60V NPN LOW SATURATION POWER TRANSISTOR

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

- BV_{CEO} > 60V
- I_C = 3A High Continuous Collector Current
- I_{CM} up to 6A Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage $V_{CE(SAT)}$ < 300mV @ 1A
- Complementary PNP Type: DXT751Q
- **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

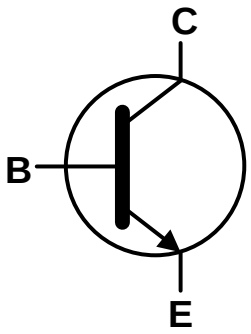
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.052 grams (Approximate)

Applications

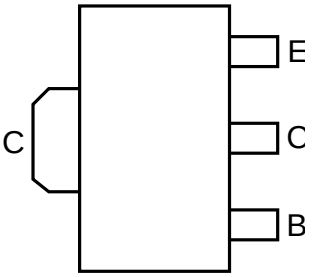
- Load Management Functions
- Motor Control
- DC-DC / DC-AC Converters

SOT89

Top View



Device Symbol



Top View
Pinout

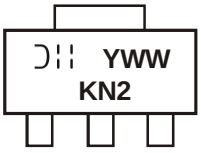
Ordering Information (Notes 4 and 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DXT651Q-13	Automotive	KN2	13	12	2,500

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. Refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

SOT89



KN2 = Product Type Marking Code
= Manufacturer's Marking Code
YWW = Date Code Marking
Y = Last Digit of Year (ex: 6 = 2016)
WW = Week Code (01 to 53)

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

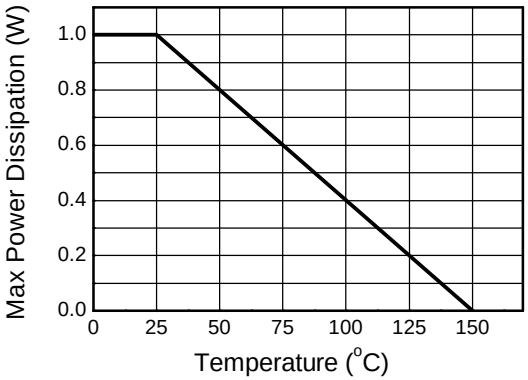
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	3	A
Peak Pulse Collector Current	I_{CM}	6	A
Peak Base Current	I_B	500	mA

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

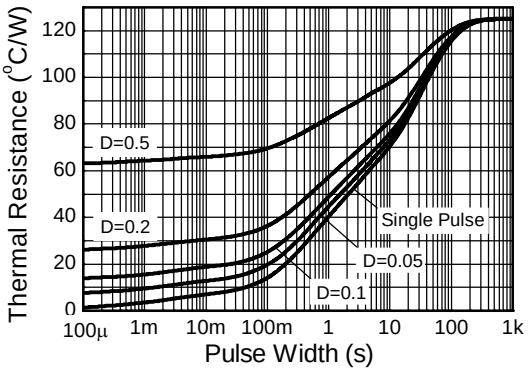
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	1	W
	(Note 7)		2	
Thermal Resistance, Junction to Ambient Air	(Note 6)	$R_{\theta JA}$	125	°C/W
	(Note 7)		62.5	
Thermal Resistance, Junction to Leads	(Note 8)	$R_{\theta JL}$	6.0	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
6. For a device surface mounted on 15mm x 15mm x 0.6mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in steady state condition.
7. Same as note 6, except the device is mounted on 40mm x 40mm x 1.6mm FR-4 PCB.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).

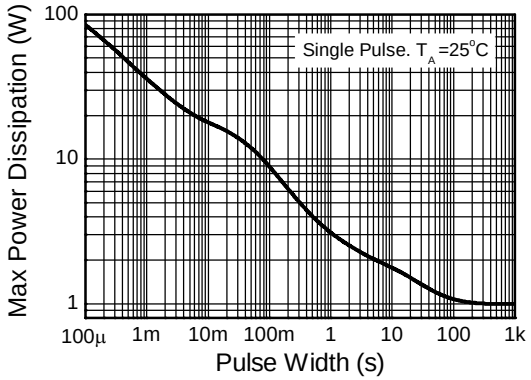
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	I_E = 100µA
Collector-Base Cutoff Current	I_{CBO}	—	—	0.1 10	µA	V_{CB} = 60V V_{CB} = 60V, T_A = +100°C
Emitter-Base Cutoff Current	I_{EBO}	—	—	0.1	µA	V_{EB} = 4V
ON CHARACTERISTICS (Note 9)						
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.08 0.23	0.3 0.6	V V	I_C = 1A, I_B = 100mA I_C = 3A, I_B = 300mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	0.85	1.25	V	I_C = 1A, I_B = 100mA
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	—	0.8	1	V	V_{CE} = 2V, I_C = 1A
DC Current Gain	h_{FE}	70 100 80 40	200 200 185 120	— 300 — —	—	V_{CE} = 2V, I_C = 50mA V_{CE} = 2V, I_C = 500mA V_{CE} = 2V, I_C = 1A V_{CE} = 2V, I_C = 2A
SMALL-SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	140	200	—	MHz	V_{CE} = 5V, I_C = 100mA, f = 100MHz
Output Capacitance	C_{obo}	—	—	30	pF	V_{CB} = 10V, f = 1MHz
Switching Times	t_{ON} t_{OFF}	— —	35 230	— —	ns ns	V_{CC} = 10V. I_C = 500mA, I_{B1} = -I_{B2} = 50mA

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

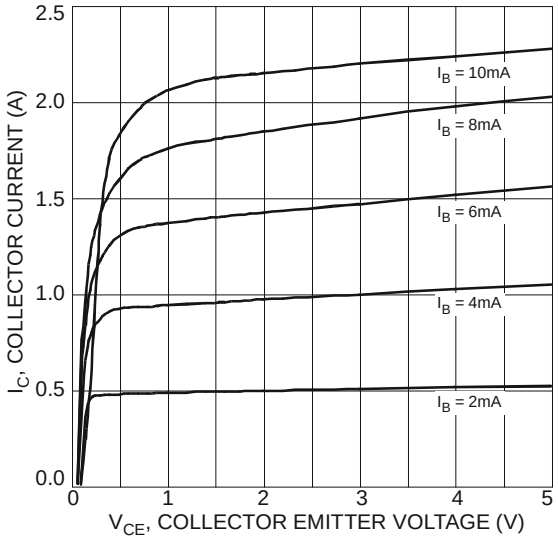


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

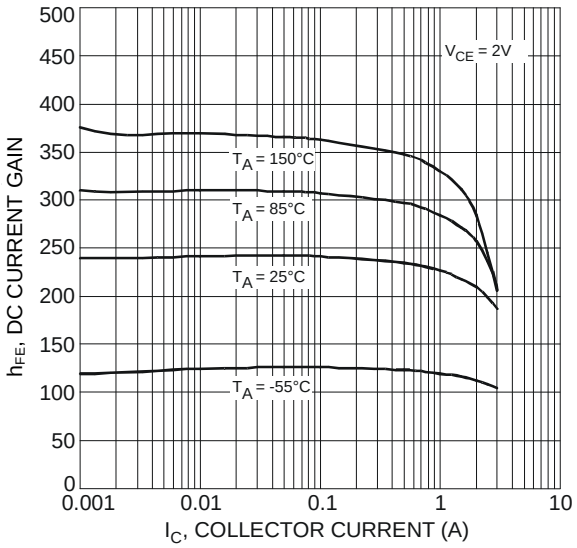


Figure 2 Typical DC Current Gain vs. Collector Current

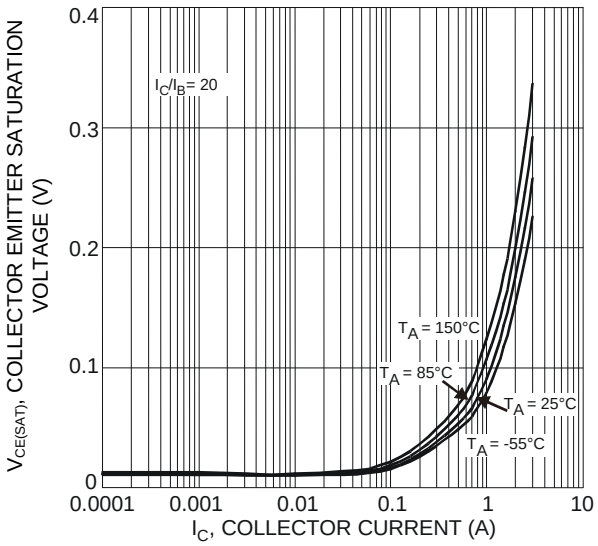


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

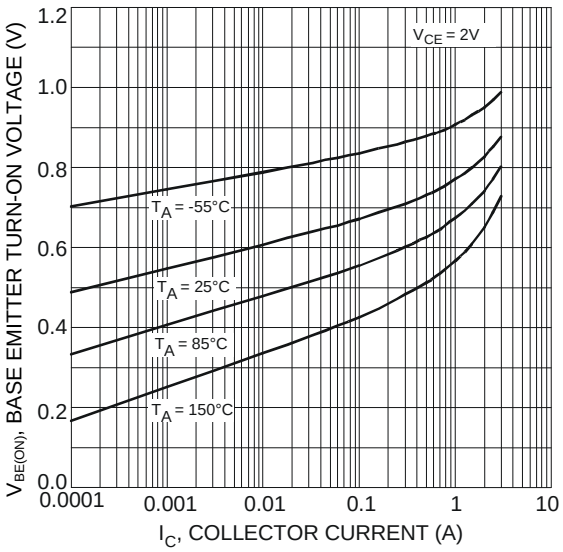


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

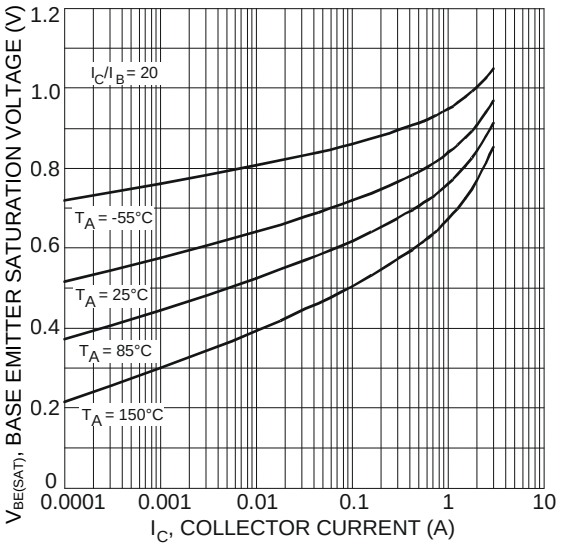


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

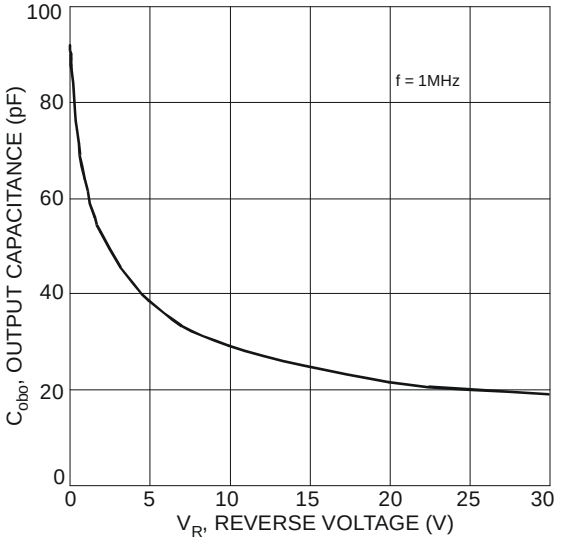


Figure 6 Typical Output Capacitance Characteristics

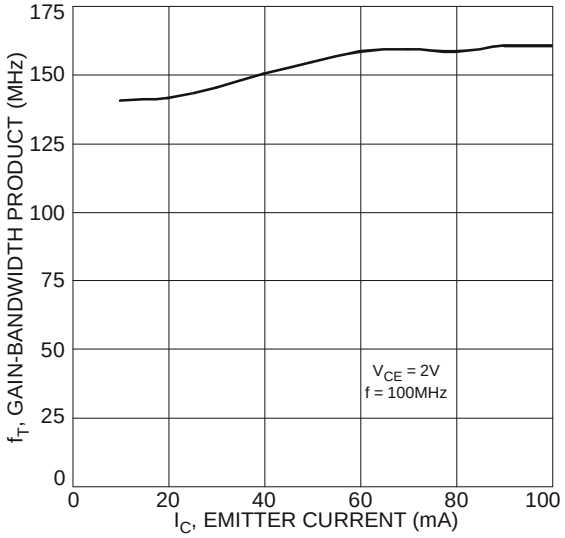
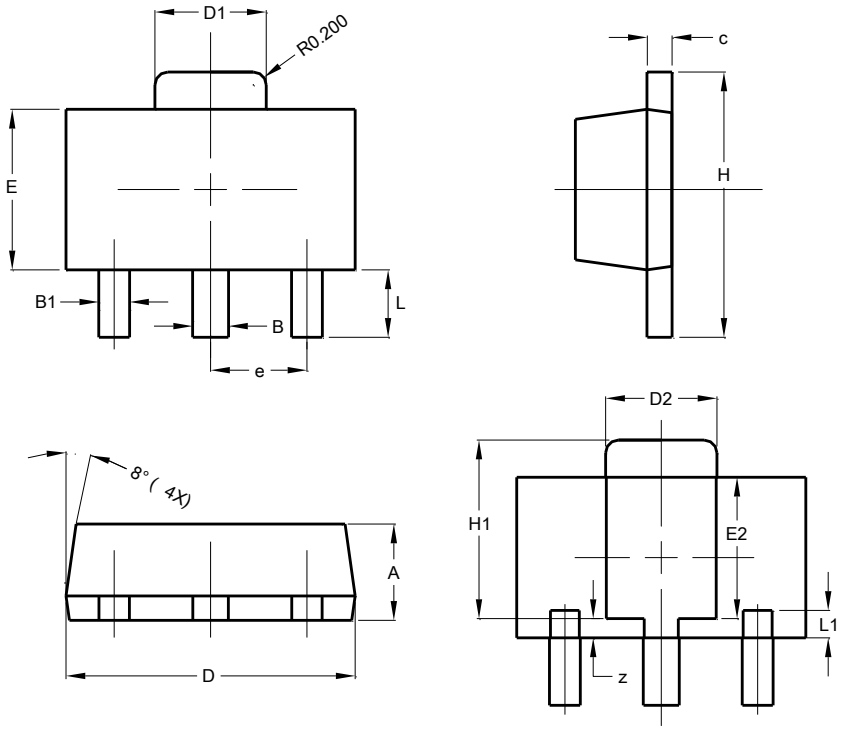


Figure 7 Typical Gain-Bandwidth Product vs. Emitter Current

Package Outline Dimensions

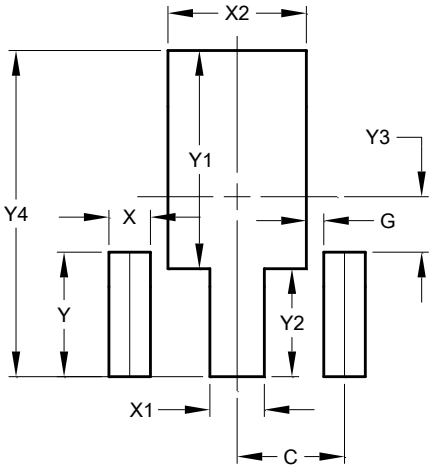
Please see http://www.diodes.com/package-outlines.html for the latest version.



SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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