

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

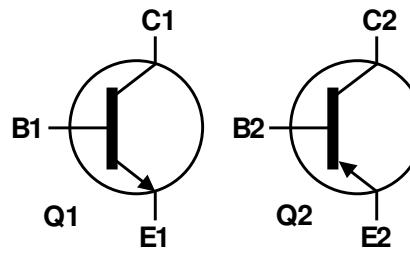
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.015 grams (Approximate)

Applications

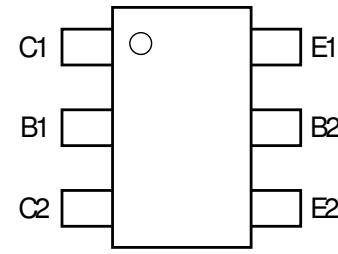
- MOSFET and IGBT Gate Driving
- Motor Drive



Top View



Device Symbol


 Top View
 Pin-Out

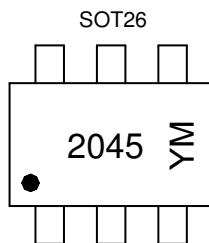
Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXT2045E6TA	AEC-Q101	2045	7	8	3,000
ZXT2045E6QTA	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) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEV}	40	V
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	1.5	A
Peak Pulsed Collector Current	I_{CM}	5	A
Base Current	I_B	1	A

Absolute Maximum Ratings – Q2 (PNP Transistor) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEV}	-40	V
Collector-Emitter Voltage	V_{CEO}	-30	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-1.5	A
Peak Pulsed Collector Current	I_{CM}	-5	A
Base Current	I_B	-1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P_D	0.7	W mW/°C
		5.6	
		0.9	
		7.2	
		1.1	
		8.8	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.1	°C/W
		8.8	
		1.7	
		13.6	
		179	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	139	
		113	
		113	
		73	
		95.50	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

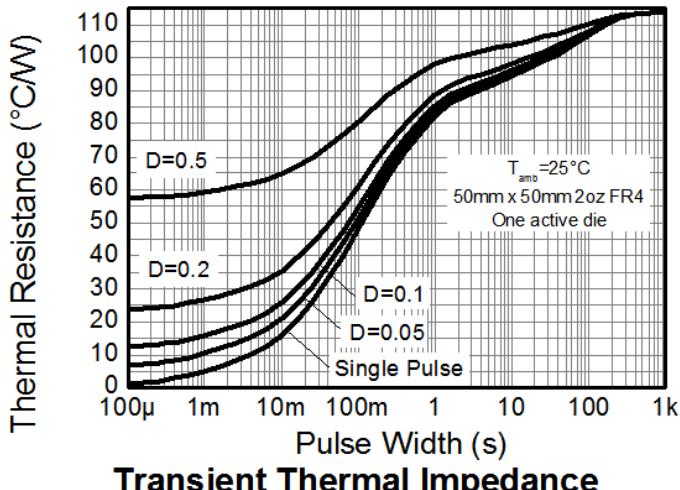
ESD Ratings (Note 13)

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

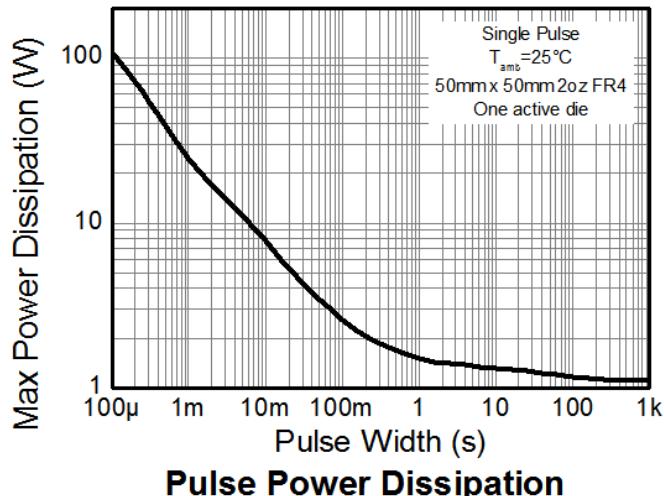
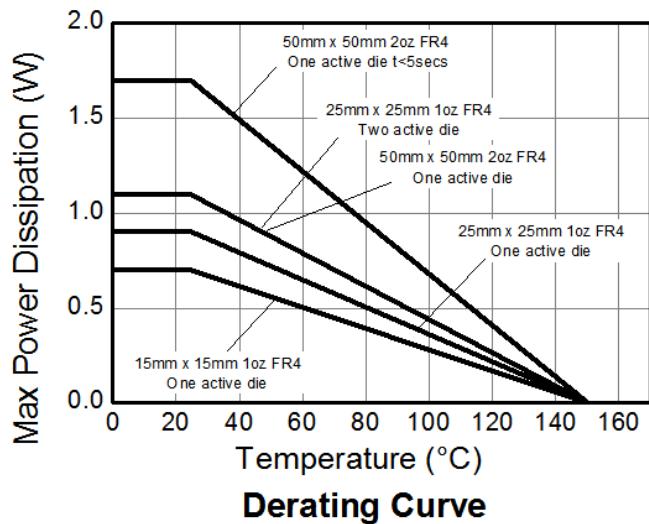
Notes:

6. 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.
7. Same as Note 6, except the device is surface mounted on 25mm x 25mm 1oz copper.
8. Same as Note 6, except the device is surface mounted on 50mm x 50mm 2oz copper.
9. Same as Note 8, except the device is measured at $t < 5$ seconds.
10. For device with one active die, both collectors attached to a common heatsink.
11. For device with two active die running at equal power, split heatsink 50% to each collector.
12. Thermal resistance from junction to solder-point (at the end of the collector lead).
13. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information



Transient Thermal Impedance



Pulse Power Dissipation

Electrical Characteristics – Q1 (NPN Transistor) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	40	-	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	BV_{CEV}	40	-	—	V	$I_C = 1\mu\text{A}, 0.25\text{V} > V_{\text{BE}} > 1.0\text{V}$
Collector-Emitter Breakdown Voltage (Note 14)	BV_{CEO}	30	-	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector Cut-Off Current	I_{CBO}	—	<1	20	nA	$V_{\text{CB}} = 32\text{V}$
Collector Cut-Off Current	$I_{\text{CES/R}}$	—	<1	20	nA	$V_{\text{CE}} = 16\text{V}, R \leq 1\text{k}\Omega$
Emitter Cut-Off Current	I_{EBO}	—	<1	20	nA	$V_{\text{EB}} = 6\text{V}$
ON CHARACTERISTICS (Note 14)						
DC Current Gain	h_{FE}	180	300	500	—	$I_C = 100\text{mA}, V_{\text{CE}} = 2\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$	—	—	375	mV	$I_C = 750\text{mA}, I_B = 15\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{sat})}$	—	—	1,200	mV	$I_C = 750\text{mA}, I_B = 15\text{mA}$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	9	20	pF	$V_{\text{CB}} = 10\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	f_T	—	265	—	MHz	$V_{\text{CE}} = 10\text{V}, I_C = 50\text{mA}, f = 100\text{MHz}$
Delay Time	t_d	—	10	—	ns	$V_{\text{CC}} = 10\text{V}, I_C = 1\text{A}$ $I_{\text{B1}} = -I_{\text{B2}} = 50\text{mA}$
Rise Time	t_r	—	12	—	ns	
Storage Time	t_s	—	185	—	ns	
Fall Time	t_f	—	45	—	ns	

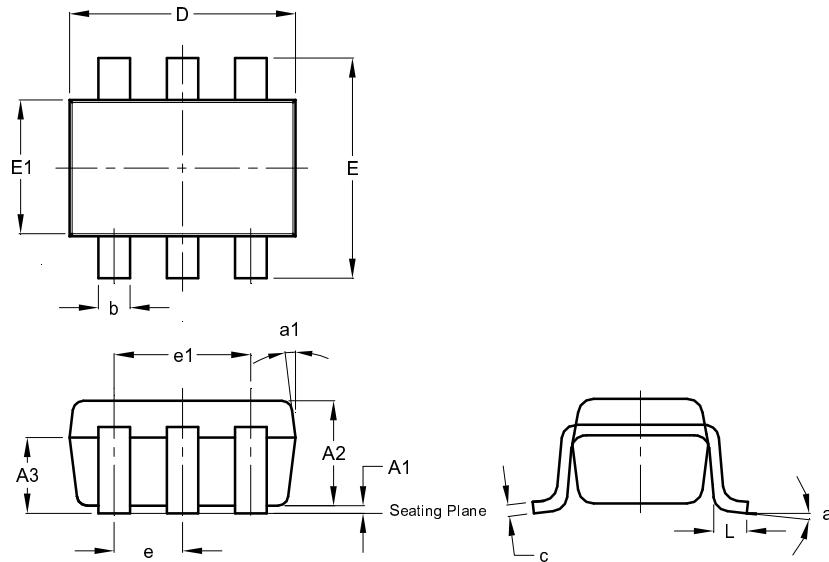
Electrical Characteristics – Q2 (PNP Transistor) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-40	-	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	BV_{CEV}	-40	-	—	V	$I_C = -1\mu\text{A}, 0.25\text{V} < V_{\text{BE}} < 1.0\text{V}$
Collector-Emitter Breakdown Voltage (Note 14)	BV_{CEO}	-30	-	—	V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.3	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector Cut-Off Current	I_{CBO}	—	<1	-20	nA	$V_{\text{CB}} = -32\text{V}$
Collector Cut-Off Current	$I_{\text{CES/R}}$	—	<1	-20	nA	$V_{\text{CE}} = -16\text{V}, R \leq 1\text{k}\Omega$
Emitter Cut-Off Current	I_{EBO}	—	<1	-20	nA	$V_{\text{EB}} = -6\text{V}$
ON CHARACTERISTICS (Note 14)						
DC Current Gain	h_{FE}	180	300	500	—	$I_C = -100\text{mA}, V_{\text{CE}} = -2\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$	—	—	-375	mV	$I_C = -750\text{mA}, I_B = -15\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{sat})}$	—	—	-1,200	mV	$I_C = -750\text{mA}, I_B = -15\text{mA}$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	9	20	pF	$V_{\text{CB}} = -10\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	f_T	—	195	—	MHz	$V_{\text{CE}} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Delay Time	t_d	—	16	—	ns	$V_{\text{CC}} = -10\text{V}, I_C = -1\text{A}$ $I_{\text{B1}} = -I_{\text{B2}} = -50\text{mA}$
Rise Time	t_r	—	11	—	ns	
Storage Time	t_s	—	220	—	ns	
Fall Time	t_f	—	31	—	ns	

Note: 14. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Package Outline Dimensions

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

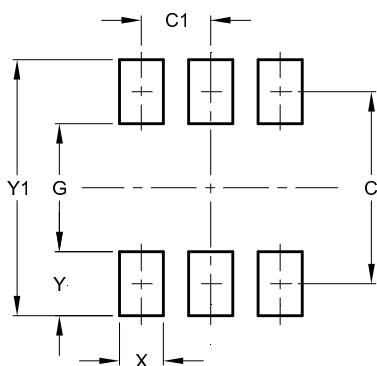


SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°

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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