

High Speed Switching Transistor



**RoHS
Compliant**



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

Specification Table

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

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 $T_A = 25^\circ C$ Derate above 25°C	P_D	500 2.28	mW mW / °C
Power Dissipation at $T_c = 25^\circ C$ 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 ($T_A = 25^\circ C$ unless otherwise specified)

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

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

Parameter	Symbol	Test Condition	Rating	Unit
DC Current Gain	h _{FE}	I _C = 0.1mA, V _{CE} = 10V	>35	-
		I _C = 1mA, V _{CE} = 10V	>50	
		I _C = 10 mA, V _{CE} = 10V	>75	
		T _A = 55°C		
		I _C = 10mA, V _{CE} = 10V	>35	
		I _C = 150mA, V _{CE} = 10V	100 to 300	
		I _C = 150mA, V _{CE} = 1V	>50	
		I _C = 500mA, V _{CE} = 10V	>40	

Dynamic Characteristics

		ALL F = 1kHz		
Small Signal Current Gain	h _{FE}	I _C = 1mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V	50 to 300 75 to 375	-
Input Impedance	h _{IE}	I _C = 1mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V	2 to 8 0.25 to 1.25	kΩ
Voltage Feedback Ratio	h _{RE}	I _C = 1mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V	<8 <4	x10 ⁻⁴
Output Admittance	h _{OE}	I _C = 1mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V	5 to 35 25 to 200	umhos
Collector Base Time Constant	rb'Cc	I _E = 20mA, V _{CB} = 20V f = 31.8MHz	<150	ps

Dynamic Characteristics

Real Part Common - Emitter High Frequency	Re (hie)	I _C = 20mA, V _{CE} = 20V	<60	Ω
Input Impedance	-	f = 300MHz	-	-
Noise Figure	N _F	I _C = 100μA, V _{CE} = 10V R _s = 1kΩ, f = 1kHz	<4	dB
Transistors Frequency	f _t	I _C = 20mA, V _{CE} = 20V f = 100MHz	>300	MHz
Output Capacitance	C _{ob}	V _{CB} = 10V, I _E = 0 f = 100kHz	<8	pF
Input Capacitance	C _{ib}	V _{EB} = 0.5V, I _C = 0 f = 100kHz	<25	

Switching Time

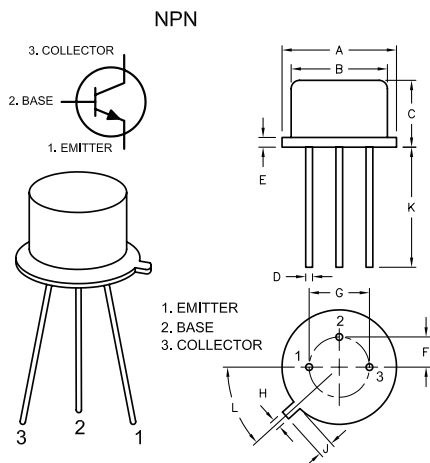
Delay Time	t _d	I _C = 150mA, I _{B1} = 15mA	<10	ns
Rise Time	t _r	V _{CC} = 30V, V _{BE} = 0.5V	<25	
Storage Time	t _s	I _C = 150mA, I _{B1} =	<225	
Fall Time	t _f	I _{B2} = 15mA, V _{CC} = 30V	<60	

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

High Speed Switching Transistor



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

Material content declaration of TO-18 1pc weight: 0.3092gm				
Components	Substance make up of Material	Chemical Composition	CAS Number	Amount of substances (gm)
Header/cap	KOVAR, CRS1010	Fe Ni 29 Co 18 Glass	7439-89-6 7440-02-0 7440-48-4	0.2889gm
Chip	Silicon	Si	7440-21-3	0.0031gm
Bonding Wire	Aluminium (Al)	Al	7429-90-05	0.00089gm
Tin Plating	Pure Tin	Sn	7440-31-5	0.0074gm

Part Number Table

Description	Part Number
Bipolar (BJT) Single Transistor, NPN, 40V, 300MHz, 1.2W, 800mA	2N2222A

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