MMBTA42L, SMMBTA42L, MMBTA43L

High Voltage Transistors

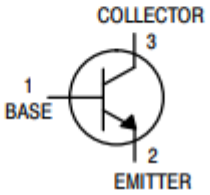
NPN Silicon

ON Semiconductor®

http://onsemi.com

Features

- AEC−Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant



SOT−23 (TO−236)
CASE 318
STYLE 6

MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Collector − Emitter Voltage MMBTA42, SMMBTA42 MMBTA43	V_{CEO}	 300 200	Vdc
Collector − Base Voltage MMBTA42, SMMBTA42 MMBTA43	V_{CBO}	 300 200	Vdc
Emitter − Base Voltage MMBTA42, SMMBTA42 MMBTA43	V_{EBO}	 6.0 6.0	Vdc
Collector Current − Continuous	I_C	500	mAdc

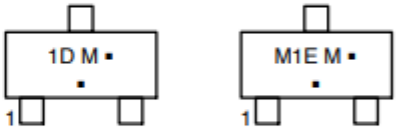
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board (Note 1) T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate (Note 2) T_A = 25°C Derate above 25°C	P_D	 300 2.4	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR−5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

MARKING DIAGRAMS



1D = MMBTA42LT, SMMBTA42L
M1E = MMBTA43LT
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)
*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (Note 3) (I_C = 1.0 mAdc, I_B = 0)	MMBTA42, SMMBTA42 MMBTA43	$V_{(BR)CEO}$	 300 200	 – –	Vdc
Collector – Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	MMBTA42, SMMBTA42 MMBTA43	$V_{(BR)CBO}$	 300 200	 – –	Vdc
Emitter – Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		$V_{(BR)EBO}$	6.0	–	Vdc
Collector Cutoff Current (V_{CB} = 200 Vdc, I_E = 0) (V_{CB} = 160 Vdc, I_E = 0)	 MMBTA42, SMMBTA42 MMBTA43	I_{CBO}	 – –	 0.1 0.1	μAdc
Emitter Cutoff Current (V_{EB} = 6.0 Vdc, I_C = 0) (V_{EB} = 4.0 Vdc, I_C = 0)	 MMBTA42, SMMBTA42 MMBTA43	I_{EBO}	 – –	 0.1 0.1	μAdc
ON CHARACTERISTICS (Note 3)					
DC Current Gain (I_C = 1.0 mAdc, V_{CE} = 10 Vdc) (I_C = 10 mAdc, V_{CE} = 10 Vdc) (I_C = 30 mAdc, V_{CE} = 10 Vdc)	 Both Types Both Types MMBTA42, SMMBTA42 MMBTA43	h_{FE}	 25 40 40 40	 – – – –	–
Collector – Emitter Saturation Voltage (I_C = 20 mAdc, I_B = 2.0 mAdc)	MMBTA42, SMMBTA42 MMBTA43	$V_{CE(sat)}$	 – –	 0.5 0.5	Vdc
Base–Emitter Saturation Voltage (I_C = 20 mAdc, I_B = 2.0 mAdc)		$V_{BE(sat)}$	–	0.9	Vdc
SMALL–SIGNAL CHARACTERISTICS					
Current – Gain – Bandwidth Product (I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)		f_T	50	–	MHz
Collector–Base Capacitance (V_{CB} = 20 Vdc, I_E = 0, f = 1.0 MHz)	MMBTA42, SMMBTA42 MMBTA43	C_{cb}	 – –	 3.0 4.0	pF

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

TYPICAL CHARACTERISTICS

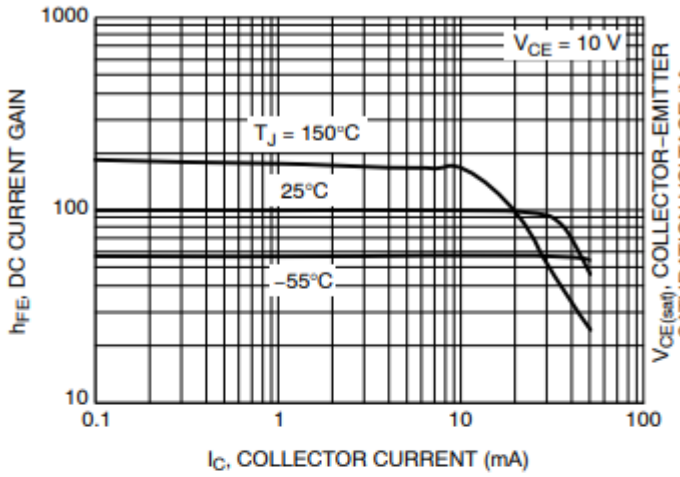


Figure 1. DC Current Gain

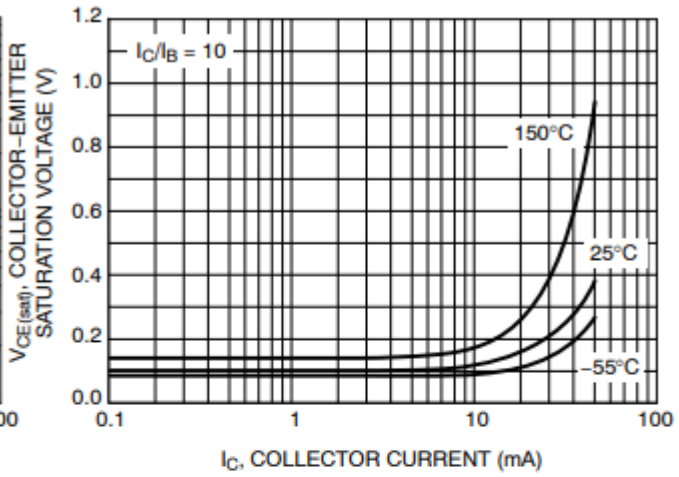


Figure 2. Collector−Emitter Saturation Voltage vs. Collector Current

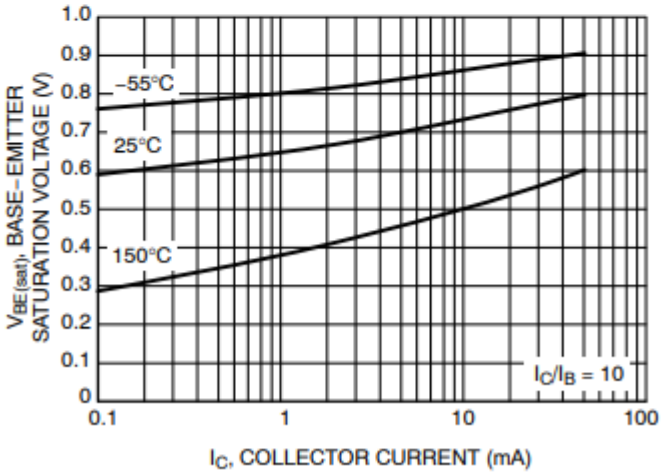


Figure 3. Base−Emitter Saturation Voltage vs. Collector Current

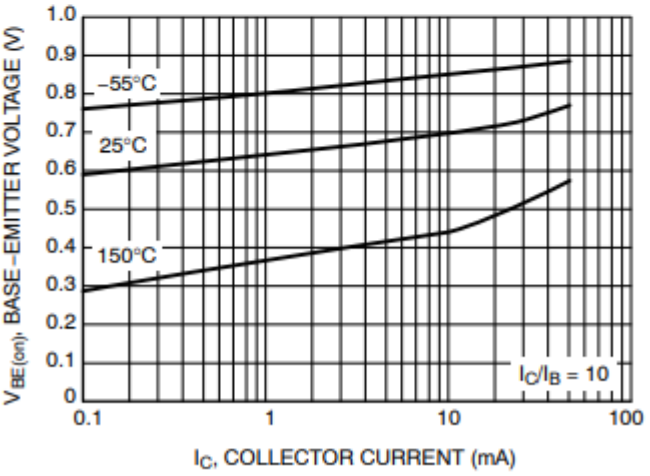


Figure 4. Base−Emitter On Voltage vs. Collector Current

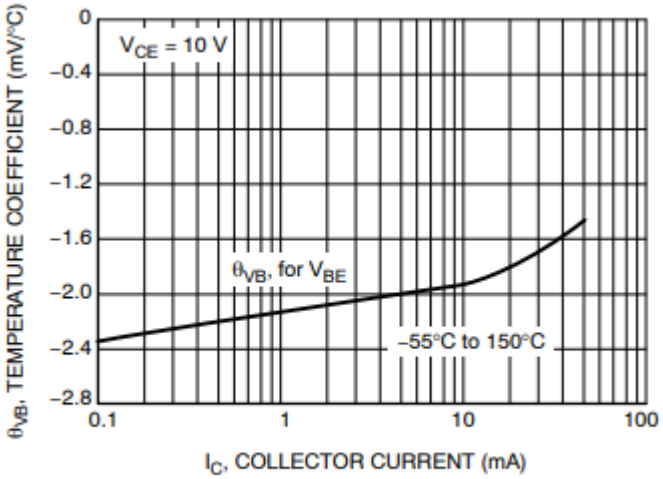


Figure 5. Base−Emitter Temperature Coefficient

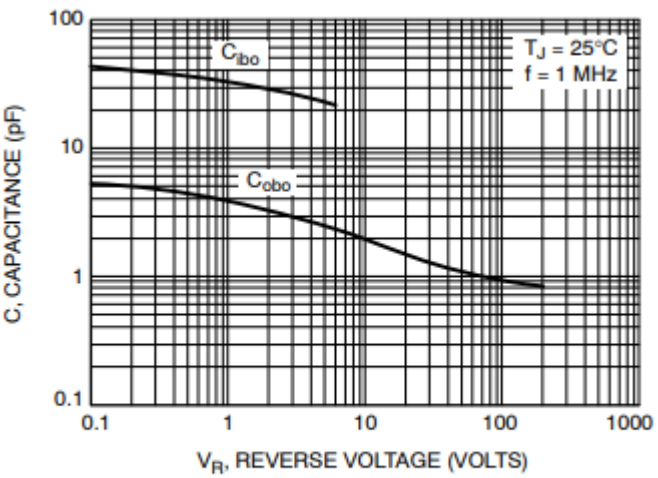


Figure 6. Capacitance

TYPICAL CHARACTERISTICS

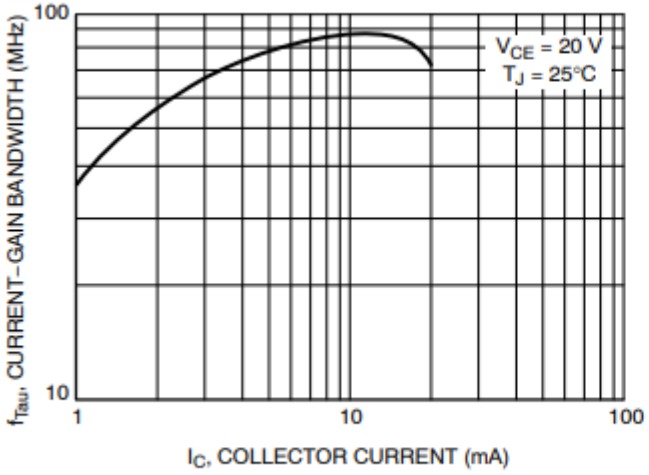


Figure 7. Current−Gain — Bandwidth Product

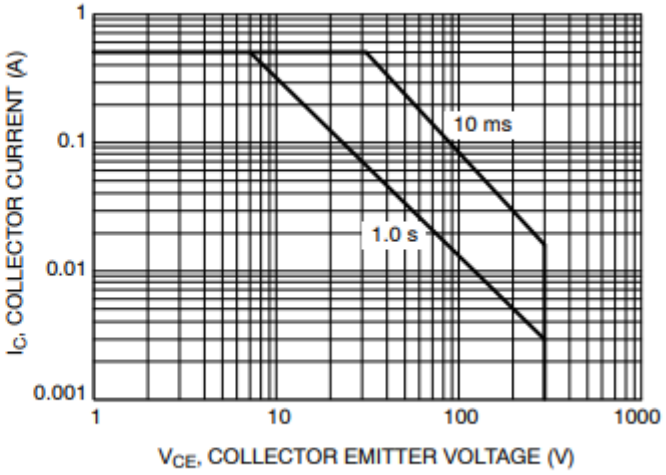
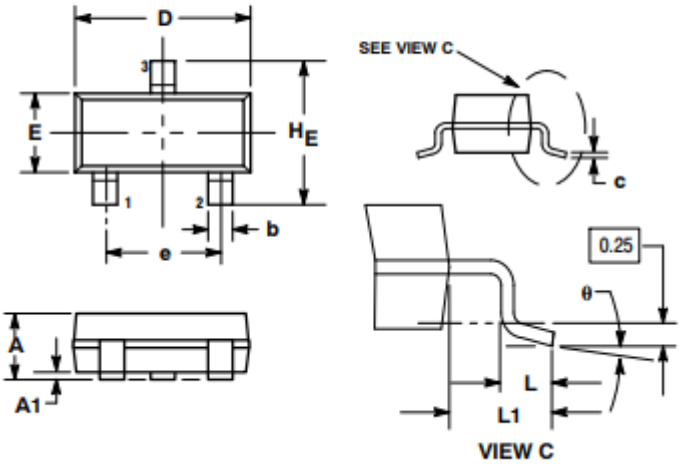


Figure 8. Safe Operating Area

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	---	10°	0°	---	10°

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR