

**/ Descriptions**

TO-220F          NPN          Silicon NPN transistor in a TO-220F Plastic Package.

**/ Features**

Low collector saturation voltage, high power dissipation.

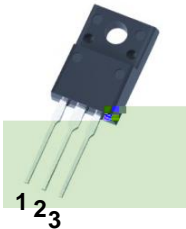
**/ Applications**

Power amplifier applications.

**/ Equivalent Circuit**



**/ Pinning**



PIN1 Base          PIN 2 Collector          PIN 3 Emitter

**/  $h_{FE}$  Classifications & Marking**

See Marking Instructions.

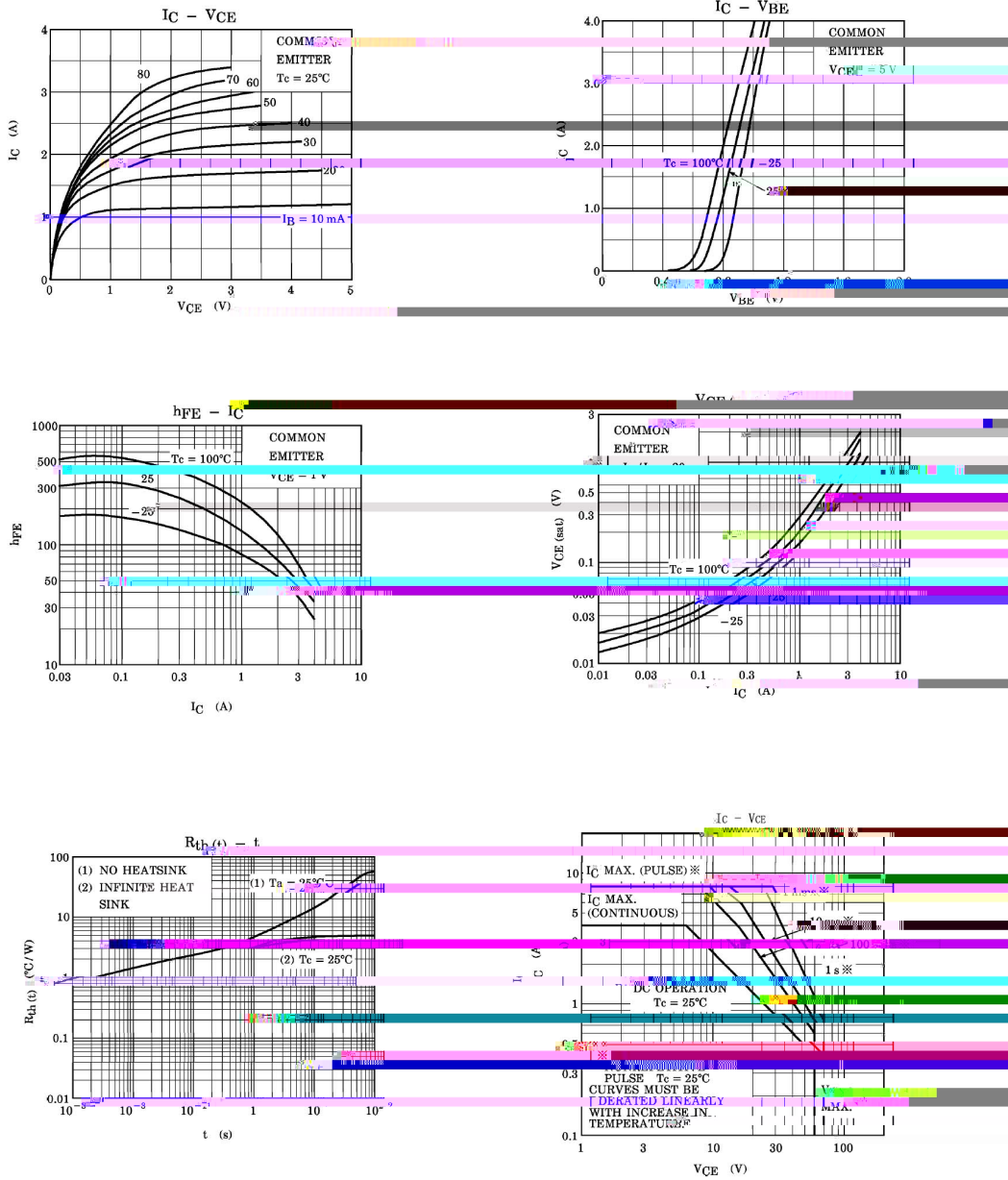
**/ Absolute Maximum Ratings(Ta=25 )**

Parameter	Symbol	Rating	Unit
Collector to Base Voltage	$V_{CBO}$	60	V
Collector to Emitter Voltage	$V_{CEO}$	60	V
Emitter to Base Voltage	$V_{EBO}$	7.0	V
Collector Current - Continuous	$I_C$	4.0	A
Base Current	$I_B$	1.0	A
Collector Power Dissipation	$P_C$	2.0	W
Collector Power Dissipation	$P_C(T_c=25 )$	25	W
Junction Temperature	$T_j$	150	
Storage Temperature Range	$T_{stg}$	-55 150	

**/ Electrical Characteristics(Ta=25 )**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector to Emitter Breakdown Voltage	$V_{CEO}$	$I_C=10mA$ $I_B=0$	60			V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=60V$ $I_E=0$			100	$\mu A$
Emitter Cut-Off Current	$I_{EBO}$	$V_{EB}=7.0V$ $I_C=0$			100	$\mu A$
DC Current Gain	$h_{FE(1)}$	$V_{CE}=5.0V$ $I_C=500mA$	100		320	
	$h_{FE(2)}$	$V_{CE}=5.0V$ $I_C=3A$	20			
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=2.5A$ $I_B=0.25A$		0.5	1.0	V
Base to Emitter Voltage	$V_{BE}$	$V_{CE}=5.0V$ $I_C=500mA$		0.75	1.0	V
Transition Frequency	$f_T$	$V_{CE}=5.0V$ $I_C=500mA$		3.0		MHz
Collector output capacitance	$C_{ob}$	$V_{CB}=10V$ $f=1.0MHz$ $I_E=0$		35		pF

/ Electrical Characteristic Curve

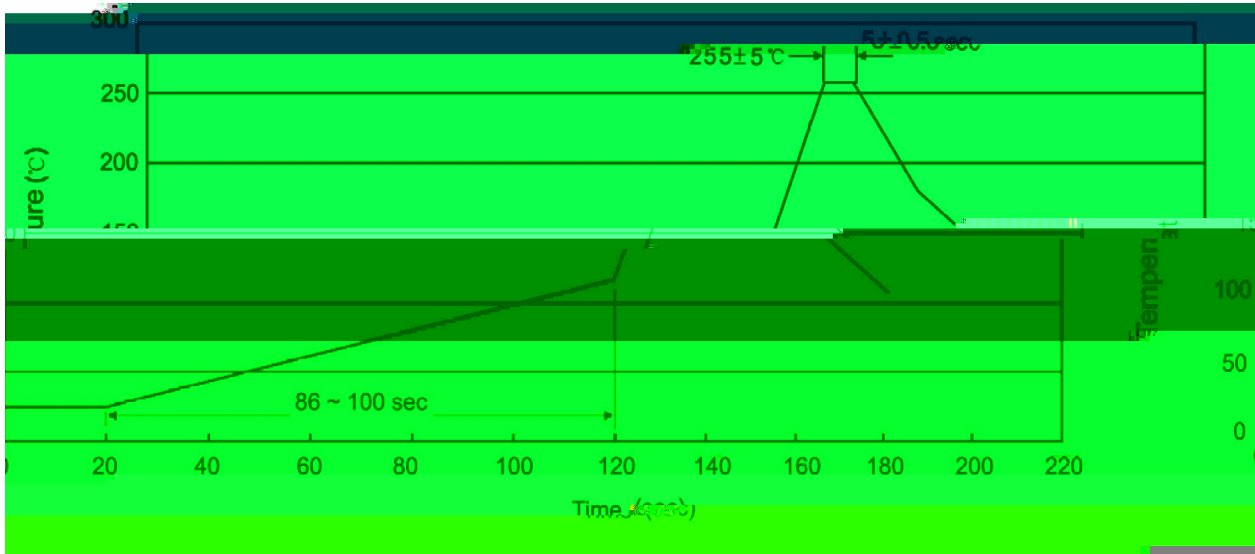


/ Package Dimensions





( ) / Temperature Profile for Dip Soldering(Pb-Free)



Note:

- |   |       |     |           |          |   |
|---|-------|-----|-----------|----------|---|
| 1 | 25    | 150 | 60        | 90sec;   | 1.Preheating:25~150 , Time:60~90sec.    |
| 2 | 255±5 |     | 5±0.5sec; |          | 2.Peak Temp.:255±5 , Duration:5±0.5sec. |
| 3 |       |     | 2         | 10 /sec. | 3. Cooling Speed: 2~10 /sec.            |

/ Resistance to Soldering Heat Test Conditions

270±5                      10±1 sec.                      Temp.:270±5                      Time:10±1 sec

/ Packaging SPEC.

/ BULK

Package Type	Units					Dimension (unit mm <sup>3</sup> )		
	Units/Bag /	Bags/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Bag	Inner Box	Outer Box
TO-220/F	200	10	2,000	5	10,000	135×190	237×172×102	560×245×195

/ TUBE

Package Type	Units					Dimension (unit mm <sup>3</sup> )		
	Units/Tube /	Tubes/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Tube	Inner Box	Outer Box
TO-220/F	50	20	1,000	5	5,000	532×31.4×5.5	555×164×50	575×290×180

/ Notices