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32V NPN SUFACE MOUNT TRANSISTOR IN SOT89

Features

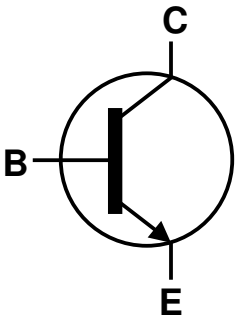
- BV_{CEO} > 32V
- Max Continuous Current I_C = 1A
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (2DB1132)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

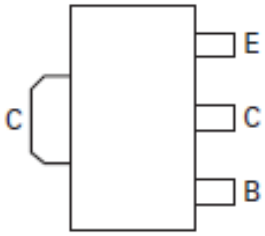
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish e3
- Weight: 0.055 grams (Approximate)

SOT89

Top View



Device Symbol



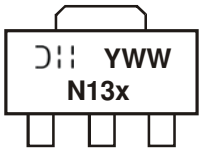
Pin Out – Top View

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
2DD1664P-13	N13P	13	12	2,500
2DD1664Q-13	N13Q	13	12	2,500
2DD1664R-13	N13R	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 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

Marking Information



N13x = Product Type Marking Code:
Where N13P = 2DD1664P
N13Q = 2DD1664Q
N13R = 2DD1664R
YWW = Date Code Marking
Y = Last digit of year ex: 1 = 2011
WW = Week code (01 – 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	32	V
Emitter-Base Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	1	A
Peak Pulse Current (Note 6)	I_{CM}	2	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	22	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. For a device surface mounted on FR-4 PCB with minimum suggested pad layout; high coverage of single sided 1 oz copper, in still air conditions
6. Measured under pulsed conditions. Pulse width = 300µs. Duty cycle ≤ 2%.
7. Thermal resistance from junction to solder-point (at the end of the collector lead).

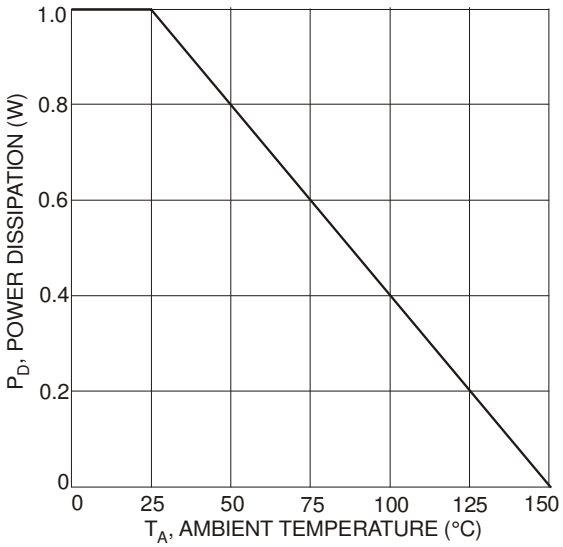


Figure 1. Power Dissipation vs. Ambient Temperature

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage		BV_{CBO}	40	-	-	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)		BV_{CEO}	32	-	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage		BV_{EBO}	6	-	-	V	I_E = 100μA
Collector-Emitter Cut-off Current		I_{CES}	-	-	100	nA	V_{CE} = 32V
Collector-Base Cut-off Current		I_{CBO}	-	-	100	nA	V_{CB} = 36V
Base-Emitter Cut-off Current		I_{EBO}	-	-	100	nA	V_{EB} = 6V
Static Forward Current Transfer Ratio (Note 8)	2DD1664P	h_{FE}	82	-	180	-	I_C = 100mA, V_{CE} = 3V
	2DD1664Q		120		270		
	2DD1664R		180		390		
Collector-Emitter saturation Voltage (Note 8)		$V_{CE(sat)}$	-	120	400	mV	I_C = 500mA, I_B = 50mA
Transition frequency		f_T	-	280	-	MHz	I_E = 50mA, V_{CE} = 5V, f = 30MHz
Output Capacitance		C_{ob}	-	10	-	pF	I_E = 0A, V_{CB} = 10V, f = 1MHz

Notes: 8. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%

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

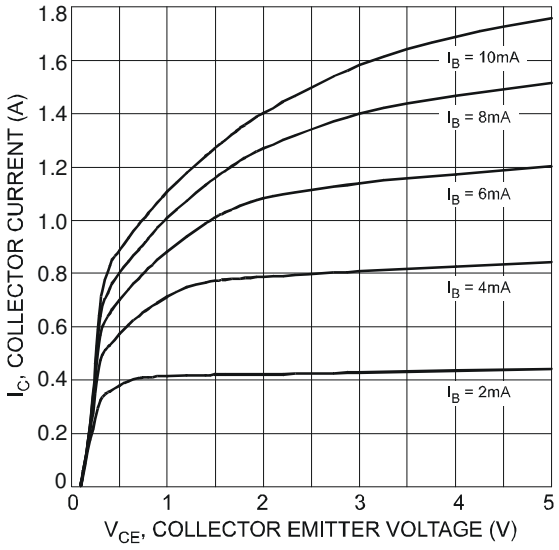


Figure 2. Typical Collector Current vs. Collector-Emitter Voltage

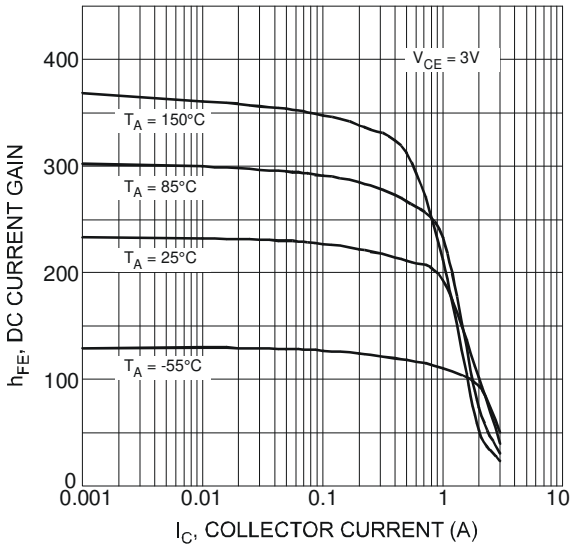


Figure 3. Typical DC Current Gain vs. Collector Current (2DD1664R)

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

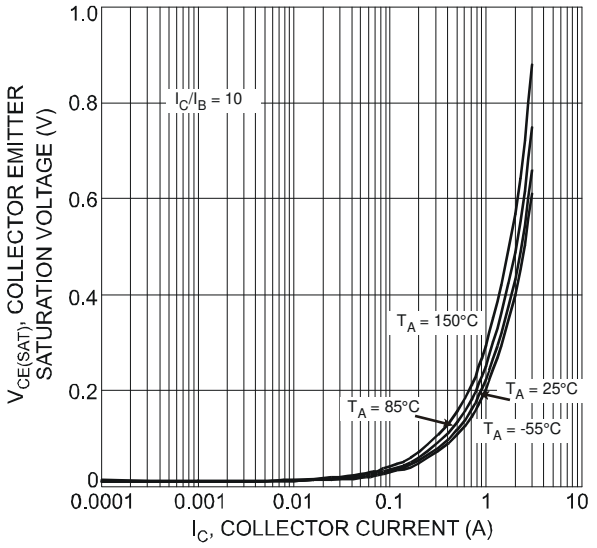


Figure 4. Typical Collector-Emitter Saturation Voltage vs. Collector Current

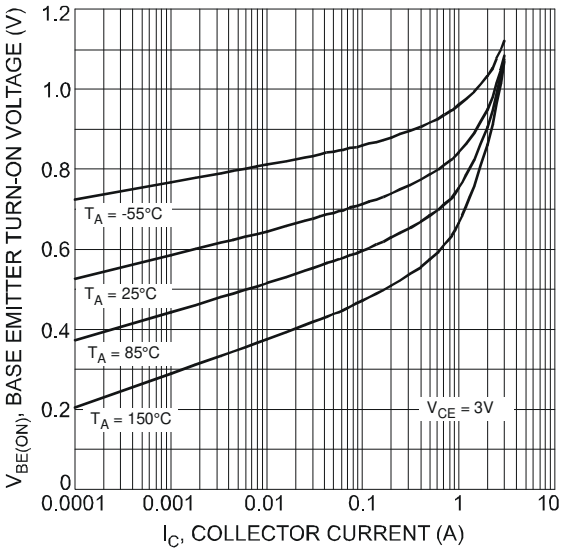


Figure 5. Typical Base-Emitter Turn-On Voltage vs. Collector Current

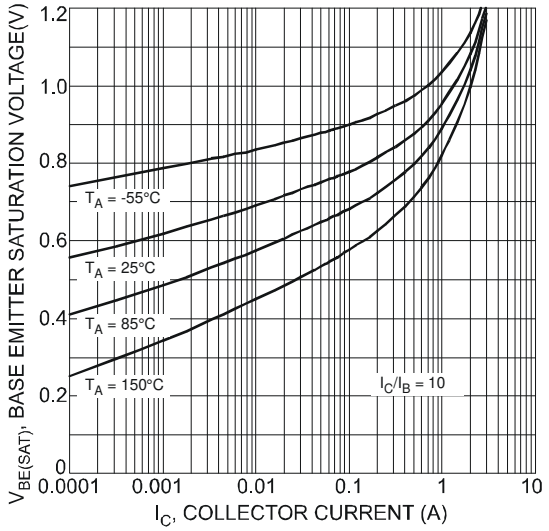


Figure 6. Typical Base-Emitter Saturation Voltage vs. Collector Current

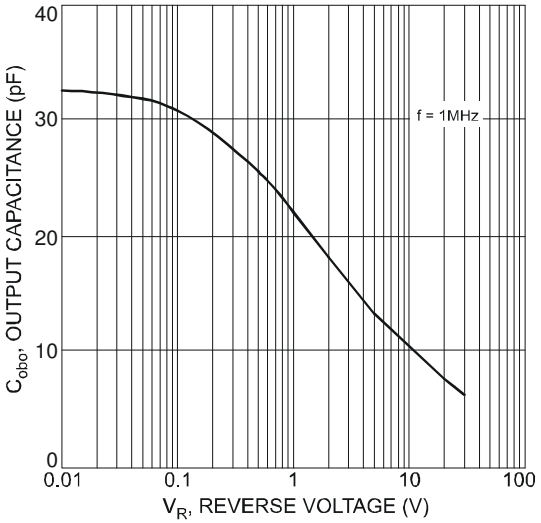


Figure 7. Typical Output Capacitance Characteristics

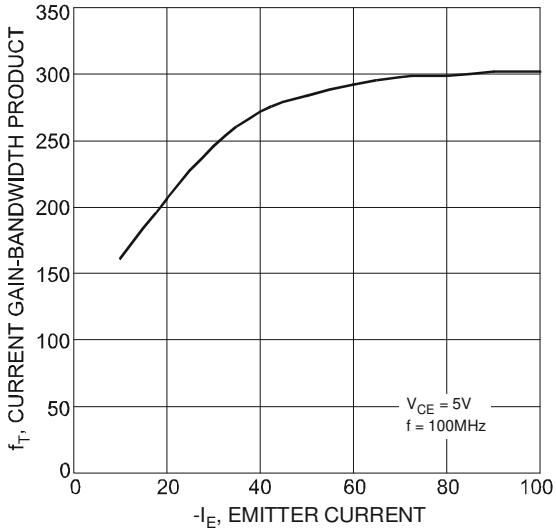
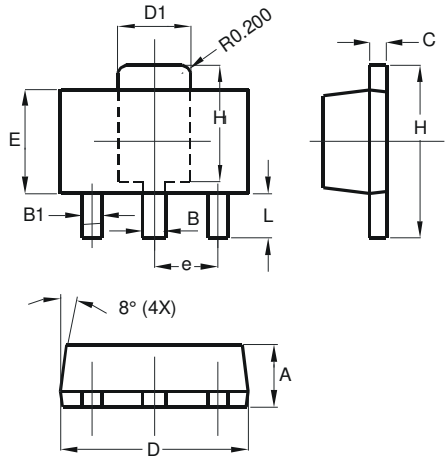


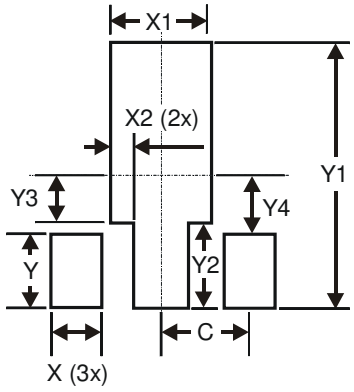
Figure 8. Typical Gain-Bandwidth Product vs. Emitter Current

Package Outline Dimensions



SOT89		
Dim	**Min**	**Max**
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions in mm		

Suggested Pad Layout



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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