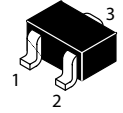
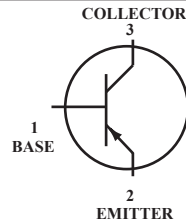


### PNP General Purpose Transistors

 Lead(Pb)-Free



SOT-323(SC-70)

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CE0}$	-60	Vdc
Collector-Base Voltage	$V_{CB0}$	-60	Vdc
Emitter-Base Voltage	$V_{EB0}$	-5.0	Vdc
Collector Current-Continuous	$I_C$	-600	mAdc

#### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (1) $T_A=25^{\circ}\text{C}$	$P_D$	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	$^{\circ}\text{C}/\text{W}$
Junction and Storage, Temperature	$T_{J,Tstg}$	-55 to +150	$^{\circ}\text{C}$

#### DEVICE MARKING

MMBT2907AW=20

#### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
-----------------	--------	-----	-----	------

#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = -10 \text{ mAdc}$ , $I_B = 0$ ) <sup>(2)</sup>	$V_{(BR)CE0}$	-60	-	Vdc
Collector-Base Breakdown Voltage ( $I_C = -10 \mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CB0}$	-60	-	Vdc
Emitter-Base Breakdown Voltage ( $I_E = -10 \mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EB0}$	-5.0	-	Vdc
Collector Cutoff Current ( $V_{CE} = -30 \text{ Vdc}$ , $V_{EB}(\text{off}) = -0.5 \text{ Vdc}$ )	$I_{CEX}$		-50	nAdc
Collector Cutoff Current ( $V_{CB} = -50 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -50 \text{ Vdc}$ , $I_E = 0$ , $T_A = 125^{\circ}\text{C}$ )	$I_{CBO}$	-	-0.010 -10	nAdc
Base Cutoff Current ( $V_{CE} = -30 \text{ Vdc}$ , $V_{EB}(\text{off}) = -0.5 \text{ Vdc}$ )	$I_{BL}$	-	-50	nAdc

1. FR-5=1.0 x 0.75 x 0.062 in

2. Pulse Test:Pulse Width=300 us, Duty Cycle $\leq$ 2.0%

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

Characteristics	Symbol	Min	Max	Unit
-----------------	--------	-----	-----	------

### DC CHARACTERISTICS<sup>(1)</sup>

DC Current Gain ( $I_C = -0.1 \text{ mA}$ , $V_{CE} = -10 \text{ V}$ )	$h_{FE}$	75	-	
( $I_C = -1.0 \text{ mA}$ , $V_{CE} = -10 \text{ V}$ )		100	-	
( $I_C = -10 \text{ mA}$ , $V_{CE} = -10 \text{ V}$ )		100	-	
( $I_C = -150 \text{ mA}$ , $V_{CE} = -10 \text{ V}$ )		100	300	
( $I_C = -500 \text{ mA}$ , $V_{CE} = -10 \text{ V}$ )		50	-	
Collector-Emitter Saturation Voltage <sup>(3)</sup> ( $I_C = -150 \text{ mA}$ , $I_B = -15 \text{ mA}$ ) ( $I_C = -500 \text{ mA}$ , $I_B = -50 \text{ mA}$ )	$V_{CE(sat)}$	-	-0.4 -1.6	Vdc
Base-Emitter Saturation Voltage <sup>(3)</sup> ( $I_C = -150 \text{ mA}$ , $I_B = -15 \text{ mA}$ ) ( $I_C = -500 \text{ mA}$ , $I_B = -50 \text{ mA}$ )	$V_{BE(sat)}$	-	-1.3 -2.6	Vdc

### SMALL-SIGNAL CHARACTERISTICS

Current-Gain-Bandwidth Product (1) ( $I_C = -50 \text{ mA}$ , $V_{CE} = -20 \text{ V}$ , $f = 100 \text{ MHz}$ )	$f_T$	200	-	MHz
Output Capacitance ( $V_{CB} = -10 \text{ V}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{obo}$	-	8.0	pF
Input Capacitance ( $V_{EB} = -2.0 \text{ V}$ , $I_C = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ibo}$	-	30	pF

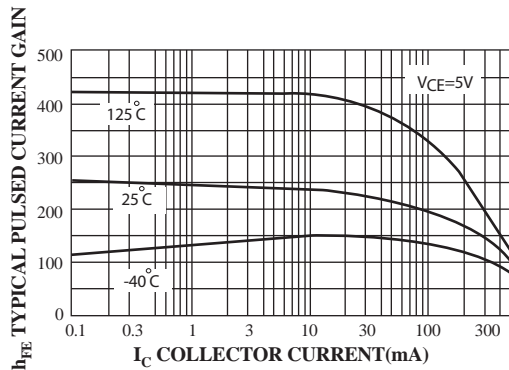
## ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ unless otherwise noted) (Continued)

Characteristics	Symbol	Min	Max	Unit
-----------------	--------	-----	-----	------

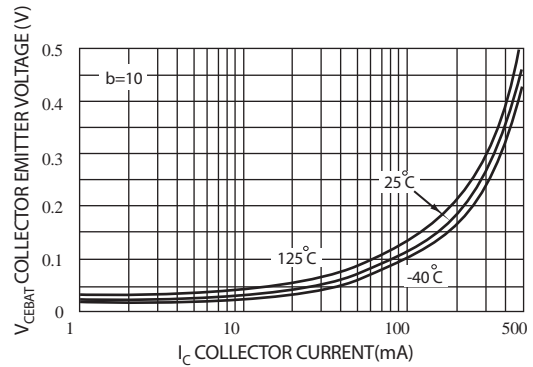
### SWITCHING CHARACTERISTICS

Turn-On Time	$(V_{CC} = -30 \text{ Vdc}, I_C = -150 \text{ mA}, I_{B1} = -15 \text{ mA})$	$t_{on}$	-	45	ns
Delay Time		$t_d$	-	10	
Rise Time		$t_r$	-	40	
Turn-Off Time	$(V_{CC} = -60 \text{ Vdc}, I_C = -150 \text{ mA}, I_{B1} = I_{B2} = -15 \text{ mA})$	$t_{off}$	-	100	
Storage Time		$t_s$	-	80	
Fall Time		$t_f$	-	30	

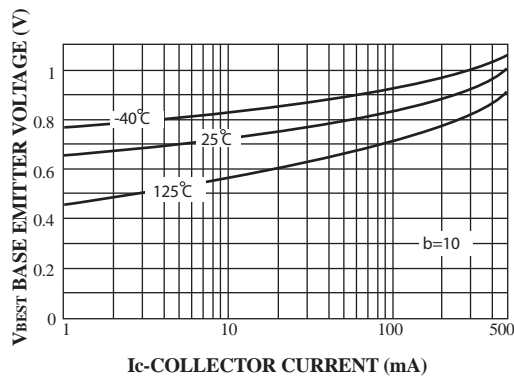
## TYPICAL CHARACTERISTICS



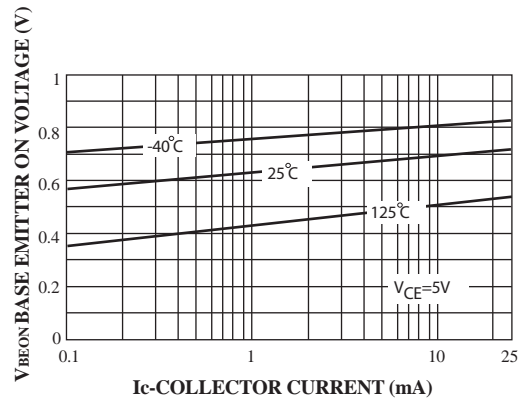
**FIG.1 Typical Pulsed Current Gain vs Collector Current**



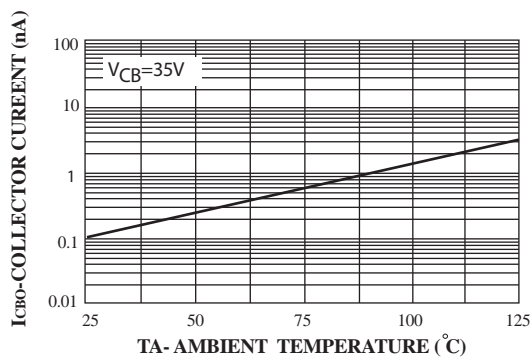
**FIG.2 Collector-Emitter Saturation Voltage vs collector Current**



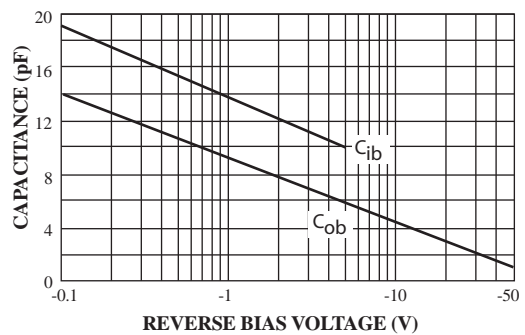
**FIG.3 Base-Emitter Saturation Voltage vs Collector Current**



**FIG.4 Base Emitter ON Voltage vs Collector Current**



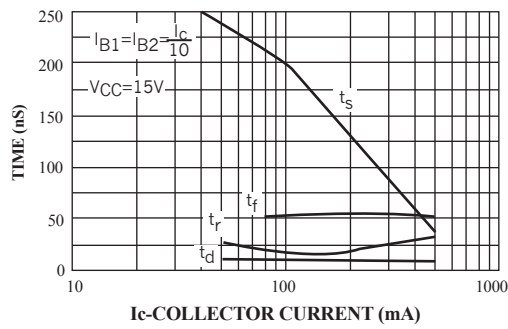
**FIG.5 Collector-Cutoff Current vs. Ambient Temperature**



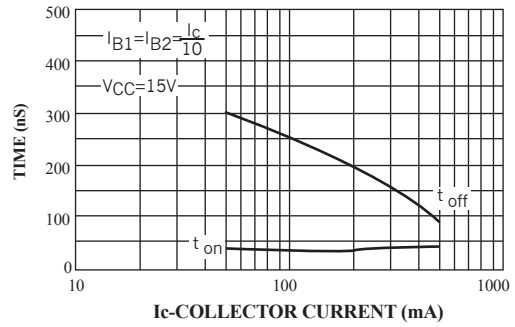
**FIG.6 Input and Output Capacitance vs Reverse Bias Voltage**

TYPICAL CHARACTERISTICS (CONTINUED)

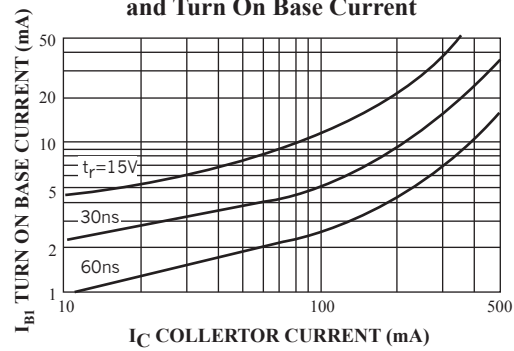
Switching Times vs Collector Current



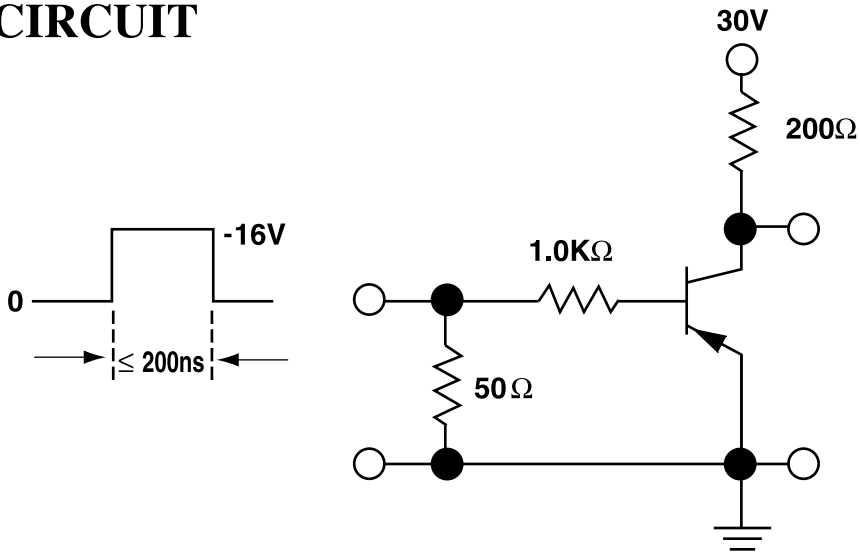
Turn On and Turn Off Times vs Collector Current



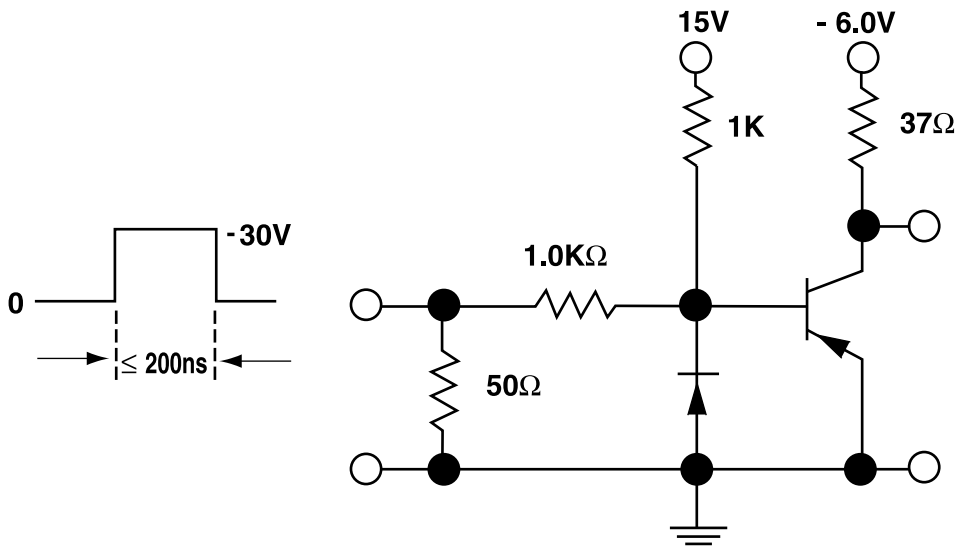
Rise Time vs Collector and Turn On Base Current



**TEST CIRCUIT**



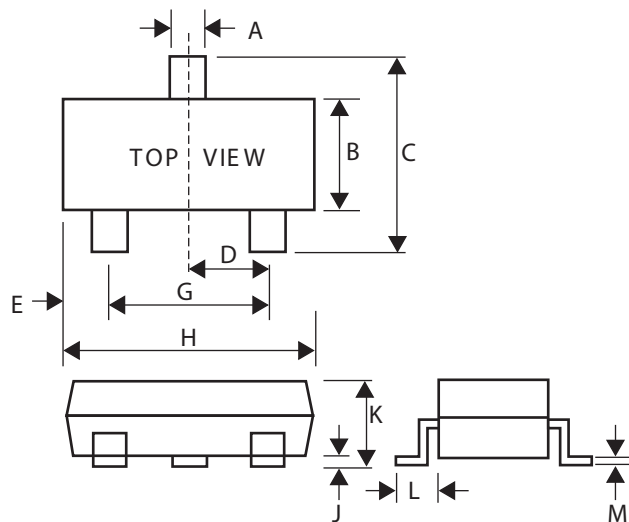
**FIGURT 1: Saturated Turn-On Switching Time**



**FIGURT 2: Saturated Turn-Off Switching Time**

## SOT-323 Package Outline Dimensions

Unit:mm



SOT-323		
Dim	Min	Max
A	0.30	0.40
B	1.15	1.35
C	2.00	2.40
D	-	0.65
E	0.30	0.40
G	1.20	1.40
H	1.80	2.20
J	0.00	0.10
K	0.80	1.00
L	0.42	0.53
M	0.10	0.25