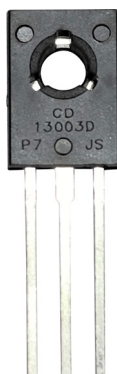


Silicon Power Transistor multicomp^{PRO}

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 _{EB0}	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 @ T _a =25 °C		P _D	1.4	W
Derate Above 25°C			11.2	mW/°C
Power Dissipation @ T _c =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%

Newark.com/multicomp-pro
Farnell.com/multicomp-pro
sg.element14.com/b/multicomp-pro

multicomp^{PRO}

Silicon Power Transistor multicomp^{PRO}

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

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Collector Base Voltage	V _{CBO}	I _C =1mA, I _E =0	700	--	--	V
Collector Emitter (sus) Voltage	V _{CEQ(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		
		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

Newark.com/multicomp-pro
Farnell.com/multicomp-pro
sg.element14.com/b/multicomp-pro

multicomp^{PRO}

Silicon Power Transistor multicomp^{PRO}

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

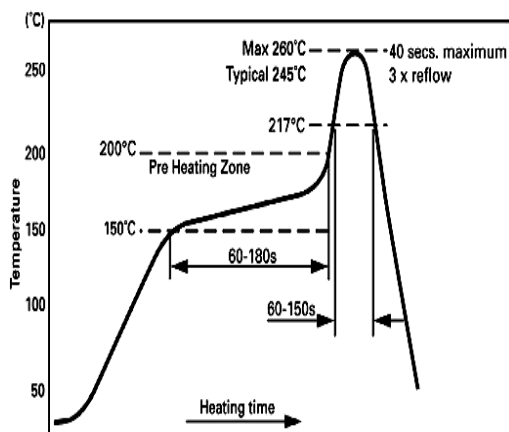
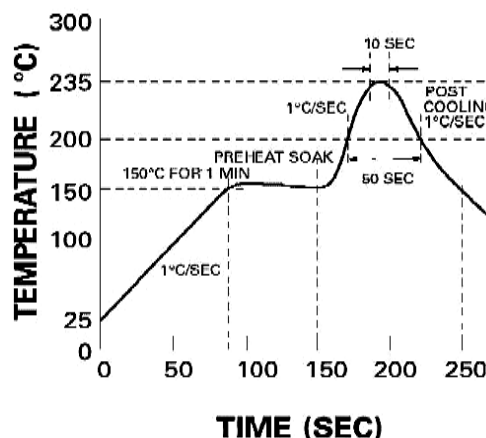


Figure 2



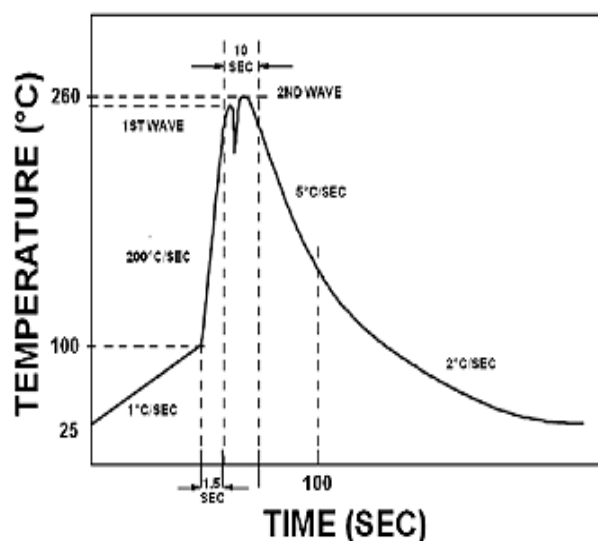
Reflow profiles in tabular form

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	5°C/second max.	6°C/second max.

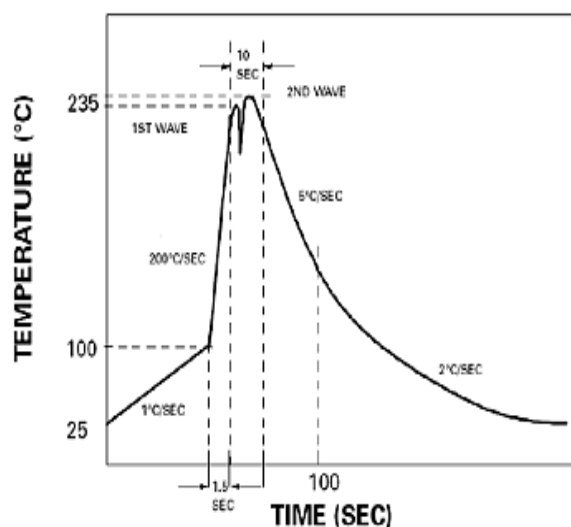
Silicon Power Transistor multcomp^{PRO}

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.

Silicon Power Transistor multcomp^{PRO}

Typical Characteristic Curves

Fig 1: Collector current v/s Collector Emitter Voltage

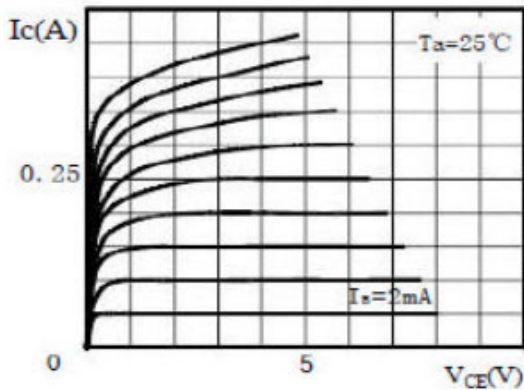


Fig 2: DC gain v/s Collector Current

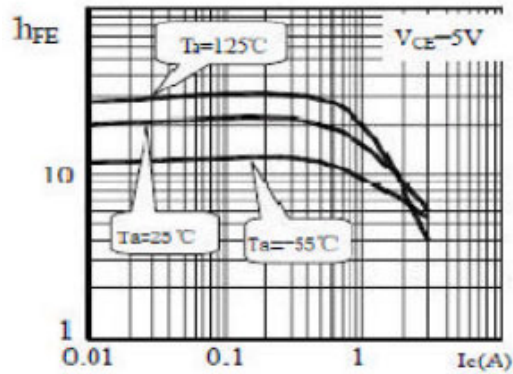


Fig 3: Collector emitter saturation voltage v/s Collector current

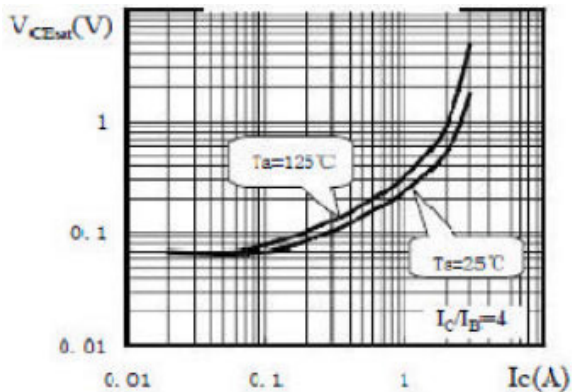


Fig 4. Base Emitter saturation voltage v/s collector current

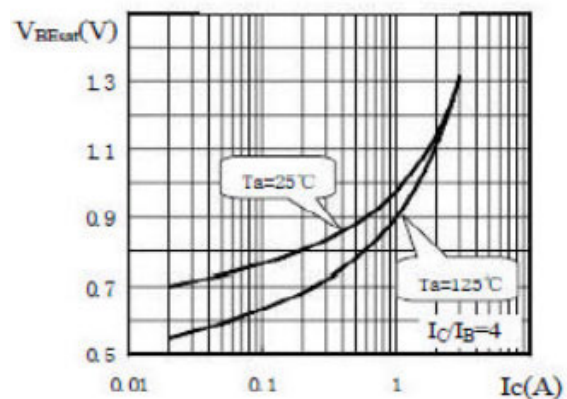


Fig 5: Power(%) v/s temperature

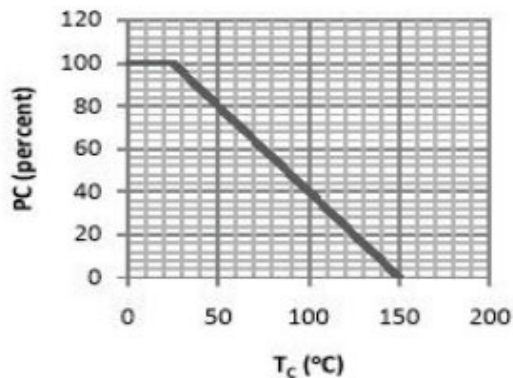
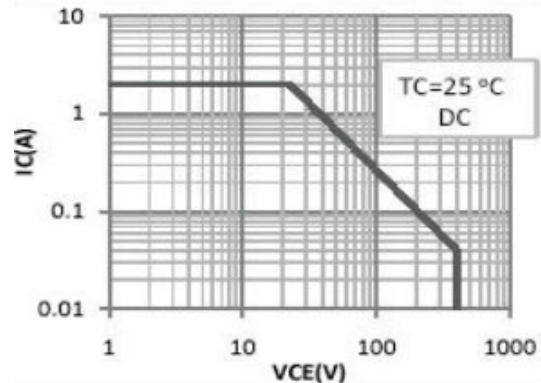
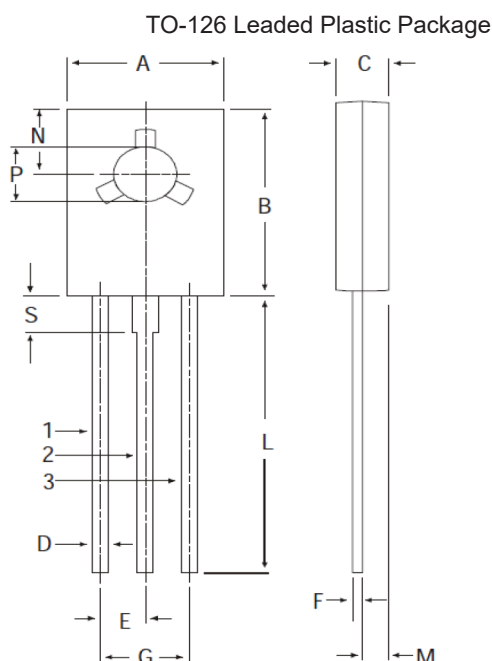


Fig 6: Safe operating Area



Silicon Power Transistor multicomp^{PRO}

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

Important Notice : This data sheet and its contents (the "Information") belong to the members of the AVNET group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp Pro is the registered trademark of Premier Farnell Limited 2019.

Newark.com/multicomp-pro
Farnell.com/multicomp-pro
sg.element14.com/b/multicomp-pro

multicomp^{PRO}