DDTC (R1 = R2 SERIES) E

NPN PRE-BIASED SMALL SIGNAL SOT-523 SURFACE MOUNT TRANSISTOR

SPICE MODELS: DDTC123EE DDTC143EE DDTC114EE DDTC144EE DDTC115EE

NEW PRODUCT

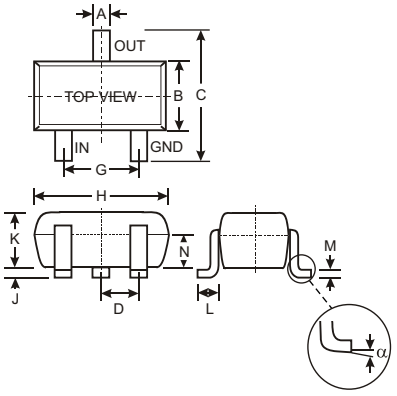
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **Available in Lead Free/RoHS Compliant Version (Note 1)**

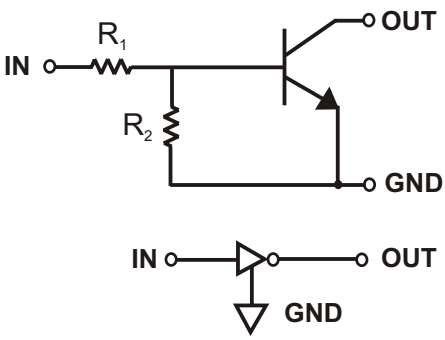
Mechanical Data

- Case: SOT-523
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Finish - Solderable per MIL-STD-202, Method 208
- Also Available in Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe). Please see Ordering Information, Note 4, on Last Page
- Marking & Type Code Information: See Table Below and Last Page
- Ordering Information: See Last Page
- Weight: 0.002 grams (approx.)

P/N	R1, R2 (NOM)	MARKING
DDTC123EE	2.2KΩ	N04
DDTC143EE	4.7KΩ	N08
DDTC114EE	10KΩ	N13
DDTC124EE	22KΩ	N17
DDTC144EE	47KΩ	N20
DDTC115EE	100KΩ	N24



SOT-523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			



SCHEMATIC DIAGRAM

Maximum Ratings @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage		V_{CC}	50	V
Input Voltage	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	V_{IN}	-10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40	V
Output Current	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	I_O	100 100 50 30 100 20	mA
Power Dissipation		P_d	150	mW
Thermal Resistance, Junction to Ambient Air (Note 2)		$R_{\theta JA}$	833	°C/W
Operating and Storage and Temperature Range		T_j, T_{STG}	-55 to +150	°C

Note: 1. No purposefully added lead.
2. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/datasheets/ap02001.pdf.

Electrical Characteristics @ $T_A = 25°C$ unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage		$V_{I(off)}$	0.5	1.1	—	V	V_{CC} = 5V, I_O = 100μA
		$V_{I(on)}$	—	1.9	3		V_O = 0.3V, I_O = 20mA, DDTC123EE V_O = 0.3V, I_O = 20mA, DDTC143EE V_O = 0.3V, I_O = 10mA, DDTC114EE V_O = 0.3V, I_O = 5mA, DDTC124EE V_O = 0.3V, I_O = 2mA, DDTC144EE V_O = 0.3V, I_O = 1mA, DDTC115EE
Output Voltage		$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I =10mA/0.5mA, DDTC123EE I_O/I_I =10mA/0.5mA, DDTC143EE I_O/I_I =10mA/0.5mA, DDTC114EE I_O/I_I =10mA/0.5mA, DDTC124EE I_O/I_I =10mA/0.5mA, DDTC144EE I_O/I_I =5mA/0.25mA, DDTC115EE
Input Current	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	I_I	—	—	3.8 1.8 0.88 0.36 0.18 0.15	mA	V_I = 5V
Output Current		$I_{O(off)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DDTC123EE DDTC143EE DDTC114EE DDTC124EE DDTC144EE DDTC115EE	G_I	20 20 30 56 68 82	—	—	—	V_O = 5V, I_O = 20mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio		R_2/R_1	0.8	1	1.2	—	—
Gain-Bandwidth Product*		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

* Transistor - For Reference Only

Typical Curves - All Devices

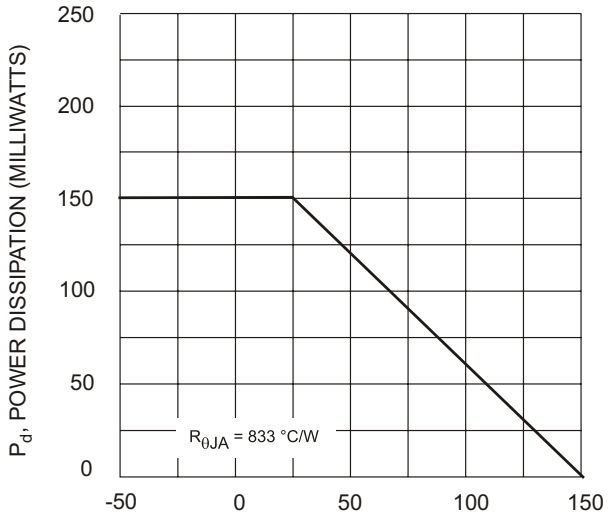


Fig. 1 Derating Curve

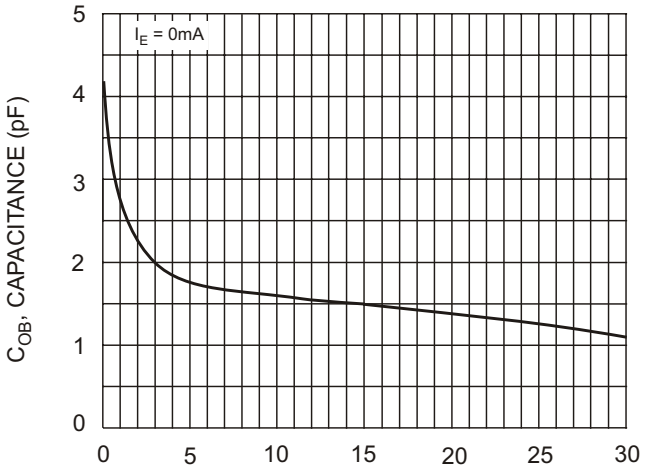


Fig. 2 Output Capacitance

Typical Curves - DDTC123EE

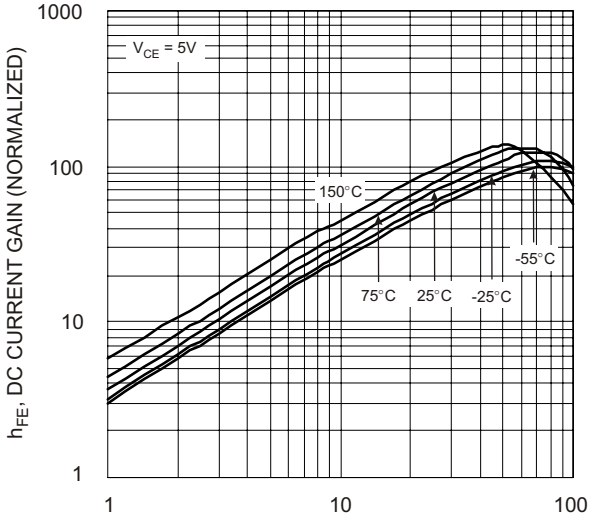


Fig. 3 Typical DC Current Gain vs. Collector Current

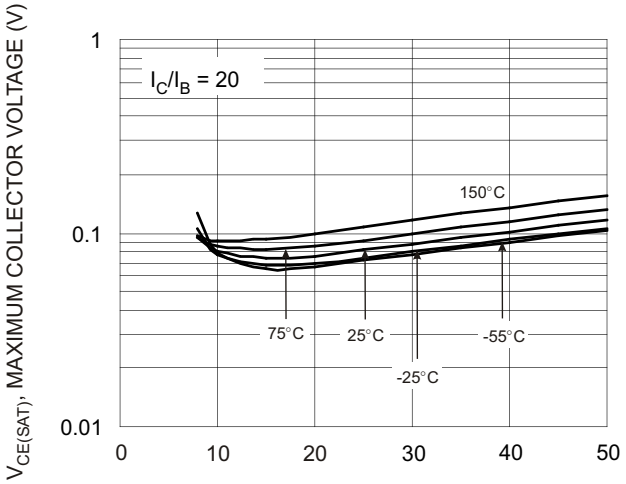


Fig. 4 $V_{CE(SAT)}$ vs. I_C

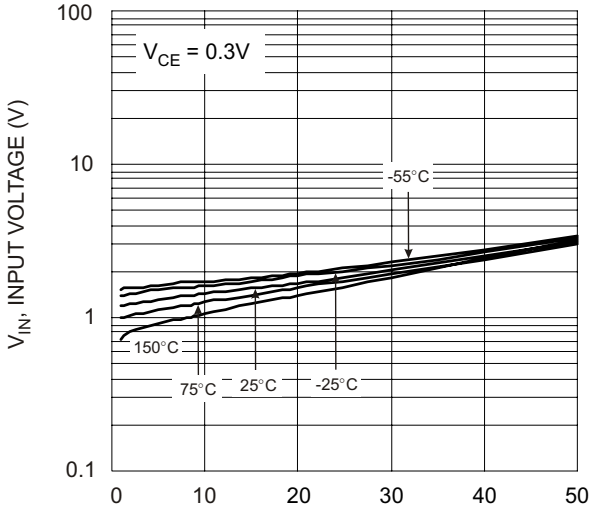


Fig. 5 Input Voltage vs. Collector Current

Typical Curves - DDTC143EE

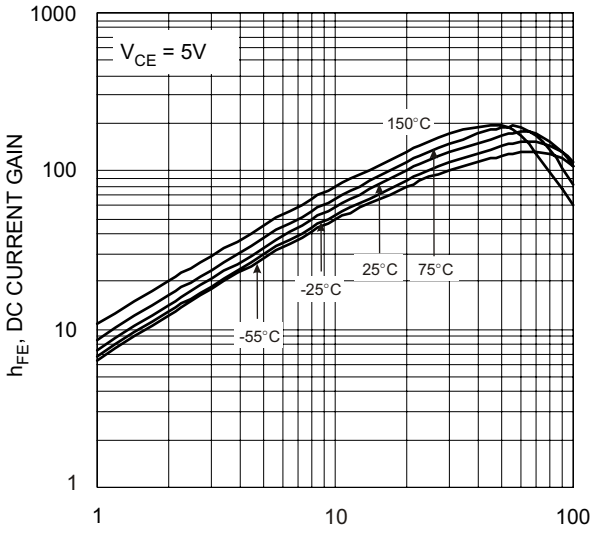


Fig. 6 Typical DC Current Gain vs Collector Current

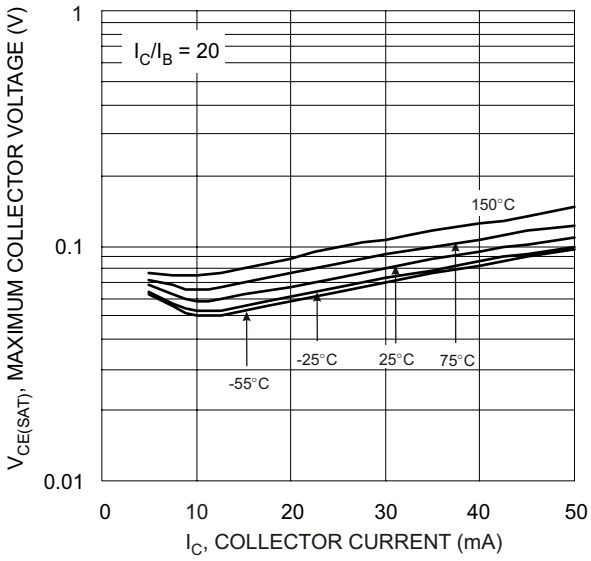


Fig. 7 $V_{CE(SAT)}$ vs. I_C

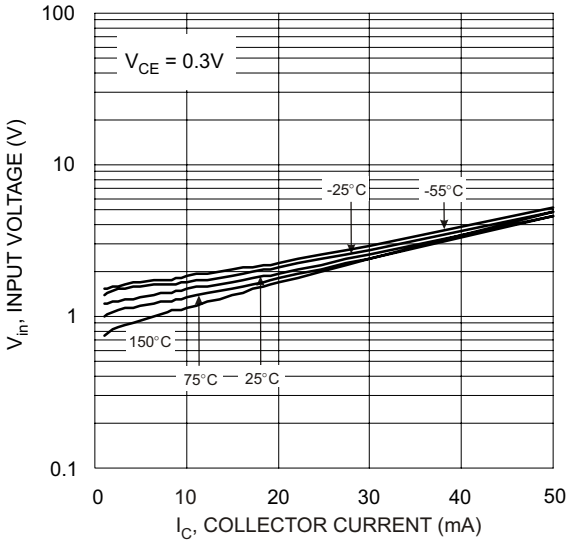


Fig. 8 Input Voltage vs. Collector Current

Typical Curves - DDTC114EE

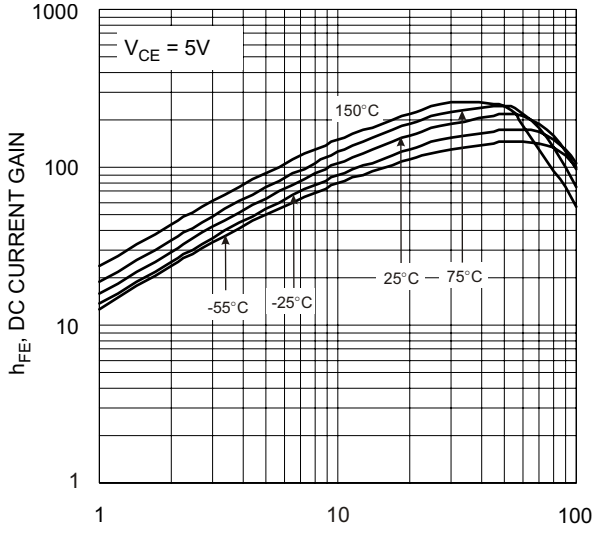


Fig. 9 Typical DC Current Gain vs Collector Current

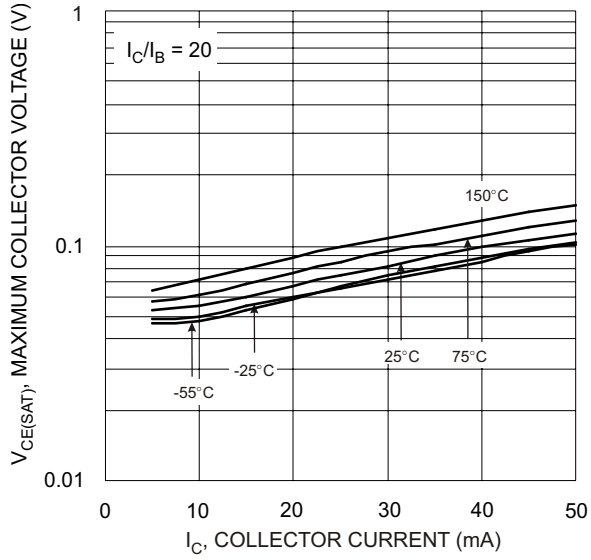


Fig. 10 $V_{CE(SAT)}$ vs. I_C

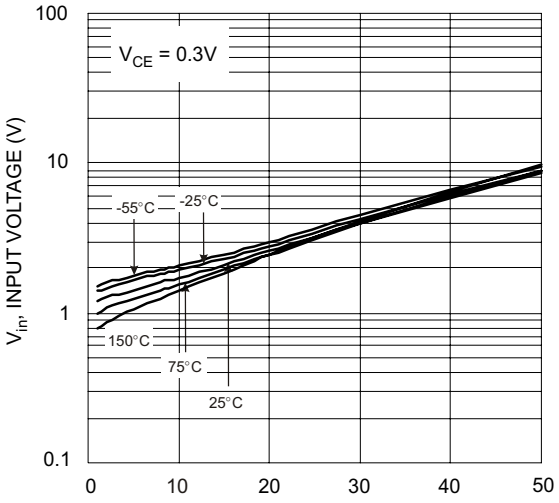


Fig. 11 Input Voltage vs. Collector Current

Typical Curves - DDTC124EE

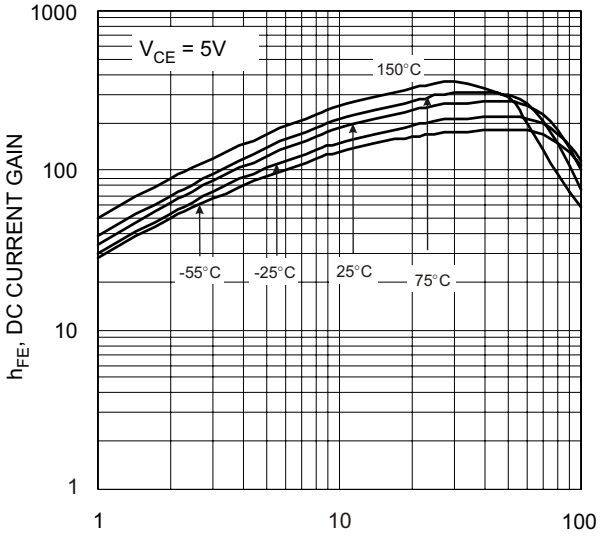


Fig. 12 Typical DC Current Gain vs Collector Current

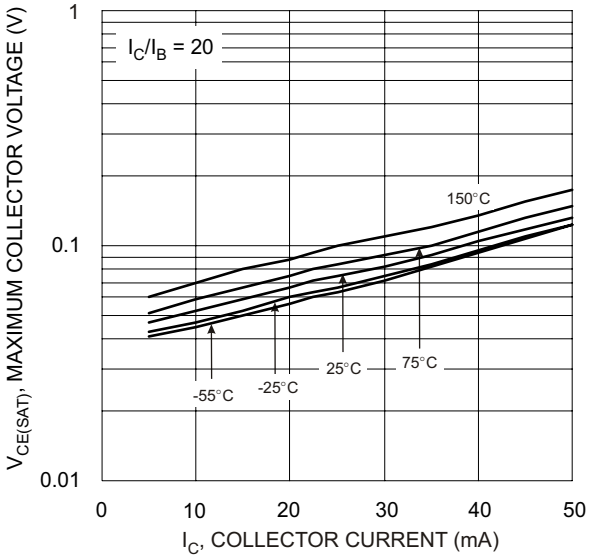


Fig. 13 $V_{CE(SAT)}$ vs. I_C

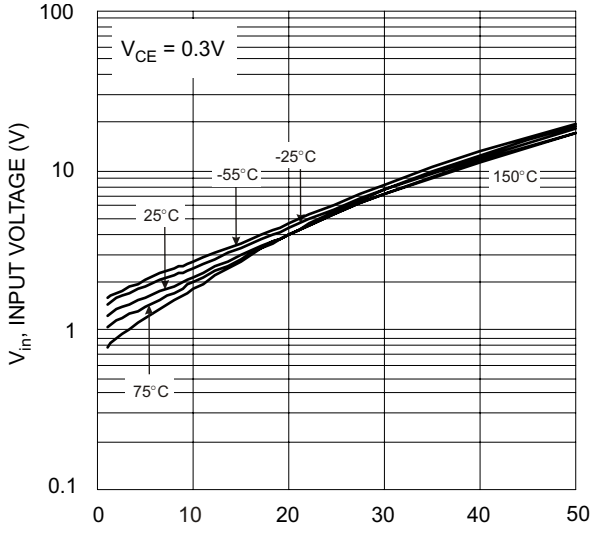


Fig. 14 Input Voltage vs. Collector Current

NEW PRODUCT

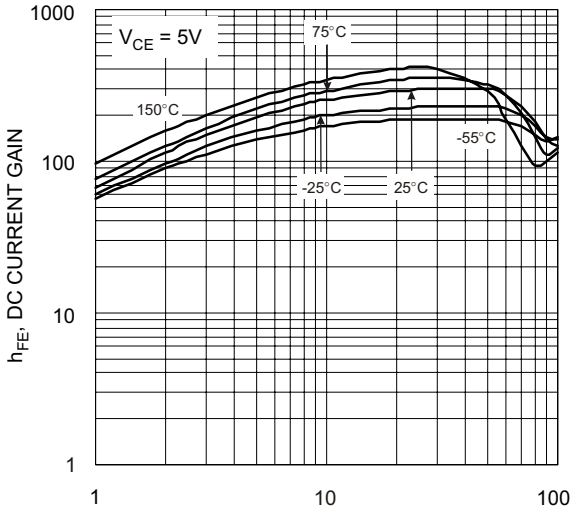


Fig. 15 Typical DC Current Gain vs Collector Current

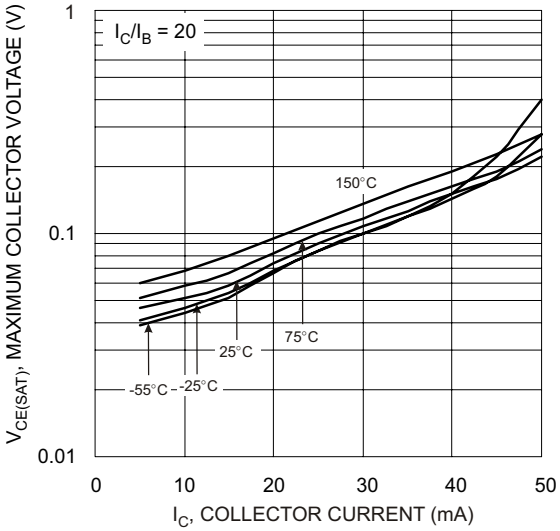


Fig. 16 $V_{CE(SAT)}$ vs. I_C

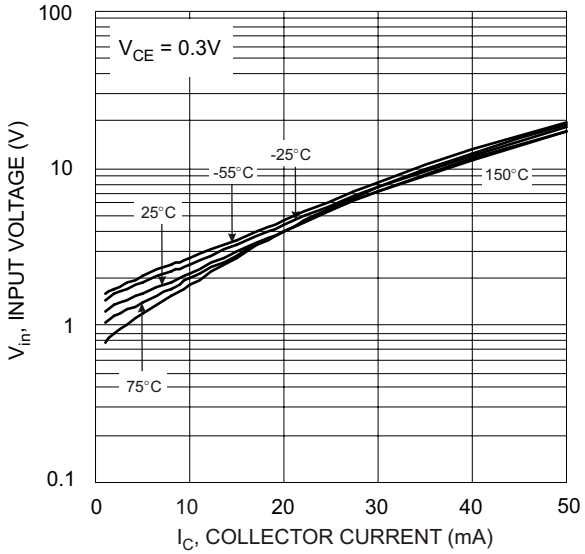


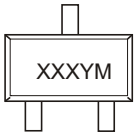
Fig. 16 Input Voltage vs. Collector Current

Ordering Information (Note 3)

Device	Packaging	Shipping
DDTC123EE-7	SOT-523	3000/Tape & Reel
DDTC143EE-7	SOT-523	3000/Tape & Reel
DDTC114EE-7	SOT-523	3000/Tape & Reel
DDTC124EE-7	SOT-523	3000/Tape & Reel
DDTC144EE-7	SOT-523	3000/Tape & Reel
DDTC115EE-7	SOT-523	3000/Tape & Reel

Notes: 3. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.
4. For Lead Free/RoHS Compliant version part number, please add "-F" suffix to the part number above. Example: DDTC115EE-7-F.

Marking Information



XXX = Product Type Marking Code (See Page 1)
YM = Date Code Marking
Y = Year ex: P = 2003
M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009
Code	N	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D