DATA SHEET
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Bipolar Transistor

160 V, 1.5 A, Low $V_{CE(sat)}$ NPN Single LFPAK

NST1602CL

This device is bipolar junction transistor featuring high current, low saturation voltage, and high speed switching.

Suitable for automotive applications. AEC−Q101 qualified and PPAP capable. (NSVT1602CLTW)

Features

- Complement to NST1601CL
- Large Current Capacitance
- Low Collector to Emitter Saturation Voltage
- Thin Profile LFPAK8 3.3 x 3.3 mm Package
- High−Speed Switching
- High Allowable Power Dissipation
- AEC−Q101 Qualified and PPAP Capable (NSVT1602CLTW)
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Load Switch
- Gate Driver Buffer
- DC−DC Converters

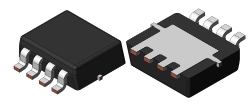
Specifications

ABSOLUTE MAXIMUM RATING at Ta = 25°C

Parameter	Symbol	Value	Unit
Collector−to−Base Voltage	V_{CBO}	180	V
Collector−to−Emitter Voltage	V_{CEO}	160	V
Emitter−to−Base Voltage	V_{EBO}	6	V
Collector Current	I_C	1.5	A
Collector Current (Pulse)	I_{CP}	2.5	A
Collector Dissipation	P_C (Note 1)	0.8	W
	P_C (Note 2)	2.2	
Junction Temperature	T_J	175	°C
Storage Temperature Range	T_{stg}	−55 to +175	°C

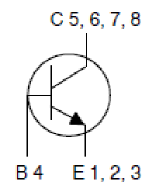
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Mounted on FRB with minimum pad of Copper 2 oz
2. Mounted on FRB with 1 in/sq pad of Copper 2 oz



LFPAK8 3.3x3.3, 0.65P
CASE 760AD

ELECTRICAL CONNECTION



MARKING DIAGRAM

NST
1602G
AWLYW

NST1602 = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
W = Work Week
G = Pb−Free Package

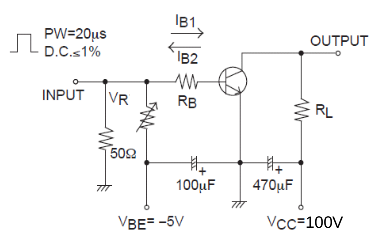
ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

ELECTRICAL CHARACTERISTICS at Ta = 25°C

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	VCB = 180 V IE = 0 A			0.1	μA
Emitter Cutoff Current	I_{EBO}	VEB = 6 V IC = 0 A			0.1	μA
DC Current Gain	h_{FE1}	VCE = 5 V IC = 100 mA	140		280	
	h_{FE2}	VCE = 5 V IC = 400 mA	120			
Gain−Bandwidth Product	f_T	VCE = 10 V IC = 100 mA		100		MHz
Output Capacitance	C_{ob}	VCB = 10 V f = 1 MHz		10		pF
Collector to Emitter Saturation Voltage	$V_{CE(sat)1}$	IC = 250 mA IB = 25 mA		0.04	0.08	V
	$V_{CE(sat)2}$	IC = 250 mA IB = 50 mA		0.035	0.07	V
	$V_{CE(sat)3}$	IC = 500 mA IB = 50 mA		0.07	0.14	V
Base−to−Emitter Saturation Voltage	$V_{BE(sat)}$	IC = 250 mA IB = 25 mA		0.8	1.2	V
Collector−to−Base Breakdown Voltage	$V_{(BR)CBO}$	IC = 10 μA, IE = 0 A	180			V
Collector−to−Emitter Breakdown Voltage	$V_{(BR)CEO}$	IC = 1 mA, RBE = ∞	160			V
Emitter−to−Base Breakdown Voltage	$V_{(BR)EBO}$	IE = 10 μA, IC = 0 A	6			V
Turn−On Time	t_{on}	See Figure 1		30		ns
Storage Time	t_{stg}			1340		ns
Fall Time	t_f			30		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



IC=10|B1=−10|B2=500mA

Figure 1. Switching Time Test Circuit

ESD RATING

Parameter	Symbol	Value	Unit	Class
Electrostatic Discharge − Human Body Model	HBM	>2000, <4000	V	2
Electrostatic Discharge − Machine Model	MM	>400	V	M4

TYPICAL CHARACTERISTICS

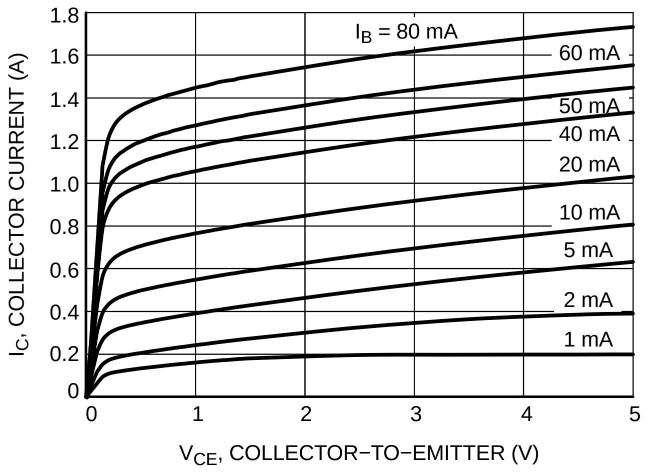


Figure 2. IC − VCE

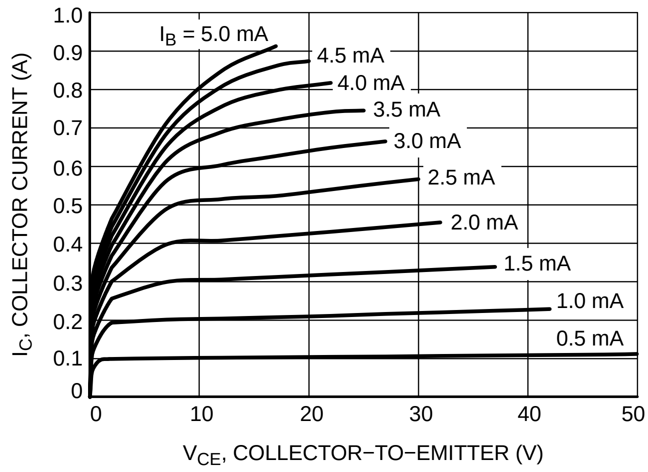


Figure 3. IC − VCE

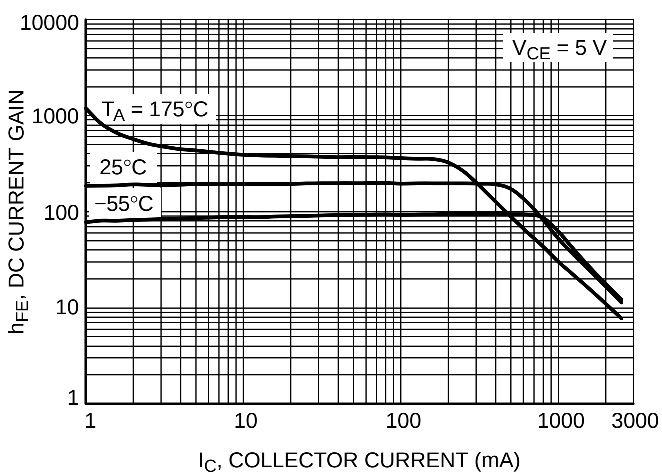


Figure 4. hFE − IC

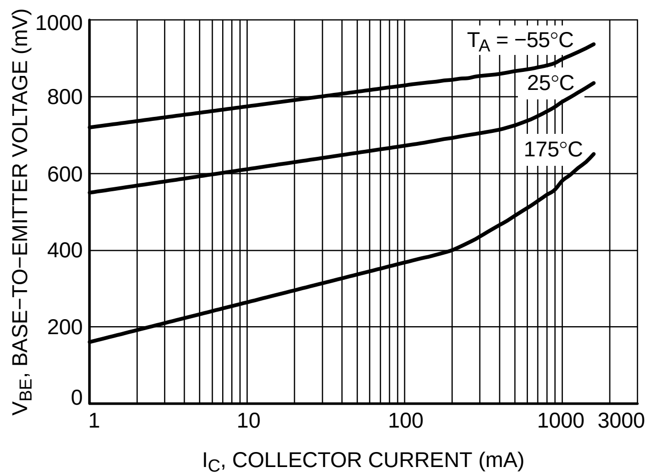


Figure 5. VBE − IC

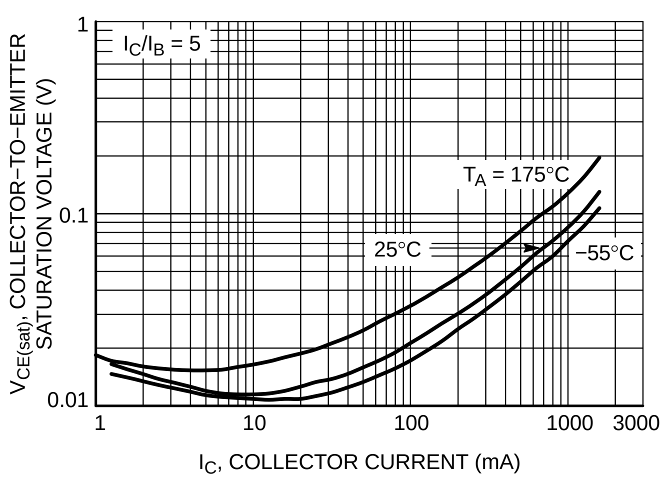


Figure 6. VCE(sat) − IC

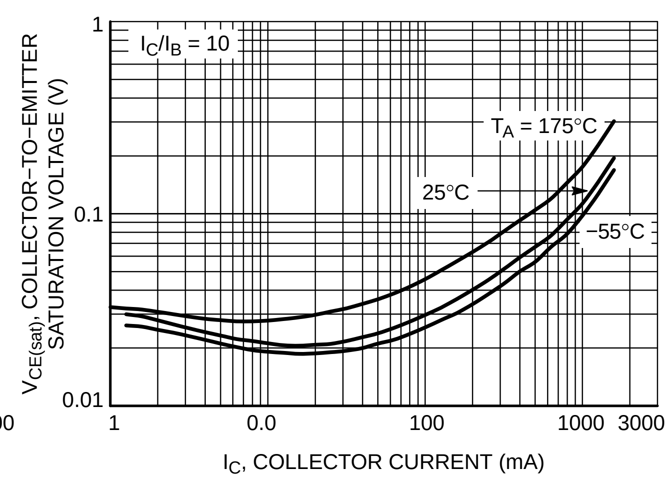


Figure 7. VCE(sat) − IC

TYPICAL CHARACTERISTICS

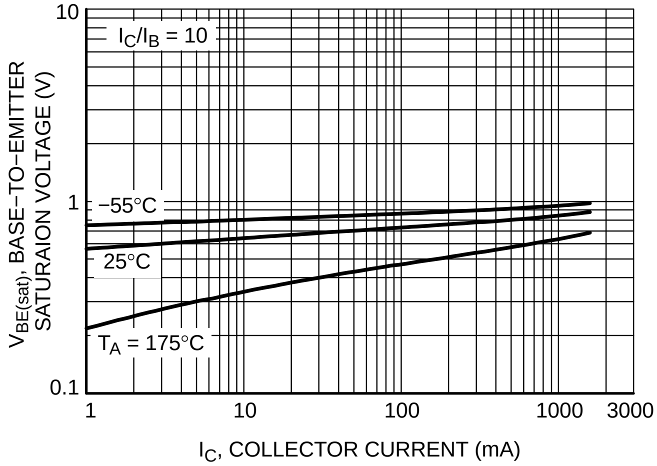


Figure 8. VBE(sat) − IC

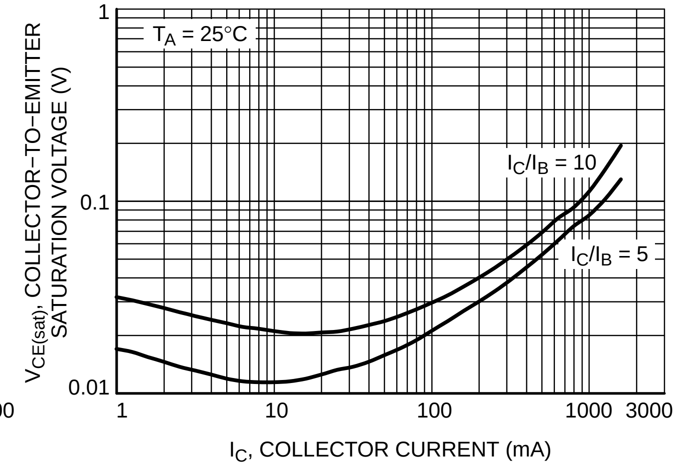


Figure 9. VCE(sat) − IC

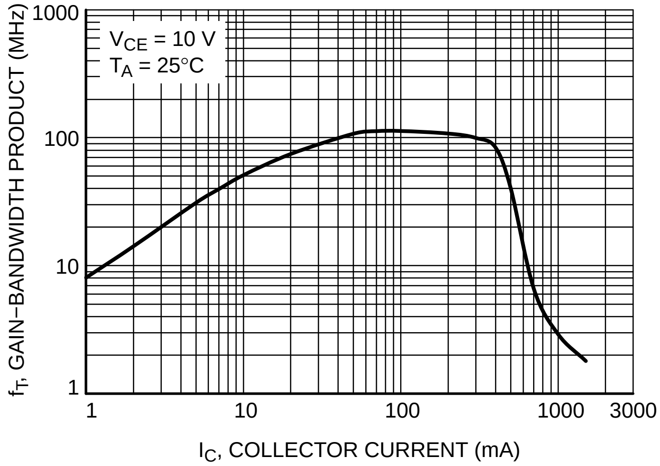


Figure 10. fT − IC

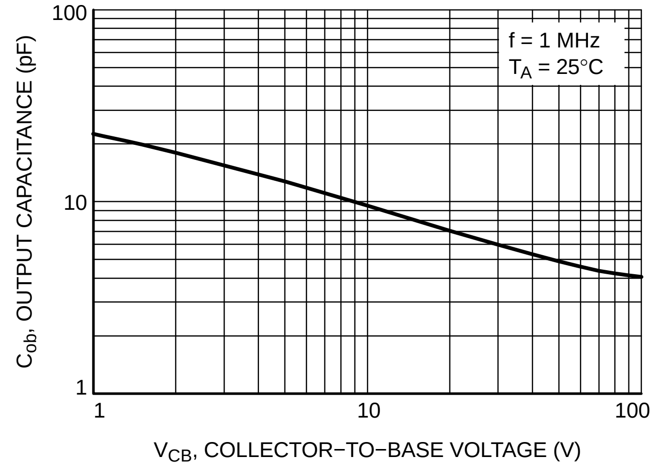


Figure 11. Cob − VCB

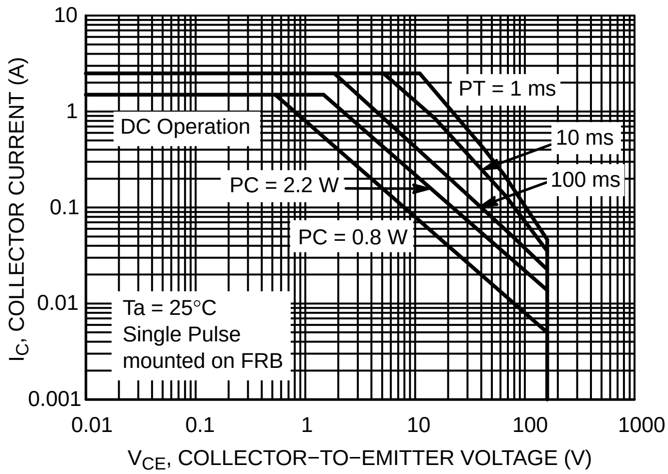


Figure 12. Safe Operating Area

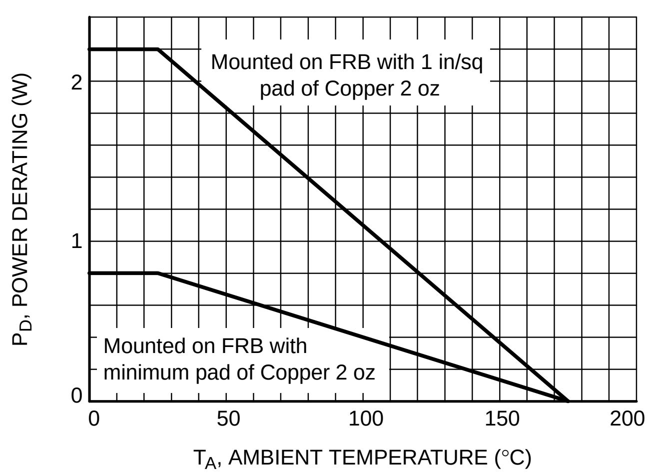
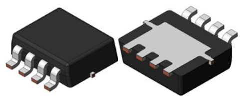


Figure 13. Power Derating

ORDERING INFORMATION

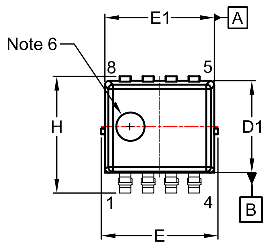
Device	Marking	Package	Shipping (Qty / Packing)†
NSVT1602CLTWG	NST1602G	LFPAK8 (Pb−Free / Halogen Free)	3,000 / Tape & Reel
NST1602CLTWG	NST1602G	LFPAK8 (Pb−Free / Halogen Free)	3,000 / Tape & Reel

†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

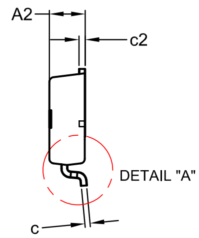


LFPAK8 3.3x3.3, 0.65P
CASE 760AD
ISSUE E

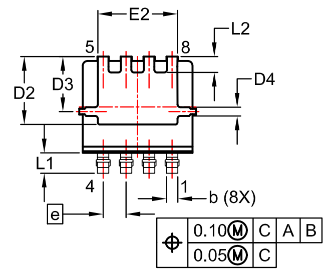
DATE 16 NOV 2020



TOP VIEW

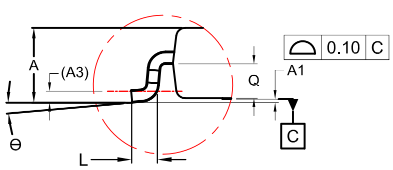


SIDE VIEW



BOTTOM VIEW

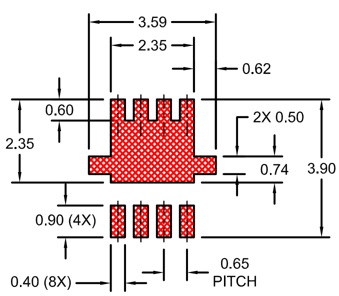
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.95	1.05	1.15
A1	0.00	0.05	0.10
A2	0.95	1.00	1.05
A3		0.15 REF	
b	0.27	0.32	0.37
c	0.12	0.17	0.22
c2	0.12	0.17	0.22
D1	2.50	2.60	2.70
D2	1.82	1.92	2.02
D3	1.46	1.56	1.66
D4	0.20	0.25	0.30
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	2.15	2.25	2.35
e		0.65 BSC	
H	3.20	3.30	3.40
L	0.25	0.37	0.50
L1	0.48	0.58	0.68
L2	0.35	0.45	0.55
Q	0.45	0.50	0.55
Θ	0°	4°	8°



DETAIL 'A'
SCALE: 2:1

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS OR BURRS SHALL NOT EXCEED 0.150mm PER SIDE.
4. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
6. OPTIONAL MOLD FEATURE.



LAND PATTERN RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC MARKING DIAGRAM*

XXXXX
XXXXX
AWLYW

XXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
W = Work Week

*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:	LFPAK8 3.3x3.3, 0.65P	PAGE 1 OF 1

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