

Product Summary

BV _{CEO}	Base Resistors R1 & R2	Package	I _{C(Max)}
50V	47kΩ	SOT363	100mA

Features

- Built-in Base Resistors
- Epitaxial Planar Die Construction
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Description

DDC144TU is best-suited for logic-switching applications using control circuits like microcontrollers, comparators, etc. It features two discrete NPN transistors which can support maximum continuous current of 100mA. NPN transistors can be used as a control and can also be biased using higher supply voltages due to the built-in current limiting base resistor of 47kΩ. The component devices can be used as a part of a circuit or as a standalone discrete device.



Fig. 1 SOT363

Mechanical Data

- Package: SOT363
- Package Material: Molded Plastic. "Green Molding" Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Fig. 2
- Terminals: Finish - Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.015 grams (Approximate)

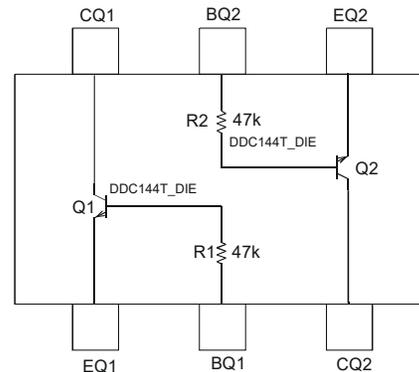


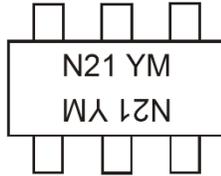
Fig. 2 Schematic and Pin Configuration

Ordering Information (Note 4)

Orderable Part Number	Marking Code	Package	Packing	
			Qty.	Carrier
DDC144TU-7	N21	SOT363	3000	Tape & Reel

- 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



N21 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: M = 2025)
 M = Month (ex: 9 = September)

Date Code Key

Year	2006	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	T	-	M	N	P	R	S	T	U	V	W	X
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P _d	200	mW
Power Deration above +25°C	P _{der}	1.6	mW/°C
Output Current	I _{out}	100	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Junction Operation and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C
Thermal Resistance, Junction to Ambient (Packaged Device) (Ref: Equivalent to Only One Heated Junction) @T _A = +25°C	R _{θJA}	625	°C/W

Note: 5. Device mounted on FR-4 PCB, 1" x 0.85" x 0.062" with recommended pad layout as shown on page 6. See Diodes Incorporated's package outlines and pad layouts on our website at <http://www.diodes.com/package-outlines.html>.

Maximum Ratings: Sub-Component Device Discrete NPN Transistor (Q1, Q2) (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	I _{C(max)}	100	mA

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics						
Collector-Base Cutoff Current	I _{CBO}	—	—	100	nA	V _{CB} = 50V, I _E = 0
Collector-Emitter Cutoff Current, I _{O(off)}	I _{CEO}	—	—	500	nA	V _{CE} = 50V, I _B = 0
Emitter-Base Cutoff Current	I _{EBO}	—	—	500	nA	V _{EB} = 5V, I _C = 0
Collector-Base Breakdown Voltage	BV _{CB0}	50	—	—	V	I _C = 50μA, I _E = 0
Collector-Emitter Breakdown Voltage	BV _{CEO}	50	—	—	V	I _C = 1mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	6	—	—	V	I _E = 50μA, I _C = 0
Output Voltage (Transistor is off)	V _{OH}	—	4.45	—	V	V _{CC} = 5V, V _B = 0.05V, R _L = 1kΩ
Input Voltage (Load is off) (Note 6)	V _{I(off)}	0.4	0.6	—	V	V _{CE} = 5V, I _C = 100μA
Output Current (Leakage Same as I _{CEO})	I _{O(off)}	—	—	850	nA	V _{CC} = 50V, V _I = 0
On Characteristics						
Collector-Emitter Saturation Voltage (Note 7)	V _{CE(sat)}	—	30	100	mV	I _C = 2.5mA, I _B = 0.25mA
		—	75	100		I _C = 10mA, I _B = 0.5mA
		—	50	100		I _C = 10mA, I _B = 1mA
		—	200	300		I _C = 50mA, I _B = 5mA
DC Current Gain (Note 7)	h _{FE}	150	400	—	—	V _{CE} = 5V, I _C = 1mA
		150	400	—		V _{CE} = 5V, I _C = 10mA
		150	350	—		V _{CE} = 5V, I _C = 25mA
		150	300	—		V _{CE} = 5V, I _C = 50mA
		50	110	—		V _{CE} = 5V, I _C = 100mA
Output Voltage (Equivalent to V _{CE(sat)} or V _{O(on)})	V _{OL}	—	200	250	mV	V _{CC} = 5V, V _B = 2.5V, R _L = 10kΩ
Input Voltage (Load is on) (Note 8)	V _{I(on)}	—	0.95	1.5	V	V _O = 0.3V, I _C = 2mA
Input Current (Note 7)	I _i	—	19.2	28	mA	V _I = 5V
Base-Emitter Turn-on Voltage	V _{BE(on)}	—	—	1.2	V	V _{CE} = 5V, I _C = 2mA
Base-Emitter Saturation Voltage	V _{BE(sat)}	—	—	1.6	V	I _C = 200μA, I _B = 20μA
Input Resistor ±30%	R ₁	32.9	47	61.1	kΩ	—
Small-Signal Characteristics						
Transition Frequency (Gain-Bandwidth Product)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = 5mA, f = 100MHz
Collector Capacitance (C _{cb0} -Output Capacitance)	C _C	—	—	5	pF	V _{CB} = 10V, I _E = 0, f = 1MHz

- Notes:
6. Guarantees that the device will be switched off if the input voltage is lower than 0.4V.
 7. Pulse test: Pulse width, t_p < 300μs, duty cycle, d ≤ 0.02.
 8. Guarantees that the device will be switched on if the input voltage is higher than 1.5V.

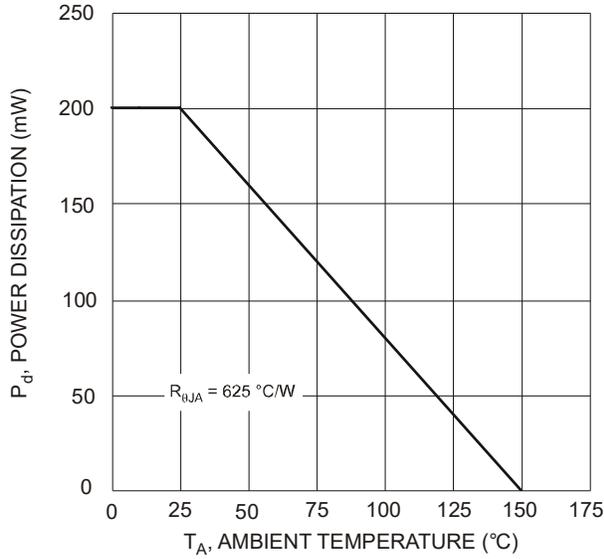


Fig. 3 Maximum Power Derating Curve

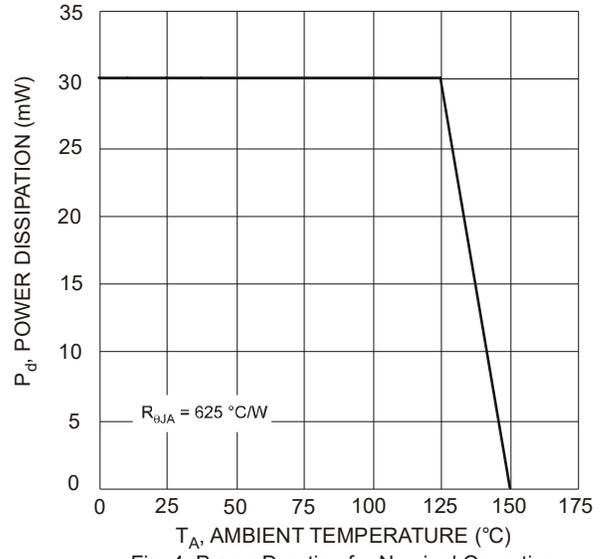


Fig. 4 Power Derating for Nominal Operation

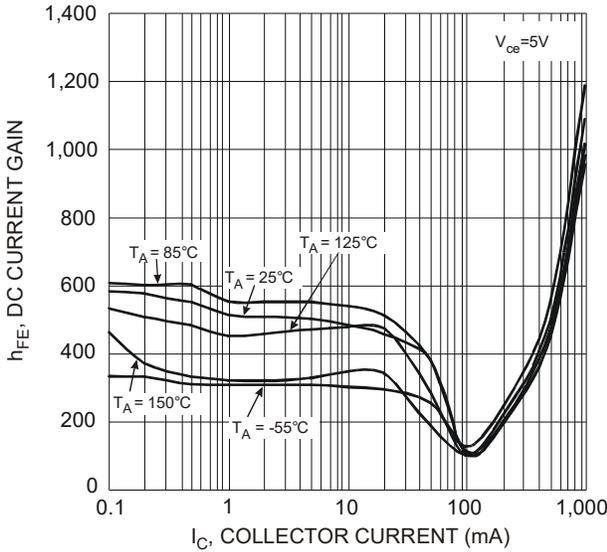


Fig. 5 DC Current Gain

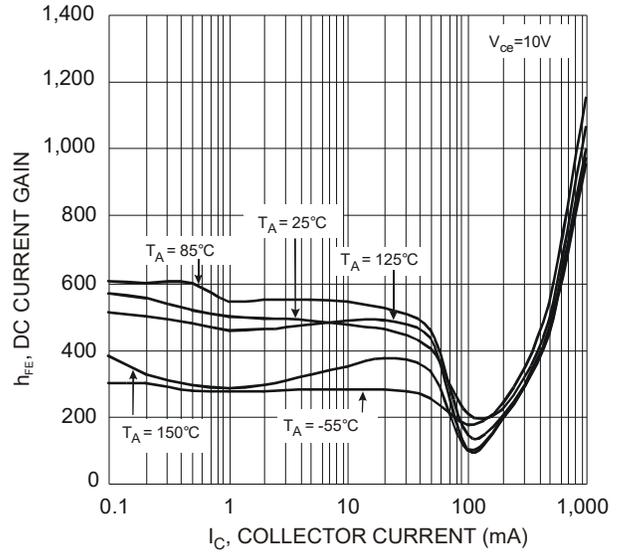


Fig. 6 DC Current Gain

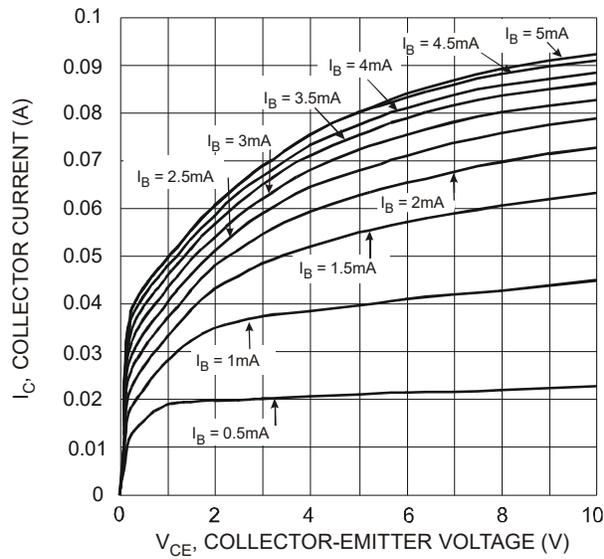


Fig. 7 I_C vs. V_{CE}

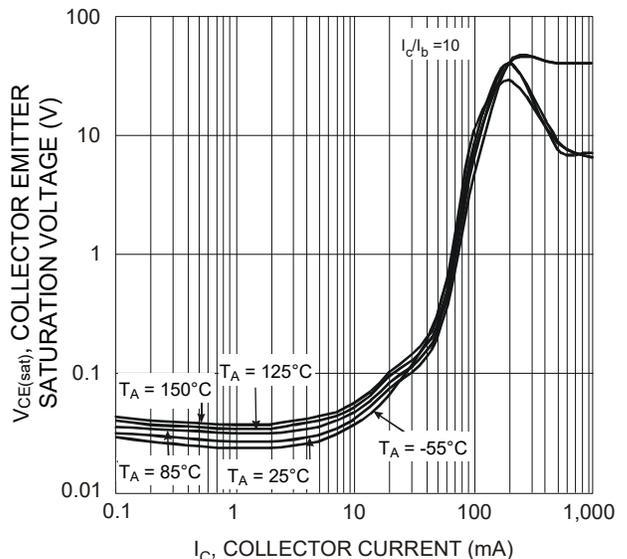


Fig. 8 $V_{CE(sat)}$ vs. I_C

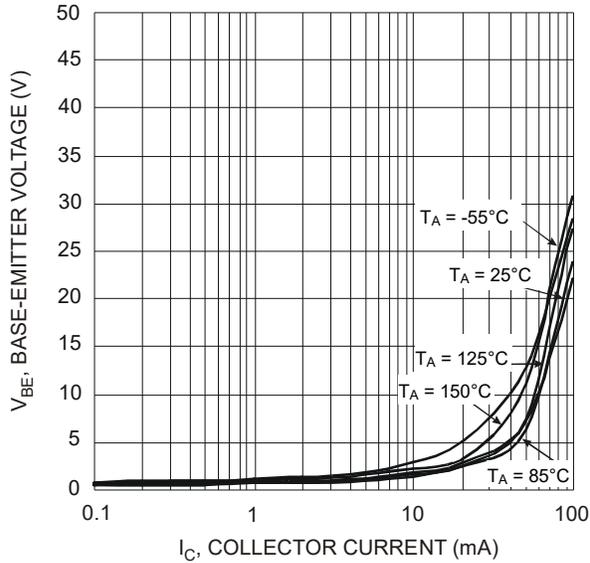


Fig. 9 V_{BE} vs I_C

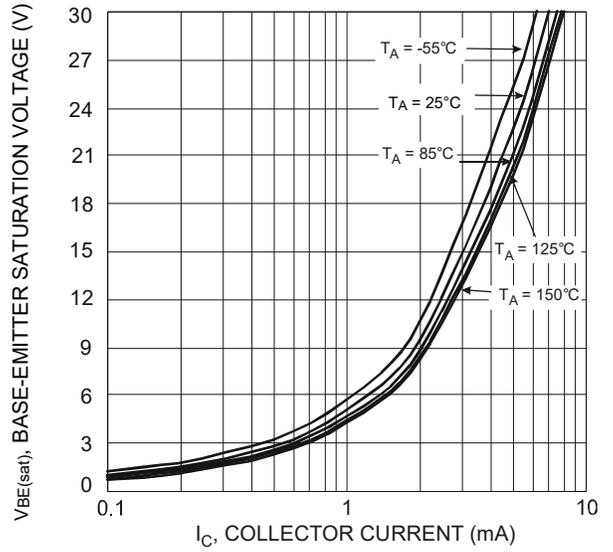


Fig. 10 $V_{BE(sat)}$ vs. I_C

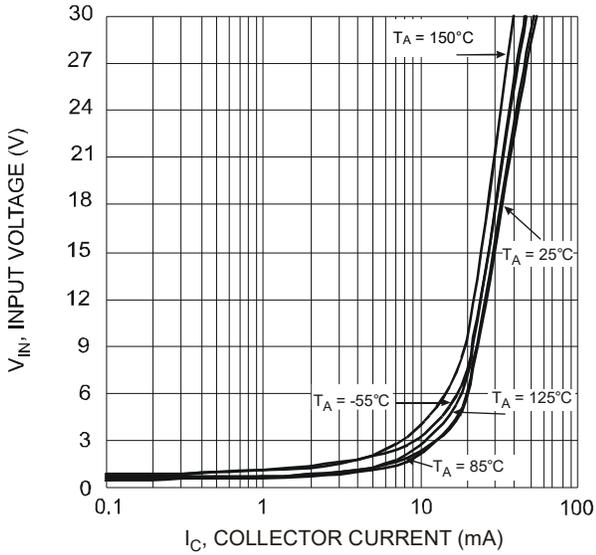
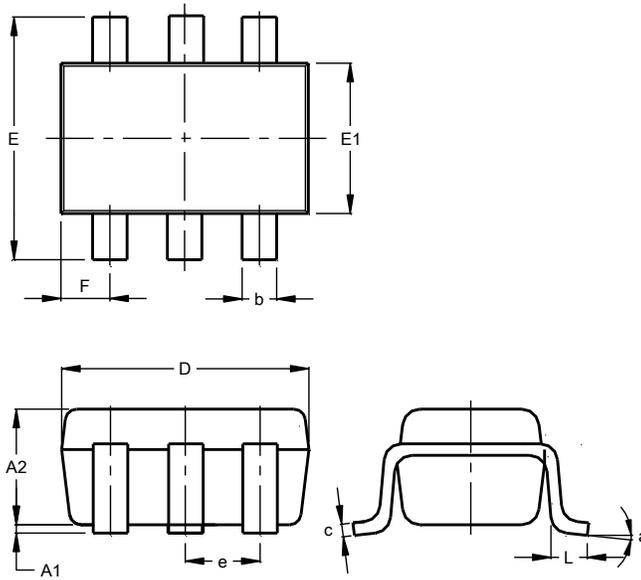


Fig. 11 Input Voltage vs. Collector Current

Package Outline Dimensions

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

SOT363

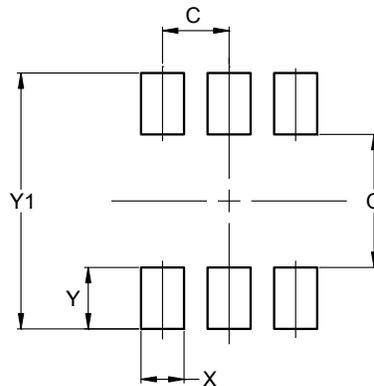


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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