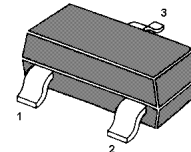


# MMBT9013

## NPN Silicon Epitaxial Planar Transistors

for switching and amplifier applications.

As complementary types the PNP transistor MMBT9012 is recommended.



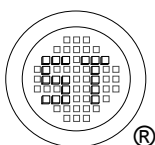
1. Base 2. Emitter 3. Collector  
TO-236 Plastic Package

### Absolute Maximum Ratings ( $T_a = 25\text{ }^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Collector Base Voltage	$V_{CBO}$	40	V
Collector Emitter Voltage	$V_{CEO}$	30	V
Emitter Base Voltage	$V_{EBO}$	5	V
Collector Current	$I_C$	500	mA
Power Dissipation	$P_{tot}$	200	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

### Characteristics at $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Min.	Max.	Unit	
DC Current Gain at $V_{CE} = 1\text{ V}$ , $I_C = 50\text{ mA}$  at $V_{CE} = 1\text{ V}$ , $I_C = 500\text{ mA}$	Current Gain Group G H	$h_{FE}$	100	250	-
		$h_{FE}$	160	400	-
		$h_{FE}$	40	-	-
Collector Base Cutoff Current at $V_{CB} = 35\text{ V}$	$I_{CBO}$	-	100	nA	
Emitter Base Cutoff Current at $V_{EB} = 5\text{ V}$	$I_{EBO}$	-	100	nA	
Collector Base Breakdown Voltage at $I_C = 100\text{ }\mu\text{A}$	$V_{(BR)CBO}$	40	-	V	
Collector Emitter Breakdown Voltage at $I_C = 1\text{ mA}$	$V_{(BR)CEO}$	30	-	V	
Emitter Base Breakdown Voltage at $I_E = 100\text{ }\mu\text{A}$	$V_{(BR)EBO}$	5	-	V	
Collector Emitter Saturation Voltage at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$	$V_{CE(sat)}$	-	0.6	V	
Base Emitter Saturation Voltage at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$	$V_{BE(sat)}$	-	1.2	V	
Base Emitter Voltage at $V_{CE} = 1\text{ V}$ , $I_C = 100\text{ mA}$	$V_{BE}$	-	1	V	
Gain Bandwidth Product at $V_{CE} = 6\text{ V}$ , $I_C = 20\text{ mA}$	$f_T$	100	-	MHz	



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ISO/TS 16949 : 2009  
Certificate No. 160713000



ISO14001 : 2004  
Certificate No. 7116



ISO 9001 : 2008  
Certificate No. 90719410



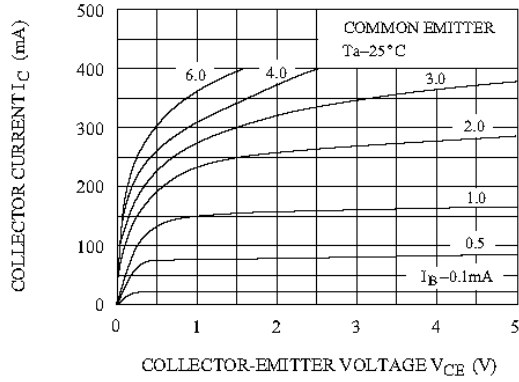
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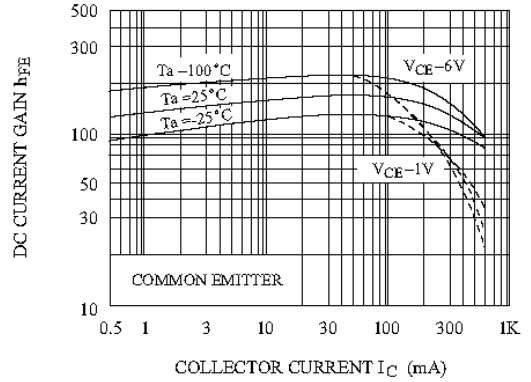
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# MMBT9013

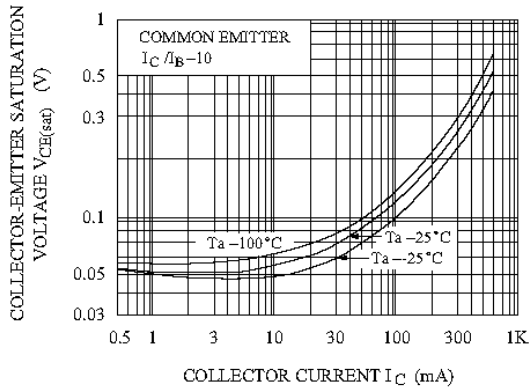
$I_C - V_{CE}$   
(LOW VOLTAGE REGION)



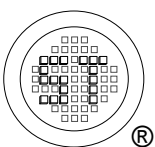
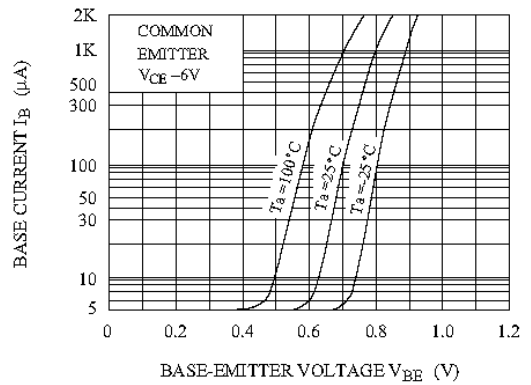
$h_{FE} - I_C$



$V_{CE(sat)} - I_C$



$I_B - V_{BE}$



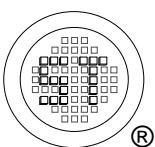
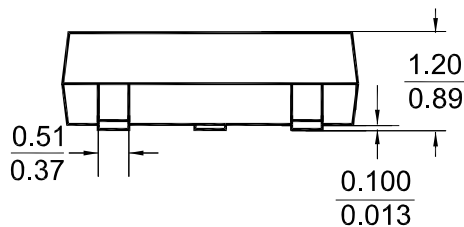
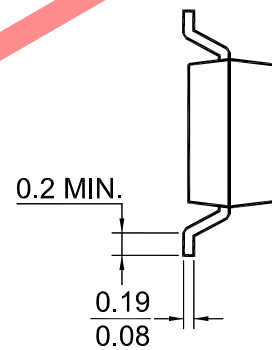
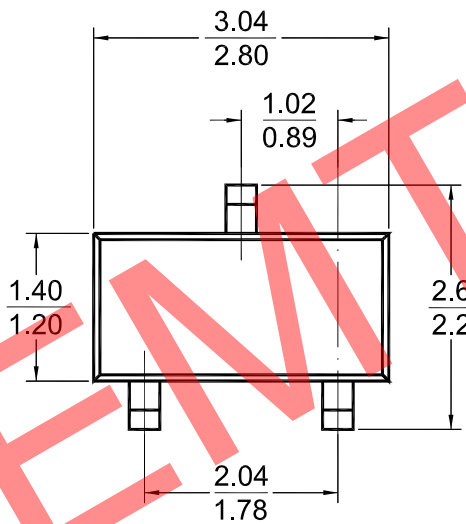
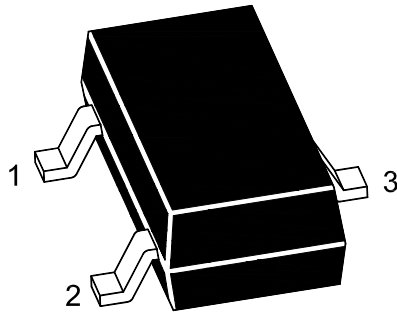
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 ISO 9001 : 2008 Certificate No. 90719410  
 BS-OHSAS 18001 : 2007 Certificate No. 7116  
 IECQ QC 080000 Certificate No. PFC-HSPM-1485

# TO-236 Package Outline

Package Outline Dimensions (Units: mm)



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Dated : 23/10/2010 Rev:01

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