



DXT651Q

### **60V NPN LOW SATURATION POWER TRANSISTOR**

## **Description**

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

### **Features**

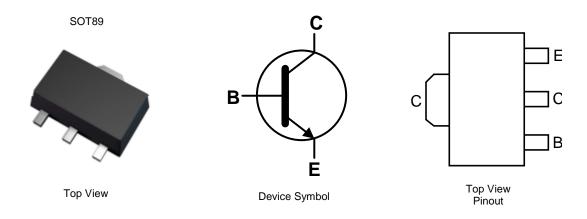
- BV<sub>CEO</sub> > 60V
- I<sub>C</sub> = 3A High Continuous Collector Current
- I<sub>CM</sub> up to 6A Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage V<sub>CE(SAT)</sub> < 300mV @ 1A</li>
- Complementary PNP Type: DXT751Q
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- 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 <sup>3</sup>
- Weight: 0.052 grams (Approximate)

## **Applications**

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



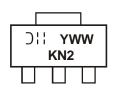
## Ordering Information (Notes 4 and 5)

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

Oli = 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V
Emitter-Base Voltage	V <sub>EBO</sub>	5	V
Collector Current	I <sub>C</sub>	3	Α
Peak Pulse Collector Current	I <sub>CM</sub>	6	Α
Peak Base Current	I <sub>B</sub>	500	mA

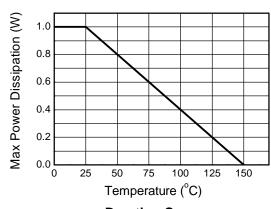
# Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
Power Dissipation	(Note 6)	D	1	W	
Fower Dissipation	(Note 7)	P <sub>D</sub>	2		
Thermal Resistance, Junction to Ambient Air	(Note 6)	Б	125	°C/W	
Thermal Resistance, Junction to Ambient Air	(Note 7)	$R_{ heta JA}$	62.5		
Thermal Resistance, Junction to Leads	(Note 8)	$R_{ heta JL}$	6.0	°C/W	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

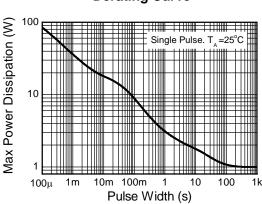
Notes:

- 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** 



**Pulse Power Dissipation** 

120 0 100 80 D=0.5 60 0 100μ 1m 10m 10m 1 10 100 1k Pulse Width (s)

**Transient Thermal Impedance** 



# Electrical Characteristics (@T<sub>A</sub> = ±25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	80	_		V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	60	_		V	$I_C = 10mA$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	5	_	_	V	$I_E = 100 \mu A$
Collector-Base Cutoff Current	I <sub>CBO</sub>	_	_	0.1 10	μΑ	V <sub>CB</sub> = 60V V <sub>CB</sub> = 60V, T <sub>A</sub> = +100°C
Emitter-Base Cutoff Current	I <sub>EBO</sub>	_	_	0.1	μA	$V_{EB} = 4V$
ON CHARACTERISTICS (Note 9)						
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	_	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 <sub>BE(SAT)</sub>	_	0.85	1.25	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Turn-On Voltage	V <sub>BE(ON)</sub>	_	0.8	1	V	V <sub>CE</sub> = 2V, I <sub>C</sub> = 1A
DC Current Gain	h <sub>FE</sub>	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⊤	140	200	_	MHz	$V_{CE} = 5V$ , $I_{C} = 100$ mA, $f = 100$ MHz
Output Capacitance	C <sub>obo</sub>		_	30	pF	$V_{CB} = 10V$ , $f = 1MHz$
Switching Times	t <sub>ON</sub>		35 230		ns ns	$V_{CC} = 10V. I_C = 500mA,$ $I_{B1} = -I_{B2} = 50mA$

Note:

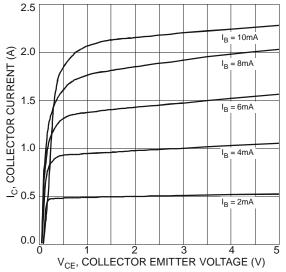


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

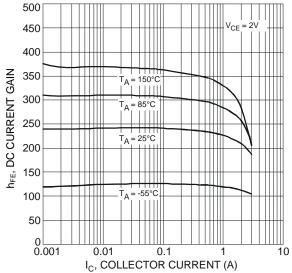


Figure 2 Typical DC Current Gain vs. Collector Current

<sup>9.</sup> Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%.



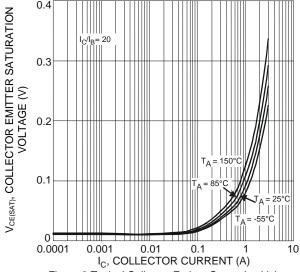


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

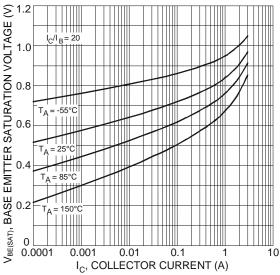


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

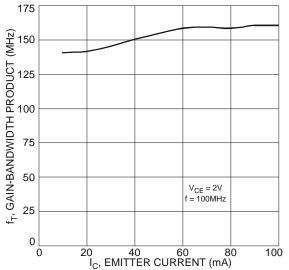


Figure 7 Typical Gain-Bandwidth Product vs. Emitter Current

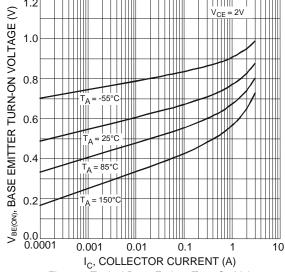


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

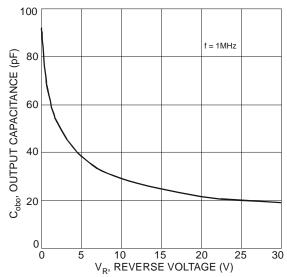
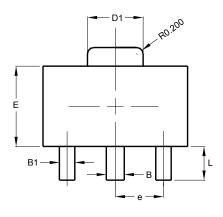


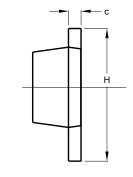
Figure 6 Typical Output Capacitance Characteristics

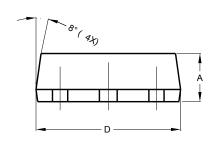


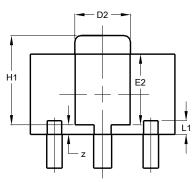
# **Package Outline Dimensions**

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





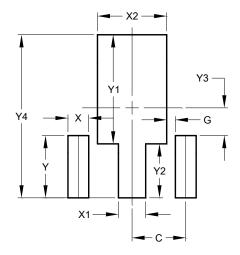




SOT89				
Dim	Min	Max	Тур	
Α	1.40	1.60	1.50	
В	0.50	0.62	0.56	
B1	0.42	0.54	0.48	
С	0.35	0.43	0.38	
D	4.40	4.60	4.50	
D1	1.62	1.83	1.733	
D2	1.61	1.81	1.71	
E	2.40	2.60	2.50	
E2	2.05	2.35	2.20	
е	1	-	1.50	
Н	3.95	4.25	4.10	
H1	2.63	2.93	2.78	
L	0.90	1.20	1.05	
L1	0.327	0.527	0.427	
Z	0.20	0.40	0.30	
All Dimensions in mm				

# **Suggested Pad Layout**

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



Dimensions	Value (in mm)
С	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



#### IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

#### **LIFE SUPPORT**

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
  - 1. are intended to implant into the body, or
  - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2016, Diodes Incorporated

www.diodes.com

# **ПОСТАВКА** ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

# Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

## http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

## Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru\_6 moschip.ru 4 moschip.ru 9