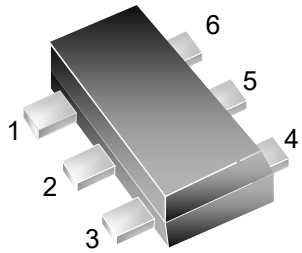
WT3946CW

Dual NPN+PNP Silicon Transistors

Features

- Lead Free Finish
- Ideal for Low Power Amplification and Switching
- Rugged and Reliable

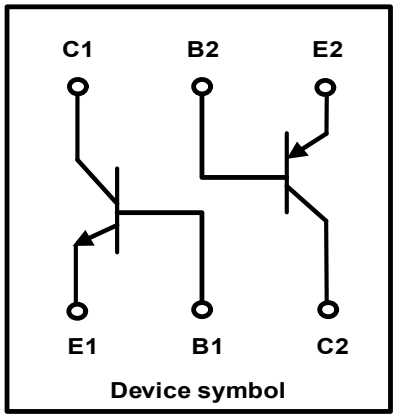


SOT-563

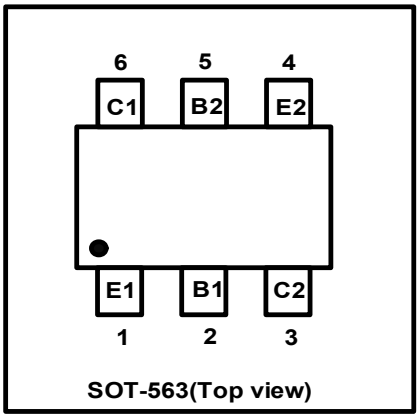
Mechanical Characteristics

- SOT-563 package
- Marking: Marking Code
- Packaging: Tape and Reel
- RoHS Compliant & HF
- Device meets MSL3 requirement

Schematic & PIN Configuration



Device symbol



SOT-563(Top view)

Absolute Maximum Rating TR1(NPN:P1&P2&P6)

Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CBO}	60	V
Collector Emitter Voltage	V_{CEO}	40	V
Emitter Base Voltage	V_{EBO}	5	V
Collector Current Continuous	I_C	0.2	A
Collector Power Dissipation	P_C	0.2	W
Junction Temperature Range	T_J	-55 ~ 150	°C
Storage Temperature Range	T_{STG}	-55 ~ 150	°C

Absolute Maximum Rating TR2(PNP:P3&P4&P5)

Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CBO}	-40	V
Collector Emitter Voltage	V_{CEO}	-40	V
Emitter Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-0.2	A
Collector Power Dissipation	P_C	0.2	W
Junction Temperature Range	T_J	-55 ~ 150	°C
Storage Temperature Range	T_{stg}	-55 ~ 150	°C

Electrical Characteristics of TR1(NPN) (Tamb=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10μA, I_E = 0	60	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1mA, I_B = 0	40	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 10μA, I_C = 0	5	-	-	V
Collector Cut-off Current	I_{CBO}	V_{CB} = 30V, I_E = 0	-	-	50	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 5V, I_C = 0	-	-	50	nA
DC Current Gain	$h_{FE(1)}$	V_{CE} = 1V, I_C = 0.1mA	40	-	-	-
	$h_{FE(2)}$	V_{CE} = 1V, I_C = 1mA	70	-	-	-
	$h_{FE(3)}$	V_{CE} = 1V, I_C = 10mA	100	-	300	-
	$h_{FE(4)}$	V_{CE} = 1V, I_C = 50mA	60	-	-	-
	$h_{FE(5)}$	V_{CE} = 1V, I_C = 100mA	30	-	-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10mA, I_B = 1mA	-	-	0.2	V
		I_C = 50mA, I_B = 5mA	-	-	0.3	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 10mA, I_B = 1mA	-	-	0.85	V
		I_C = 50mA, I_B = 5mA	-	-	0.95	
Transition Frequency	f_T	V_{CE}=20V, I_C=10mA, f=100MHz	300	-	-	MHz
Collector Output Capacitance	C_{ob}	V_{CB} = 5V, I_E = 0, f=1MHz	-	3.5	-	pF
Noise Figure	NF	V_{CE}=5V,I_C=0.1mA,f=1kHz,R_S=1KΩ	-	-	5	dB
Delay Time	t_d	V_{CC} = 3V, $V_{BE(off)}$ = -0.5V, I_C = 10mA, I_{B1}= -I_{B2}=1mA	-	30	-	nS
Rise Time	t_r		-	30	-	nS
Storage Time	t_s	V_{CC} = 3V, I_C = 10mA, I_{B1} =-I_{B2} =1mA	-	180	-	nS
Fall Time	t_f		-	45	-	nS

Electrical Characteristics of TR2(PNP) (Tamb=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = -10μA, I_E = 0	-40	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = -1mA, I_B = 0	-40	-	-	V
Emitter-Base Bbreakdown Voltage	$V_{(BR)EBO}$	I_E = -10μA, I_C = 0	-5	-	-	V
Collector Cut-off Current	I_{CBO}	V_{CB} = -40V,I_E = 0	-	-	-100	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = -5V,I_C = 0	-	-	-100	nA
DC Current Gain	$h_{FE(1)}$	V_{CE} = -1V, I_C = -0.1mA	60	-	-	-
	$h_{FE(2)}$	V_{CE} = -1V, I_C = -1mA	80	-	-	-
	$h_{FE(3)}$	V_{CE} = -1V, I_C = -10mA	100	-	300	-
	$h_{FE(4)}$	V_{CE} = -1V, I_C = -50mA	60	-	-	-
	$h_{FE(5)}$	V_{CE} = -1V, I_C = -100mA	30	-	-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = -10mA,I_B = -1mA	-	-	-0.25	V
		I_C = -50mA,I_B = -5mA	-	-	-0.4	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = -10mA,I_B = -1mA	-	-	-0.85	V
		I_C = -50mA,I_B = -5mA	-	-	-0.95	
Transition Frequency	f_T	V_{CE}= -20V,I_C= -10mA,f=100MHz	250	-	-	MHz
Noise Figure	NF	V_{CE}=-5V,I_C=-0.1mA,f=1kHz,R_g=1KΩ	-	-	4	dB
Delay Time	t_d	V_{CC} = -3V, V_{BC} = -0.5V, I_C = -10mA, I_{B1} = I_{B2} = -1mA	-	-	35	ns
Rise Time	t_r		-	-	35	ns
Storage Time	t_s	V_{CC} = -3V, I_C = -10mA, I_{B1} = -I_{B2} = -1mA	-	-	225	ns
Fall Time	t_f		-	-	75	ns

Typical Characteristics of TR1(NPN)

Figure 1. Static Characteristics

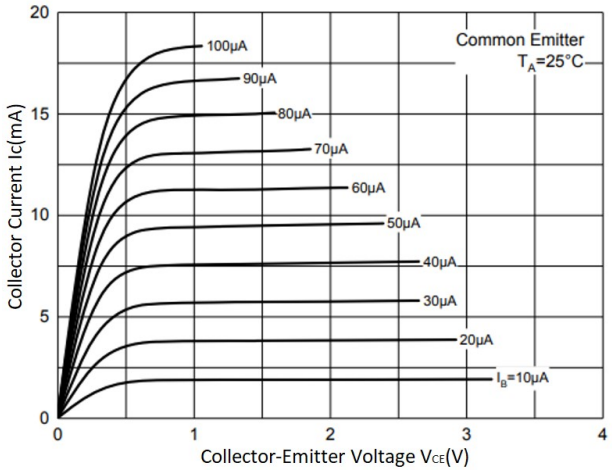


Figure 2. h_{FE} vs. I_C

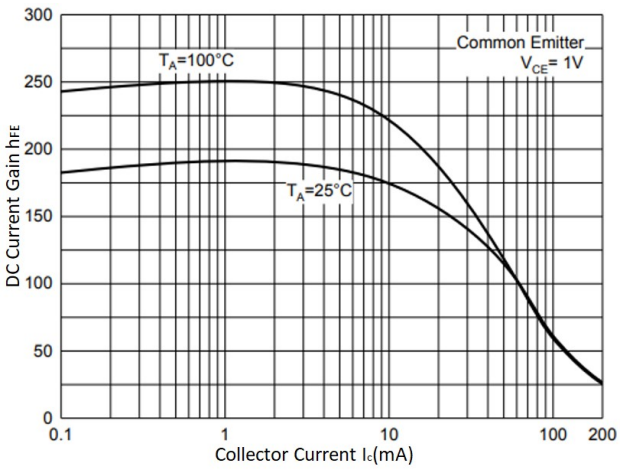


Figure 3. $V_{CE(sat)}$ vs. I_C

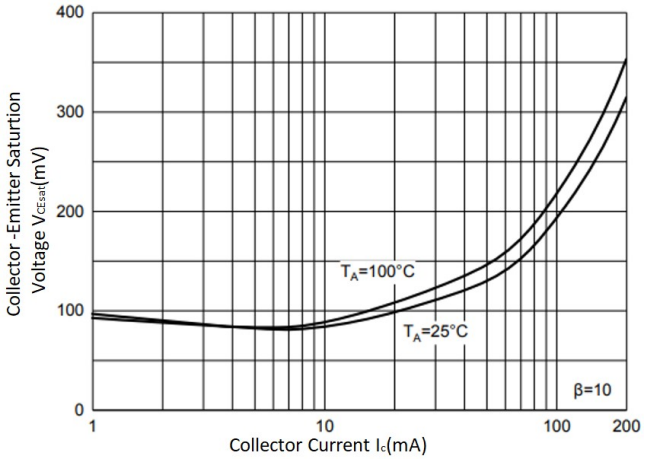


Figure 4. $V_{BE(sat)}$ vs. I_C

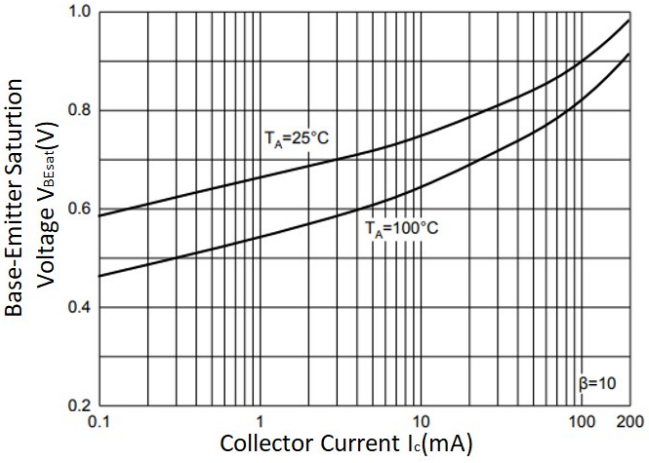


Figure 5. I_C vs. V_{BE}

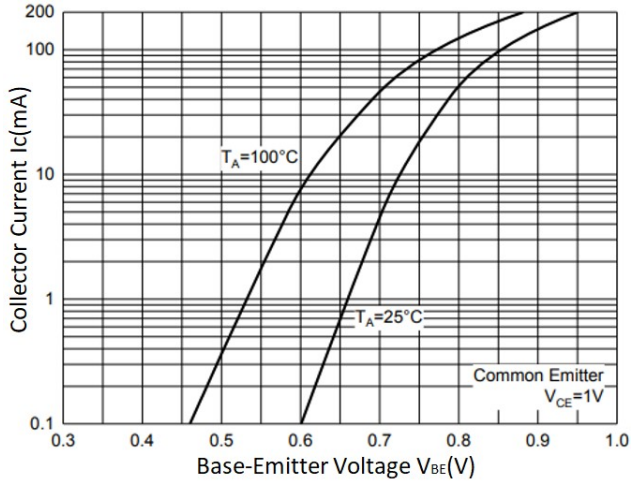
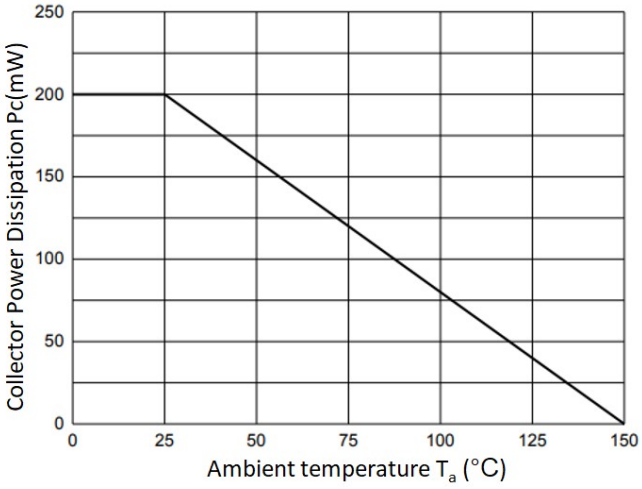


Figure 6. P_C vs. T_a



Typical Characteristics of TR2(PNP)

Figure 1. Static Characteristic

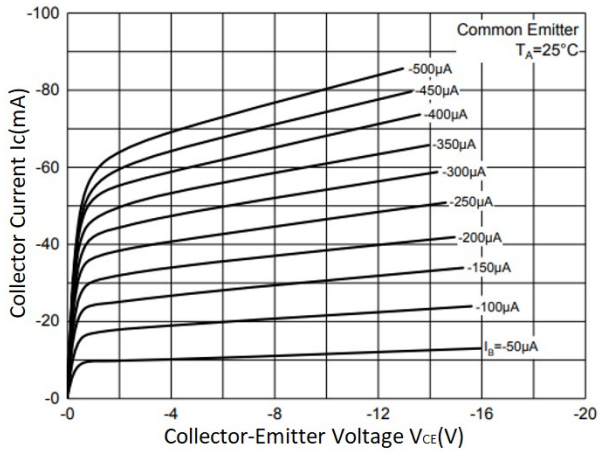


Figure 2. h_{FE} vs. I_C

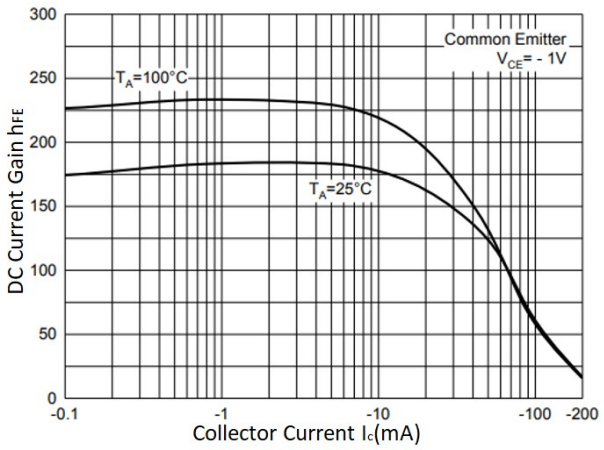


Figure 3. $V_{CE(sat)}$ vs. I_C

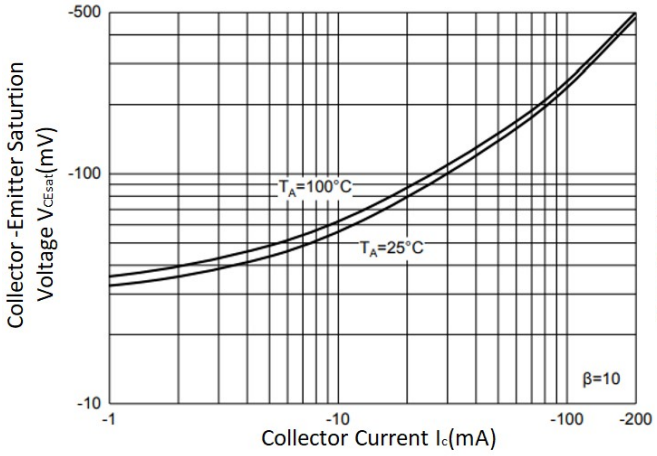


Figure 4. $V_{BE(sat)}$ vs. I_C

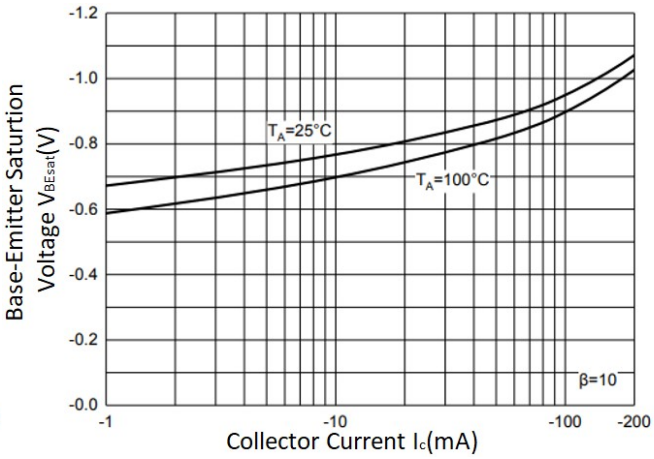


Figure 5. I_C vs. V_{BE}

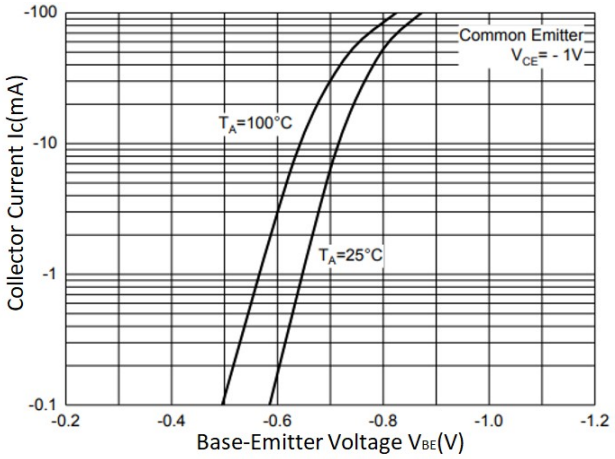
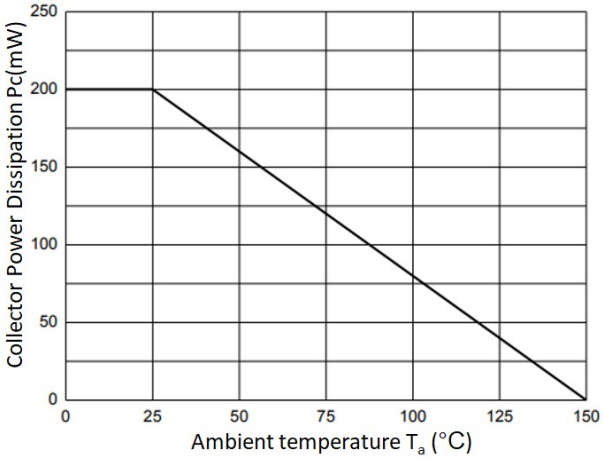
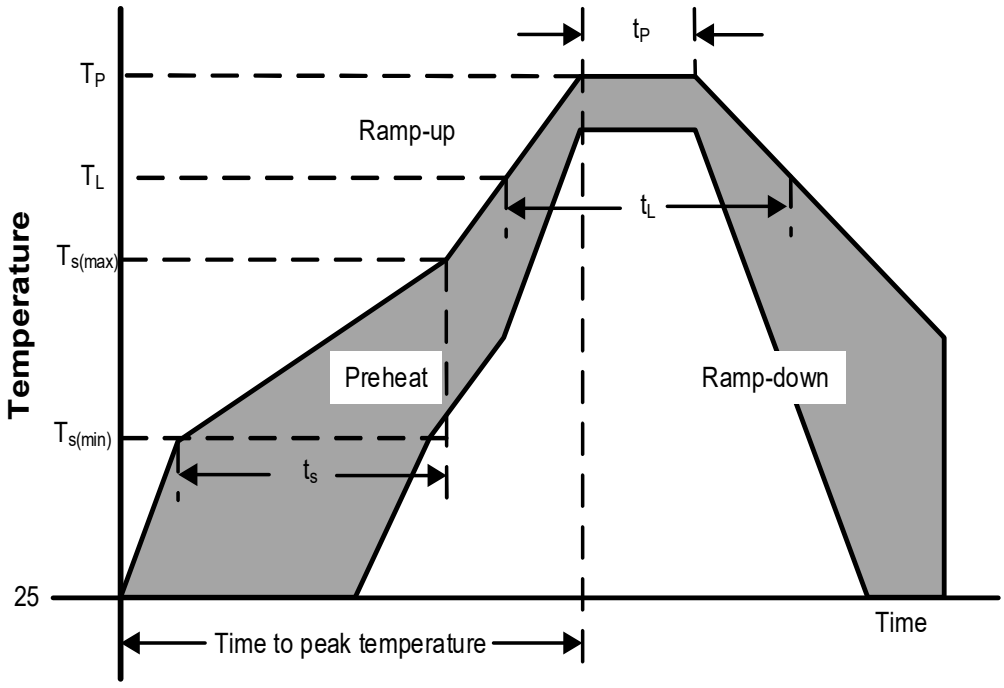


Figure 6. P_C vs. T_a



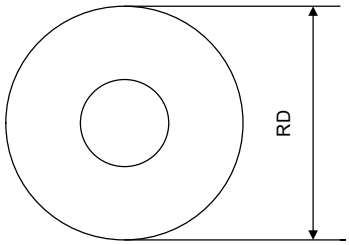
Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (ts)	60 – 190 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L——Ramp-up Rate		5°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260+0/-5 °C
Time within actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C

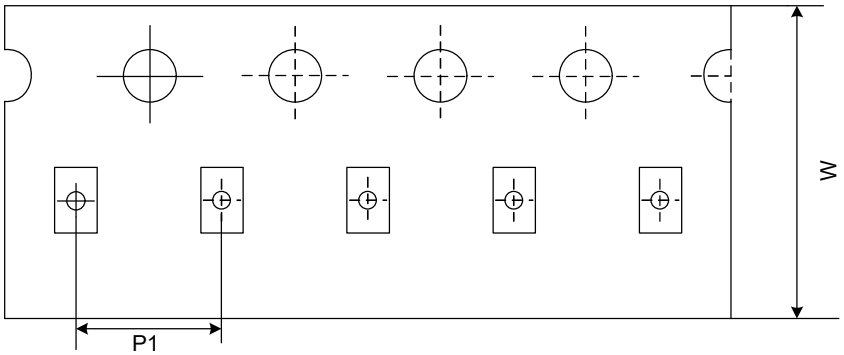


Tape And Reel Information

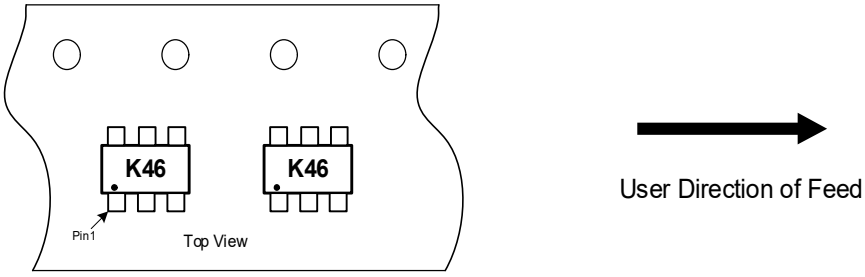
Reel Dimensions



Tape Dimensions



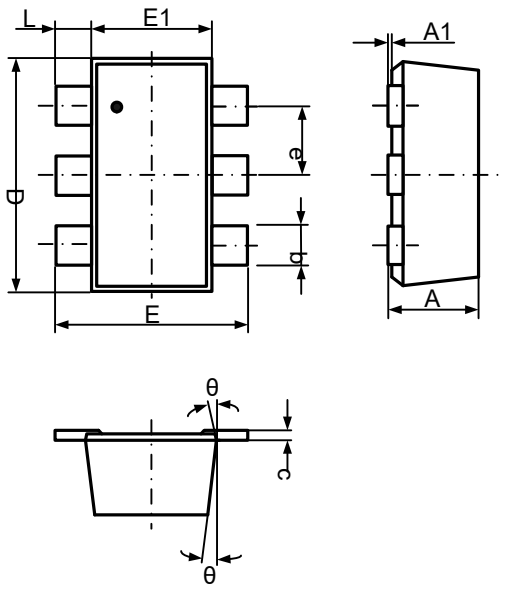
Quadrant Assignments For PIN1 Orientation In Tape

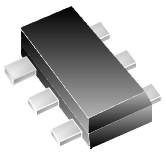


RD	Reel Dimensions	7 inch
W	Overall width of the carrier tape	8 mm
P1	Pitch between successive cavity centers	4 mm

Outline Drawing – SOT-563

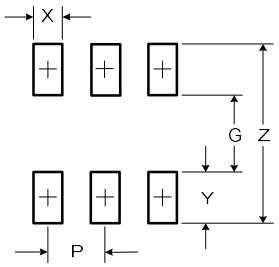
PACKAGE OUTLINE





SOT-563

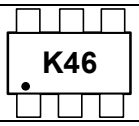
SYMBOL	MILLIMETERS	
	MIN	MAX
A	0.500	0.600
A1	0.000	0.050
e	0.450	0.550
c	0.090	0.160
D	1.500	1.700
b	0.130	0.300
E1	1.100	1.300
E	1.400	1.800
L	0.100	0.300
θ	7°REF	



DIM	MILLIMETERS
Z	1.91
G	0.89
P	0.51 TYP
X	0.3
Y	0.51

Notes:
Controlling Dimension: Millimeter.

Marking Codes

Part Number	WT3946CW
Marking Code	

Package Information

Qty：3k/Reel

CONTACT INFORMATION

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WAYON website: **http://www.way-on.com**
For additional information, please contact your local Sales Representative.

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Product Specification Statement

1. The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3. WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

4. Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

5. The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

6. Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. WAYON shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.