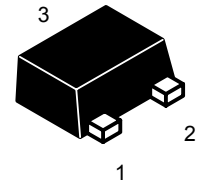
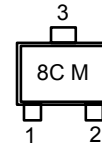


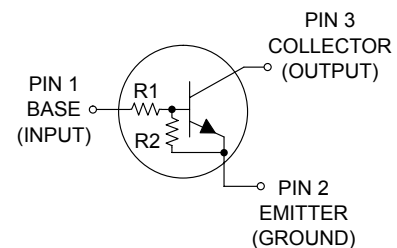
PRIMARY CHARACTERISTICS	
V_{CEO}	50V
V_{CBO}	50V
I_C	100mA
$T_{J,Max}$	150°C

SOT-723 PACKAGE

Marking :



8C = Specific Device Code
M = Date Code


FEATURES

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- The SOT-723 Package can be Soldered using Wave or Reflow
- These are Pb-Free Devices

MECHANICAL DATA

- Case : Molded plastic, SOT-723
- Polarity : Shown above
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Epoxy : UL94-V0 rated flame retardant

This new series of digital transistors is designed to replace a single device and its external resistor bias network. The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base-emitter resistor. The BRT eliminates these individual components by integrating them into a single device. The use of a BRT can reduce both system cost and board space. The device is housed in the SOT-723 package which is designed for low power surface mount applications.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	260 (Note 1) 600 (Note 2) 2.0 (Note 1) 4.8 (Note 2)	mW mW/ $^\circ\text{C}$
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	480 (Note 1) 205 (Note 2)	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to $+150$	$^\circ\text{C}$

1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 x 1.0 inch Pad

DEVICE MARKING AND RESISTOR VALUES

Device	Marking	R1 (K)	R2 (K)	Package	Shipping
DTC144EM	8C	47	47	SOT-723 (Pb-Free)	8000/Tape & Reel

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Base Cutoff Current ($V_{CB} = 50\text{ V}$, $I_E = 0$)	I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current ($V_{CE} = 50\text{ V}$, $I_B = 0$)	I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current ($V_{EB} = 6.0\text{ V}$, $I_C = 0$)	I_{EBO}	–	–	0.1	mAdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 3) ($I_C = 2.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	50	–	–	Vdc

ON CHARACTERISTICS (Note 3)

DC Current Gain ($V_{CE} = 10\text{ V}$, $I_C = 5.0\text{ mA}$)	h_{FE}	80	140	–	
Collector-Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$)	$V_{CE(sat)}$	–	–	0.25	Vdc
Output Voltage (on) ($V_{CC} = 5.0\text{ V}$, $V_B = 3.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$)	V_{OL}	–	–	0.2	Vdc

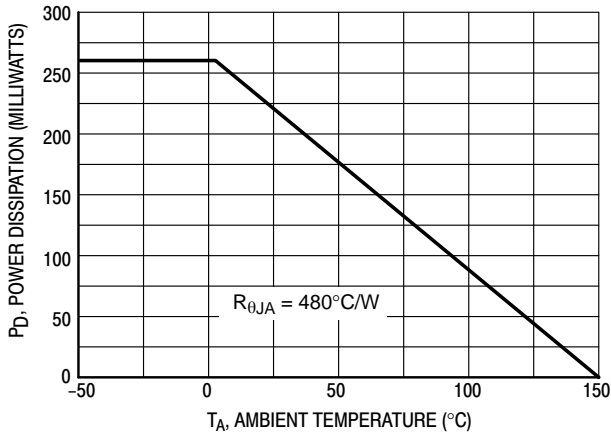
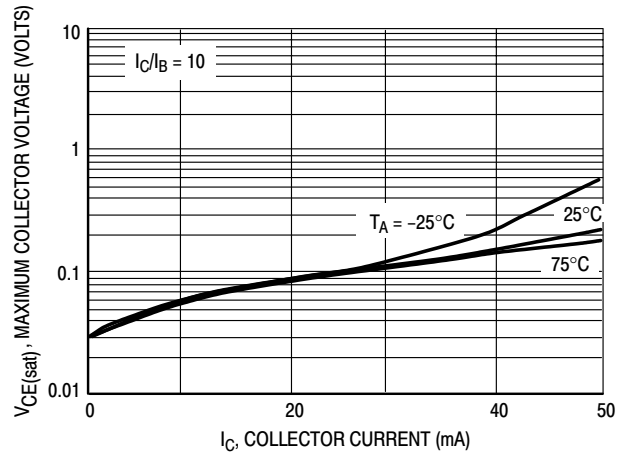
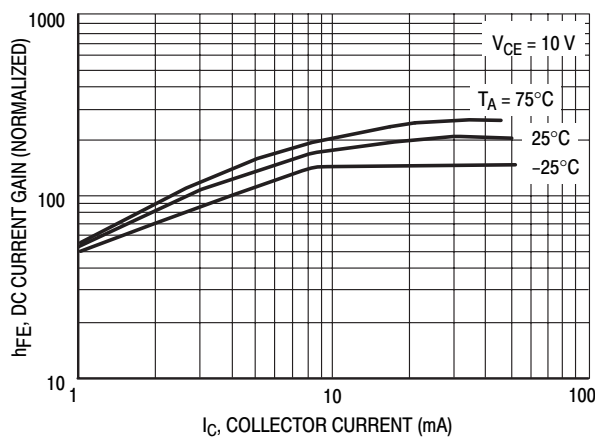
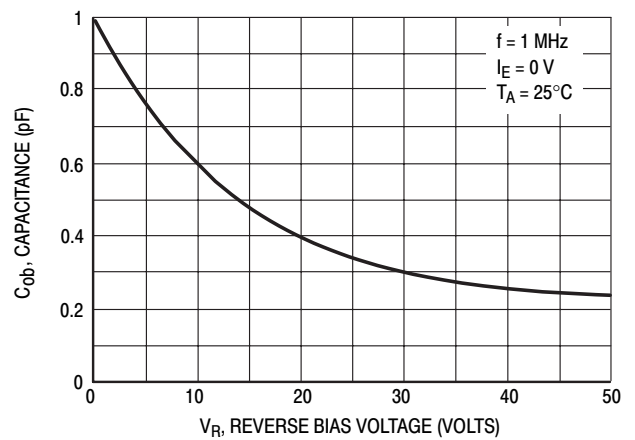
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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ON CHARACTERISTICS (Note 4)

Characteristic	Symbol	Min	Typ	Max	Unit
Input Resistor	R1	32.9	47	61.1	k Ω
Resistor Ratio	R_1/R_2	0.8	1.0	1.2	

3. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.
4. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.

**Figure 1. Derating Curve****Figure 12. $V_{CE(sat)}$ versus I_C** **Figure 13. DC Current Gain****Figure 14. Output Capacitance**

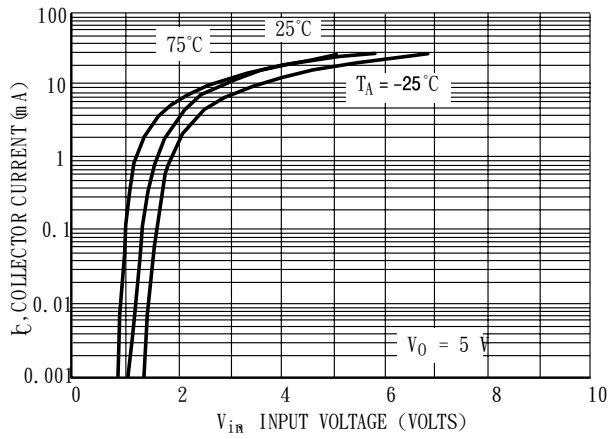


Figure 15. Output Current versus Input Voltage

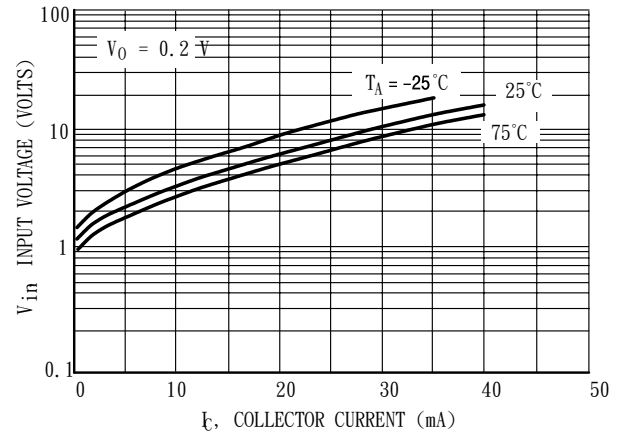
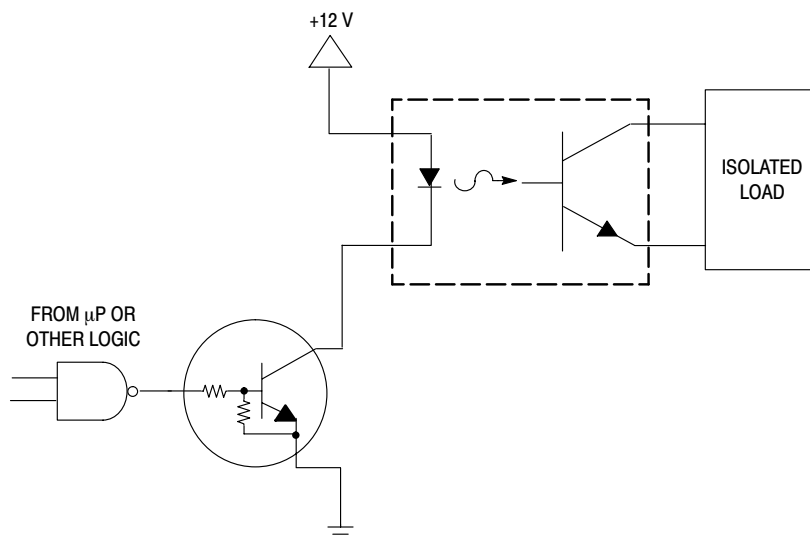
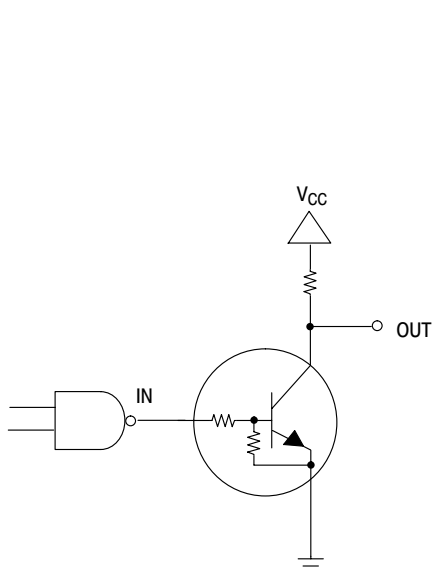
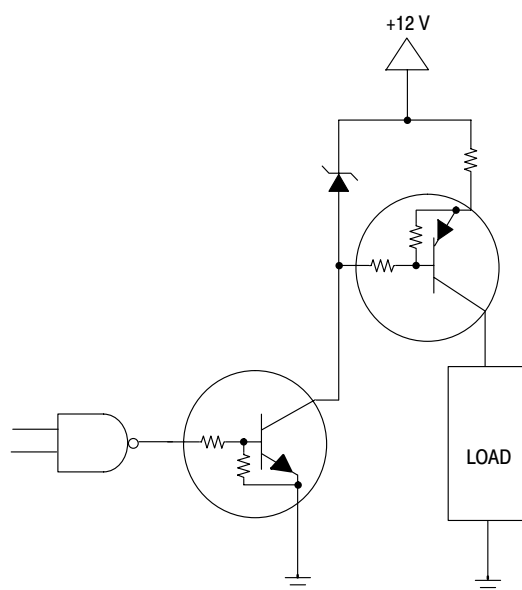


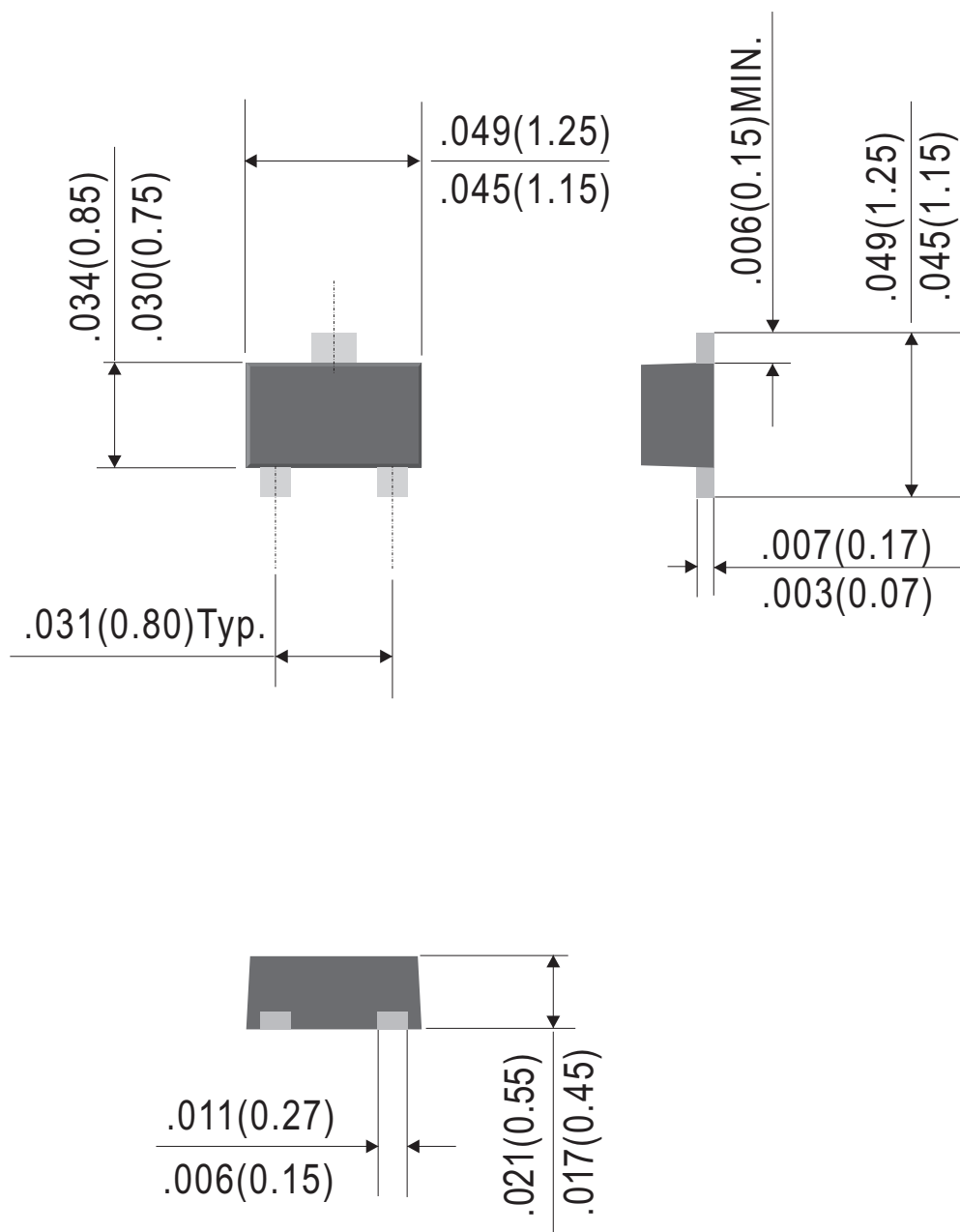
Figure 16. Input Voltage versus Output Current

TYPICAL APPLICATIONS FOR NPN BRTs

Figure 22. Level Shifter: Connects 12 or 24 Volt Circuits to Logic

**Figure 23. Open Collector Inverter:
Inverts the Input Signal**

Figure 24. Inexpensive, Unregulated Current Source



Outline Drawing

SOT-723



Dimensions in inches and (millimeters)

Rev.E

Ordering Information:

Device PN	Packing
DTC144EM -T ⁽¹⁾ G ⁽²⁾ -WS ⁽³⁾	Tape&Reel: 8 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) RoHS product for packing code suffix "G" ; Halogen free product for packing code suffix "H"

(3) WS : Willas brand abbreviation, Label Type does not display

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