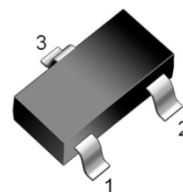


REPLACEMENT TYPE :MMBT4401
FEATURES

- Switching Transistor

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current-Continuous	I_C	600	mA
Collector Power Dissipation	P_C	300	mW
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$



SOT-23 MARKING:2X

1: BASE 2:EMITTER 3: COLLECTOR

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

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	V_{CBO}	$I_C=100\mu\text{A}, I_E=0$	60			V
Collector-Emitter Breakdown Voltage	V_{CEO}	$I_C=1\text{mA}, I_B=0$	40			V
Emitter-Base Breakdown Voltage	V_{EBO}	$I_E=100\mu\text{A}, I_C=0$	6			V
Collector Cut-off current	I_{CEX}	$V_{CE}=35\text{V}, V_{EB(off)}=0.4\text{V}$			0.1	μA
Collector Cut-off Current	I_{CBO}	$V_{CB}=50\text{V}, I_E=0$			0.1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$			0.1	μA
DC Current Gain	$h_{FE(1)}$	$V_{CE}=1\text{V}, I_C=0.1\text{mA}$	20			
	$h_{FE(2)}$	$V_{CE}=1\text{V}, I_C=1\text{mA}$	40			
	$h_{FE(3)}$	$V_{CE}=1\text{V}, I_C=10\text{mA}$	80			
	$h_{FE(4)}$	$V_{CE}=1\text{V}, I_C=150\text{mA}$	100		300	
	$h_{FE(5)}$	$V_{CE}=2\text{V}, I_C=500\text{mA}$	40			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$			0.4	V
		$I_C=500\text{mA}, I_B=50\text{mA}$			0.75	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$			0.95	V
		$I_C=500\text{mA}, I_B=50\text{mA}$			1.2	
Transition Frequency	f_T	$V_{CE}=10\text{V}, I_C=20\text{mA}, f=100\text{MHz}$	250			MHz
Delay Time	t_D	$V_{CC}=30\text{V}, V_{BE}=-2\text{V}$			15	nS
Rise Time	t_R	$I_C=150\text{mA}, I_{B1}=15\text{mA}$			20	nS
Storage Time	t_S	$V_{CC}=30\text{V}, I_C=150\text{mA}$			225	nS
Fall Time	t_F	$I_{B1}=I_{B2}=15\text{mA}$			60	nS

Typical Characteristics

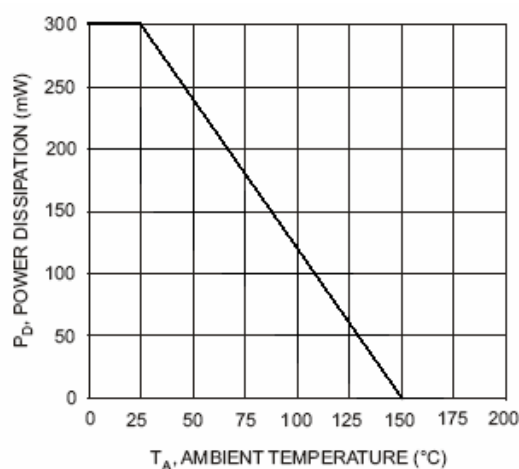


Fig. 1 Max Power Dissipation vs Ambient Temperature

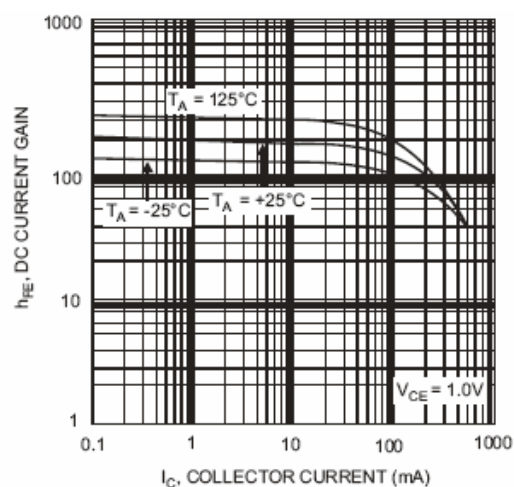


Fig. 2 Typical DC Current Gain vs Collector Current

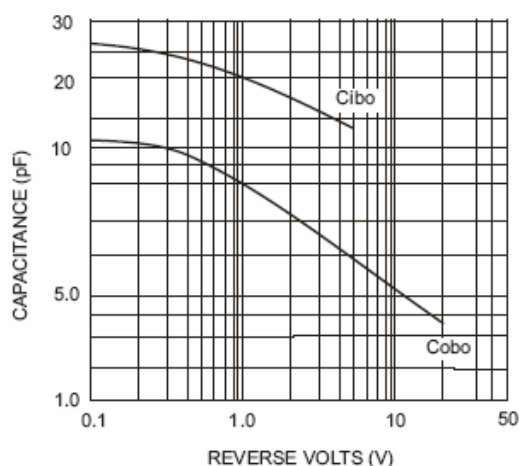


Fig. 3 Typical Capacitance

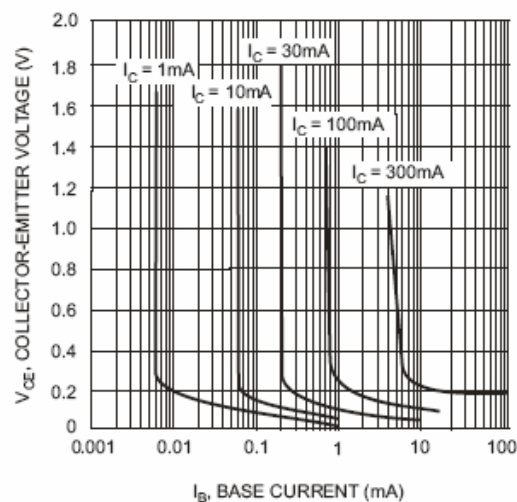


Fig. 4 Typical Collector Saturation Region

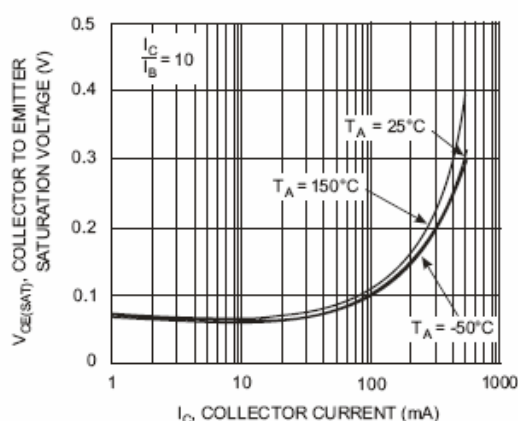


Fig. 5 Collector Emitter Saturation Voltage vs. Collector Current

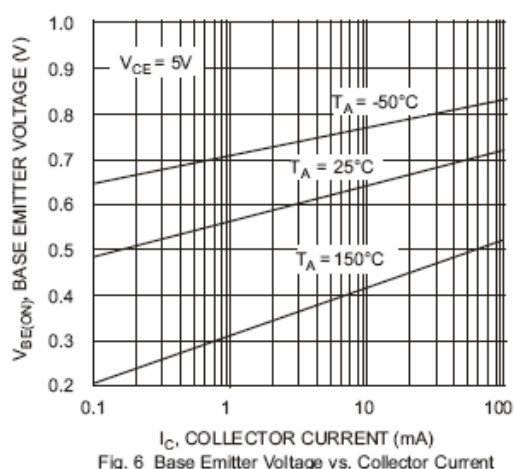
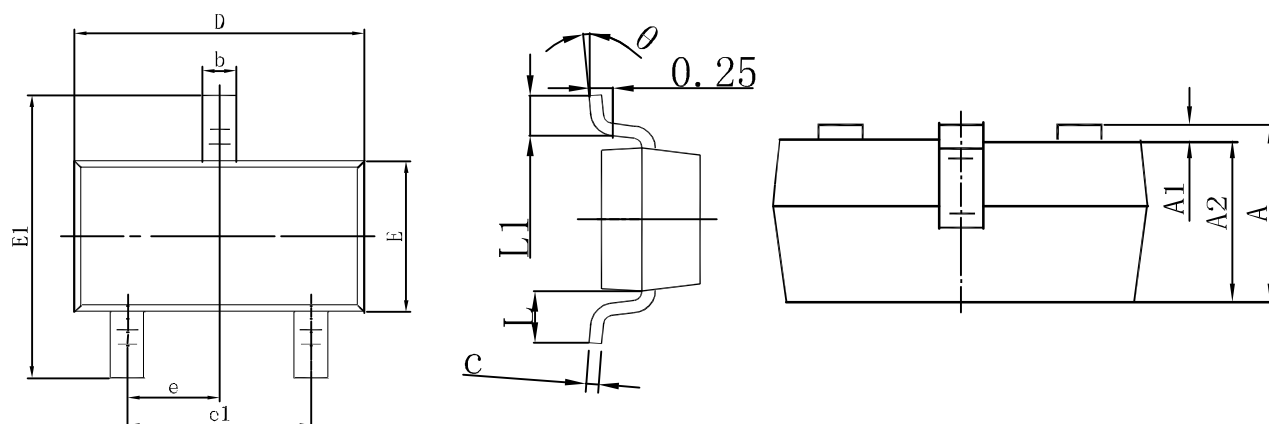
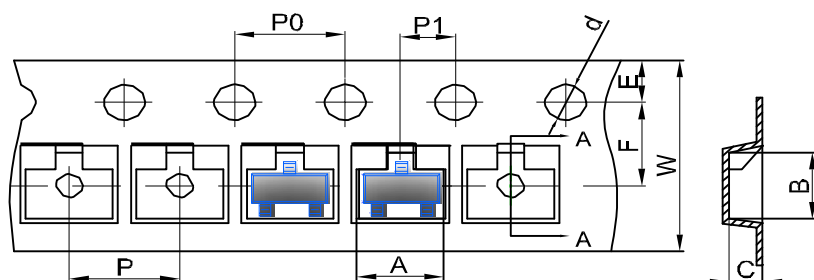


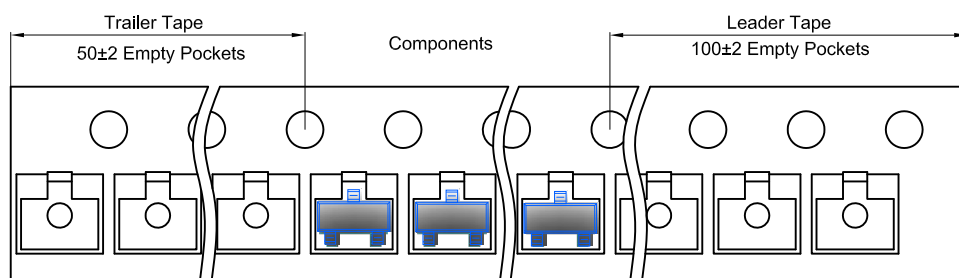
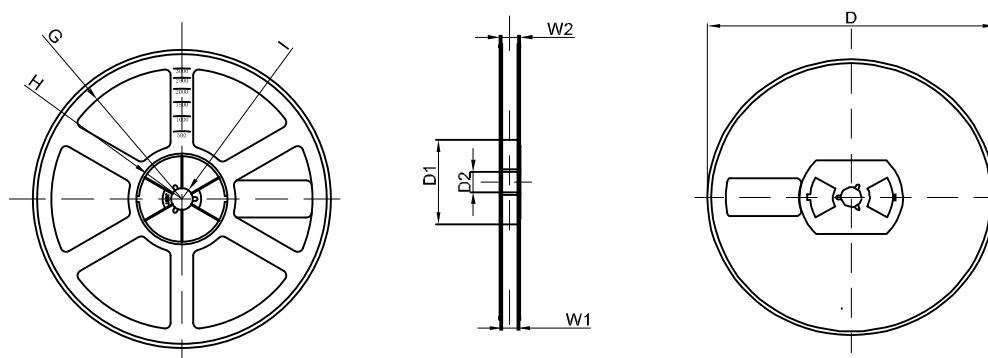
Fig. 6 Base Emitter Voltage vs. Collector Current

SOT-23 Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Embossed Carrier Tape


	DIMENSIONS ARE IN MILLIMETER									
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	φ1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SOT-23 Tape Leader and Traller

SOT-23 Reel


	DIMENSIONS ARE IN MILLIMETER							
REEL OPTION	D	D1	D2	G	H	I	W1	W2
7" DIA	φ178	54.40	13.00	R78	R25.60	R6.50	9.50	12.30
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1