NST3906DP6T5G

Dual General Purpose Transistor

The NST3906DP6T5G device is a spin−off of our popular SOT−23/SOT−323/SOT−563 three−leaded device. It is designed for general purpose amplifier applications and is housed in the SOT−963 six−leaded surface mount package. By putting two discrete devices in one package, this device is ideal for low−power surface mount applications where board space is at a premium.

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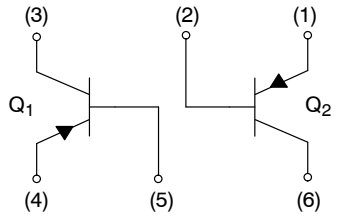
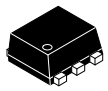
Features

- h_{FE}, 100−300
- Low $V_{CE(sat)}$, ≤ 0.4 V
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- This is a Pb−Free Device



NST3906DP6T5G



SOT−963
CASE 527AD

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CEO}	−40	V
Collector − Base Voltage	V_{CBO}	−40	V
Emitter − Base Voltage	V_{EBO}	−5.0	V
Collector Current − Continuous	I_C	−200	mA
Electrostatic Discharge HBM MM	ESD Class	2 B	

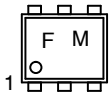
THERMAL CHARACTERISTICS

Characteristic (Single Heated)	Symbol	Max	Unit
Total Device Dissipation T_A = 25°C Derate above 25°C (Note 1)	P_D	240 1.9	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	520	°C/W
Total Device Dissipation T_A = 25°C Derate above 25°C (Note 2)	P_D	280 2.2	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	446	°C/W
Characteristic (Dual Heated) (Note 3)	**Symbol**	**Max**	**Unit**
Total Device Dissipation T_A = 25°C Derate above 25°C (Note 1)	P_D	350 2.8	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	357	°C/W
Total Device Dissipation T_A = 25°C Derate above 25°C (Note 2)	P_D	420 3.4	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	297	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR−4 @ 100 mm^2, 1 oz. copper traces, still air.
2. FR−4 @ 500 mm^2, 1 oz. copper traces, still air.
3. Dual heated values assume total power is sum of two equally powered channels.

MARKING DIAGRAM



F = Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NST3906DP6T5G	SOT−963 (Pb−Free)	8000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector – Emitter Breakdown Voltage (Note 4) (I_C = 1.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	−40	–	V
Collector – Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	−40	–	V
Emitter – Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	−5.0	–	V
Collector Cutoff Current (V_{CE} = 30 Vdc, V_{EB} = 3.0 Vdc)	I_{CEX}	–	−50	nA
ON CHARACTERISTICS (Note 4)				
DC Current Gain (I_C = −0.1 mA, V_{CE} = −1.0 V) (I_C = −1.0 mA, V_{CE} = −1.0 V) (I_C = −10 mA, V_{CE} = −1.0 V) (I_C = −50 mA, V_{CE} = −1.0 V) (I_C = −100 mA, V_{CE} = −1.0 V)	h_{FE}	 60 80 100 60 30	 – – 300 – –	–
Collector – Emitter Saturation Voltage (I_C = −10 mA, I_B = −1.0 mA) (I_C = −50 mA, I_B = −5.0 mA)	$V_{CE(sat)}$	 – –	 −0.25 −0.4	V
Base – Emitter Saturation Voltage (I_C = −10 mA, I_B = −1.0 mA) (I_C = −50 mA, I_B = −5.0 mA)	$V_{BE(sat)}$	 −0.65 –	 −0.85 −0.95	V
SMALL– SIGNAL CHARACTERISTICS				
Current – Gain – Bandwidth Product (I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	f_T	250	–	MHz
Output Capacitance (V_{CB} = −5.0 V, I_E = 0 mA, f = 1.0 MHz)	C_{obo}	–	4.5	pF
Input Capacitance (V_{EB} = −0.5 V, I_E = 0 mA, f = 1.0 MHz)	C_{ibo}	–	10.0	pF
Noise Figure (V_{CE} = −5.0 V, I_C = −100 μA, R_S = 1.0 k Ω, f = 1.0 kHz)	NF	–	4.0	dB
SWITCHING CHARACTERISTICS				
Delay Time	(V_{CC} = −3.0 V, V_{BE} = 0.5 V)	t_d	–	35	ns
Rise Time	(I_C = −10 mA, I_{B1} = −1.0 mA)	t_r	–	35	
Storage Time	(V_{CC} = −3.0 V, I_C = −10 mA)	t_s	–	250	ns
Fall Time	(I_{B1} = I_{B2} = −1.0 mA)	t_f	–	50	

4. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

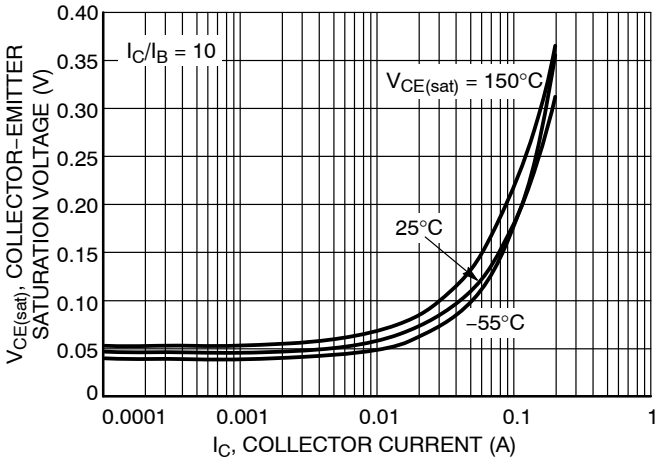


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

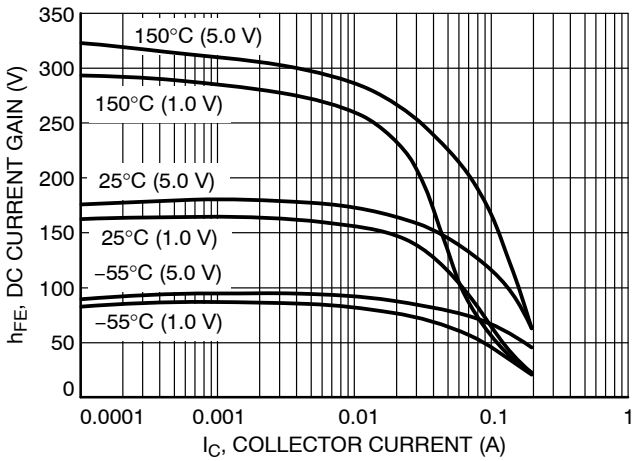


Figure 2. DC Current Gain vs. Collector Current

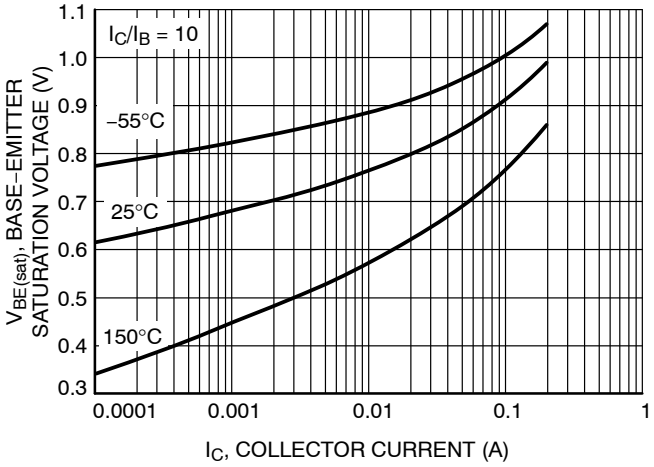


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

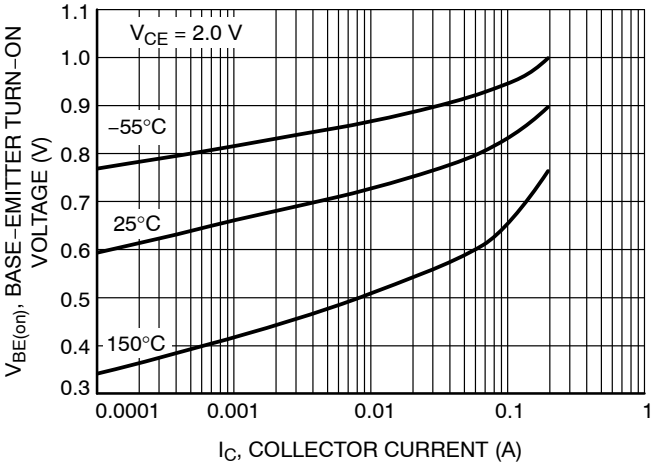


Figure 4. Base Emitter Turn−On Voltage vs. Collector Current

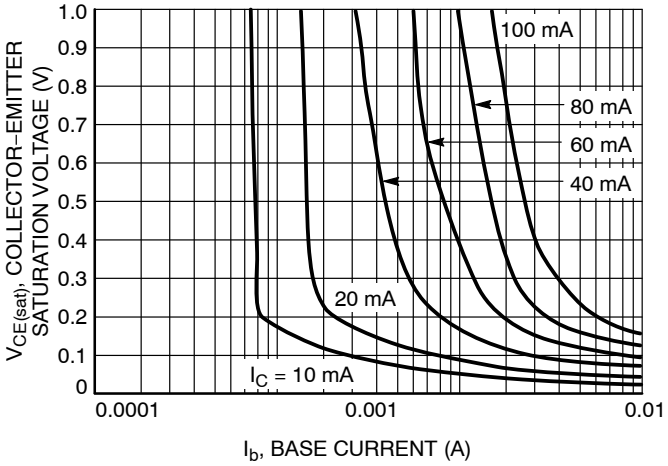


Figure 5. Saturation Region

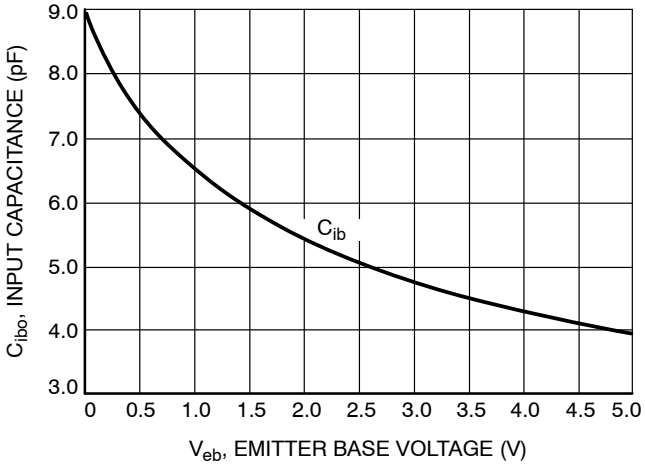


Figure 6. Input Capacitance

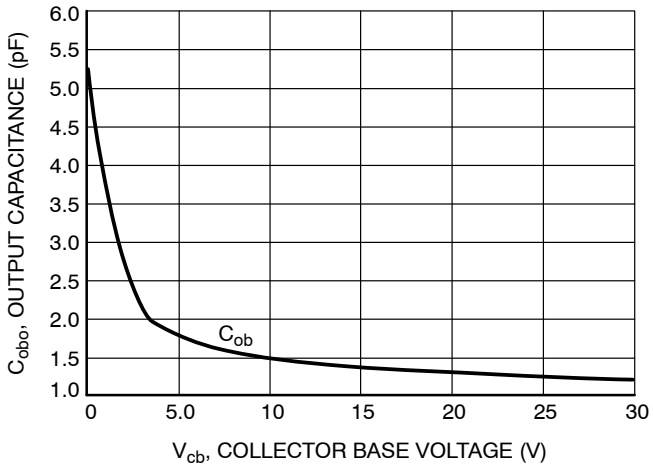
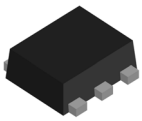


Figure 7. Output Capacitance

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

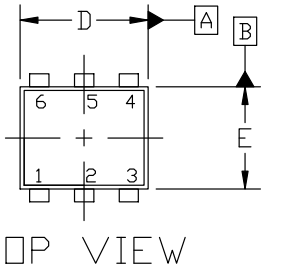


SOT−963 1.00x1.00x0.37, 0.35P
CASE 527AD
ISSUE F

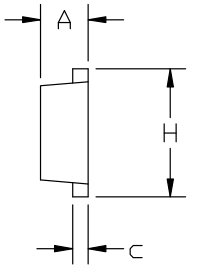
DATE 20 FEB 2024

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

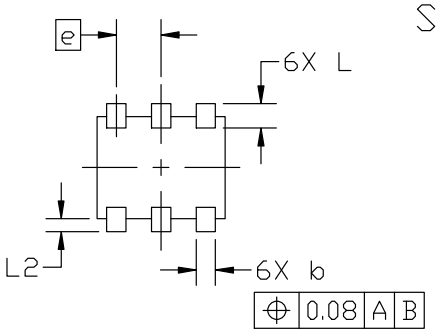
	MILLIMETERS		
DIM	MIN.	NOM.	MAX.
A	0.34	0.37	0.40
b	0.10	0.15	0.20
c	0.07	0.12	0.17
D	0.95	1.00	1.05
E	0.75	0.80	0.85
e	0.35 BSC		
H	0.95	1.00	1.05
L	0.19 REF		
L2	0.05	0.10	0.15



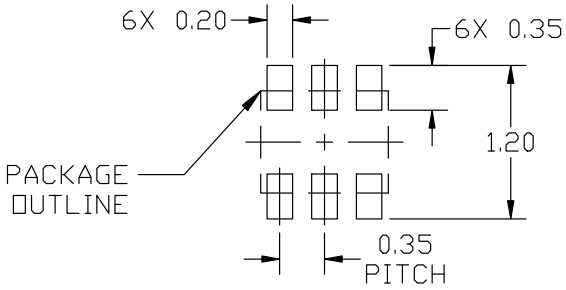
TOP VIEW



SIDE VIEW



BOTTOM VIEW



RECOMMENDED MOUNTING FOOTPRINT

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference manual, SOLDERRM/D.

STYLE 1:
PIN 1. EMITTER 1
2. BASE 1
3. COLLECTOR 2
4. EMITTER 2
5. BASE 2
6. COLLECTOR 1

STYLE 2:
PIN 1. EMITTER 1
2. EMITTER2
3. BASE 2
4. COLLECTOR 2
5. BASE 1
6. COLLECTOR 1

STYLE 3:
PIN 1. CATHODE 1
2. CATHODE 1
3. ANODE/ANODE 2
4. CATHODE 2
5. CATHODE 2
6. ANODE/ANODE 1

STYLE 4:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 5:
PIN 1. CATHODE
2. CATHODE
3. ANODE
4. ANODE
5. CATHODE
6. CATHODE

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

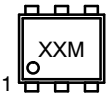
STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

GENERIC MARKING DIAGRAM*



XX = Specific Device Code
M = Month Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	SOT−963 1.00x1.00x0.37, 0.35P	PAGE 1 OF 1

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