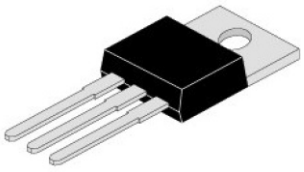
Bipolar Transistor

RoHS Compliant



Description

Complementary Silicon Transistors intended for a wide variety of Switching and Amplifier Applications, Series and Shunt Regulators, Driver and Output stages of Hi-Fi Amplifiers

Features

- This product is available in AEC-Q101 Compliant and PPAP Capable also.

Note: For AEC-Q101 compliant products, please use suffix -AQ in the part number while ordering.

Absolute Maximum Ratings (Ta = 25°C Unless otherwise specified)

Description	Symbol	TIP30C	Unit
Collector Emitter (sus) Voltage	V_{CEO}	100	V
Collector Base Voltage	V_{CBO}	100	
Emitter Base Voltage	V_{EBO}	5	
Collector Current Continuous	I_C	1	A
Collector Current Peak	I_{CM}	3	
Base Current	I_B	0.4	
Power Dissipation upto Tc=25ºC	P_D	30	W
Power Dissipation upto Ta=25ºC		2	
Derate above 25ºC		16	mW/°C
Storage Temperature	T_{stg}	- 65 to +150	ºC
Junction Temperature	T_j	150	

Thermal Resistances

Description	Symbol	Value	Unit
Junction to Case	$R_{th(j-c)}$	4.167	ºC/W
Junction to Ambient in free air	$R_{th(j-a)}$	62.5	

Electrical Characteristics

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector Emitter (sus) Voltage	$V_{CEO(sus)}$[1]	I_C=30mA, I_B=0	100	--		V
Collector Cut off Current	I_{CEO}	V_{CE}=60V, I_B=0	--		0.3	mA
Collector Cut Off Current	I_{CES}	V_{CE}=$V_{CEO(max)}$, V_{BE}=0			0.2	
Emitter Cut Off Current	I_{EBO}	V_{EB}=5V, I_C=0			1	
DC Current Gain	h_{FE}[1]	I_C=0.2A, V_{CE}=4V	40		--	
		I_C=1A, V_{CE}=4V	15		100	
Collector Emitter Saturation Voltage	$V_{CE\ (sat)}$[1]	I_C=1A, I_B=125mA	--		0.7	V
Base Emitter On Voltage	$V_{BE(on)}$[1]	I_C=1A, V_{CE}=4V	--		1.3	
Dynamic Characteristic						
Small Signal Current Gain	h_{fe}	I_C=0.2A, V_{CE}=10V, f=1KHz	20	--	--	--
Transition Frequency	f_T	I_C=0.2A, V_{CE}=10V, f=1KHz	3			MHz
Switching Characteristics						
Turn On Time	t_{on}	Vcc=30V, Ic=2A,	--	0.43	--	µS
Turn Off Time	t_{off}	I_{B1}=I_{B2}=0.2A		1		

Note:
1. Pulse Test : Pulse width <300ms, Duty Cycle <2%

Recommended Reflow Solder Profiles

The recommended reflow solder profiles for Pb and Pb-free devices are shown below.

Figure 1 shows the recommended solder profile for devices that have Pb-free terminal plating, and where a Pb free solder is used.

Figure 2 shows the recommended solder profile for devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with a leaded solder.

Figure 1

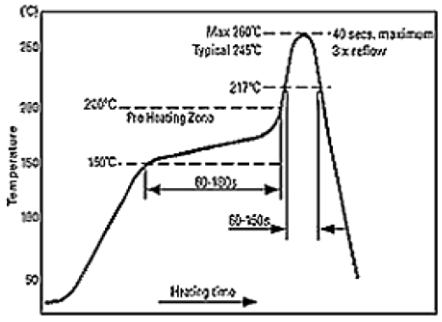
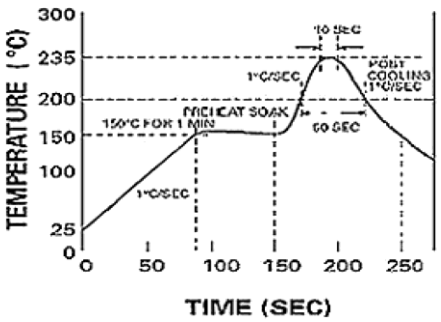


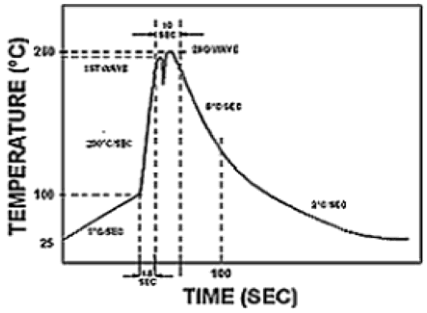
Figure 2



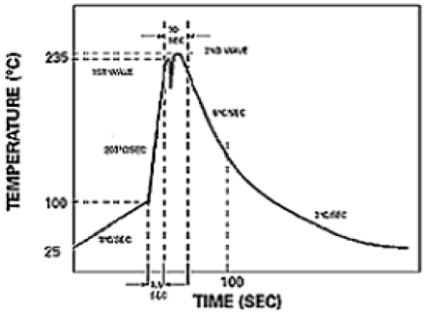
Reflow profiles in tabular form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	150-170°C 60-180 seconds	150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	200°C 30-50 seconds	217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	40 seconds
Ramp-Down Rate	3°C/second max.	6°C/second max.

The Recommended Solder Profile for Devices With Pb-free terminal plating, where a Pb-free solder is used



The recommended solder Profile For Devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with leaded solder



Wave Profiles in Tabular Form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~200°C/second	~200°C/second
Heating rate during preheat	Typical 1-2, Max 4°C/sec	Typical 1-2, Max 4°C/Sec
Final preheat Temperature	Within 125°C of Solder Temp	Within 125°C of Solder Temp
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	10 seconds
Ramp-Down Rate	5°C/second max.	5°C/second max.

Typical Characteristics Curves

Fig 1: DC Current Gain

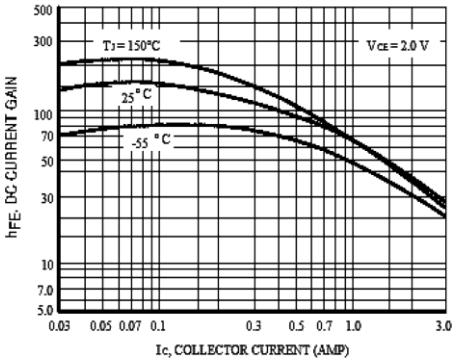


Fig 4: Turn-Off Time

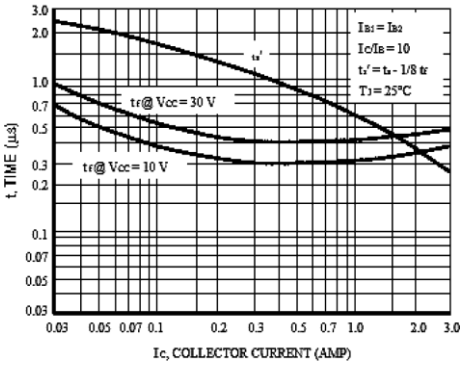


Fig 2: Turn-Off Time

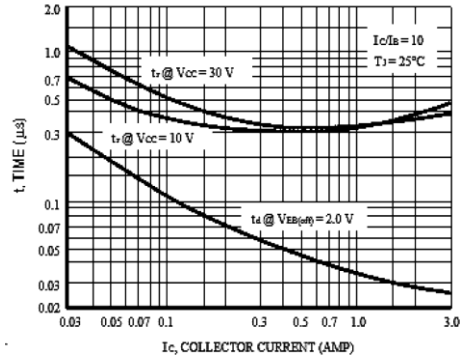
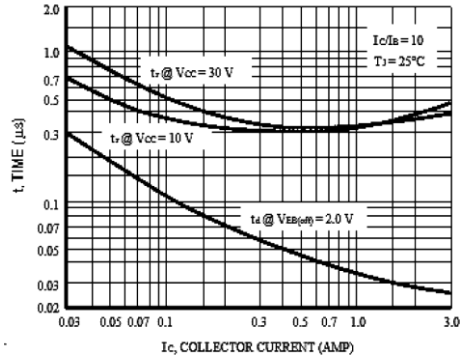
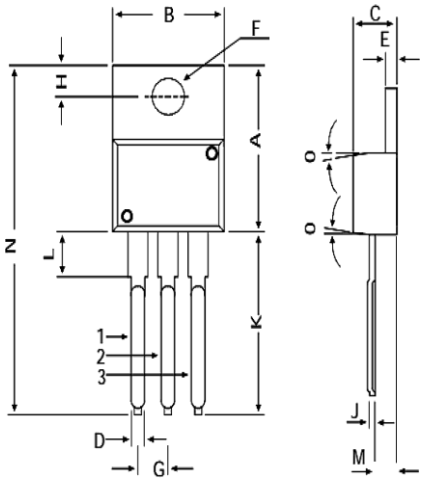


Fig 2: Turn-Off Time



Package Details

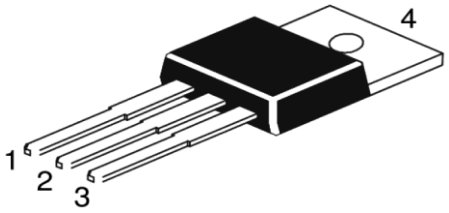
TO-220 Leaded Plastic Package



DIM	MIN	MAX
A	14.42	16.51
B	9.36	10.67
C	3.56	4.83
D	--	0.9
E	1.15	1.4
F	3.75	3.88
G	2.29	2.79
H	2.54	3.43
J	--	0.56
K	12.7	14.73
L	2.8	4.07
M	2.03	2.92
N	--	31.24
O	7°	

Dimensions: Millimeters

Bipolar Transistor



Pin Configuration
1. Base
2. Collector
3. Emitter
4. Collector

Part Number Table

Description	Part Number
Bipolar Transistor, PNP, 100V, 1A, TO-220	TIP30C