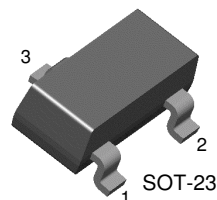


MMBT3646

MMBT3646

Switching Transistor



1. Base 2. Emitter 3. Collector

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	15	V
V_{CES}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5	
I_C	Collector Current (DC) - Continuous	300	mA
P_D	Total Device Dissipation @ $T_A=25^\circ\text{C}$ - Derate above 25°C	625 5	mW mW/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	150	$^\circ\text{C}$

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units
Off Characteristics					
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage ($I_C = 100\mu\text{Adc}$, $V_{BE} = 0$)	40			V
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage (1) ($I_C = 10\text{mAdc}$, $I_B = 0$)	15			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ($I_C = 100\mu\text{Adc}$, $I_E = 0$)	40			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_E = 100\mu\text{Adc}$, $I_C = 0$)	5			V
I_{CES}	Collector Cut-off Current ($V_{CE} = 20\text{Vdc}$, $V_{BE} = 0$) ($V_{CE} = 20\text{Vdc}$, $V_{BE} = 0$, $T_A = 65^\circ\text{C}$)			0.5 3	μA
On Characteristics (1)					
h_{FE}	DC Current Gain ($I_C = 30\text{mAdc}$, $V_{CE} = 0.4\text{Vdc}$) ($I_C = 100\text{mAdc}$, $V_{CE} = 0.5\text{Vdc}$) ($I_C = 300\text{mAdc}$, $V_{CE} = 1\text{Vdc}$)	30 25 15		120	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ($I_C = 30\text{mAdc}$, $I_B = 3\text{mAdc}$) ($I_C = 100\text{mAdc}$, $I_B = 10\text{mAdc}$) ($I_C = 300\text{mAdc}$, $I_B = 30\text{mAdc}$) ($I_C = 30\text{mA}$, $I_B = 3\text{mA}$, $T_A = 65^\circ\text{C}$)			0.2 0.28 0.5 0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ($I_C = 30\text{mAdc}$, $I_B = 3\text{mAdc}$) ($I_C = 100\text{mAdc}$, $I_B = 10\text{mAdc}$) ($I_C = 300\text{mAdc}$, $I_B = 30\text{mAdc}$)	0.73		0.95 1.2 1.7	V

Electrical Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise noted) (Continued)

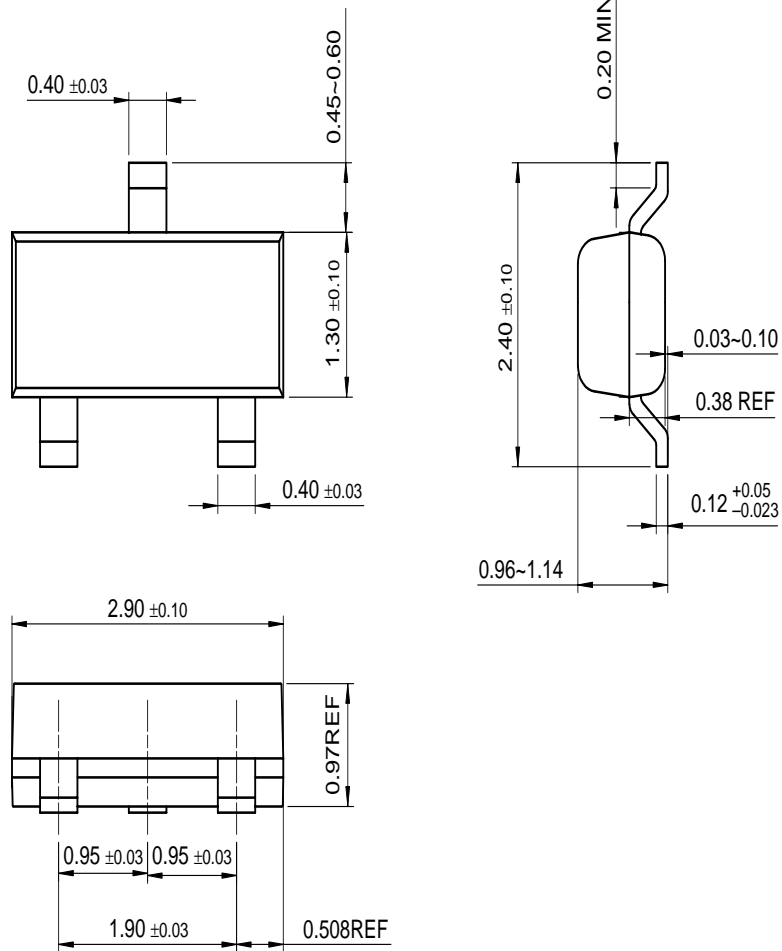
Symbol	Parameter	Min.	Typ.	Max.	Units
Small-Signal Characteristics					
C_{obo}	Output Capacitance ($V_{CE} = 5\text{Vdc}$, $I_E = 0$, $f = 1\text{MHz}$)			5	pF
C_{ibo}	Input Capacitance ($V_{EB} = 0.5\text{Vdc}$, $I_C = 0$, $f = 1\text{MHz}$)			8	pF
Switching Characteristics					
t_{on}	Turn-On Time	$V_{CC} = 10\text{Vdc}$, $I_C = 300\text{mAdc}$, $I_{B1} = 30\text{mAdc}$, $V_{CE(off)} = 3\text{V}$		18	ns
t_d	Delay Time			10	ns
t_r	Rise Time			15	ns
t_{off}	Turn-Off Time	$V_{CC} = 10\text{Vdc}$, $I_C = 300\text{mAdc}$, $I_{B1} = I_{B2} = 30\text{mAdc}$		28	ns
t_f	Fall Time			15	ns
t_s	Storage Time			20	ns

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient			200	$^{\circ}\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case			83.3	$^{\circ}\text{C}$

Package Dimensions

SOT-23



Dimensions in Millimeters

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