

**30V COMPLEMENTARY MEDIUM POWER TRANSISTOR IN SOT26**

**Features**

- NPN + PNP Combination
- $BV_{CEO} > 30$  (-30)V
- $BV_{CEV} > 40$  (-40)V
- $I_{CM} = 5$  (-5)A Peak Pulse Current
- **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)**

**Description**

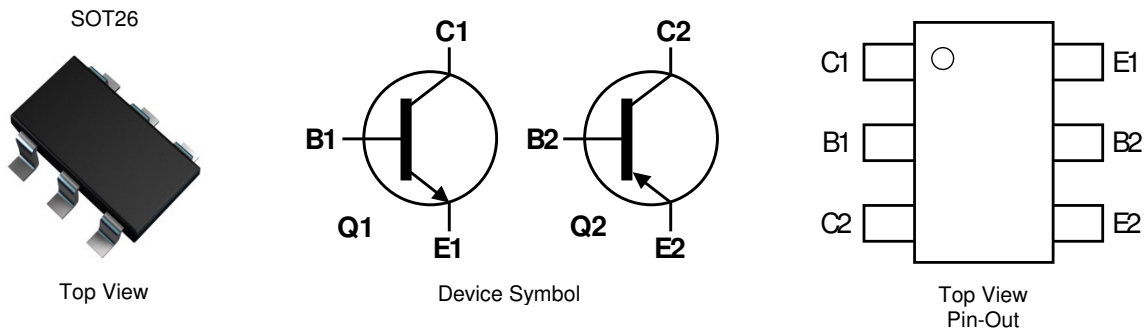
Advanced process capability is used to achieve this high performance device. Combining NPN and PNP transistors, the SOT26 package provides a compact solution for the intended applications.

**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 ③
- Weight: 0.015 grams (Approximate)

**Applications**

- MOSFET and IGBT Gate Driving
- Motor Drive

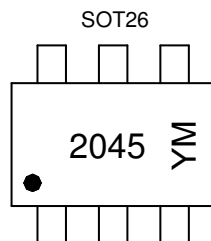


**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC2045E6TA	AEC-Q101	2045	7	8	3,000
ZXTC2045E6QTA	Automotive	2045	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/> 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 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>

**Marking Information**



2045 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: C = 2015)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	C	D	E	F	G	H	I	J	K	L	M

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Absolute Maximum Ratings – Q1 (NPN Transistor)** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	40	V
Collector-Emitter Voltage	V <sub>CEV</sub>	40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	30	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	1.5	A
Peak Pulsed Collector Current	I <sub>CM</sub>	5	A
Base Current	I <sub>B</sub>	1	A

**Absolute Maximum Ratings – Q2 (PNP Transistor)** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEV</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-30	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-1.5	A
Peak Pulsed Collector Current	I <sub>CM</sub>	-5	A
Base Current	I <sub>B</sub>	-1	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

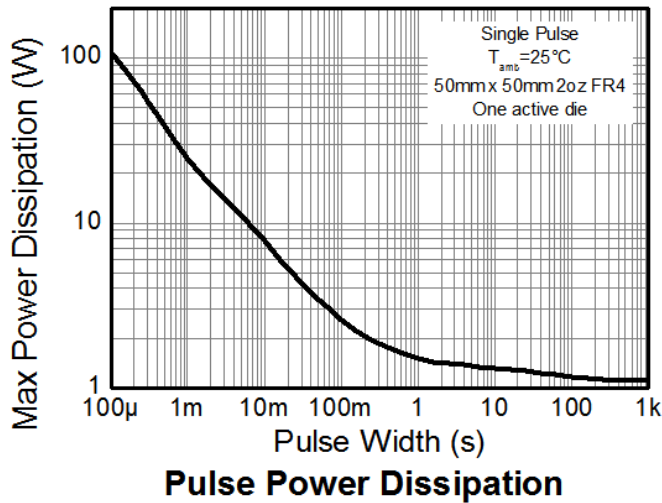
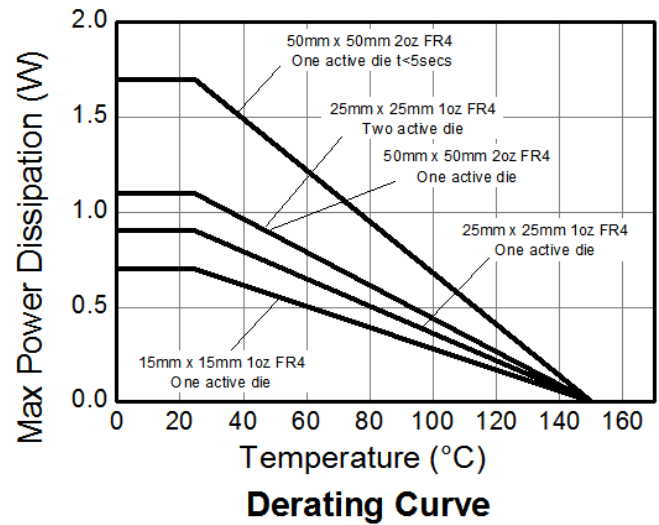
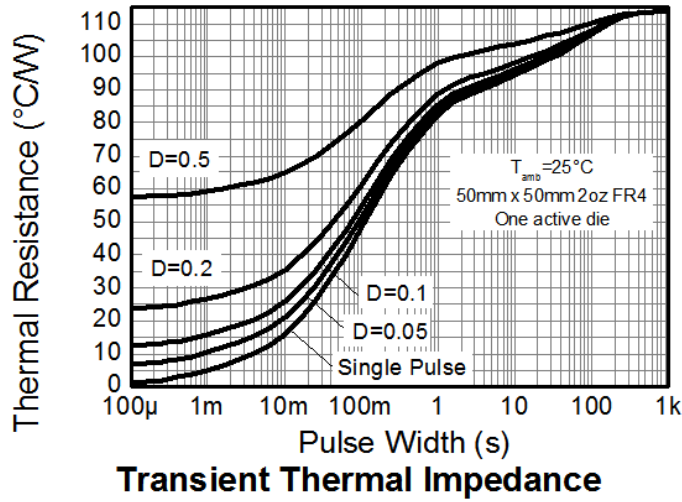
Characteristic	Symbol	Value	Unit	
Power Dissipation Linear Derating Factor	P <sub>D</sub>	0.7	W mW/°C	
		(Notes 6 & 10)		5.6
		(Notes 7 & 10)		0.9
		(Notes 7 & 11)		7.2
		(Notes 8 & 10)		1.1
		(Notes 9 & 10)		8.8
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	1.1	°C/W	
		(Notes 6 & 10)		8.8
		(Notes 7 & 10)		1.7
		(Notes 7 & 11)		13.6
		(Notes 8 & 10)		179
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	(Notes 9 & 10)	139	
		(Note 12)	113	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	95.50	°C	

**ESD Ratings** (Note 13)

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 surface mounted on 15mm x 15mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as Note 6, except the device is surface mounted on 25mm x 25mm 1oz copper.
  - Same as Note 6, except the device is surface mounted on 50mm x 50mm 2oz copper.
  - Same as Note 8, except the device is measured at t < 5 seconds.
  - For device with one active die, both collectors attached to a common heatsink.
  - For device with two active die running at equal power, split heatsink 50% to each collector.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**



**Electrical Characteristics – Q1 (NPN Transistor)** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	40	-	—	V	I <sub>C</sub> = 100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	BV <sub>CEV</sub>	40	-	—	V	I <sub>C</sub> = 1μA, 0.25V > V <sub>BE</sub> > 1.0V
Collector-Emitter Breakdown Voltage (Note 14)	BV <sub>CEO</sub>	30	-	—	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.3	—	V	I <sub>E</sub> = 100μA, I <sub>C</sub> = 0
Collector Cut-Off Current	I <sub>CBO</sub>	—	<1	20	nA	V <sub>CB</sub> = 32V
Collector Cut-Off Current	I <sub>CES/R</sub>	—	<1	20	nA	V <sub>CE</sub> = 16V, R ≤ 1kΩ
Emitter Cut-Off Current	I <sub>EBO</sub>	—	<1	20	nA	V <sub>EB</sub> = 6V
<b>ON CHARACTERISTICS (Note 14)</b>						
DC Current Gain	h <sub>FE</sub>	180	300	500	—	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	375	mV	I <sub>C</sub> = 750mA, I <sub>B</sub> = 15mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	1,200	mV	I <sub>C</sub> = 750mA, I <sub>B</sub> = 15mA
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	C <sub>obo</sub>	—	9	20	pF	V <sub>CB</sub> = 10V, f = 1.0MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	—	265	—	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz
Delay Time	t <sub>d</sub>	—	10	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A I <sub>B1</sub> = -I <sub>B2</sub> = 50mA
Rise Time	t <sub>r</sub>	—	12	—	ns	
Storage Time	t <sub>s</sub>	—	185	—	ns	
Fall Time	t <sub>f</sub>	—	45	—	ns	

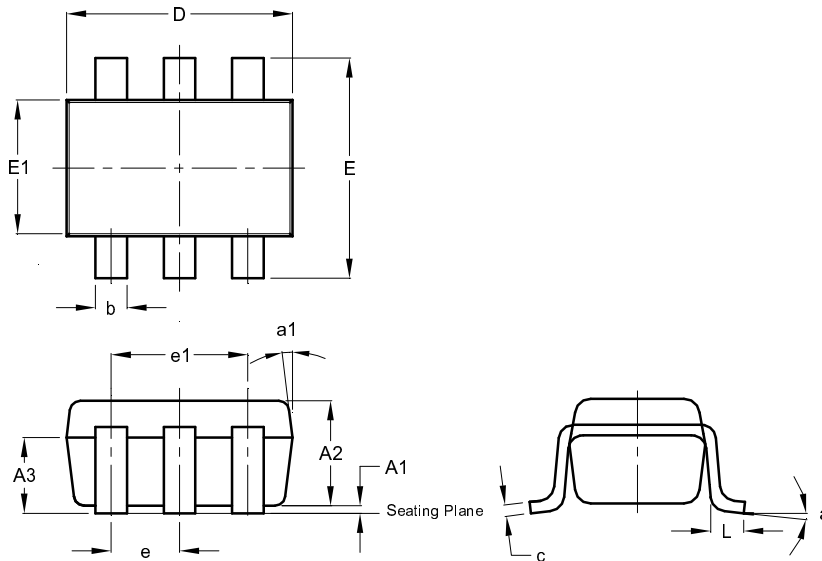
**Electrical Characteristics – Q2 (PNP Transistor)** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-40	-	—	V	I <sub>C</sub> = -100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	BV <sub>CEV</sub>	-40	-	—	V	I <sub>C</sub> = -1μA, 0.25V < V <sub>BE</sub> < 1.0V
Collector-Emitter Breakdown Voltage (Note 14)	BV <sub>CEO</sub>	-30	-	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.3	—	V	I <sub>E</sub> = -100μA, I <sub>C</sub> = 0
Collector Cut-Off Current	I <sub>CBO</sub>	—	<-1	-20	nA	V <sub>CB</sub> = -32V
Collector Cut-Off Current	I <sub>CES/R</sub>	—	<-1	-20	nA	V <sub>CE</sub> = -16V, R ≤ 1kΩ
Emitter Cut-Off Current	I <sub>EBO</sub>	—	<-1	-20	nA	V <sub>EB</sub> = -6V
<b>ON CHARACTERISTICS (Note 14)</b>						
DC Current Gain	h <sub>FE</sub>	180	300	500	—	I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	-375	mV	I <sub>C</sub> = -750mA, I <sub>B</sub> = -15mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	-1,200	mV	I <sub>C</sub> = -750mA, I <sub>B</sub> = -15mA
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	C <sub>obo</sub>	—	9	20	pF	V <sub>CB</sub> = -10V, f = 1.0MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	—	195	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Delay Time	t <sub>d</sub>	—	16	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A I <sub>B1</sub> = -I <sub>B2</sub> = -50mA
Rise Time	t <sub>r</sub>	—	11	—	ns	
Storage Time	t <sub>s</sub>	—	220	—	ns	
Fall Time	t <sub>f</sub>	—	31	—	ns	

Note: 14. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

## Package Outline Dimensions

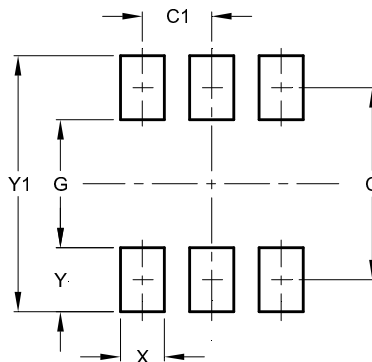
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
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)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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