



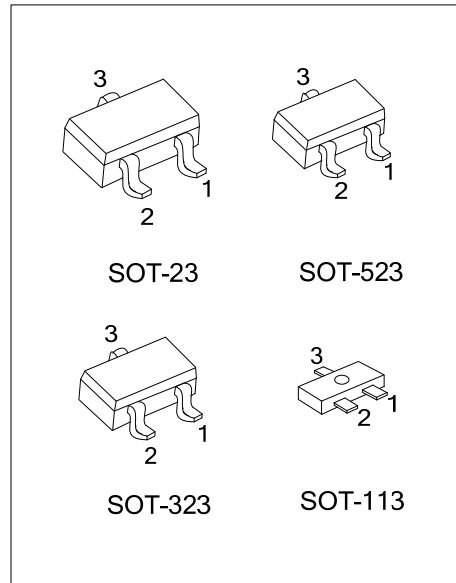
# MMBT1015

## PNP SILICON TRANSISTOR

### LOW FREQUENCY PNP AMPLIFIER TRANSISTOR

■ FEATURES

- \* Collector-Emitter Voltage:  $BV_{CEO} = -50V$
- \* Collector current up to 150mA
- \* High  $h_{FE}$  linearity
- \* Complement to MMBT1815



Lead-free: MMBT1015L  
Halogen-free: MMBT1015G

■ ORDERING INFORMATION

Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free	Halogen Free		1	2	3	
MMBT1015-x-AC3-R	MMBT1015L-x-AC3-R	MMBT1015G-x-AC3-R	SOT-113	E	B	C	Tape Reel
MMBT1015-x-AE3-R	MMBT1015L-x-AE3-R	MMBT1015G-x-AE3-R	SOT-23	E	B	C	Tape Reel
MMBT1015-x-AL3-R	MMBT1015L-x-AL3-R	MMBT1015G-x-AL3-R	SOT-323	E	B	C	Tape Reel
MMBT1015-x-AN3-R	MMBT1015L-x-AN3-R	MMBT1015G-x-AN3-R	SOT-523	E	B	C	Tape Reel

<p>MMBT1015L-x-AC3-R</p> <p>(1) Packing Type (2) Package Type (3) Rank (4) Lead Plating</p>	<p>(1) R: Tape Reel (2) AC3: SOT-113, AE3: SOT-23, AL3: SOT-323, AN3: SOT-523 (3) x: refer to Classification of <math>h_{FE1}</math> (4) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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■ MARKING

PACKAGE	MARKING		
	Y	GR	BL
SOT-23	<p>L: Lead Free G: Halogen Free</p>	<p>L: Lead Free G: Halogen Free</p>	<p>L: Lead Free G: Halogen Free</p>
SOT-113 SOT-323 SOT-523	<p>L: Lead Free G: Halogen Free</p>		

■ ABSOLUTE MAXIMUM RATING ( Ta=25°C , unless otherwise specified )

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		$V_{CBO}$	-50	V
Collector-Emitter Voltage		$V_{CEO}$	-50	V
Emitter-Base Voltage		$V_{EBO}$	-5	V
Collector Dissipation	SOT-23	$P_C$	250	mW
	SOT-523/SOT-113/SOT-323		200	mW
Collector Current		$I_C$	-150	mA
Base Current		$I_B$	-50	mA
Junction Temperature		$T_J$	125	°C
Storage Temperature		$T_{STG}$	-55 ~ +150	°C

Note Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

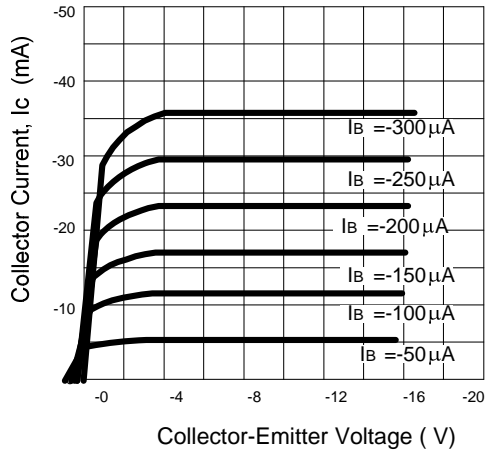
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C = -100\mu A, I_E = 0$	-50			V
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C = -10mA, I_B = 0$	-50			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E = -10\mu A, I_C = 0$	-5			V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C = -100mA, I_B = -10mA$		-0.1	-0.3	V
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	$I_C = -100mA, I_B = -10mA$			-1.1	V
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = -50V, I_E = 0$			-100	nA
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = -5V, I_C = 0$			-100	nA
DC Current Gain	$h_{FE1}$	$V_{CE} = -6V, I_C = -2mA$	120		700	
	$h_{FE2}$	$V_{CE} = -6V, I_C = -150mA$	25			
Transition Frequency	$f_T$	$V_{CE} = -10V, I_C = -1mA$	80			MHz
Output Capacitance	$C_{OB}$	$V_{CB} = -10V, I_E = 0, f = 1MHz$		4.0	7.0	pF
Noise Figure	NF	$I_C = -0.1mA, V_{CE} = -6V$ $R_G = 1k\Omega, f = 100Hz$		0.5	6	dB

■ CLASSIFICATION OF  $h_{FE1}$

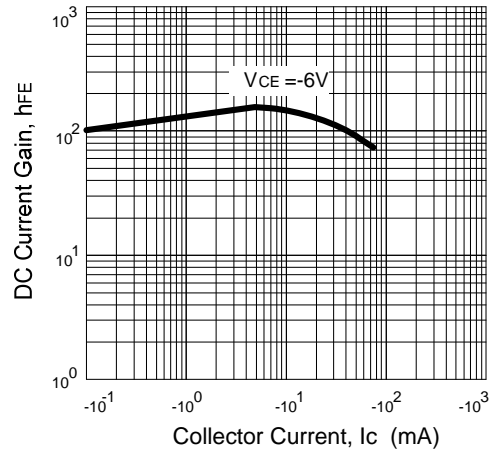
RANK	Y	GR	BL
RANGE	120-240	200-400	350-700

### ■ TYPICAL CHARACTERISTICS

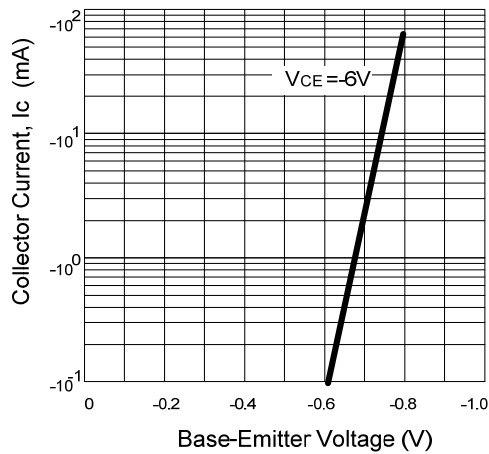
Static Characteristics



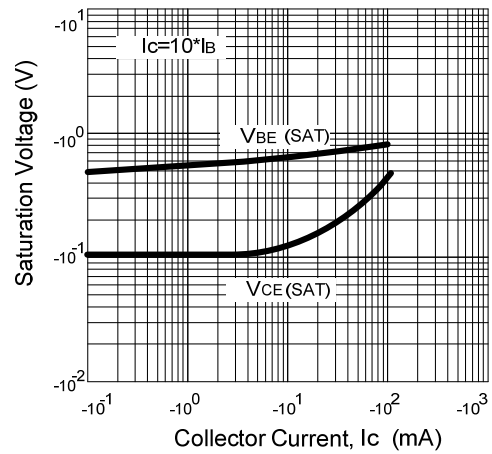
DC Current Gain



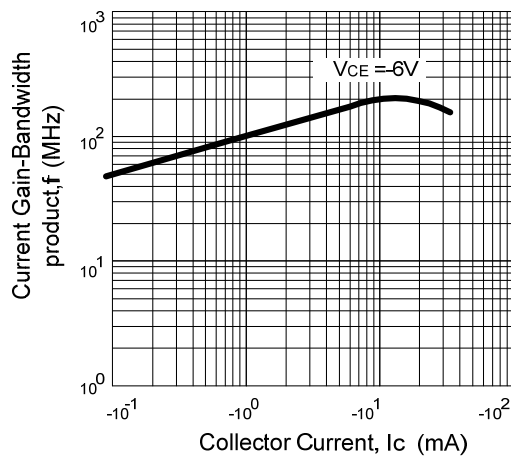
Base-Emitter on Voltage



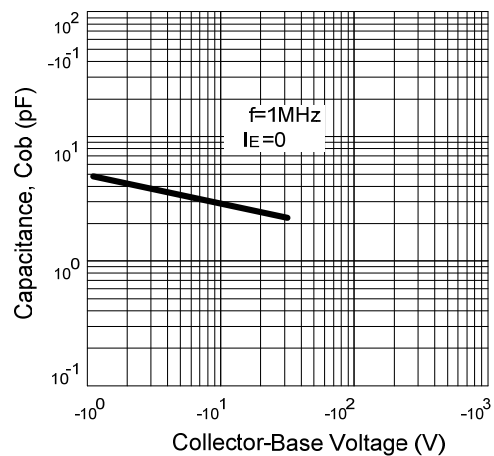
Saturation Voltage



Current Gain-Bandwidth Product



Collector Output Capacitance



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