




**THE DATASHEET OF  
DSS60601MZ4-13**

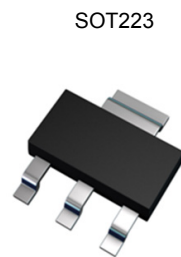


## Features

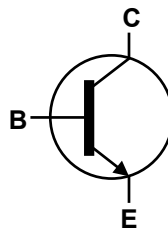
- $BV_{CEO} > 60V$
- $I_C = 6A$  High Continuous Current
- $I_{CM} = 12A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < 60mV @ 1A$
- Complementary PNP Type: DSS60600MZ4
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

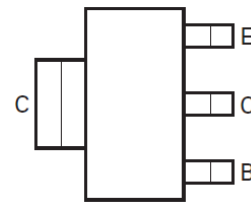
- Case: SOT223
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.115 grams (approximate)



Top View



Device Symbol



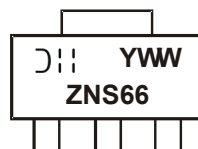
Top View  
Pin-Out

## Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape width (mm)	Quantity per reel
DSS60601MZ4-13	AEC-Q101	ZNS66	13	12	2500

- 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](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



ZNS66 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y = Last digit of year (ex: 4 = 2014)  
 WW = Week code 01 - 52

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	100	V
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Continuous Collector Current	I <sub>C</sub>	6	A
Peak Pulse Collector Current	I <sub>CM</sub>	12	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3	W
		2	
		1.2	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	41.7	°C/W
		62.5	
		104	
Thermal Resistance, Junction to Leads (Note 8)	R <sub>θJL</sub>	12.9	°C/W
Operating and Storage Temperature Range	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	400	V	C

- Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
  6. Same as note (5), except the device is mounted on 25mm x 25mm 2oz copper.
  7. Same as note (5), except the device is mounted on minimum recommended pad (MRP) layout.
  8. Thermal resistance from junction to solder-point (at the end of the collector lead).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

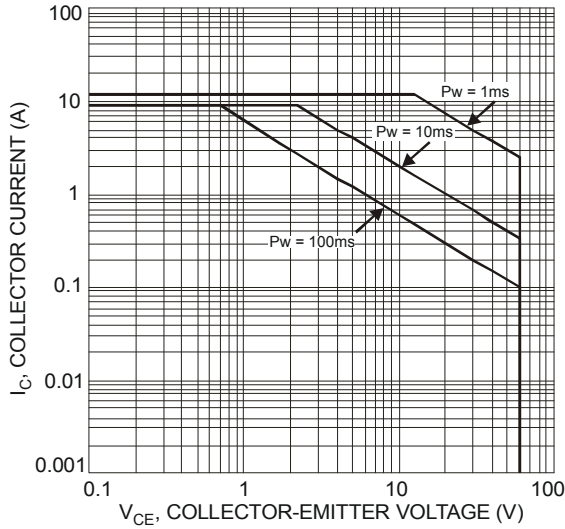
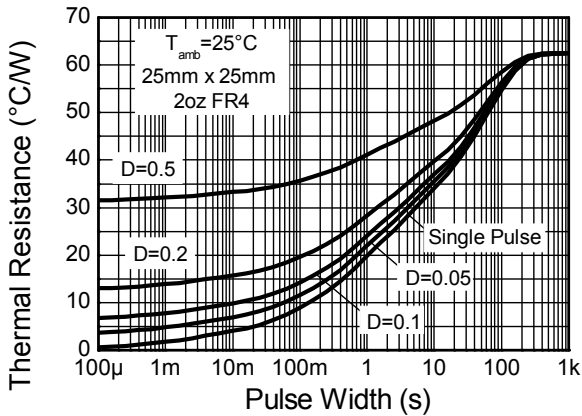
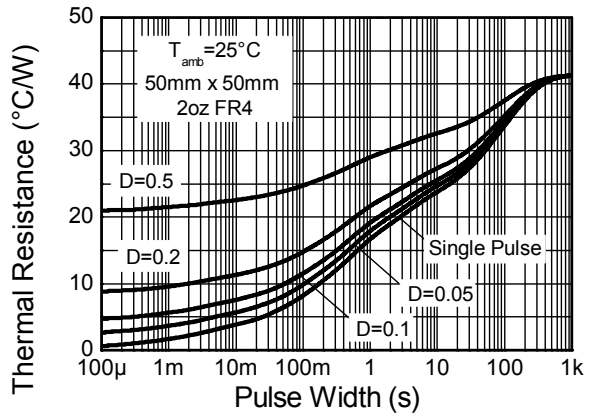


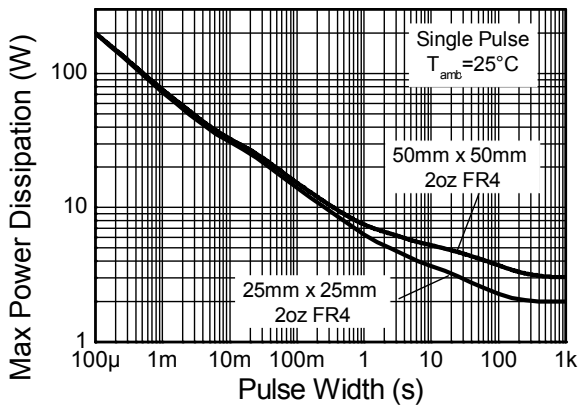
Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage (Note 3)



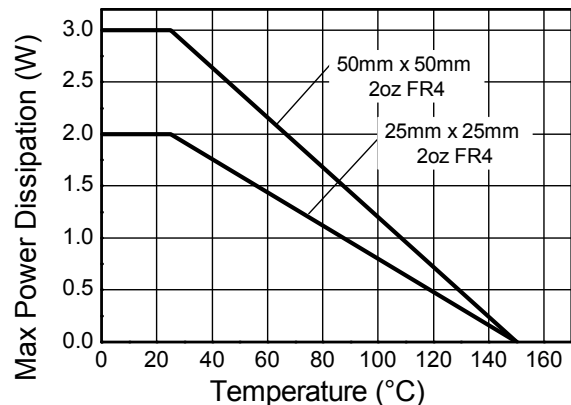
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	100	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	60	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA
Collector-Base Cutoff Current	I <sub>CBO</sub>	—	—	100	nA	V <sub>CB</sub> = 40V, I <sub>E</sub> = 0
		—	—	50	μA	V <sub>CB</sub> = 40V, I <sub>E</sub> = 0, T <sub>J</sub> = 150°C
Emitter-Base Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 10)</b>						
DC Current Gain	h <sub>FE</sub>	150	—	—	—	V <sub>CE</sub> = 2V, I <sub>C</sub> = 0.5A
		120	—	360		V <sub>CE</sub> = 2V, I <sub>C</sub> = 1A
		100	—	—		V <sub>CE</sub> = 2V, I <sub>C</sub> = 2A
		50	—	—		V <sub>CE</sub> = 2V, I <sub>C</sub> = 6A
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	—	40	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 2.0mA
		—	—	60		I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		—	80	100		I <sub>C</sub> = 2A, I <sub>B</sub> = 200mA
		—	—	220		I <sub>C</sub> = 3A, I <sub>B</sub> = 60mA
		—	—	300		I <sub>C</sub> = 6A, I <sub>B</sub> = 600mA
Equivalent On-Resistance	R <sub>CE(SAT)</sub>	—	40	50	mΩ	I <sub>E</sub> = 2A, I <sub>B</sub> = 200mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	—	0.9	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Turn-on Voltage	V <sub>BE(ON)</sub>	—	—	0.9	V	V <sub>CE</sub> = 2V, I <sub>C</sub> = 1A
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	f <sub>T</sub>	100	—	—	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 100mA, f = 100MHz
Output Capacitance	C <sub>obo</sub>	—	26	—	pF	V <sub>CB</sub> = 10V, f = 1MHz
Input Capacitance	C <sub>ibo</sub>	—	325	—	pF	V <sub>EB</sub> = 5V, f = 1MHz
Turn-On Time	t <sub>on</sub>	—	87	—	ns	V <sub>CC</sub> = -30v, I <sub>CC</sub> = 150mA I <sub>B1</sub> = - I <sub>B2</sub> = 15mA
Delay Time	t <sub>d</sub>	—	41	—	ns	
Rise Time	t <sub>r</sub>	—	46	—	ns	
Turn-Off Time	t <sub>off</sub>	—	294	—	ns	
Storage Time	t <sub>s</sub>	—	250	—	ns	
Fall Time	t <sub>f</sub>	—	44	—	ns	

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

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

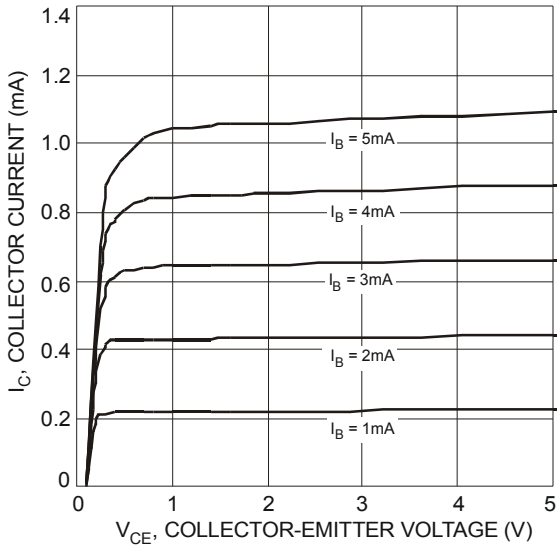


Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

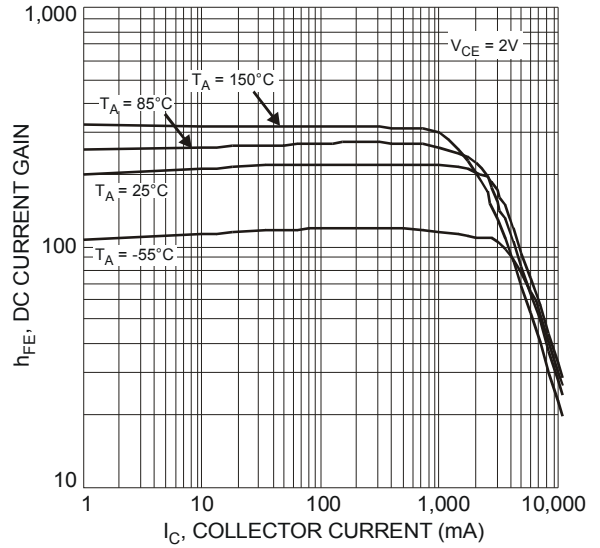


Fig. 4 Typical DC Current Gain vs. Collector Current

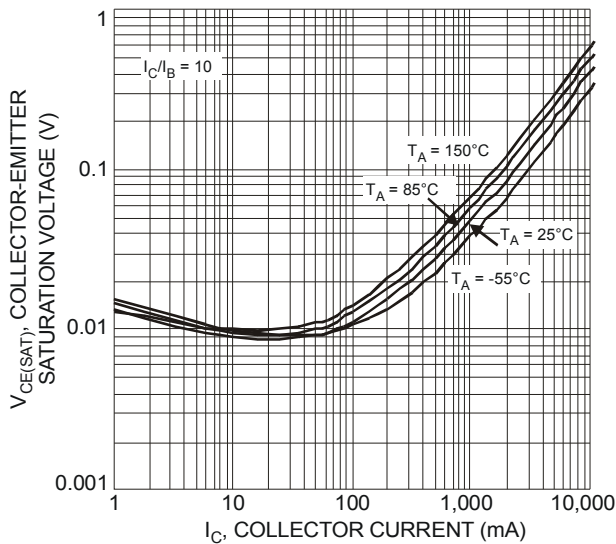


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

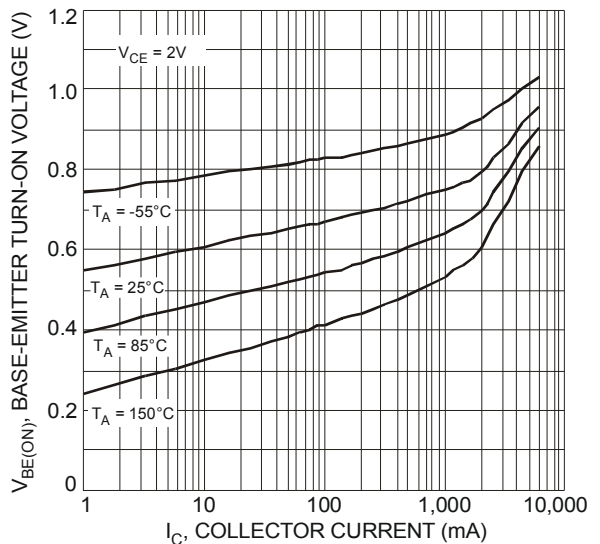


Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

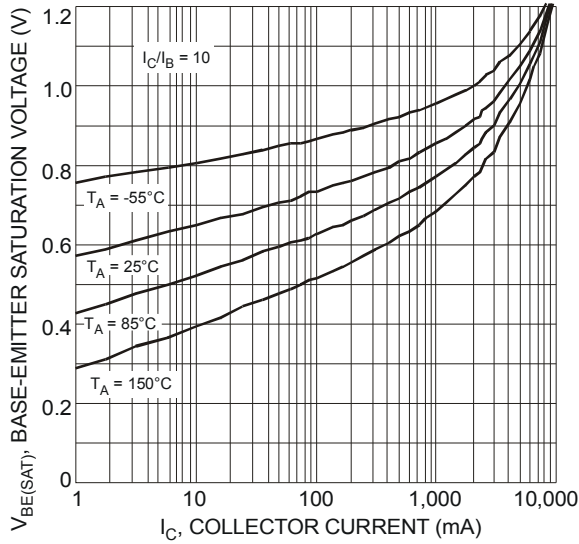


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

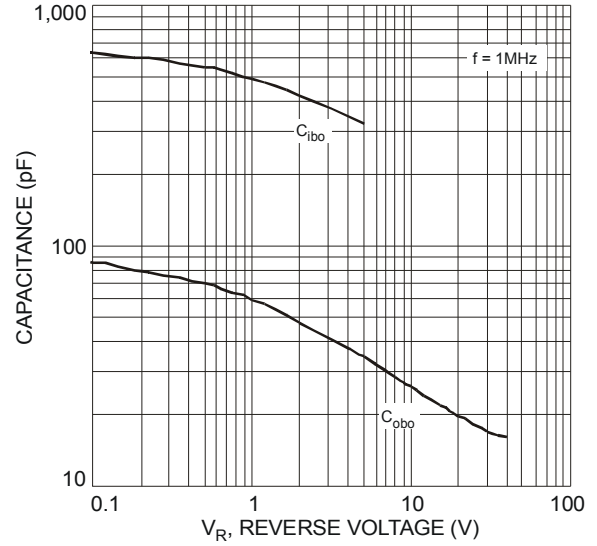


Fig. 8 Typical Capacitance Characteristics

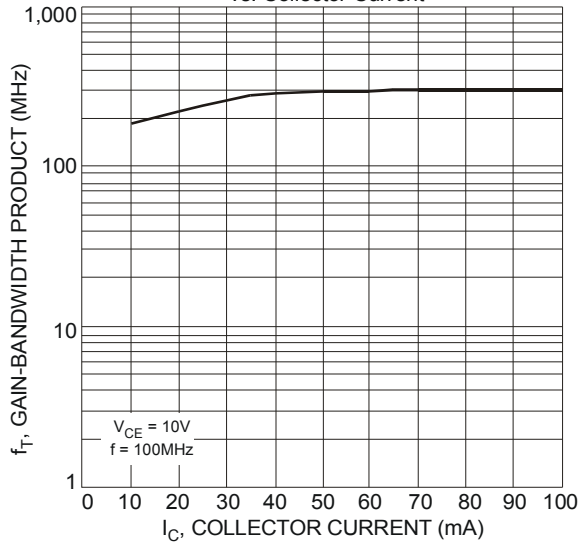
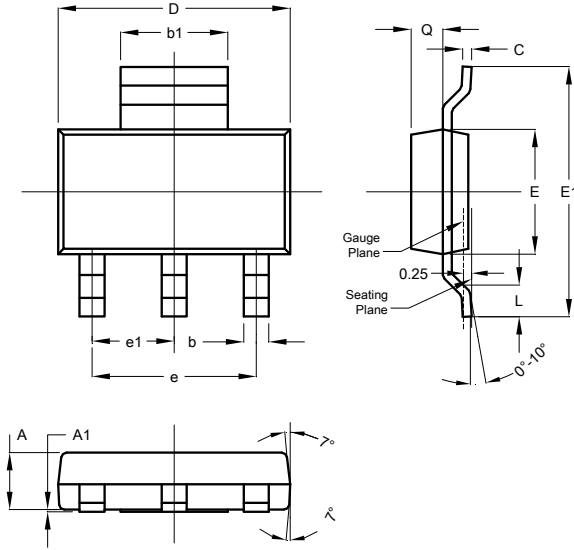


Fig. 9 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

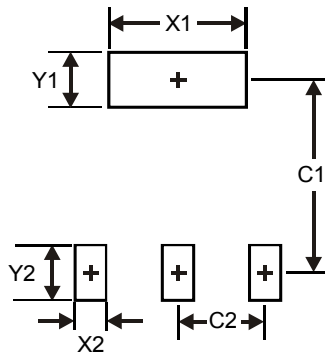
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
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)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

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