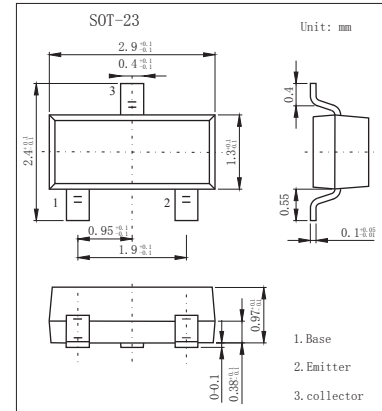


NPN Transistors

MMBT4401 (KMBT4401)

■ Features

- Ideal for Medium Power Amplification and Switching
- Complementary PNP Type Available (MMBT4403)



■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Collector-base voltage	V_{CB0}	60	V
Collector-emitter voltage	V_{CE0}	40	V
Emitter-base voltage	V_{EB0}	6.0	V
Collector current	I_C	600	mA
Total Device Dissipation Alumina Substrate	P_D	300	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

■ Electrical Characteristics $T_a = 25^\circ\text{C}$

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_E = 0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1.0\text{ mA}, I_B = 0$	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}, I_C = 0$	6.0			V
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}	$I_C = 0.1\text{ mA}, V_{CE} = 1.0\text{ V}$	20			
		$I_C = 1.0\text{ mA}, V_{CE} = 1.0\text{ V}$	40			
		$I_C = 10\text{ mA}, V_{CE} = 1.0\text{ V}$	80			
		$I_C = 150\text{ mA}, V_{CE} = 1.0\text{ V}$	100		300	
		$I_C = 500\text{ mA}, V_{CE} = 2.0\text{ V}$	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 *	$V_{BE(sat)}$	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$	0.75		0.95	V
		$I_C = 500\text{ mA}, I_B = 50\text{ mA}$			1.2	
Transition frequency	f_T	$I_C = 20\text{ mA}, V_{CE} = 10\text{ V}, f = 100\text{ MHz}$	250			MHz
Delay time	t_d	$V_{CC} = 30\text{ V}, V_{EB} = 2.0\text{ V},$			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	$I_{B1} = I_{B2} = 15\text{ mA}$			30	ns

* Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2.0\%$.

■ Marking

Marking	2X
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■ Typical Characteristics

