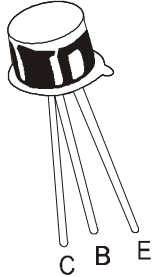


NPN SILICON PLANAR SWITCHING TRANSISTORS

2N2221 2N2222



**TO-18
Metal Can Package**

General Purpose Transistor

ABSOLUTE MAXIMUM RATINGS

DESCRIPTION	SYMBOL	VALUE	UNIT
Collector Emitter Voltage	V_{CEO}	30	V
Collector Base Voltage	V_{CBO}	60	V
Emitter Base Voltage	V_{EBO}	5	V
Collector Current Continuous	I_C	800	mA
Power Dissipation @ $T_a=25^\circ\text{C}$ Derate Above 25°C	P_D	500 2.85	mW mW/°C
Power Dissipation @ $T_c=25^\circ\text{C}$ Derate Above 25°C	P_D	1.2 6.85	W mW/°C
Operating And Storage Junction Temperature Range	T_j, T_{stg}	- 65 to +200	°C

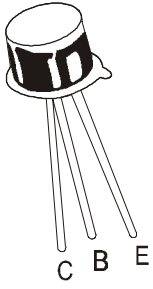
ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless specified otherwise)

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Collector Emitter Voltage	$*V_{CEO}$	$I_C=10\text{mA}, I_B=0$	30			V
Collector Base Voltage	V_{CBO}	$I_C=10\mu\text{A}, I_E=0$	60			V
Emitter Base Voltage	V_{EBO}	$I_E=10\mu\text{A}, I_C=0$	5			V
Collector Cut Off Current	I_{CBO}	$V_{CB}=50\text{V}, I_E=0$			10	nA
		$V_{CB}=50\text{V}, I_E=0,$ $T_a=150^\circ\text{C}$			10	μA
Collector Cut Off Current	I_{EBO}	$V_{EB}=3\text{V}, I_C=0$			10	nA

			2N2221	2N2222	
DC Current Gain	h_{FE}	$*I_C=0.1\text{mA}, V_{CE}=10\text{V}$	>20	>35	
		$I_C=1\text{mA}, V_{CE}=10\text{V}$	>25	>50	
		$*I_C=10\text{mA}, V_{CE}=10\text{V}$	>35	>75	
		$*I_C=150\text{mA}, V_{CE}=10\text{V}$	40 - 120	100 - 300	
		$*I_C=150\text{mA}, V_{CE}=1\text{V}$	>20	>50	
		$*I_C=500\text{mA}, V_{CE}=10\text{V}$	>20	>30	

***Pulse Test: Pulse Width $\leq 300\text{ms}$, Duty Cycle $\leq 2\%$**

2N2221_2222Rev_1 310303E



TO-18
Metal Can Package

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

SMALL SIGNAL CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Collector Emitter Saturation Voltage	$*V_{CE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$			0.4	V
		$I_C=500\text{mA}, I_B=50\text{mA}$			1.6	V
Base Emitter Saturation Voltage	$*V_{BE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$			1.3	V
		$I_C=500\text{mA}, I_B=50\text{mA}$			2.6	V
Transition Frequency	$**f_T$	$I_C=20\text{mA}, V_{CE}=20\text{V}, f=100\text{MHz}$	250			MHz
Output Capacitance	C_{obo}	$V_{CB}=10\text{V}, I_E=0, f=100\text{KHz}$			8.0	pF
Input Capacitance	C_{ibo}	$V_{BE}=0.5\text{V}, I_C=0, f=100\text{KHz}$			30	pF

SWITCHING TIME

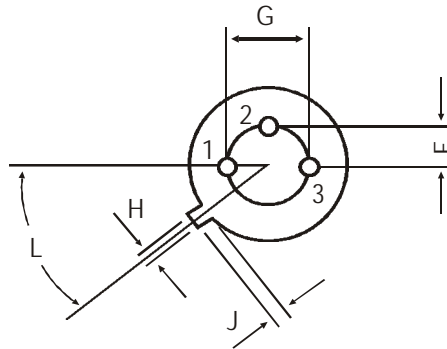
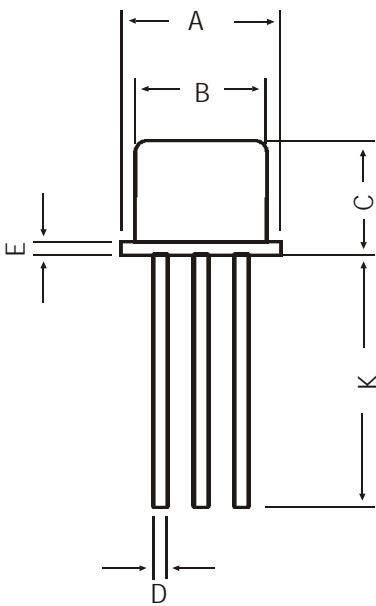
DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Delay Time	t_d	$I_C=150\text{mA}, I_{B1}=15\text{mA}, V_{CC}=30\text{V}, V_{BE(off)}=0.5\text{V}$			10	ns
Rise Time	t_r				25	ns
Storage Time	t_s	$I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}, V_{CC}=30\text{V}$			225	ns
Fall Time	t_f				60	ns

*Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

** f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity

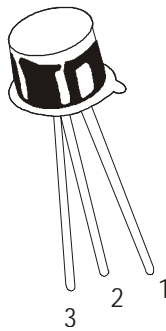
**TO-18
Metal Can Package**

TO-18 Metal Can Package



All dimensions in mm.

DIM	MIN	MAX
A	5.24	5.84
B	4.52	4.97
C	4.31	5.33
D	0.40	0.53
E	—	0.76
F	—	1.27
G	—	2.97
H	0.91	1.17
J	0.71	1.21
K	12.70	—
L	45 DEG	



PIN CONFIGURATION

- 1. EMITTER
- 2. BASE
- 3. COLLECTOR

Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-18	1K/polybag	350 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	34 kgs

Disclaimer

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