

**SOT-323 BIPOLAR TRANSISTORS**  
**TRANSISTOR (PNP)**

**FEATURES**

- \* Power dissipation  
Pcm: 0.2 W (Tamb=25°C)
- \* Collector current  
Icm: -0.6 A
- \* Collector-base voltage  
V(BR)CBO: -40 V
- \* Operating and storage junction temperature range  
Tj,Tstg: -55°C to +150°C

**MECHANICAL DATA**

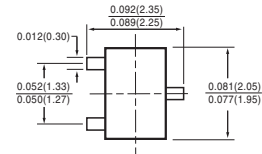
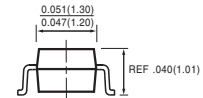
- \* Case: Molded plastic
- \* Epoxy: UL 94V-O rate flame retardant
- \* Lead: MIL-STD-202E method 208C guaranteed
- \* Mounting position: Any
- \* Weight: 0.006 gram

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25 °C ambient temperature unless otherwise specified.



**SOT-323**



Dimensions in inches and (millimeters)

**MAXIMUM RATINGS** ( @ TA = 25°C unless otherwise noted )

RATINGS	SYMBOL	VALUE	UNITS
Zener Current ( see Table "Characteristics" )	-	-	-
Max. Steady State Power Dissipation (1)	P <sub>D</sub>	200	mW
Max. Operating Temperature Range	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

**ELECTRICAL CHARACTERISTICS** ( @ TA = 25°C unless otherwise noted )

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal Resistance Junction to Ambient (1)	R θ <sub>JA</sub>	-	-	625	°C/W
Max. Instantaneous Forward Voltage at I <sub>F</sub> = 10mA	V <sub>F</sub>	-	-	-	Volts

NOTES : 1.Valid provided that terminals are kept at ambient temperature.

**ELECTRICAL CHARACTERISTICS** (@TA=25°C unless otherwise noted)

Chatacteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS (2)**

Collector-Emitter Breakdown Voltage ( $I_C = -1.0\text{mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	-40	-	Vdc
Collector-Base Breakdown Voltage ( $I_C = -100\mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-40	-	Vdc
Emitter-Base Breakdown Voltage ( $I_E = -100\mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-5.0	-	Vdc
Collector Cutoff Current ( $V_{CE} = -35\text{Vdc}$ , $I_B = 0$ )	$I_{CEO}$	-	-0.1	$\mu\text{A}$
Collector Cutoff Current ( $V_{CB} = -35\text{Vdc}$ , $I_E = 0$ )	$I_{CBO}$	-	-0.1	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = -4\text{Vdc}$ , $I_C = 0$ )	$I_{EBO}$	-	-0.1	$\mu\text{A}$
Base Cutoff Current ( $V_{CE} = -35\text{Vdc}$ , $V_{EB(off)} = -0.4\text{Vdc}$ )	$I_{BL}$	-	-100	nA

**ON CHARACTERISTICS (2)**

DC Current Gain ( $I_C = -100\mu\text{A}$ , $V_{CE} = -1.0\text{Vdc}$ )	hFE	30	-	-
( $I_C = -1.0\text{mA}$ , $V_{CE} = -1.0\text{Vdc}$ )		60	-	
( $I_C = -10\text{mA}$ , $V_{CE} = -1.0\text{Vdc}$ )		100	-	
( $I_C = -150\text{mA}$ , $V_{CE} = -2.0\text{Vdc}$ )		100	300	
( $I_C = -500\text{mA}$ , $V_{CE} = -2.0\text{Vdc}$ )		30	-	
Collector-Emitter Saturation Voltage ( $I_C = -150\text{mA}$ , $I_B = -15\text{mA}$ )	$V_{CE(sat)}$	-	-0.40	Vdc
( $I_C = -500\text{mA}$ , $I_B = -50\text{mA}$ )		-	-0.75	
Base-Emitter Saturation Voltage ( $I_C = -150\text{mA}$ , $I_B = -15\text{mA}$ )	$V_{BE(sat)}$	-0.75	-0.95	Vdc
( $I_C = -500\text{mA}$ , $I_B = -50\text{mA}$ )		-	-1.30	

**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain-Bandwidth Product ( $I_C = -10\text{mA}$ , $V_{CE} = -20\text{Vdc}$ , $f = 1.0\text{kHz}$ )	$f_T$	200	-	MHz
Output Capacitance ( $V_{CB} = -10\text{Vdc}$ , $I_E = 0$ , $f = 1.0\text{MHz}$ )	$C_{obo}$	-	8.5	pF
Input Capacitance ( $V_{EB} = -0.5\text{Vdc}$ , $I_C = 0$ , $f = 1.0\text{MHz}$ )	$C_{ebo}$	-	30	pF
Input Impedance ( $I_C = 1.0\text{mA}$ , $V_{CE} = 10\text{Vdc}$ , $f = 1.0\text{kHz}$ )	$h_{ie}$	1.5	15	k $\Omega$
Voltage Feedback Ratio ( $I_C = 1.0\text{mA}$ , $V_{CE} = 10\text{Vdc}$ , $f = 1.0\text{kHz}$ )	$h_{re}$	0.1	8.0	$\times 10^{-4}$
Small-Signal Current Gain ( $I_C = 1.0\text{mA}$ , $V_{CE} = 10\text{Vdc}$ , $f = 1.0\text{kHz}$ )	$h_{fe}$	60	400	-
Output Admittance ( $I_C = 10\text{mA}$ , $V_{CE} = 10\text{Vdc}$ , $f = 1.0\text{kHz}$ )	$h_{oe}$	1.0	100	$\mu\text{s}$

**SWITCHING CHARACTERISTICS**

Delay Time	$(V_{CC} = -30\text{Vdc}$ , $V_{BE} = -2.0\text{Vdc}$ , $I_C = -150\text{mA}$ , $I_{B1} = -15\text{mA}$ )	$t_d$	-	15	ns
Rise Time		$t_r$	-	20	
Storage Time	$(V_{CC} = -30\text{Vdc}$ , $I_C = -150\text{mA}$ , $I_{B1} = I_{B2} = -15\text{mA}$ )	$t_s$	-	225	ns
Fall Time		$t_f$	-	30	

NOTES : 2. Pulse Test: Pulse Width $\leq$ 300 $\mu\text{s}$ , Duty Cycle $\leq$ 2.0%

## RATING AND CHARACTERISTICS CURVES ( MMST4403 )

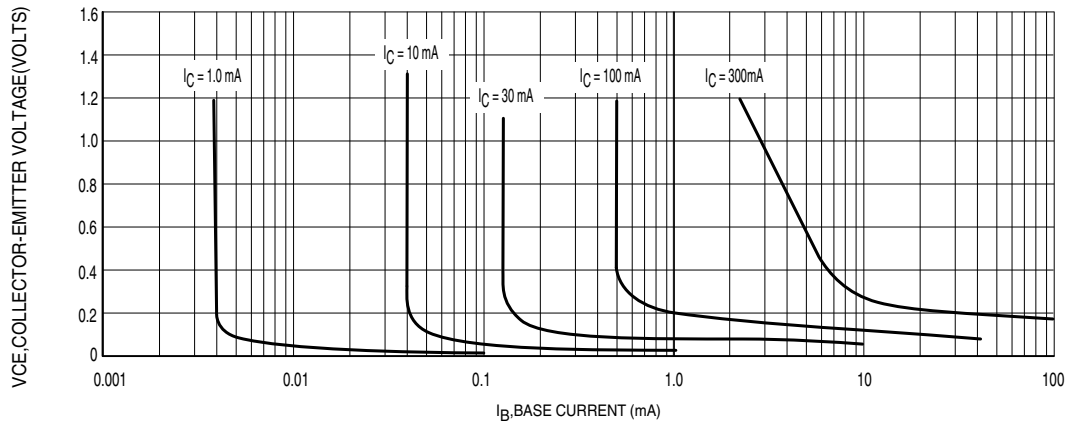


Figure 1. Typical Collector Saturation Region

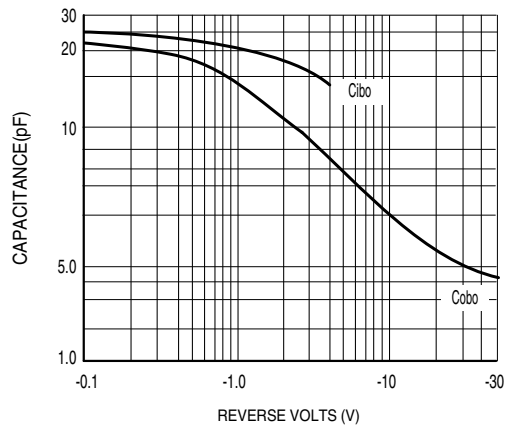


Figure 2. Capacitances (Typical)