

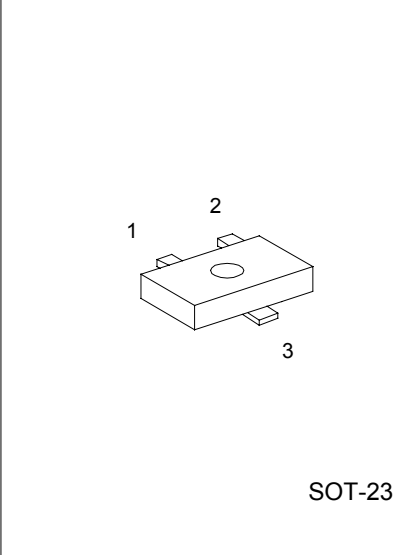
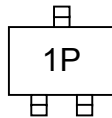
UTC MMBT2222A NPN EPITAXIAL SILICON TRANSISTOR

NPN GENERAL PURPOSE AMPLIFIER

FEATURES

*This device is for use as a medium power amplifier and switch requiring collector currents up to 500mA. Sourced from Process 19.

MARKING



1:EMITTER 2:BASE 3:COLLECTOR

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

PARAMETER	SYMBOL	RATING	UNIT
Collector-base voltage	VCBO	75	V
Collector-emitter voltage	VCEO	40	V
Emitter-base voltage	VEBO	6	V
Collector current	Ic	1	A
Collector dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	TSTG	-55 ~ +150	°C

Note: These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-base breakdown voltage	V(BR)CBO	Ic=10μA, IE=0	75			V
Collector-emitter breakdown voltage	V(BR)CEO	Ic=10mA, IB=0	40			V
Emitter-base breakdown voltage	V(BR)EBO	IE=10μA, Ic=0	6			V
Collector cutoff current	ICEX	VCE=60V, VEB(OFF)=3.0V			10	nA
Collector cutoff current	ICBO	VCB=60V, IE=0			0.01	μA
		VCB=60V, IE=0, TA=150°C			10	μA
Emitter cutoff current	IEBO	VEB=3.0V, Ic=0			10	nA
Base cutoff current	IBL	VCE=60V, VEB(OFF)=3.0V			20	nA

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PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
ON CHARACTERISTICS						
DC current gain	h_{FE}	$I_C=0.1\text{mA}$, $V_{CE}=10\text{V}$ $I_C=1.0\text{mA}$, $V_{CE}=10\text{V}$ $I_C=10\text{mA}$, $V_{CE}=10\text{V}$ $I_C=10\text{mA}$, $V_{CE}=10\text{V}$, $T_A=-55^\circ\text{C}$ $I_C=150\text{mA}$, $V_{CE}=10\text{V}^*$ $I_C=150\text{mA}$, $V_{CE}=1.0\text{V}^*$ $I_C=500\text{mA}$, $V_{CE}=10\text{V}^*$	35 50 75 35 100 50 40		300	
Collector-emitter saturation voltage*	$V_{CE(sat)}$	$I_C=150\text{mA}$, $I_B=15\text{mA}$ $I_C=500\text{mA}$, $I_B=50\text{mA}$			0.3 1.0	V V
Base-emitter saturation voltage*	$V_{BE(sat)}$	$I_C=150\text{mA}$, $I_B=15\text{mA}$ $I_C=500\text{mA}$, $I_B=50\text{mA}$	0.6		1.2 2.0	V V
SMALL SIGNAL CHARACTERISTICS						
Current gain-Bandwidth product	f_T	$I_C=20\text{mA}$, $V_{CE}=20\text{V}$, $f=100\text{MHz}$	300			MHz
Output capacitance	C_{obo}	$V_{CB}=10\text{V}$, $I_E=0$, $f=100\text{kHz}$			8.0	pF
Input capacitance	C_{ibo}	$V_{EB}=0.5\text{V}$, $I_C=0$, $f=100\text{kHz}$			25	pF
Collector base time constant	$\tau_{b'c}$	$I_C=20\text{mA}$, $V_{CB}=20\text{V}$, $f=31.8\text{MHz}$			150	pS
Noise figure	NF	$I_C=100\mu\text{A}$, $V_{CE}=10\text{V}$, $R_s=1.0\text{k}\Omega$, $f=1.0\text{kHz}$			4.0	dB
Real part of common-emitter high frequency input impedance	$\text{Re}(h_{ie})$	$I_C=20\text{mA}$, $V_{CB}=20\text{V}$, $f=300\text{MHz}$			60	Ω
SWITCHING CHARACTERISTICS						
Delay time	t_d	$V_{CC}=30\text{V}$, $V_{BE(OFF)}=0.5\text{V}$, $I_C=150\text{mA}$, $I_{B1}=15\text{mA}$			10	ns
Rise time	t_r				25	ns
Storage time	t_s	$V_{CC}=30\text{V}$, $I_C=150\text{mA}$, $I_{B1}=I_{B2}=15\text{mA}$			225	ns
Fall time	t_f				60	ns
THERMAL CHARACTERISTICS (TA=25°C, unless otherwise noted)						
Total Device Dissipation Derate above 25°C	P_D				350 2.8	mW mW/°C
Thermal resistance, junction to Ambient	$R_{\theta JA}$				357	°C/W

*Pulse test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

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TEST CIRCUITS

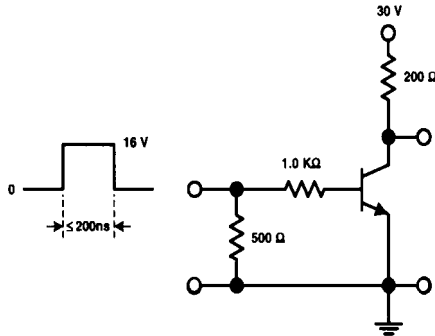


FIG.1 Saturated Turn-On Switching Time

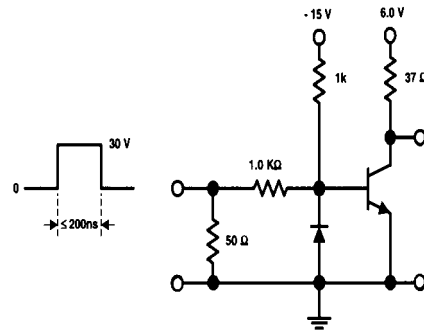
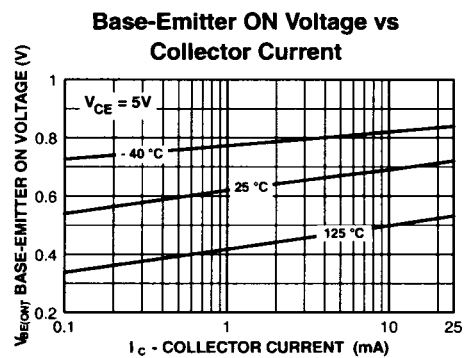
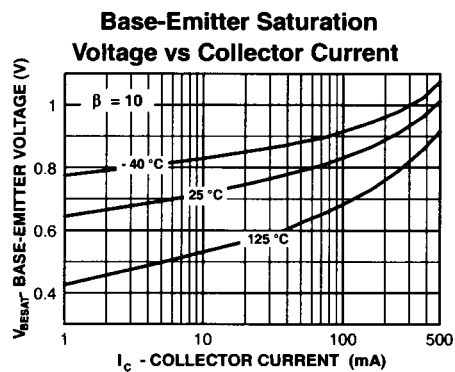
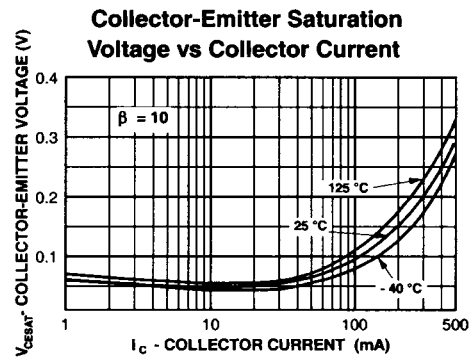
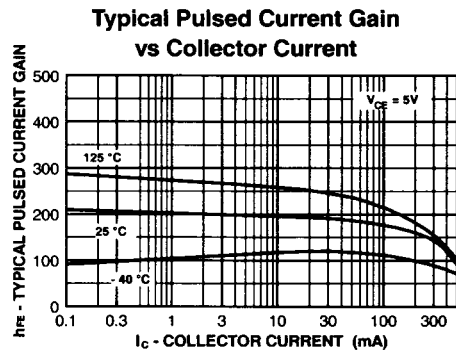
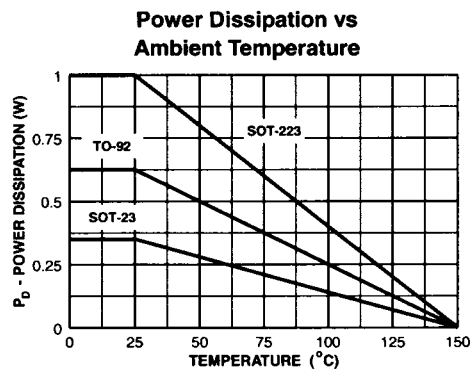
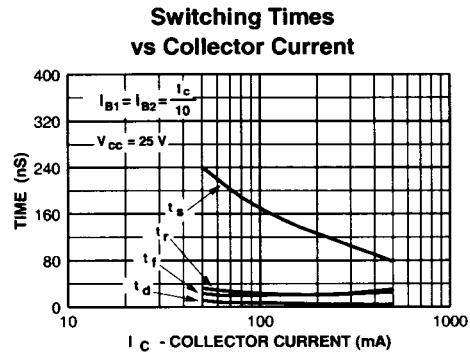
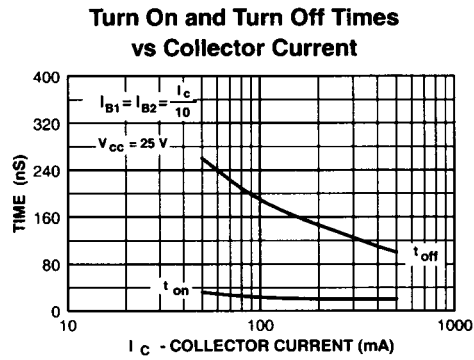
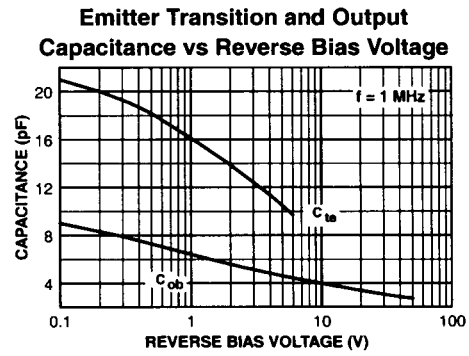
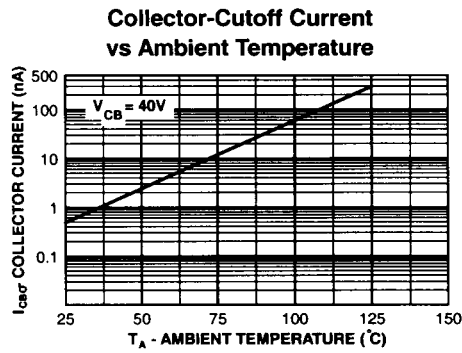


FIG.2 Saturated Turn-Off Switching Time

TYPICAL CHARACTERISTICS



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