

60V NPN HIGH GAIN POWER TRANSISTOR IN SOT23F

Features

- $BV_{CEO} > 60V$
- $BV_{CEX} > 160V$
- $BV_{ECO} > 6V$
- $I_C = 5.5A$ Continuous Collector Current
- Low Saturation Voltage $V_{CE(SAT)} < 45mV @ 1A$
- $R_{CE(SAT)} = 26m\Omega$
- h_{FE} Characterised Up to 6A
- 1.5W Power Dissipation
- Complementary PNP Type: ZXTP19060CFF
- **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**

Mechanical Data

- Case: SOT23F
- 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 208③
- Weight: 0.012 grams (Approximate)

Description

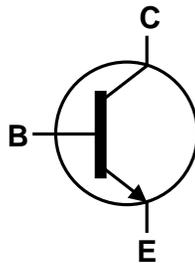
Advanced process capability has been used to maximise the performance of this transistor. The SOT23F package is pin compatible with the industry standard SOT23 footprint but offers lower profile and higher dissipation for applications where power density is of utmost importance.

Applications

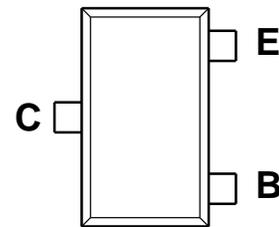
- Line Switching
- Motor Driving (Including DC Fans)
- High-Side Switches
- Subscriber Line Interface Cards (SLIC)



Top View



Device Symbol



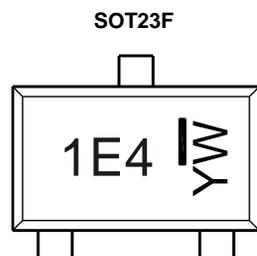
Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTN19060CFFTA	AEC-Q101	1E4	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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



- 1E4 = Product Type Marking Code
- YW = Date Code Marking
- Y = Year : 0~9
- W = Week : A~Z : 1~26
- a~z : 27~52
- z represents 52 & 53 week

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	160	V
Collector-Emitter Voltage (Forward Blocking)	V_{CEX}	160	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECO}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5.5	A
Peak Pulse Current	I_{CM}	12	A
Base Current	I_B	1	A

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

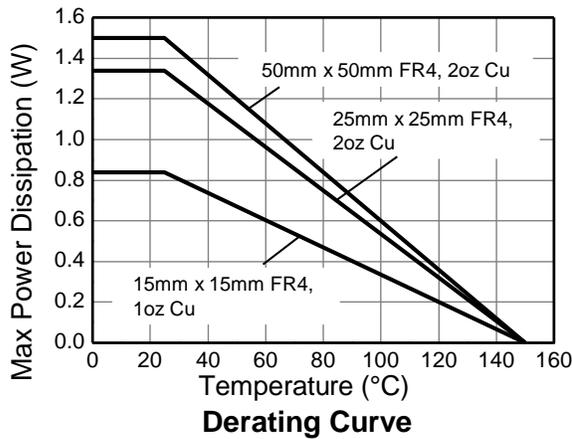
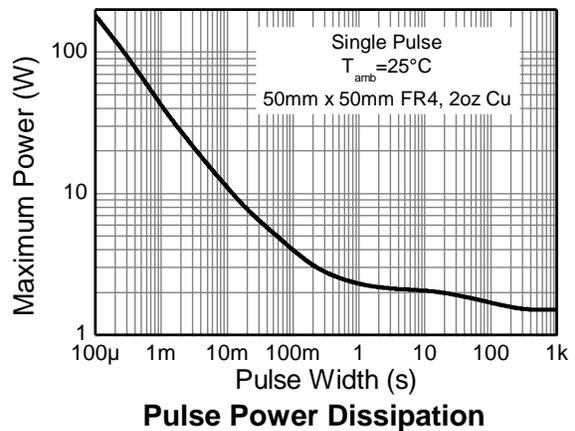
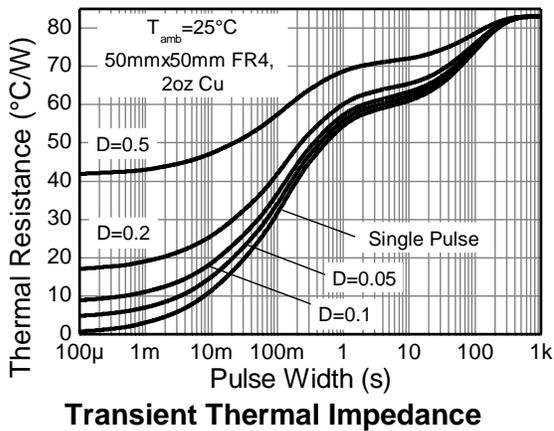
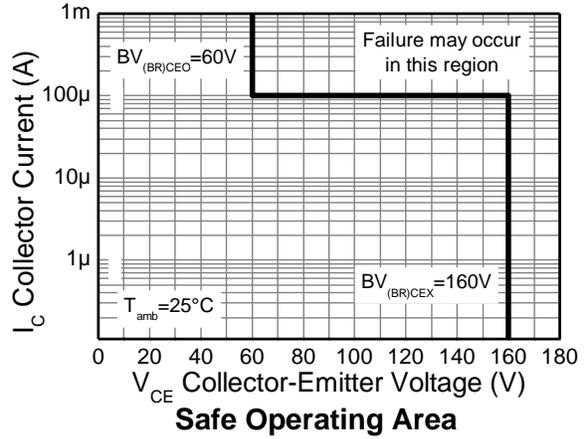
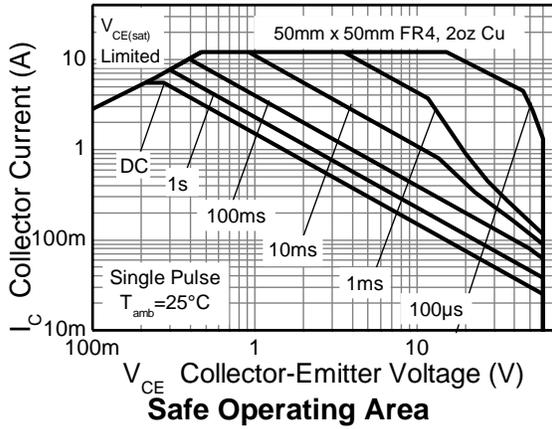
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P_D	0.84	W mW/°C
		6.72	
		1.34	
		10.72	
		1.50	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	12.0	°C/W
		2.0	
		16.0	
		149	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	93	°C/W
		83	
		60	
		43.8	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

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 5, except the device is mounted on 25mm x 25mm 2oz copper.
 - Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
 - Same as Note 7, whilst measured at $t < 5$ seconds.
 - 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

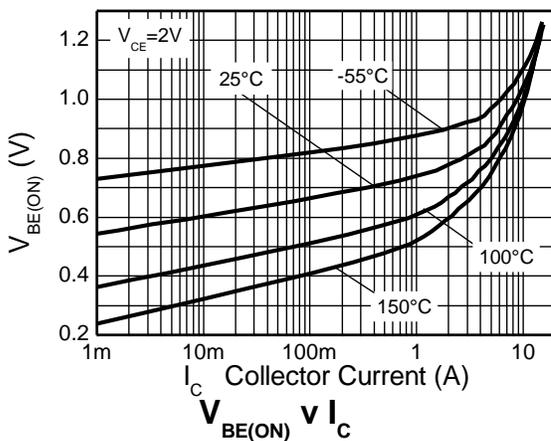
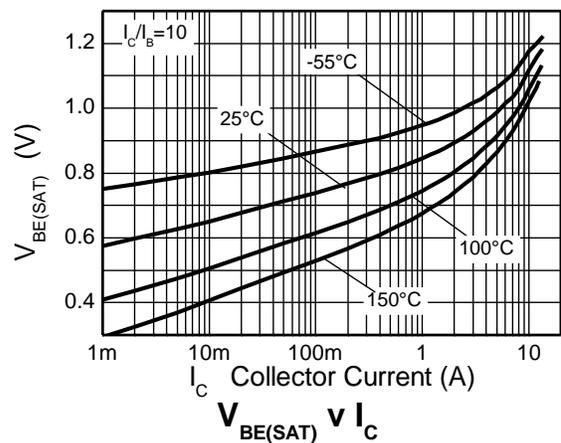
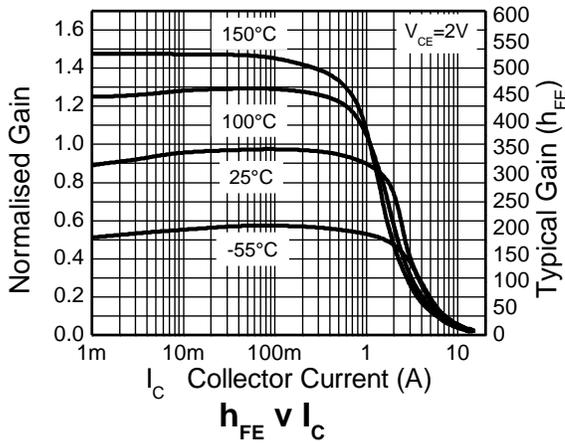
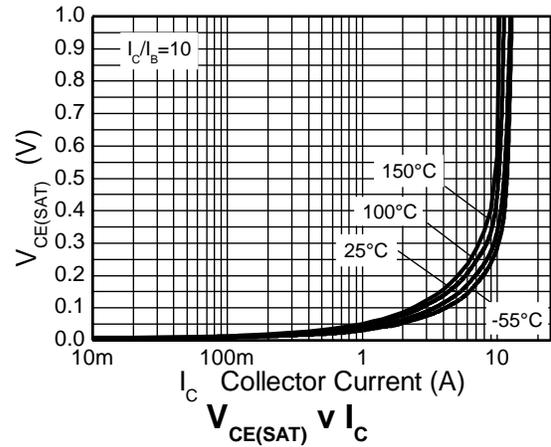
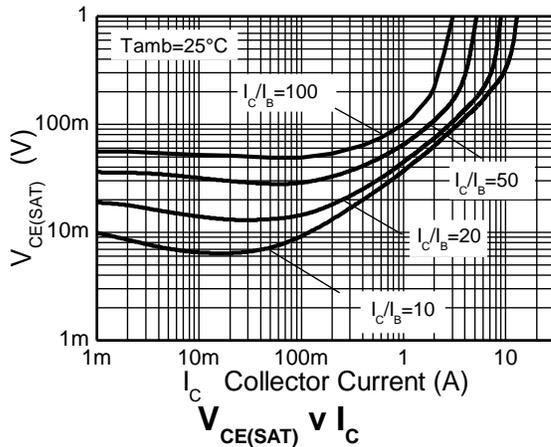


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CB0}	160	200	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Forward Blocking)	BV _{CEX}	160	200	—	V	I _C = 100μA, R _{BE} < 1kΩ or -1V < V _{BE} < 0.25V
Collector-Emitter Breakdown Voltage (Base Open) (Note 11)	BV _{CEO}	60	75	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8.3	—	V	I _E = 100μA
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV _{ECX}	6	7	—	V	I _E = 100μA, R _{BC} < 1kΩ or 0.25V < V _{BC} < -0.25V
Emitter-Collector Breakdown Voltage (Base Open)	BV _{ECO}	6	7	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CB0}	—	<1	50	nA μA	V _{CB} = 160V V _{CB} = 160V, T _A = +100°C
Emitter-Base Cutoff Current	I _{EBO}	—	<1	50	nA	V _{EB} = 5.6V
ON CHARACTERISTICS (Note 11)						
Static Forward Current Transfer Ratio	h _{FE}	200 160 30	350 280 50	500 — —	—	I _C = 100mA, V _{CE} = 2V I _C = 2A, V _{CE} = 2V I _C = 6A, V _{CE} = 2V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	36 105 105 145	45 150 135 175	mV	I _C = 1A, I _B = 100mA I _C = 1A, I _B = 10mA I _C = 2A, I _B = 40mA I _C = 5.5A, I _B = 550mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	1,000	1,100	mV	I _C = 5.5A, I _B = 550mA
Base-Emitter On Voltage	V _{BE(ON)}	—	880	1,000	mV	I _C = 5.5A, V _{CE} = 2V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	—	130	—	MHz	I _C = 50mA, V _{CE} = 10V, f = 50MHz
Input Capacitance	C _{IBO}	—	310	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{OBO}	—	19.3	25	pF	V _{CB} = 10V, f = 1MHz
Delay Time	t _D	—	27.3	—	ns	V _{CC} = 10V, I _C = 500mA, I _{B1} = I _{B2} = 50mA
Rise Time	t _R	—	13.2	—	ns	
Storage Time	t _S	—	682	—	ns	
Fall Time	t _F	—	90.9	—	ns	

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

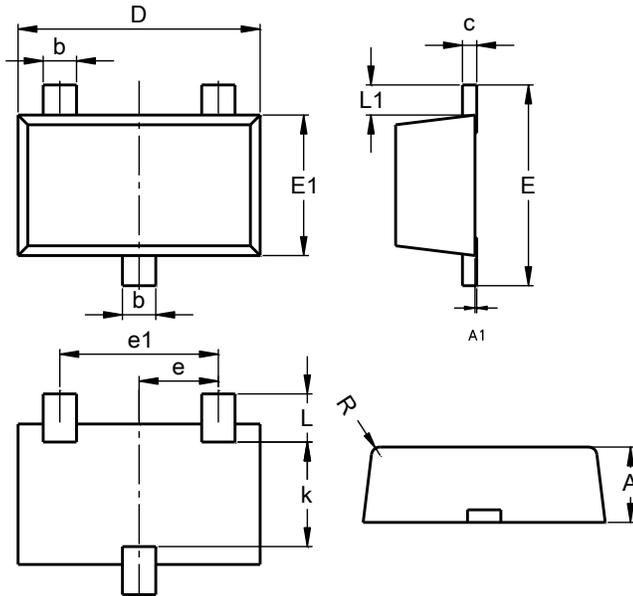
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT23F

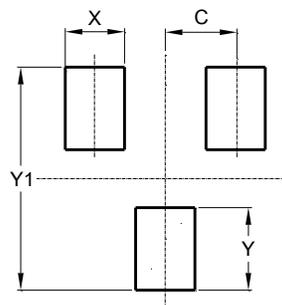


SOT23F			
Dim	Min	Max	Typ
A	0.80	1.00	0.90
b	0.35	0.50	0.44
c	0.10	0.20	0.16
D	2.80	3.00	2.90
e	0.95 REF		
e1	0.190 REF		
E	2.30	2.50	2.40
E1	1.50	1.70	1.65
k	1.20	-	-
L	0.30	0.65	0.50
L1	0.30	0.50	0.40
R	0.05	0.15	-
All Dimensions in mm			

Suggested Pad Layout

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

SOT23F



Dimensions	Value (in mm)
C	0.95
X	0.80
Y	1.110
Y1	3.000

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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