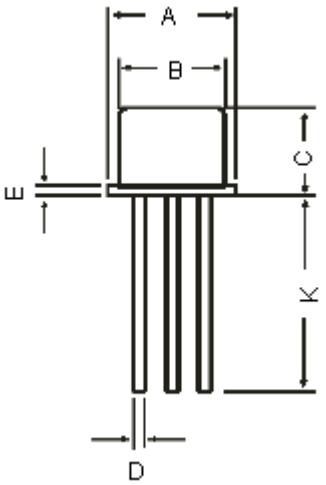
High Speed Switching Transistor

Features:

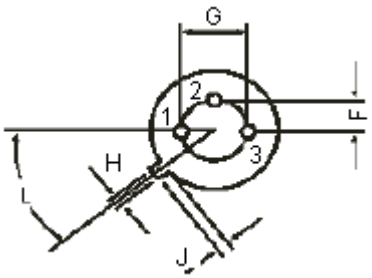
- NPN Silicon Planar Switching Transistor
- Fast switching devices exhibiting short turn-off and low saturation voltage characteristics
- Switching and Linear application DC and VHF Amplifier applications

TO-18 Metal Can Package



Dimensions	Minimum	Maximum
A	5.24	5.84
B	4.52	4.97
C	4.31	5.33
D	0.4	0.53
E	-	0.76
F	-	1.27
G	-	2.97
H	0.91	1.17
J	0.71	1.21
K	12.7	-
L	45°	

Dimensions : Millimetres



Pin Configuration

1. Emitter
2. Base
3. Collector

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Collector - Emitter Voltage	V_{CEO}	40	V
Collector - Base Voltage	V_{CBO}	75	
Emitter - Base Voltage	V_{EBO}	6	
Collector Current Continuous	I_c	800	mA
Power Dissipation at T_a = 25°C Derate above 25°C	P_D	500 2.28	mW mW / °C
Power Dissipation at T_C = 25°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°C unless otherwise specified)

Parameter	Symbol	Test Condition	Value		
			Minimum	Maximum	Unit
Collector - Emitter Voltage	V_{CEO}	I_C = 10 mA, I_B = 0	40	-	V
Collector - Base Voltage	V_{CBO}	I_C = 10 µA, I_E = 0	75	-	
Emitter - Base Voltage	V_{EBO}	I_E = 10 µA, I_C = 0	6	-	
Collector - Cut off Current	I_{CBO}	V_{CB} = 60 V, I_E = 0	-	10	nA
		T_a = 150°C		10	µA
	I_{CEX}	V_{CB} = 60 V, I_E = 0 V_{CE} = 60 V, V_{EB} = 3 V		10	nA
Emitter - Cut off Current	I_{EBO}	V_{EB} = 3 V, I_C = 0	-	10	nA
Base - Cut off Current	I_{BL}	V_{CE} = 60 V, V_{EB} = 3 V	-	20	
Collector Emit >35 ter Saturation Voltage	*$V_{CE\ (Sat)}$	I_C = 150 mA, I_B = 15 mA	-	0.3	V
		I_C = 500 mA, I_B = 50 mA	-	1	
Base Emitter Saturation Voltage	*$V_{BE\ (Sat)}$	I_C = 150 mA, I_B = 15 mA	-	0.6 to 1.2	
		I_C = 500 mA, I_B = 50 mA	-	2	

Electrical Characteristics (T_a = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Rating	Unit
DC Current Gain	h_{FE}	I_C = 0.1 mA, V_{CE} = 10 V	>35	-
		I_C = 1 mA, V_{CE} = 10 V	>50	
		I_C = 10 mA, V_{CE} = 10 V	>75	
		T_a = 55°C		
		I_C = 10 mA, V_{CE} = 10 V	>35	
		I_C = 150 mA, V_{CE} = 10 V	100 to 300	
		I_C = 150 mA, V_{CE} = 1 V	>50	
		I_C = 500 mA, V_{CE} = 10 V	>40	
Dynamic Characteristics				
		ALL F = 1 kHz		
Small Signal Current Gain	h_{fe}	I_C = 1 mA, V_{CE} = 10 V	50 to 300	-
		I_C = 10 mA, V_{CE} = 10 V	75 to 375	
Input Impedance	h_{ie}	I_C = 1 mA, V_{CE} = 10 V	2 to 8	kΩ
		I_C = 10 mA, V_{CE} = 10 V	0.25 to 1.25	
Voltage Feedback Ratio	h_{re}	I_C = 1 mA, V_{CE} = 10 V	<8	x10-4
		I_C = 10 mA, V_{CE} = 10 V	<4	
Output Admittance	h_{oe}	I_C = 1 mA, V_{CE} = 10 V	5 to 35	umhos
		I_C = 10 mA, V_{CE} = 10 V	25 to 200	
Collector Base Time Constant	rb'Cc	I_E = 20 mA, V_{CB} = 20 V f = 31.8 MHz	<150	ps

Parameter	Symbol	Test Condition	Rating	Unit
Dynamic Characteristics				
Real Part Common - Emitter High Frequency	$Re_{(hie)}$	I_C = 20 mA, V_{CE} = 20 V	<60	Ω
Input Impedance	-	f = 300 MHz	-	-
Noise Figure	N_F	I_C = 100 µA, V_{CE} = 10 V Rs = 1 kΩ, f = 1 kHz	<4	dB
Dynamic Characteristics				
Transistors Frequency	f_t	I_C = 20 mA, V_{CE} = 20 V f = 100 MHz	>300	MHz
Output Capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0 f = 100 kHz	<8	pF
Input Capacitance	C_{ib}	V_{EB} = 0.5 V, I_C = 0 f = 100 kHz	<25	
Switching Time				
Delay Time Rise Time	t_d t_r	I_C = 150 mA, I_{B1} = 15 mA V_{CC} = 30V, V_{BE} = 0.5 V	<10 <25	ns
Storage Time Fall Time	t_s t_f	I_C = 150 mA, I_{B1} = I_{B2} = 15 mA, V_{CC} = 30 V	<225 <60	

***Pulse Condition: Pulse Width = 300 µs, Duty Cycle = 2%**

Specification Table

V_{CEO} Maximum (V)	I_C Maximum (A)	$V_{CE\ (sat)}$ Maximum (V) at I_C = 150 mA	t_{off} Maximum (ns) at I_C = 150 mA	h_{FE} Minimum at I_C = 150 mA	P_{tot} at 25°C (mW)	Package and Pin Out	Part Number
40	0.8	0.3	60	100	500	TO-18	2N2222A