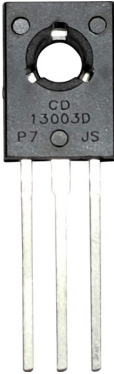


RoHS
Compliant



Applications

- Suitable for Lighting, Switching Regulator and Motor Control

Features

- With Built - in Integrated Diode between Emitter & Collector
- This product is available in AEC-Q101 Compliant and PPAP Capable also.

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

Parameter	Symbol	Value	Unit	
Collector Base Voltage	V _{CB0}	700	V	
Collector Emitter (sus) Voltage	V _{CEO}	400		
Emitter Base Voltage	V _{EBO}	9		
Collector Current	Continuous	I _c	2	A
	Pulse ¹	I _{CM}	3	
Collector Current	Continuous	I _B	0.75	
	Pulse ¹	I _{BM}	1.5	
Emitter Current	Continuous	I _E	2.25	
	Pulse ¹	I _{EM}	4.5	
Power Dissipation @ Ta=25 °C	P _D	1.4	W	
Derate Above 25°C		11.2	mW/°C	
Power Dissipation @ Tc=25 °C	P _D	45	W	
Derate Above 25°C		360	mW/°C	
Operating And Storage Junction Temperature Range	T _J , T _{STG}	-65 to +150	°C	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction to Case	R _{th (j-c)}	2.77	°C/W
Junction to Ambient	R _{th (j-a)}	89	
Maximum Lead Temperature for Soldering Purpose: 1/8" from Case for 5 Seconds	T _L	275	°C

Note:

1. Pulse Test: Pulse Width=5ms, Duty Cycle=10%

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Electrical Characteristics at (Ta = 25°C Unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Collector Base Voltage	V _{CB0}	I _C =1mA, I _E =0	700			V
Collector Emitter (sus) Voltage	V _{CE0(SUS)} ¹	I _C =10mA, I _B =0	400		--	
Collector Cut Off Current	I _{CBO}	V _{CB} =680V, I _E =0	--		1	mA
		V _{CB} =680V, I _E =0, T _C =100°C			5	
Emitter Cutoff Current	I _{EBO}	V _{EB} =9V, I _C =0			1	
DC Current Gain	h _{FE} ²	I _C =500mA, V _{CE} =5V ²	15		25	
	h _{FE}	I _C =1A, V _{CE} =5V	5		25	
Collector Emitter Saturation Voltage	V _{CE(sat)} ¹	I _C =0.5A, I _B =0.1A	--		0.5	V
		I _C =1A, I _B =0.25A			1	
		I _C =1.5A, I _B =0.5A			2.5	
		I _C =1A, I _B =0.25A, T _C =100°C			1	
Base Emitter Saturation Voltage	V _{BE(sat)} ¹	I _C =0.5A, I _B =0.1A	--		1	V
		I _C =1A, I _B =0.25A			1.2	
		I _C =1A, I _B =0.25A, T _C =100°C			1.1	
Integrated Diode Forward Voltage	V _{FEC}	I _F =2A			2	

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Current Gain Bandwidth Product	f _T	I _C =100mA, V _{CE} =10V, f=1MHz	4	--	--	MHz
Output Capacitance	C _{OB}	V _{CB} =10V, f=0.1MHz	--	21		pF

Switching Time

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Turn On Time	t _{on}	V _{CC} =125V, I _C =1A, I _{B1} =0.2A, I _{B2} =0.2A	--	--	1.1	μS
Storage Time	t _{stg}		2		4	
Fall Time	t _r		--		0.7	

Note:

1. Pulse Test:- PW=300μs, Duty Cycle=2%

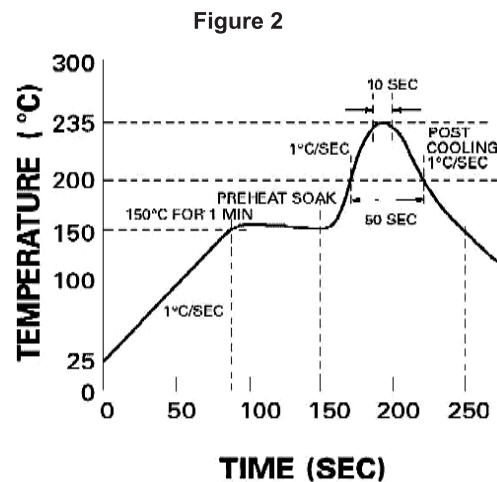
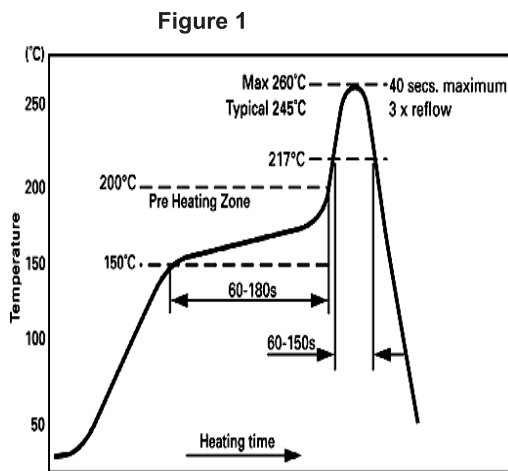
h _{FE} ² Classification:-	A	B
	15-19	19-25

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.



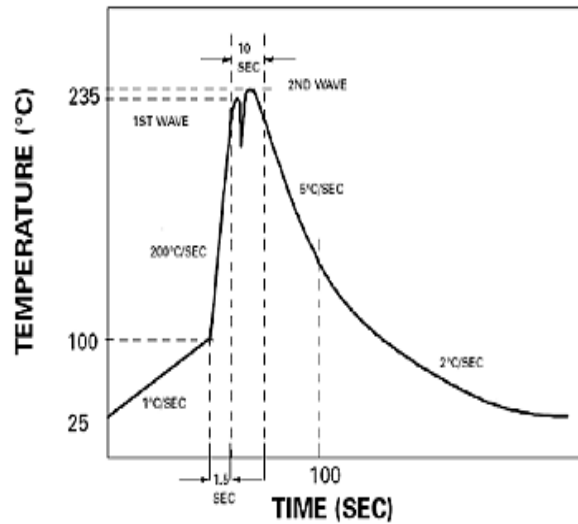
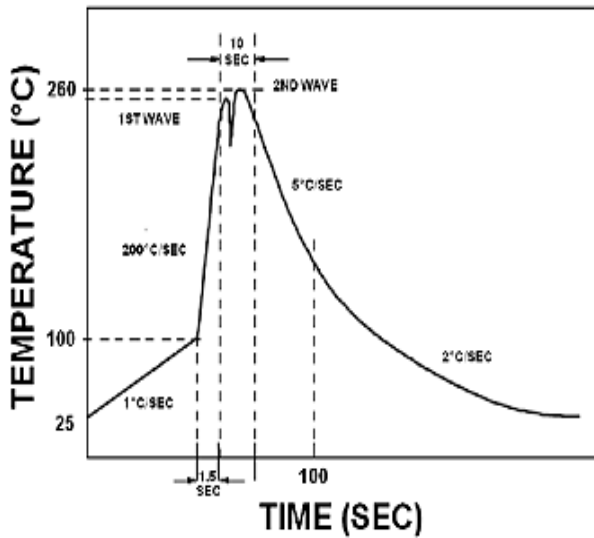
Reflow profiles in tabular form

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	5°C/second max.	6°C/second max.

Recommended Wave Solder Profiles

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	3°C/second max.	5°C/second max.

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Typical Characteristic Curves

Fig 1: Collector current v/s Collector Emitter Voltage

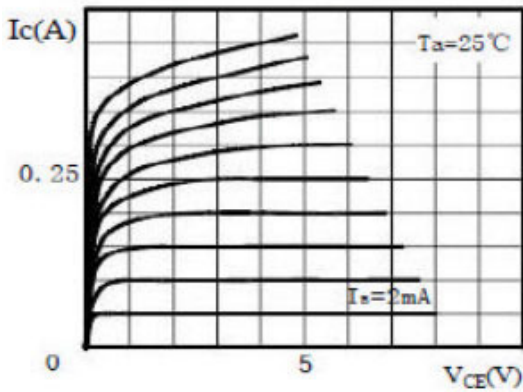


Fig 2: DC gain v/s Collector Current

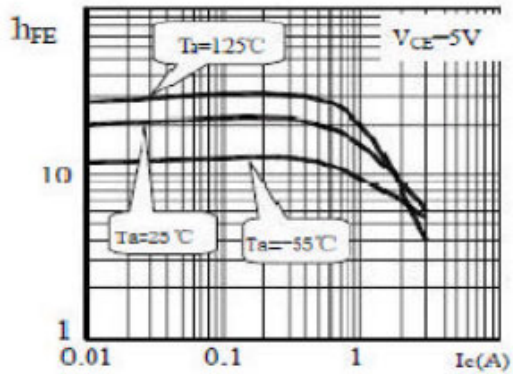


Fig 3: Collector emitter saturation voltage v/s Collector current

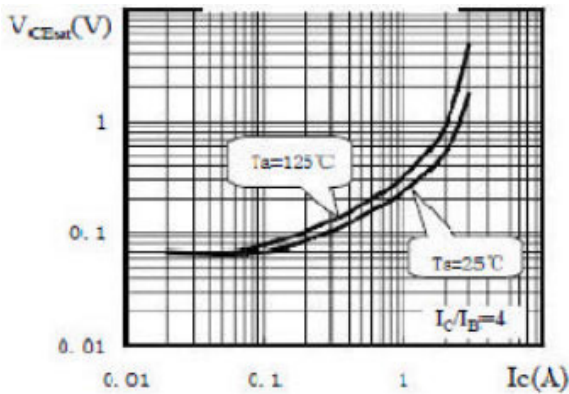


Fig 4. Base Emitter saturation voltage v/s collector current

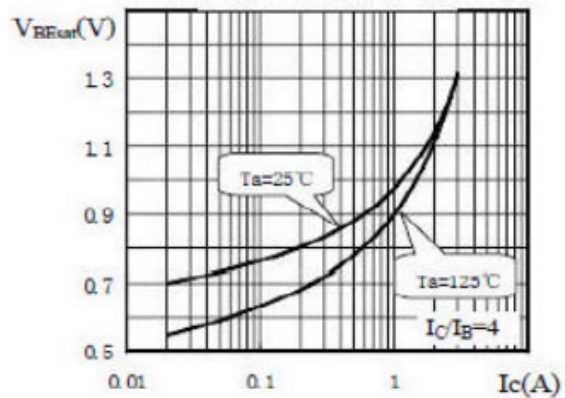


Fig 5: Power(%) v/s temperature

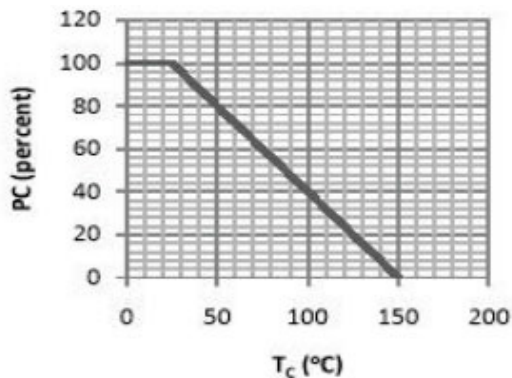
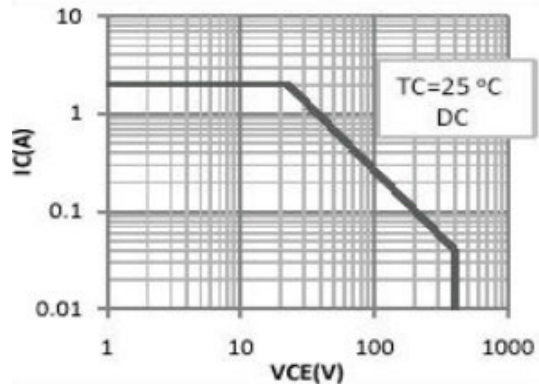
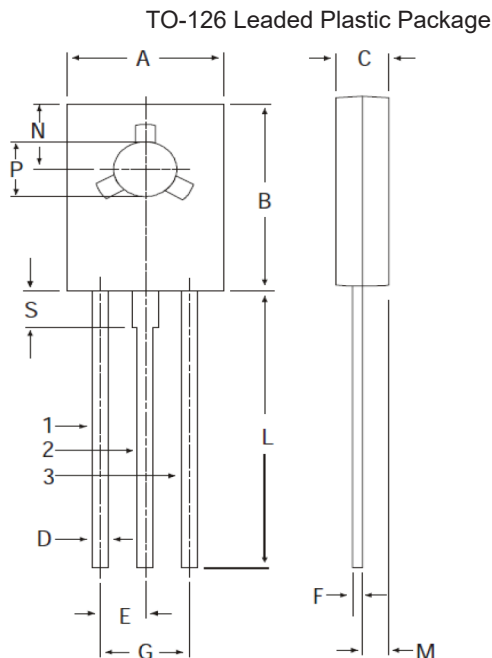


Fig 6: Safe operating Area



Dimensions



DIM	MIN.	MAX.
A	7.4	7.8
B	10.5	10.8
C	2.4	2.7
D	0.7	0.9
E	2.25 TYP	
F	0.49	0.75
G	4.5 TYP	
L	15.7 TYP	
M	1.27 TYP	
N	3.75 TYP	
P	3	3.2
S	2.5 TYP	

Dimensions : Millimetres

Part Number Table

Description	Part Number
Silicon Power Transistor, NPN, TO-126	CD13003D

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