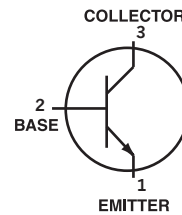
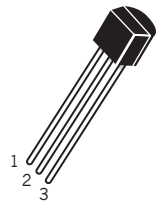


### NPN General Purpose Transistors

 Lead(Pb)-Free



TO-92



#### MAXIMUM RATINGS

Rating	Symbol	2222	2222A	Unit
Collector-Emitter Voltage	$V_{ECO}$	30	40	Vdc
Collector-Base Voltage	$V_{CBO}$	60	75	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	6.0	Vdc
Collector Current-Continuous	$I_C$	600		mAdc

#### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (1) $T_A=25^{\circ}\text{C}$ Derate above $25^{\circ}\text{C}$	$P_D$	225	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.8	$\text{mW}/^{\circ}\text{C}$
Total Device Dissipation Alumina Substrate, (2) $T_A=25^{\circ}\text{C}$ Derate above $25^{\circ}\text{C}$	$P_D$	300	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	2.4	$\text{mW}/^{\circ}\text{C}$
Junction and Storage, Temperature	$T_J, T_{stg}$	-55 to +150	$^{\circ}\text{C}$

#### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C=10\text{ mAdc}, I_B=0$ )	MPS 2222 MPS 2222A	$V_{(BR)CEO}$	30 40	- -	Vdc
Collector-Base Breakdown Voltage ( $I_C=10\text{ }\mu\text{Adc}, I_E=0$ )	MPS 2222 MPS 2222A	$V_{(BR)CBO}$	60 75	- -	Vdc
Emitter-Base Breakdown Voltage ( $I_E=10\text{ }\mu\text{Adc}, I_C=0$ )	MPS 2222 MPS 2222A	$V_{(BR)EBO}$	5.0 6.0	- -	Vdc
Collector Cutoff Current ( $V_{CE}=60\text{ Vdc}, V_{EB}(\text{off})=3.0\text{ Vdc}$ )	MPS 2222A	$I_{CEX}$	-	10	nAdc
Collector Cutoff Current ( $V_{CB}=50\text{ Vdc}, I_E=0$ ) ( $V_{CB}=60\text{ Vdc}, I_E=0$ ) ( $V_{CB}=50\text{ Vdc}, I_E=0, T_A=125^{\circ}\text{C}$ ) ( $V_{CB}=60\text{ Vdc}, I_E=0, T_A=125^{\circ}\text{C}$ )	MPS 2222 MPS 2222A MPS 2222 MPS 2222A	$I_{CBO}$	- - - -	0.01 0.01 10 10	nAdc
Emitter Cutoff Current ( $V_{EB}=3.0\text{ Vdc}, I_C=0$ )	MPS 2222A	$I_{EBO}$	-	100	nAdc
Base Cutoff Current ( $V_{CE}=60\text{ Vdc}, V_{EB}(\text{off})=3.0\text{ Vdc}$ )	MPS 2222A	$I_{BL}$	-	20	nAdc

1.FR-5=1.0 x 0.75 x 0.062 in

2.Alumina=0.4 x 0.3 x 0.024 in. 99.5% alumina

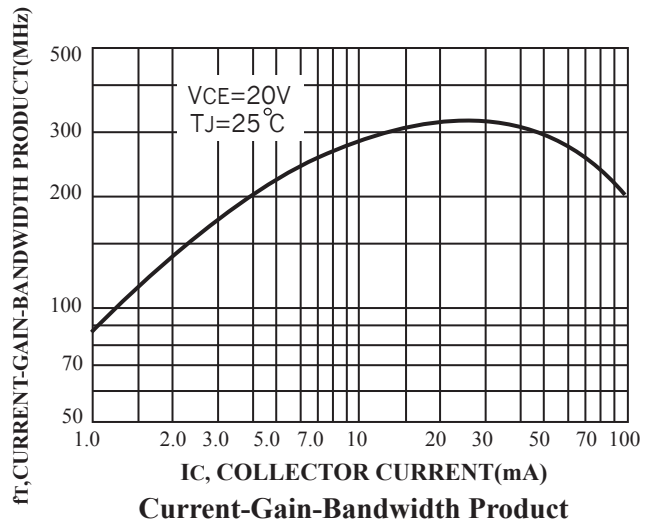
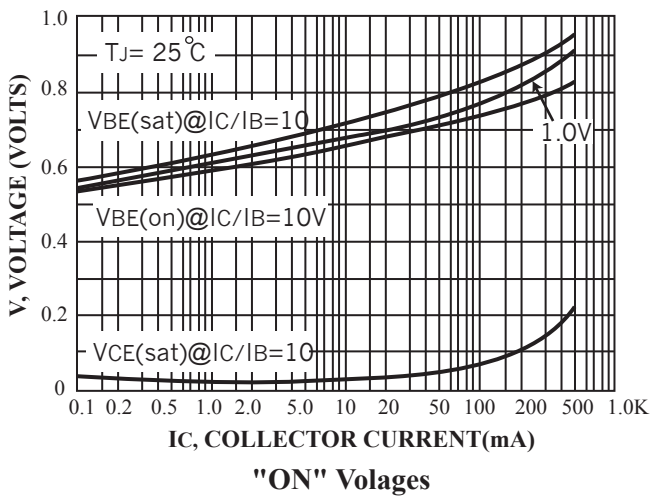
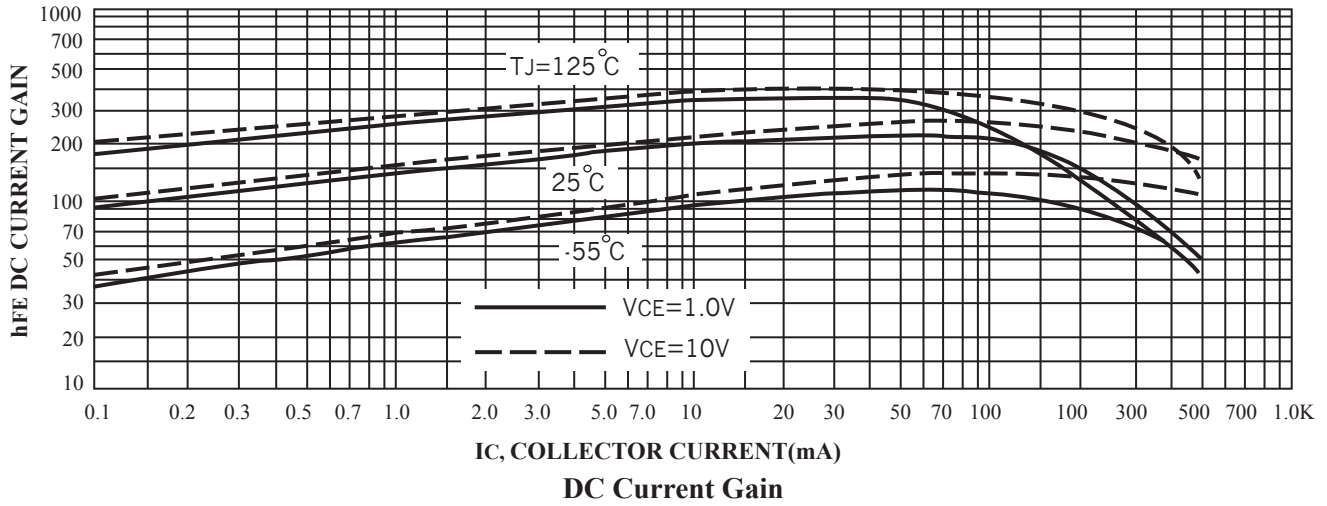
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted) (Continued)

Characteristics	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C=0.1\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ ) ( $I_C=1.0\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ ) ( $I_C=10\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ ) ( $I_C=10\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $T_A=-55^{\circ}\text{C}$ ) ( $I_C=150\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ ) (3) ( $I_C=150\text{ mAdc}$ , $V_{CE}=1.0\text{Vdc}$ ) (3) ( $I_C=500\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ ) (3)	$h_{FE}$	35 50 75 35 100 50 30 40	- - - - 300 - - -	-
	MPS 2222A ONLY			
	MPS 2222 MPS 2222A			
Collector-Emitter Saturation Voltage (3) ( $I_C=150\text{ mAdc}$ , $I_B=15\text{ mAdc}$ )  ( $I_C=500\text{ mAdc}$ , $I_B=50\text{ mAdc}$ )	$V_{CE(sat)}$	- - - -	0.4 0.3 1.6 1.0	Vdc
	MPS 2222 MPS 2222A			
	MPS 2222 MPS 2222A			
Base-Emitter Saturation Voltage (3) ( $I_C=150\text{ mAdc}$ , $I_B=15\text{ mAdc}$ )  ( $I_C=500\text{ mAdc}$ , $I_B=50\text{ mAdc}$ )	$V_{BE(sat)}$	- 0.6 - -	1.3 1.2 2.6 2.0	Vdc
	MPS 2222 MPS 2222A			
	MPS 2222 MPS 2222A			

**SMALL-SIGNAL CHARACTERISTICS**

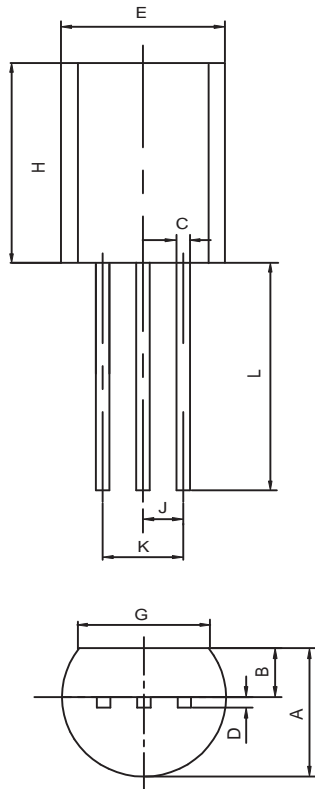
Current-Gain-Bandwidth Product (4) ( $I_C=20\text{ mAdc}$ , $V_{CE}=20\text{ Vdc}$ , $f=100\text{ MHz}$ )	$f_T$	250 300	- -	MHz
	MPS 2222 MPS 2222A			
Output Capacitance ( $V_{CB}=10\text{ Vdc}$ , $I_E=0$ , $f=1.0\text{ MHz}$ )	$C_{obo}$	-	8.0	pF
	MPS 2222 MPS 2222A			
Input Capacitance ( $V_{EB}=0.5\text{ Vdc}$ , $I_C=0$ , $f=1.0\text{ MHz}$ )	$C_{ibo}$	- -	30 25	pF
	MPS 2222 MPS 2222A			
Input Impedance ( $I_C=1.0\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ ) ( $I_C=10\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ )	$h_{ie}$	2.0 0.25	8.0 1.25	k
	MPS 2222 MPS 2222A			
Voltage Feedback Ratio ( $I_C=1.0\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ ) ( $I_C=10\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ )	$h_{re}$	- -	8.0 4.0	$\times 10^{-4}$
	MPS 2222 MPS 2222A			
Small-Signal Current Gain ( $I_C=1.0\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ ) ( $I_C=10\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ )	$h_{fe}$	50 75	300 375	-
	MPS 2222 MPS 2222A			
Output Admittance ( $I_C=1.0\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ ) ( $I_C=10\text{ mAdc}$ , $V_{CE}=10\text{ Vdc}$ , $f=1.0\text{ kHz}$ )	$h_{oe}$	5.0 25	35 200	$\mu\text{mhos}$
	MPS 2222 MPS 2222A			
Collector Base Time Constant ( $I_E=20\text{ mAdc}$ , $V_{CB}=20\text{ Vdc}$ , $f=31.8\text{ MHz}$ )	$r_b, C_c$	-	150	ps
	MPS 2222A			
Noise Figure ( $I_C=100\text{ }\mu\text{A}$ , $V_{CE}=10\text{ Vdc}$ , $R_S=1.0\text{ k}$ , $f=1.0\text{ kHz}$ )	NF	-	4.0	dB
	MPS 2222A			

## Typical Characteristics



**TO-92 Outline Dimensions**

unit:mm



<b>TO-92</b>		
<b>Dim</b>	<b>Min</b>	<b>Max</b>
<b>A</b>	3.30	3.70
<b>B</b>	1.10	1.40
<b>C</b>	0.38	0.55
<b>D</b>	0.36	0.51
<b>E</b>	4.40	4.70
<b>G</b>	3.43	-
<b>H</b>	4.30	4.70
<b>J</b>	1.270TYP	
<b>K</b>	2.44	2.64
<b>L</b>	14.10	14.50