



DSS3515MQ

#### 15V PNP LOW VCESAT TRANSISTOR

#### **Description**

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

#### **Features**

- BV<sub>CEO</sub> > -15V
- I<sub>C</sub> = -500mA High Collector Current
- I<sub>CM</sub> = -1A Peak Pulse Current
- P<sub>D</sub> = 1000mW Power Dissipation
- Low Collector-Emitter Saturation Voltage, V<sub>CE(SAT)</sub>
- 0.60mm<sup>2</sup> Package Footprint, 13 Times Smaller than SOT23
- 0.5mm Height Package Minimizing Off-Board Profile
- Complementary NPN Type DSS2515M
- 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)

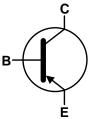
### **Mechanical Data**

- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound.
   UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu.
   Solderable per MIL-STD-202, Method 208 @4
- Weight: 0.0009 grams (Approximate)

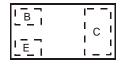
# X1-DFN1006-3







Device Symbol



Top View Device Schematic

### Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DSS3515MQ-7	Automotive	TB	7	8	10,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/quality/.
- 5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

### **Marking Information**

#### X1-DFN1006-3



TB = Product Type Marking Code
Bar Denotes Base and Emitter Side



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-15	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-15	V
Emitter-Base Voltage	V <sub>EBO</sub>	-6	V
Collector Current - Continuous	Ic	-500	mA
Peak Pulse Collector Current	I <sub>CM</sub>	-1	Α
Peak Base Current	I <sub>BM</sub>	-100	mA

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

Characteristic		Symbol	Value	Unit	
Power Dissipation	(Note 6)	р	400	mW	
Power Dissipation	(Note 7)	P <sub>D</sub>	1000		
Thermal Resistance, Junction to Ambient	(Note 6)	310		°C/M	
Thermal Resistance, Junction to Ambient	(Note 7)	$R_{\theta JA}$	120	°C/W	
Thermal Resistance, Junction to Lead	$R_{ heta JL}$	120	°C/W		
Operating and Storage and Temperature Range	је	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

### ESD Ratings (Note 9)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	200	V	В

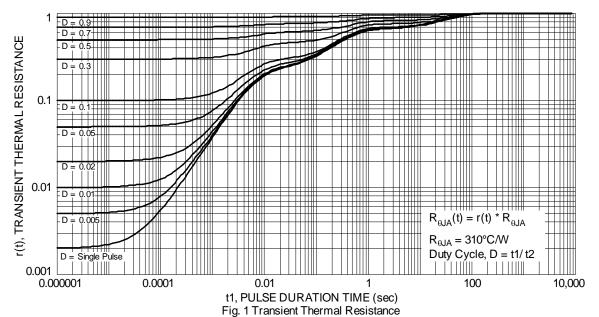
Notes:

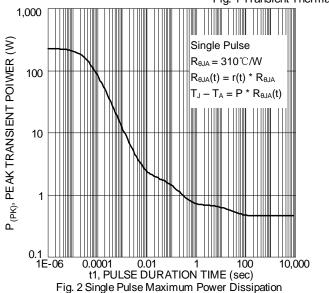
- 6. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.

  7. Same as Note 6, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
- 8. Thermal resistance from junction to solder-point (on the exposed collector pad).
- 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.



#### **Thermal Characteristics**







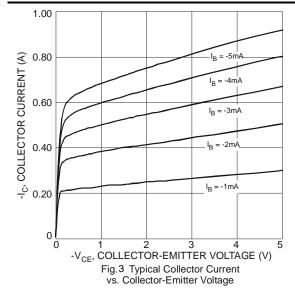
# **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

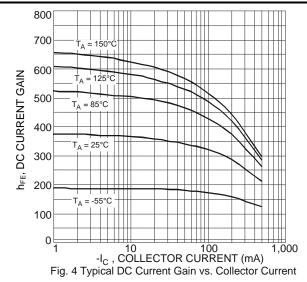
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-15	_		V	$I_C = -100\mu A, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	-15	_	_	V	$I_C = -10 \text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-6	_		V	$I_E = -100\mu A, I_C = 0$
Collector Cutoff Current	T			-100	nA	$V_{CB} = -15V, I_{E} = 0$
Collector Cutoff Current	I <sub>CBO</sub>	_	_	-50	μΑ	$V_{CB} = -15V, I_E = 0, T_A = +150$ °C
Emitter Cutoff Current	I <sub>EBO</sub>	_	_	-100	nA	$V_{EB} = -5V, I_C = 0$
ON CHARACTERISTICS (Note 10)	•					
		200	_			$V_{CE} = -2V, I_{C} = -10mA$
DC Current Gain	h <sub>FE</sub>	150	_			$V_{CE} = -2V, I_{C} = -100mA$
		90	_			$V_{CE} = -2V, I_{C} = -500mA$
		_	_	-25		$I_C = -10 \text{mA}, I_B = -0.5 \text{mA}$
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	_	_	-150	mV	$I_C = -200 \text{mA}, I_B = -10 \text{mA}$
		_	_	-250		$I_C = -500 \text{mA}, I_B = -50 \text{mA}$
Collector-Emitter Saturation Resistance	R <sub>CE(SAT)</sub>	_	_	500	mΩ	I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	_	_	-1.1	V	I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Turn On Voltage	V <sub>BE(ON)</sub>	_	_	-0.9	V	$V_{CE} = -2V, I_{C} = -100mA$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C <sub>obo</sub>		_	10	pF	$V_{CB} = -10V, f = 1.0MHz$
Current Gain-Bandwidth Product	f <sub>T</sub>	100	340	_	MHz	$V_{CE} = -5V$ , $I_{C} = -100$ mA, $f = 100$ MHz

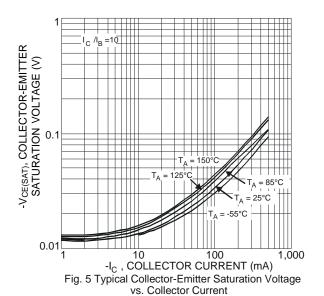
Note: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

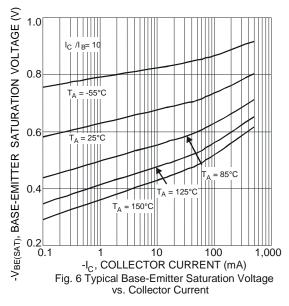


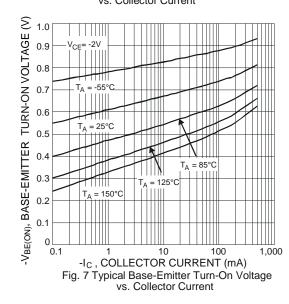
### Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)











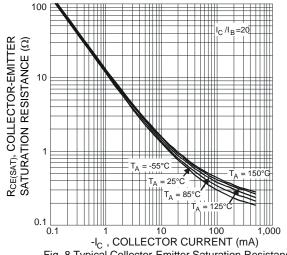


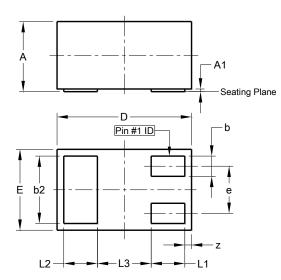
Fig. 8 Typical Collector-Emitter Saturation Resistance vs. Collector Current



### **Package Outline Dimensions**

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

#### X1-DFN1006-3

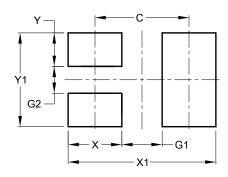


X1-DFN1006-3					
Dim	Min	Max	Тур		
Α	0.47	0.53	0.50		
A1	0.00	0.05	0.03		
b	0.10	0.20	0.15		
b2	0.45	0.55	0.50		
D	0.95	1.075	1.00		
E	0.55	0.675	0.60		
е			0.35		
L1	0.20	0.30	0.25		
L2	0.20	0.30	0.25		
L3		_	0.40		
Z	0.02	0.08	0.05		
All Dimensions in mm					

### **Suggested Pad Layout**

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

#### X1-DFN1006-3



Dimensions	Value (in mm)
С	0.70
G1	0.30
G2	0.20
Х	0.40
X1	1.10
Y	0.25
Y1	0.70



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