

60V NPN MEDIUM POWER TRANSISTOR IN E-LINE
Features

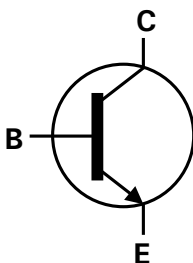
- $BV_{CEO} > 60V$
- $I_C = 2A$ High Continuous Collector Current
- $I_{CM} = 6A$ Peak Pulse Current
- T_J up to $+200^\circ C$ for High Temperature Operation
- Low Saturation Voltage $< 300mV @ 1A$
- $P_D = 1W$ Power dissipation
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

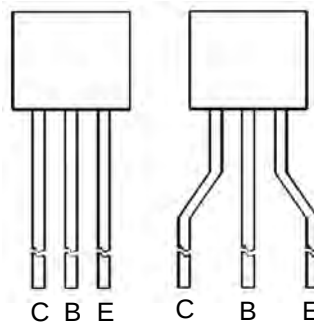
- Case: E-Line (TO-92 Compatible)
- Case Material: molded plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.159 grams (approximate)

 E-Line
 (TO-92 Compatible)

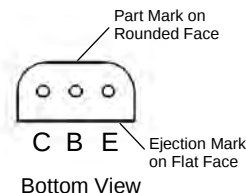

Flat Face View



Device Symbol



Rounded Face View

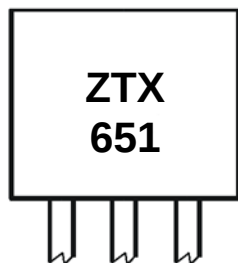


Bottom View

Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Case	Leads	Quantity
ZTX651	AEC-Q101	ZTX651	E-Line	Straight	4,000 loose in a Box
ZTX651Q	Automotive	ZTX651	E-Line	Straight	4,000 loose in a Box
ZTX651STZ	AEC-Q101	ZTX651	E-Line	Joggled	2,000 taped per Ammo Box
ZTX651QSTZ	Automotive	ZTX651	E-Line	Joggled	2,000 taped per Ammo Box

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 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. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


Rounded Face View

ZTX651 = Product type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	80	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	2	A
Peak Pulse Current	I _{CM}	6	A

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

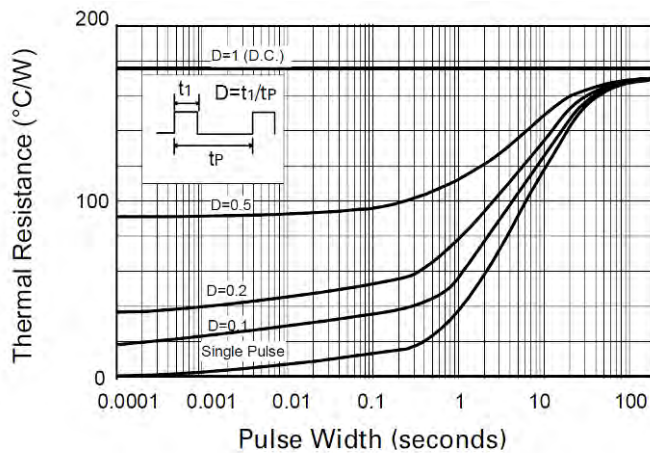
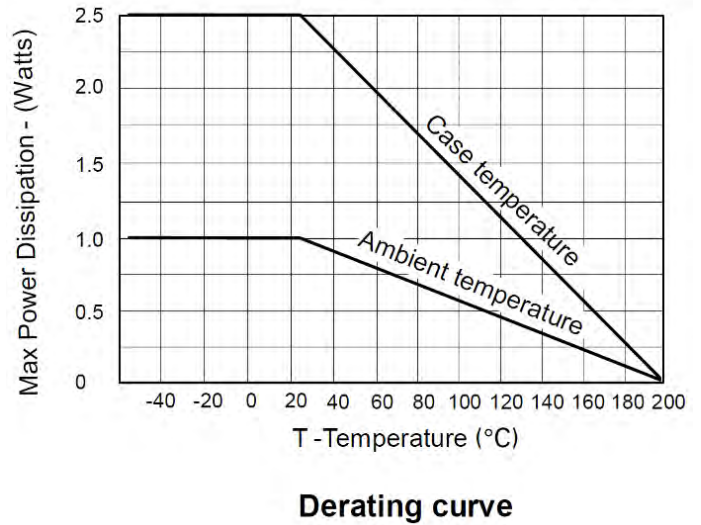
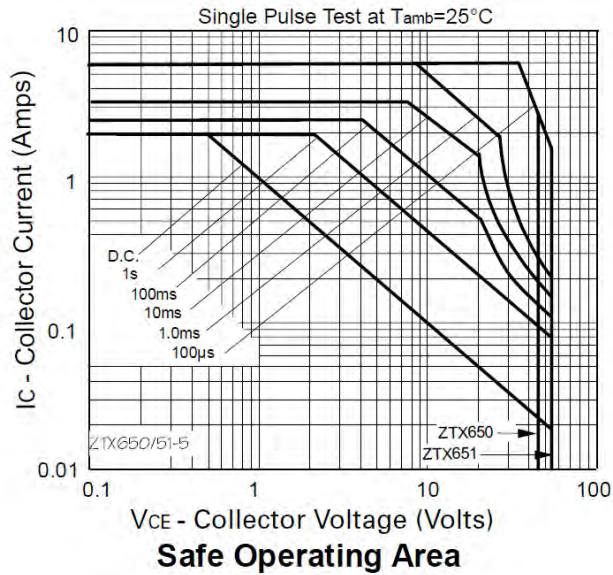
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	1.5	W
Power Dissipation (Note 7)	P _D	1	W
Thermal Resistance Junction to Ambient (Note 6)	R _{θJA}	116	°C/W
Thermal Resistance Junction to Ambient (Note 7)	R _{θJA}	175	°C/W
Thermal Resistance Junction to Lead (Note 8)	R _{θJL}	70	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +200	°C

ESD Ratings (Note 9)

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 through-hole device mounted at the seating plane (2.5mm lead length) with the collector lead on 25mm x 25mm 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as note (5), except the device is mounted on minimum recommended pad layout with 12mm lead length from the bottom of package to the board.
 - Thermal resistance from junction to solder-point at the seating plane (2.5mm from the bottom of package along the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

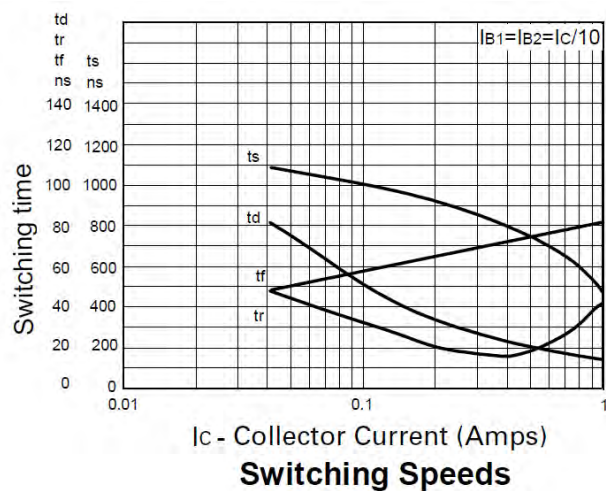
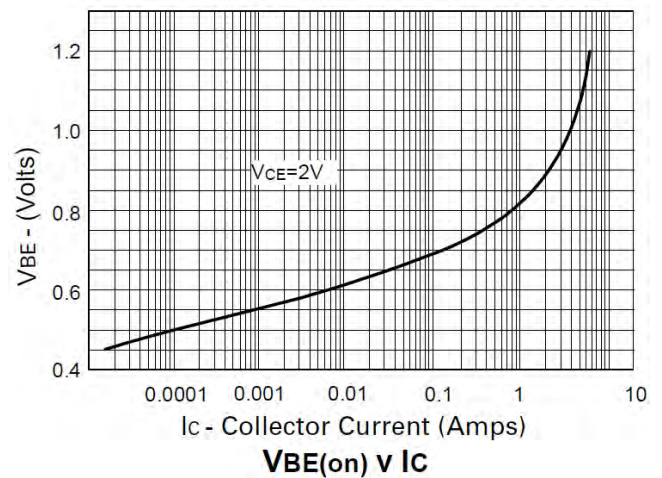
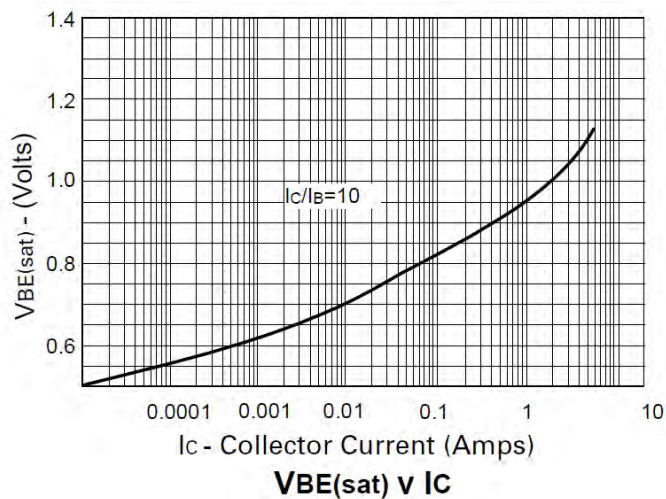
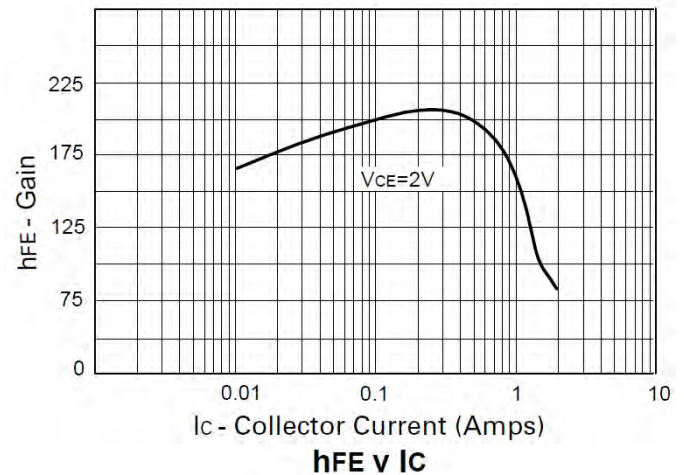
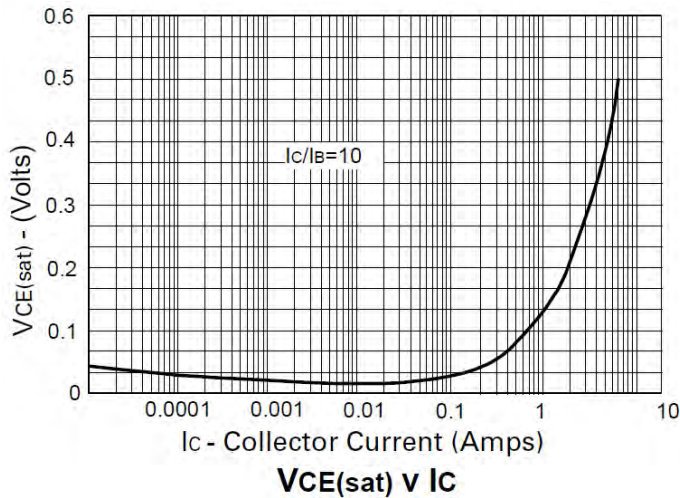


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	80	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV _{CEO}	60	—	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100μA
Collector Cut-off Current	I _{CBO}	—	—	0.1 10	μA μA	V _{CB} = 60V V _{CB} = 60V, T _{amb} = 100°C
Emitter Cut-off Current	I _{EBO}	—	—	0.1	μA	V _{EB} = 6V
Collector-Emitter Saturation Voltage (Note 10)	V _{CE(sat)}	—	120 230	300 500	mV	I _C = 1A, I _B = 100mA I _C = 2A, I _B = 200mA
Base-Emitter Saturation Voltage (Note 10)	V _{BE(sat)}	—	0.9	1.25	V	I _C = 1A, I _B = 100mA
Base-Emitter Turn-On Voltage (Note 10)	V _{BE(on)}	—	0.8	1	V	I _C = 1A, V _{CE} = 2V
DC Current Gain (Note 10)	h _{FE}	70 100 80 40	200 200 170 80	— 300 — —	—	I _C = 50mA, V _{CE} = 2V I _C = 500mA, V _{CE} = 2V I _C = 1A, V _{CE} = 2V I _C = 2A, V _{CE} = 2V
Current Gain-Bandwidth Product (Note 10)	f _T	140	175	—	MHz	V _{CE} = 5V, I _C = 100mA f = 100MHz
Output Capacitance (Note 10)	C _{obo}	—	—	30	pF	V _{CB} = 10V, f = 1MHz
Turn-On Times	t _{on}	—	45	—	ns	I _C = 500mA, I _{B1} = I _{B2} = 50mA,
Turn-Off Times	t _{off}	—	800	—	ns	V _{CC} = 10V

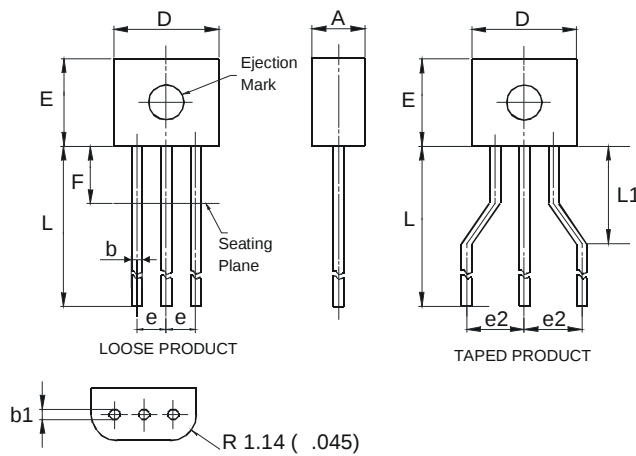
Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%

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.



E-Line			
Dim	Min	Max	Typ
A	2.16	2.41	—
b	0.41	0.495	—
b1	0.41	0.495	—
D	4.37	4.77	—
E	3.61	4.01	—
e	—	—	1.27
e2	—	—	2.54
F	—	2.50	—
L	13.00	13.97	—
L1	2.50	3.50	—
All Dimensions in mm			

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