

ZXTD6717E6

COMPLEMENTARY 15V NPN & 12V PNP LOW SATURATION TRANSISTORS IN SOT26

Features & Benefits

NPN Transistor

- $BV_{CEO} > 15V$
- $I_C = 1.5A$ Continuous Collector Current
- Low Saturation Voltage (100mV max @ 1A)
- $R_{SAT} = 135m\Omega$ @ 1.5A for a low equivalent On-Resistance

PNP Transistor

- $BV_{CEO} > -12V$
- $I_C = -1.25A$ Continuous Collector Current
- Low Saturation Voltage (-140mV max @ -1A)
- $R_{SAT} = 150m\Omega$ @ 1.2A for a low equivalent On-Resistance
- $P_d = 1.1W$ in SOT26 package
- **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

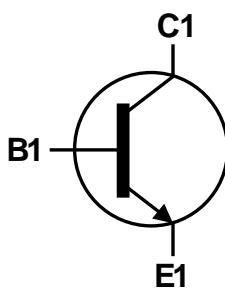
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.015 grams (approximate)

Applications

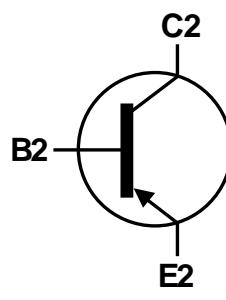
- Efficient driving functions including motors, lamps, relays and solenoids
- High Output Current Switches



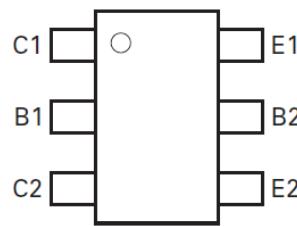
Top View



NPN Transistor



PNP Transistor

Top View
Pin-Out

Device Symbol

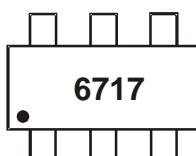
Ordering Information (Notes 4 and 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTD6717E6TA	AEC-Q101	6717	7	8	3,000
ZXTD6717E6QTA	Automotive	6717	7	8	3,000

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



6717 = Product Type Marking Code

ZXTD6717E6

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	15	V
Collector-Emitter Voltage	V _{CEO}	15	V
Emitter-Base Voltage	V _{EBO}	7	V
Peak Pulse Current	I _{CM}	5	A
Continuous Collector Current	I _C	1.5	A
Base Current	I _B	200	A

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-12	V
Collector-Emitter Voltage	V _{CEO}	-12	V
Emitter-Base Voltage	V _{EBO}	-7	V
Peak Pulse Current	I _{CM}	-3	A
Continuous Collector Current	I _C	-1.25	mA
Base Current	I _B	-200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	1.1	W mW/°C
		8.8	
		1.7	
		13.6	
Thermal Resistance, Junction to Ambient	(Note 6)	125	°C/W
		45	
Thermal Resistance, Junction to Lead	(Note 8)	R _{θJL}	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	

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:

6. For a device mounted with the collector lead on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; the device is measured under still air conditions whilst operating in a steady-state. Two active dice running at equal power with heatsink split 50% to each collector.
7. Same as note (6), except the device is measured at t < 5 seconds.
8. Thermal resistance from junction to solder-point (at the end of the collector lead).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

ZXTD6717E6

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	15	—	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	15	—	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector Cutoff Current	I_{CBO}	—	<1	10	nA	$V_{\text{CB}} = 10\text{V}$
Emitter Cutoff Current	I_{EBO}	—	<1	10	nA	$V_{\text{EB}} = 5.6$
Emitter Cutoff Current	I_{CES}	—	<1	10	nA	$V_{\text{CE}} = 10\text{V}$
ON CHARACTERISTICS (Note 10)						
DC Current Gain	h_{FE}	200	420	—	—	$I_C = 10\text{mA}, V_{\text{CE}} = 2\text{V}$
		300	450	—	—	$I_C = 100\text{mA}, V_{\text{CE}} = 2\text{V}$
		250	390	—	—	$I_C = 500\text{mA}, V_{\text{CE}} = 2\text{V}$
		200	300	—	—	$I_C = 1\text{A}, V_{\text{CE}} = 2\text{V}$
		75	150	—	—	$I_C = 3\text{A}, V_{\text{CE}} = 2\text{V}$
		30	75	—	—	$I_C = 5\text{A}, V_{\text{CE}} = 2\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$	—	16.5	20	mV	$I_C = 100\text{mA}, I_B = 10\text{mA}$
		—	40	55	mV	$I_C = 250\text{mA}, I_B = 10\text{mA}$
		—	75	100	mV	$I_C = 500\text{mA}, I_B = 10\text{mA}$
		—	150	200	mV	$I_C = 1\text{A}, I_B = 10\text{mA}$
		—	205	245	mV	$I_C = 1.5\text{A}, I_B = 20\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{sat})}$	—	0.93	1.10	V	$I_C = 1.5\text{A}, I_B = 20\text{mA}$
Base-Emitter Turn-On Voltage	$V_{\text{BE}(\text{on})}$	—	0.865	1.10	V	$I_C = 1.5\text{A}, V_{\text{CE}} = 2\text{V}$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	15	—	pF	$V_{\text{CB}} = 10\text{V}, f = 1.0\text{MHz}$
Current Gain Bandwidth Product	f_T	—	180	—	MHz	$I_C = 50\text{mA}, V_{\text{CE}} = 10\text{V}$ $f = 100\text{MHz}$
SWITCHING CHARACTERISTICS						
Turn-On Time	t_{on}	—	50	—	ns	$I_C = 1\text{A}, V_{\text{CC}} = 10\text{V}$
Turn-Off Time	t_{off}	—	250	—	ns	$I_{B1} = -I_{B2} = 100\text{mA}$

Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

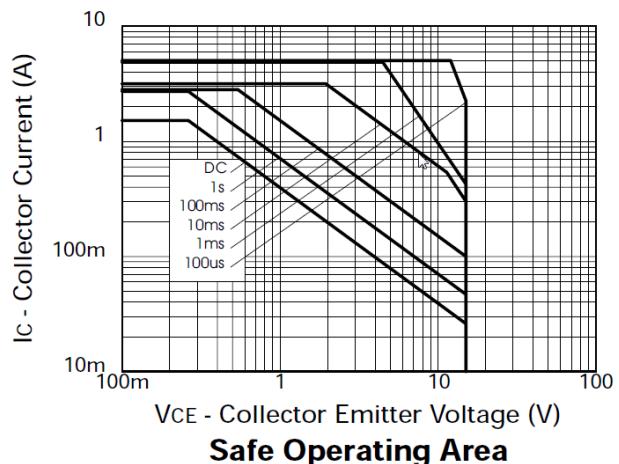
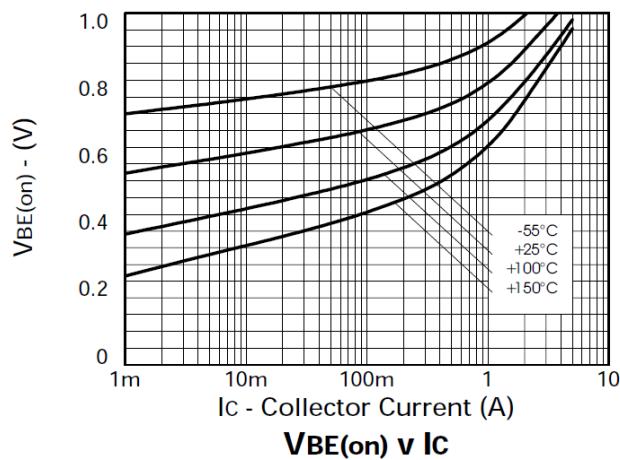
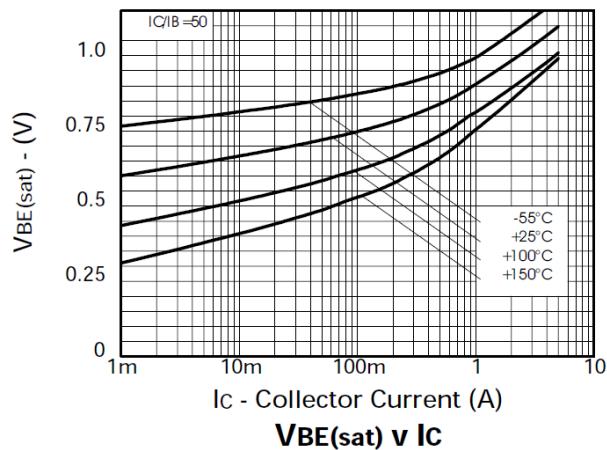
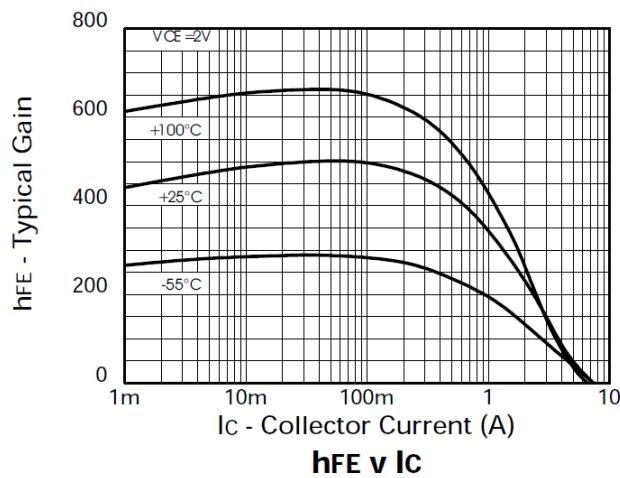
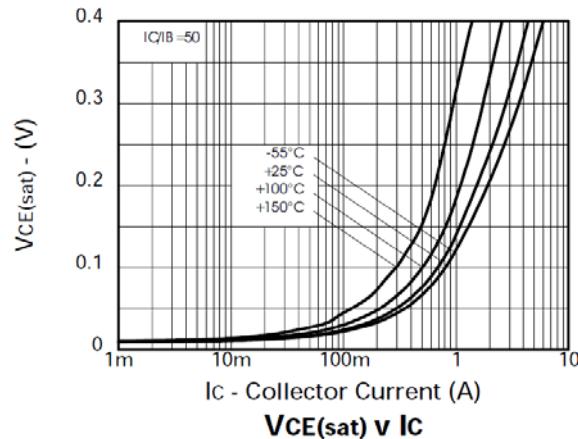
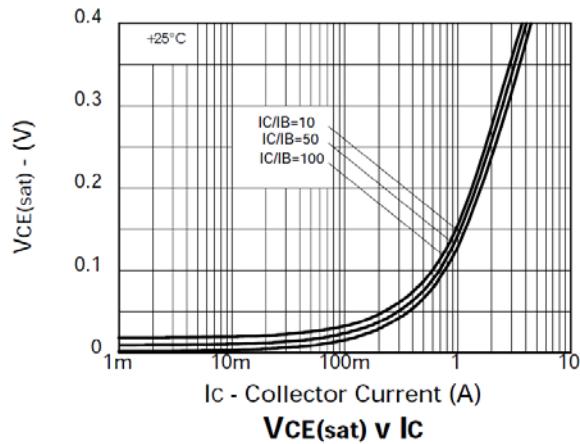
PNP - Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-12	—	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	-12	—	—	V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector Cutoff Current	I_{CBO}	—	<-1	-10	nA	$V_{\text{CB}} = -10\text{V}$
Emitter Cutoff Current	I_{EBO}	—	<-1	-10	nA	$V_{\text{EB}} = -5.6\text{V}$
Emitter Cutoff Current	I_{CES}	—	<-1	-10	nA	$V_{\text{CE}} = -10\text{V}$
ON CHARACTERISTICS (Note 10)						
DC Current Gain	h_{FE}	300	490	—	—	$I_C = -10\text{mA}, V_{\text{CE}} = -2\text{V}$
		300	450	—	—	$I_C = -100\text{mA}, V_{\text{CE}} = -2\text{V}$
		200	340	—	—	$I_C = -500\text{mA}, V_{\text{CE}} = -2\text{V}$
		125	250	—	—	$I_C = -1.25\text{A}, V_{\text{CE}} = -2\text{V}$
		75	140	—	—	$I_C = -2\text{A}, V_{\text{CE}} = -2\text{V}$
		30	80	—	—	$I_C = -3\text{A}, V_{\text{CE}} = -2\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$	—	-25	-40	mV	$I_C = -100\text{mA}, I_B = -10\text{mA}$
		—	-55	-100	mV	$I_C = -250\text{mA}, I_B = -10\text{mA}$
		—	-110	-175	mV	$I_C = -500\text{mA}, I_B = -10\text{mA}$
		—	-160	-215	mV	$I_C = -1\text{A}, I_B = -50\text{mA}$
		—	-185	-240	mV	$I_C = -1.25\text{A}, I_B = -100\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{sat})}$	—	-0.99	-1.10	V	$I_C = -1.25\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage	$V_{\text{BE}(\text{on})}$	—	-0.85	-1.0	V	$I_C = -1.25\text{A}, V_{\text{CE}} = -2\text{V}$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	15	—	pF	$V_{\text{CB}} = -10\text{V}, f = 1.0\text{MHz}$
Current Gain Bandwidth Product	f_T	—	220	—	MHz	$I_C = -50\text{mA}, V_{\text{CE}} = -10\text{V}$ $f = 100\text{MHz}$
SWITCHING CHARACTERISTICS						
Turn-On Time	t_{on}	—	50	—	ns	$I_C = -1\text{A}, V_{\text{CC}} = -10\text{V}$
Turn-Off Time	t_{off}	—	135	—	ns	$I_{B1} = -I_{B2} = -100\text{mA}$

Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

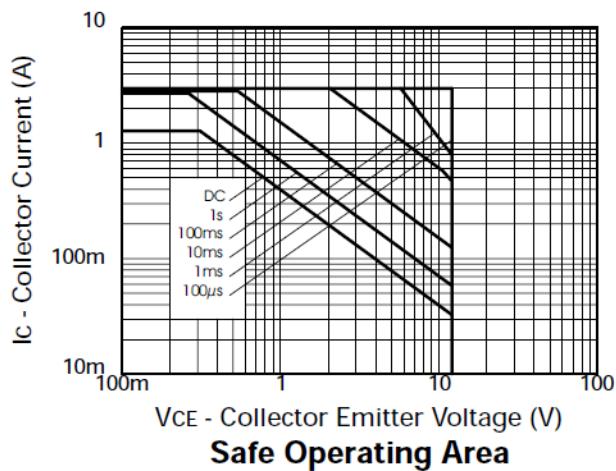
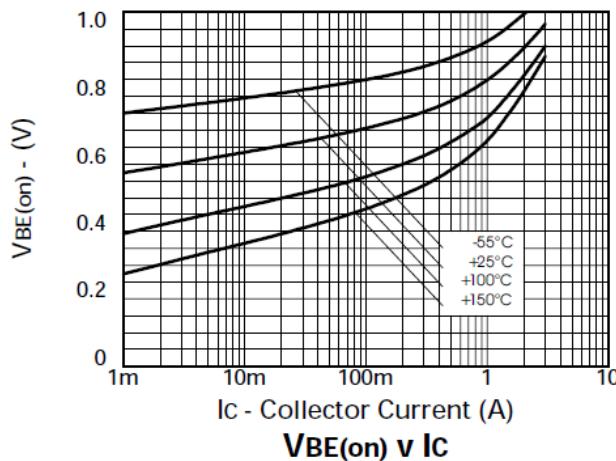
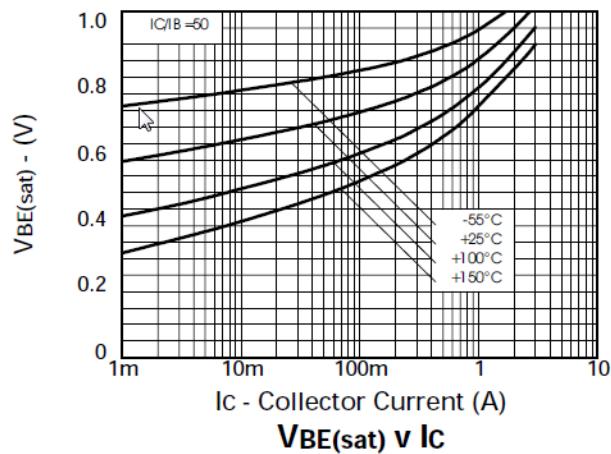
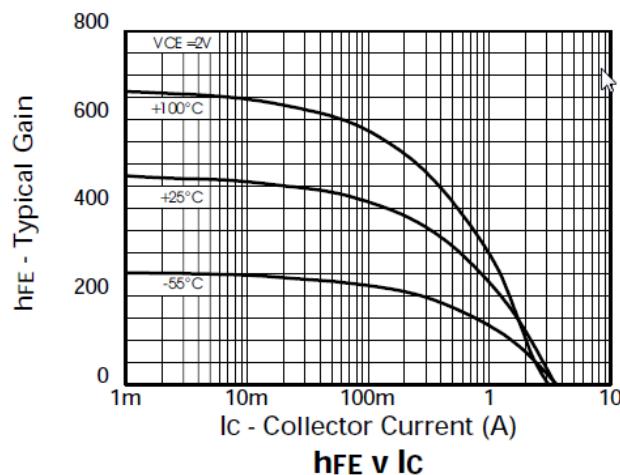
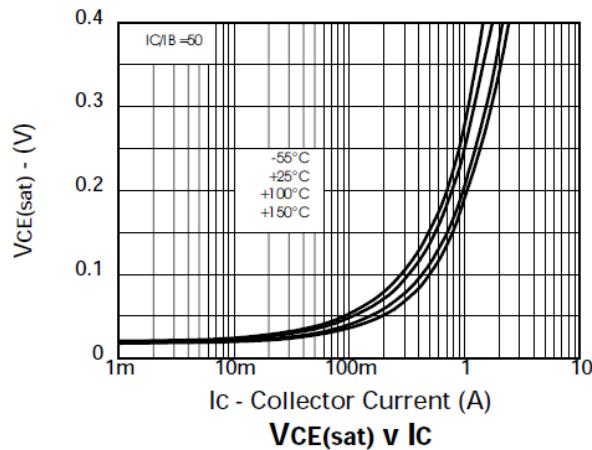
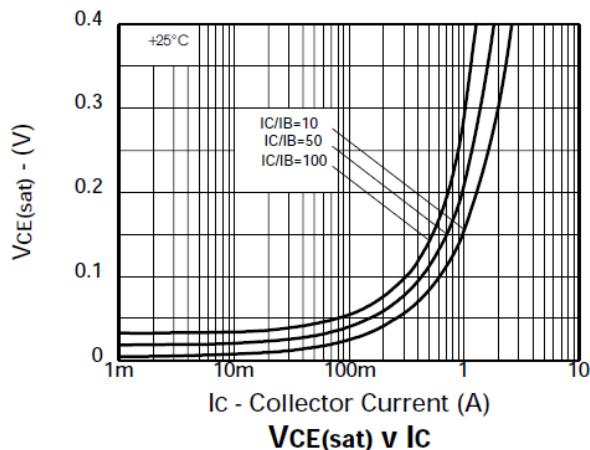
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NPN - Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



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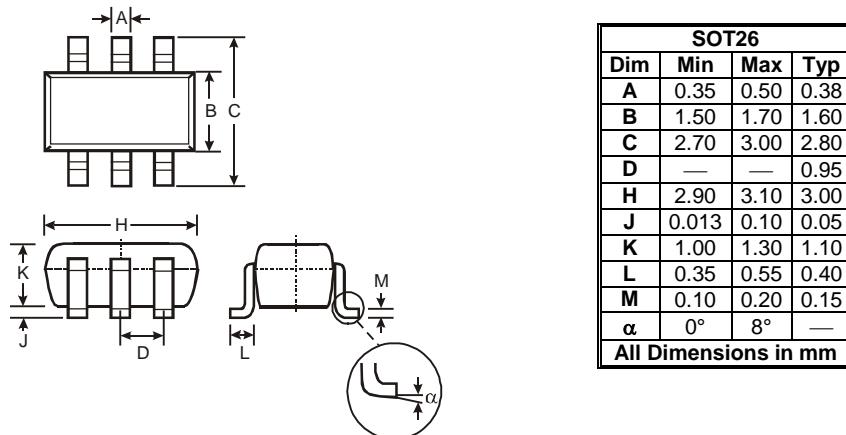
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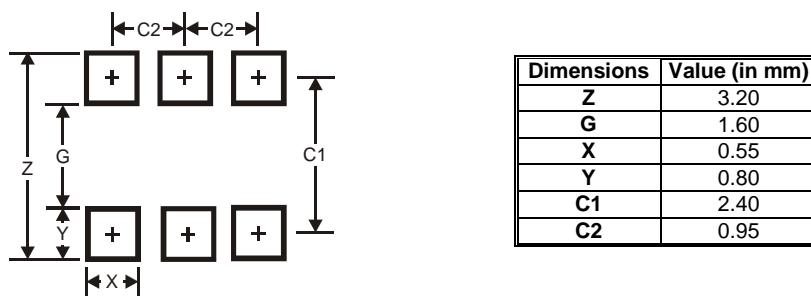
Package Outline Dimensions

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



Suggested Pad Layout

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