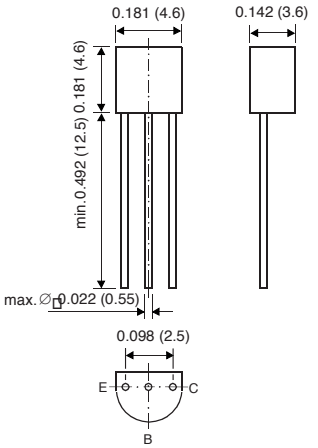
MPS2222A

SMALL SIGNAL TRANSISTORS (NPN)

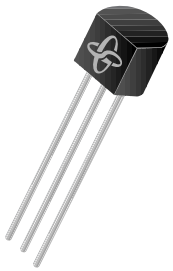
TO-92



Dimensions in inches and (millimeters)

FEATURES

- NPN Silicon Epitaxial Planar Transistor for switching and amplifier applications.
- On special request, this transistor is also manufactured in the pin configuration TO-18.
- This transistor is also available in the SOT-23 case with the type designation MMBT2222A



MECHANICAL DATA

Case: TO-92 Plastic Package
Weight: approx. 0.18g

MAXIMUM RATINGS AND THERMAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified

	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	75	Volts
Collector-Emitter Voltage	V_{CEO}	40	Volts
Emitter-Base Voltage	V_{EBO}	6.0	Volts
Collector Current-Continuous	I_C	600	mA
Power Dissipation at T_A=25°C Derate above 25°C	P_{tot}	625 5.0	mW mW/°C
Power Dissipation at T_C=25°C Derate above 25°C	P_{tot}	1.5 12	W mW/°C
Thermal Resistance, Junction to Ambient Air	$R_{\Theta JA}$	200	°C/W
Thermal Resistance Junction to Case	$R_{\Theta JC}$	83.3	°C/W
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_S	–55 to +150	°C

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ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified

	SYMBOL	MIN.	MAX.	UNIT
Collector-Base Breakdown Voltage at I_C = 10 μA, I_E = 0	$V_{(BR)CBO}$	75	–	Volts
Collector-Emitter Breakdown Voltage(1) at I_C = 10 mA, I_B = 0	$V_{(BR)CEO}$	40	–	Volts
Emitter-Base Breakdown Voltage at I_E = 10 μA, I_C = 0	$V_{(BR)EBO}$	6.0	–	Volts
Collector-Emitter Saturation Voltage(1) at I_C = 150 mA, I_B = 15 mA at I_C = 500 mA, I_B = 50 mA	 V_{CEsat} V_{CEsat}	 0.6 –	 0.3 1.0	 Volts Volts
Base-Emitter Saturation Voltage(1) at I_C = 150 mA, I_B = 15 mA at I_C = 500 mA, I_B = 50 mA	 V_{BEsat} V_{BEsat}	 – –	 1.2 2.0	 Volts Volts
Collector Cutoff Current at V_{EB} = 3 V, V_{CE} = 60 V	I_{CEX}	–	10	nA
Collector Cutoff Current at V_{CB} = 60 V, I_E = 0 at V_{CB} = 50 V, I_E = 0, T_A=125°C	I_{CBO}	–	 0.01 10	μA
Emitter Cutoff Current at V_{EB} = 3 V, I_C = 0	I_{EBO}	–	100	nA
Base Cutoff Current at V_{CE} = 60 V, V_{EB} = 3.0 V	I_{BL}	–	20	nA
DC Current Gain at V_{CE} = 10 V, I_C = 0.1 mA at V_{CE} = 10 V, I_C = 1 mA at V_{CE} = 10 V, I_C = 10 mA at V_{CE} = 10 V, I_C = 10 mA, T_A=-55°C at V_{CE} = 10 V, I_C = 150 mA(1) at V_{CE} = 1.0 V, I_C = 150 mA(1) at V_{CE} = 10 V, I_C = 500 mA(1)	 h_{FE} h_{FE} h_{FE} h_{FE} h_{FE} h_{FE} h_{FE}	 35 50 75 35 100 50 40	 – – – – 300 – –	 – – – – – – –
Input Impedance at V_{CE} = 10 V, I_C = 1 mA, f = 1 kHz at V_{CE} = 10 V, I_C = 10 mA, f = 1 kHz	h_{ie}	2.0 0.25	8.0 1.25	kΩ
Voltage Feedback Ratio at V_{CE} = 10 V, I_C = 1 mA, f = 1 kHz at V_{CE} = 10 V, I_C = 10 mA, f = 1 kHz	h_{re}	–	$8 \cdot 10^{-4}$ $4 \cdot 10^{-4}$	–
Current Gain-Bandwidth Product at V_{CE} = 20 V, I_C = 20 mA, f = 100 MHz	f_T	300	–	MHz
Output Capacitance at V_{CB} = 10 V, f = 1 kHz, I_E=0	C_{OBO}	–	8.0	pF
Input Capacitance at V_{EB} = 0.5 V, f = 1 kHz, I_C=0	C_{IBO}	–	25	pF

NOTES
(1) Pulse test: Pulse width ≤ 300μs - Duty cycle ≤ 2%

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ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified

	SYMBOL	MIN.	MAX.	UNIT
Small Signal Current Gain at V_{CE} = 10 V, I_C = 1 mA, f = 1 kHz at V_{CE} = 10 V, I_C = 10 mA, f = 1 kHz	h_{fe}	 50 75	 300 375	 – –
Output Admittance at V_{CE} = 10 V, I_C = 1 mA, f = 1 kHz at V_{CE} = 10 V, I_C = 10 mA, f = 1 kHz	h_{oe}	 5.0 25	 35 200	 μS
Collector Base Time Constant at I_E = 20 mA, V_{CB} = 20 V, f = 31.8 MHz	$r_b'C_C$	–	150	ps
Noise Figure at V_{CE} = 10 V, I_C = 100 μA, R_S = 1 kΩ f = 1 kHz	NF	–	4.0	dB
Delay Time (see fig.1) at I_{B1} = 15 mA, I_C = 150 mA, V_{CC}=30V, V_{BE} = -0.5V	t_d	–	10	ns
Rise Time (see fig.1) at I_{B1} = 15 mA, I_C = 150 mA, V_{CC}=30V, V_{BE} = -0.5V	t_r	–	25	ns
Storage Time (see fig. 2) at I_{B1} = I_{B2} = 15 mA, I_C = 150 mA, V_{CC}=30V	t_s	–	225	ns
Fall Time (see fig. 2) at I_{B1} = I_{B2} = 15 mA, I_C = 150 mA, V_{CC}=30V	t_f	–	60	ns

SWITCHING TIME EQUIVALENT TEST CIRCUIT

FIGURE 1 - TURN-ON TIME

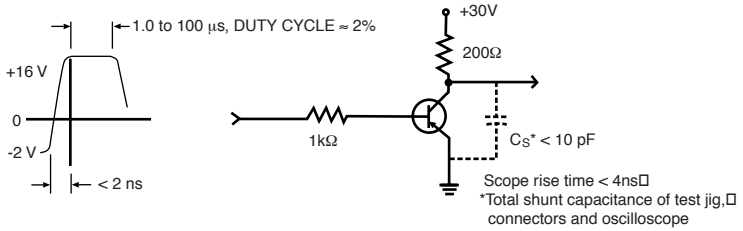
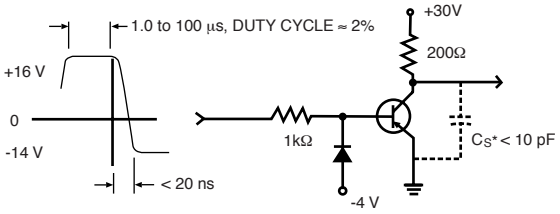


FIGURE 2 - TURN-OFF TIME



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