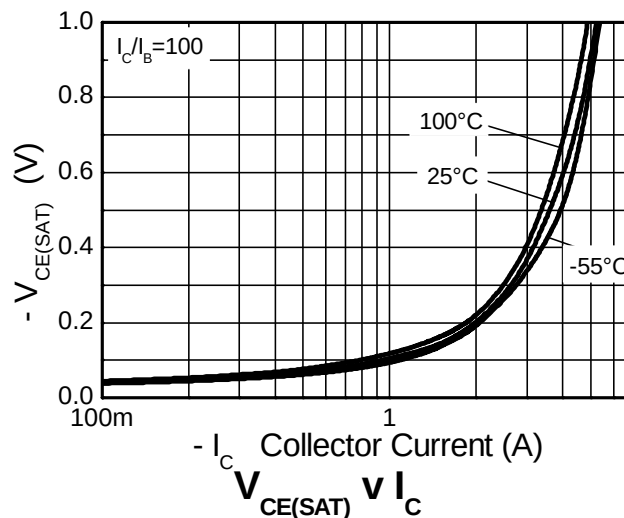
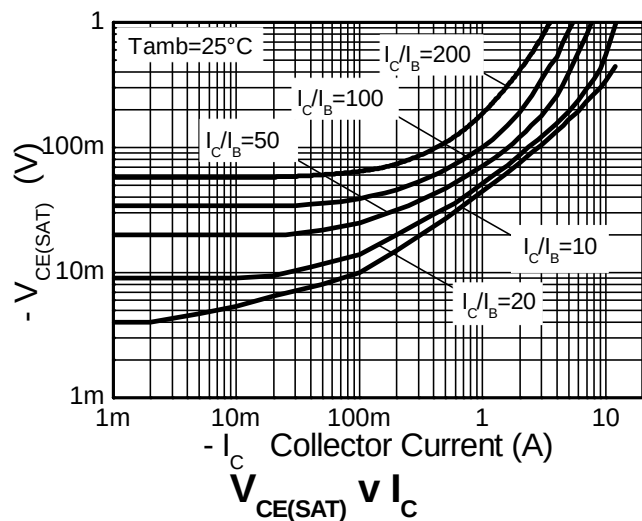


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-50	-90	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage	BV _{CES}	-50	-90	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV _{CEO}	-40	-58	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7.5	-8.3	—	V	I _E = -100μA
Collector Cutoff Current	I _{CBO}	—	<1	-20	nA	V _{CB} = -40V
Collector Cutoff Current	I _{CES}	—	<1	-20	nA	V _{CE} = -32V
Emitter Cutoff Current	I _{EBO}	—	<1	-20	nA	V _{EB} = -6V
DC Current Transfer Static Ratio (Note 12)	h _{FE}	200 200 170 110	390 350 290 175	— 550 — —	—	I _C = -10mA, V _{CE} = -2V I _C = -0.5A, V _{CE} = -2V I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V
Collector-Emitter Saturation Voltage (Note 12)	V _{CE(SAT)}	— — —	-15 -44 -50 -120 -70 -125 -130 -162	-30 -60 -70 -165 -80 -175 -175 -185	mV	I _C = -0.1A, I _B = -10mA I _C = -1A, I _B = -100mA I _C = -1A, I _B = -50mA I _C = -1A, I _B = -10mA I _C = -2A, I _B = -200mA I _C = -2A, I _B = -40mA I _C = -3.5A, I _B = -175mA I _C = -5.5A, I _B = -550mA
Base-Emitter Saturation Voltage (Note 12)	V _{BE(SAT)}	—	-820 -1000	-900 -1075	V	I _C = -2A, I _B = -40mA I _C = -5.5A, I _B = -550mA
Base-Emitter Turn-On Voltage (Note 12)	V _{BE(ON)}	—	-778 -869	-850 -950	V	I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V
Transitional Frequency	f _T	—	152	—	MHz	I _C = -50mA, V _{CE} = -10V f = 100MHz
Output Capacitance	C _{obo}	—	53	—	pF	V _{CB} = -10V, f = 1MHz,
Switching Times	t _d	—	18	—	nS	I _C = -1A, V _{CC} = -10V I _{B1} = -I _{B2} = -100mA
	t _r		17			
	t _s		325			
	t _f		60			
Switching Times	t _d	—	55	—	nS	I _C = -2A, V _{CC} = -30V I _{B1} = -I _{B2} = -20mA
	t _r		107			
	t _s		264			
	t _f		103			

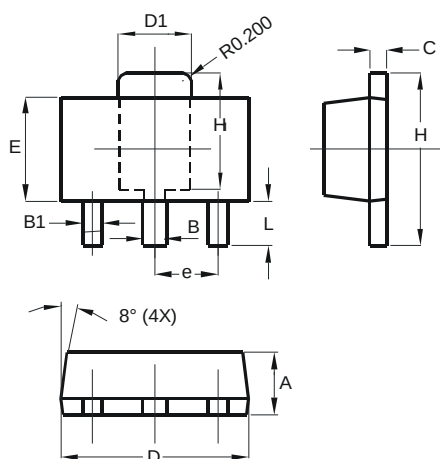
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

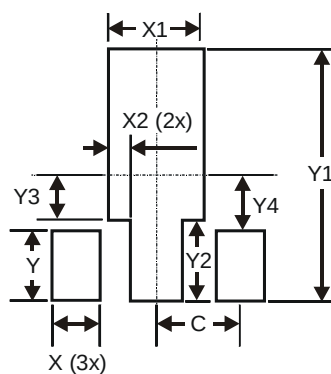
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT89		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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