High Voltage Silicon Transistors PNP/NPN

multicomp PRO

RoHS Compliant

PNP 2N5679, 2N5680
NPN 2N5681, 2N5682

DEVICE MARKING

Full part number

GENERAL DESCRIPTION

The 2N5679, 2N5680, 2N5681 2N5682 series devices are complementary silicon power transistors, manufactured by the epitaxial planar process, designed for general-purpose amplifier and switching applications where high voltages are required. TO-39, Metal Can Package.

FEATURE:

1. High Voltage V_{CEO} = 120V (Max).
2. Hermetically sealed device
3. High current

ABSOLUTE MAXIMUM RATINGS (Ta = 25 ℃ Unless otherwise specified)

PARAMETER		SYMBOL	VALUE		UNIT
			2N5679 2N5681	2N5680 2N5682	
Collector - Base Voltage		V_{CBO}	100	120	V
Collector - Emitter Voltage		V_{CEO}	100	120	V
Emitter - Base Voltage		V_{EBO}	4.0		V
Continuous Collector Current		I_C	1.0		A
Base Current		I_B	0.5		A
Total Power Dissipation	@T_A=25°C	P_D	1.0		W
	Derating above@T_A=25°C		5.7		mW/°C
Total Power Dissipation	@T_C=25°C	P_D	10.0		W
	Derating above@T_C=25°C		57.0		mW/°C
Operating & Storage Junction Temperature Range		T_J, T_{stg}	-65 to +200		°C
THERMAL RESISTANCE					
Thermal Resistance Junction-to-Ambient		$R_{\theta JA}$	175.0		°C/W
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	17.5		°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

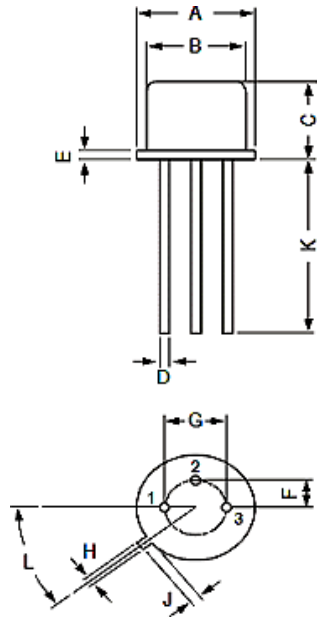
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Collector – Emitter Voltage	**2N5679, 2N5681**	$V_{CEO(SUS)}$ [1]	I_C = 10mA, I_B = 0	100	--	--	V
	2N5680 2N5682			120	--	--	V
Collector Cut-Off Current		I_{CBO}	V_{CE} = 100V I_E = 0	--	--	1.0	µA
			V_{CE} = 120V I_E = 0	--	--	1.0	
		I_{CEO}	V_{CE} = 70V I_B = 0	--	--	10	µA
			V_{CE} = 80V I_B = 0	--	--	10	
		I_{CEX}	V_{CE} = 100V V_{BE} = 1.5V	--	--	1.0	µA
			V_{CE} = 120V V_{BE} = 1.5V	--	--	1.0	
Collector Cut-Off Current	T_C=150°C		V_{CE} = 100V V_{BE} = 1.5V	--	--	1.0	µA
			V_{CE} = 120V V_{BE} = 1.5V	--	--	1.0	
Emitter-Cut off Current		I_{EBO}	V_{EB} = 4V, I_C = 0	--	--	1.0	µA
DC Current Gain	**2N5679, 2N5681**	h_{FE} [1]	I_C = 1.0A, V_{CE} = 2V	5.0	--		
DC Current Gain			I_C = 250mA, V_{CE} = 2V	40	--	160	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$ [1]	I_C = 250mA, I_B = 25mA	--	--	0.6	V
			I_C = 500mA, I_B = 50mA	--	--	1.0	
			I_C = 1.0 A, I_B = 200mA	--	--	2.0	
Base Emitter on Voltage		$V_{BE(ON)}$ [1]	I_C = 250mA, V_{CE} = 2V	--	--	1.0	
SMALL SIGNAL CHARACTERISTICS							
Small Signal Current Gain		h_{fe}	I_C = 200mA, V_{CE} = 1.5V, f = 1MHz	20	--	--	
Out-Put Capacitance		C_{ob}	V_{CB}=20V, I_E=0, f = 1MHz	--	--	50	pF
Transistors Frequency		f_t	I_C = 100mA, V_{CE} = 10V, f = 10MHz	30	--	--	MHz

Notes

1. Pulse Width ≤ 380us, δ ≤ 2%

PACKAGE DETAILS

TO-39 Metal Can Package



DIM	MIN	MAX
A	8.50	9.39
B	7.74	8.50
C	6.09	6.60
D	0.40	0.53
E	--	0.88
F	2.41	2.66
G	4.82	5.33
H	0.71	1.86
J	0.73	1.02
K	12.70	--
L	42°	

All Dimension are in mm

PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

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 leaded solder.

Figure 1

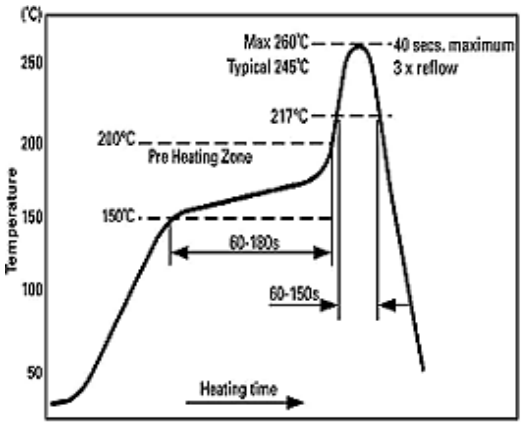
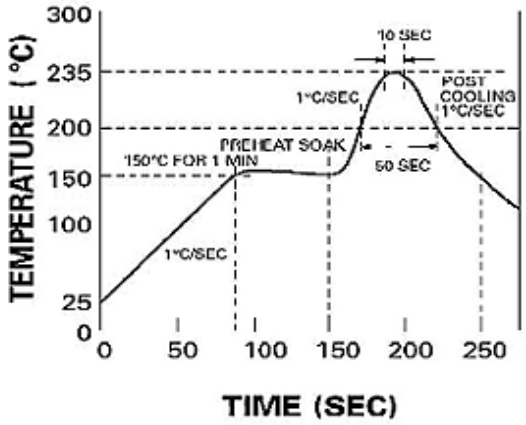


Figure 2

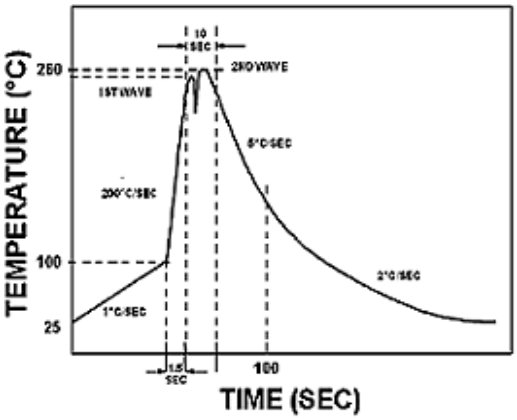


Reflow profiles in tabular form

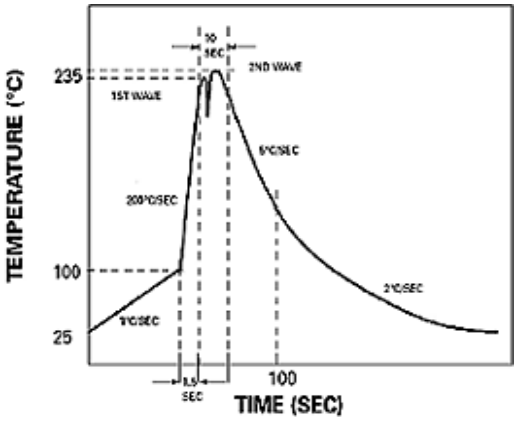
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	 150-170°C 60-180 seconds	 150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	 200°C 30-50 seconds	 217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time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

Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by Multicomp Pro.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying.
- Avoid storage in areas subject to corrosive gas or dust. The product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid temperature changes.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.

- The product shall not be placed directly on the floor.
- The product shall be stored in a plain area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period, which is defined as 2 years.
If products are stored longer than the shelf life of 2 years, the products shall be subjected to quality.

Floor Life the Products and MSL Level

The floor life will start when the products are opened from the original packing.
For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	**Time**	**Condition**
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label (TOL)	≤30 °C / 60% RH

Part Number Table

Description	Part Number
Transistor, PNP, 1A, 100V, TO-39	2N5679
Transistor, PNP, 1A, 120V, TO-39	2N5680
Transistor, NPN, 1A, 100V, TO-39	2N5681
Transistor, NPN, 1A, 120V, TO-39	2N5682