

# NSS1C300ET4G

## 100 V, 3.0 A, Low $V_{CE(sat)}$ PNP Transistor

ON Semiconductor's e<sup>2</sup>PowerEdge family of low  $V_{CE(sat)}$  transistors are surface mount devices featuring ultra low saturation voltage ( $V_{CE(sat)}$ ) and high current gain capability. These are designed for use in low voltage, high speed switching applications where affordable efficient energy control is important.

Typical applications are DC-DC converters and power management in portable and battery powered products such as cellular and cordless phones, PDAs, computers, printers, digital cameras and MP3 players. Other applications are low voltage motor controls in mass storage products such as disc drives and tape drives. In the automotive industry they can be used in air bag deployment and in the instrument cluster. The high current gain allows e<sup>2</sup>PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

### Features

- These Devices are Pb-Free and are RoHS Compliant
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Rating	Symbol	Max	Unit
Collector-Base Voltage	$V_{CBO}$	140	Vdc
Collector-Emitter Voltage	$V_{CEO}$	100	Vdc
Emitter-Base Voltage	$V_{EB}$	6.0	Vdc
Collector Current - Continuous - Peak	$I_C$	3.0 6.0	Adc
Base Current	$I_B$	0.5	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	12.5 0.1	W W/ $^\circ\text{C}$
Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.4 0.011	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

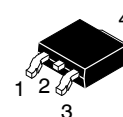
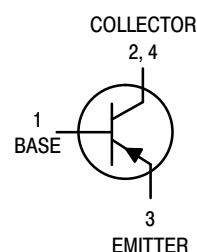
1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.



**ON Semiconductor**<sup>®</sup>

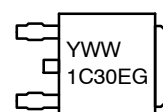
<http://onsemi.com>

## 100 VOLTS, 3.0 AMPS 12.5 WATTS PNP LOW $V_{CE(sat)}$ TRANSISTOR



**DPAK  
CASE 369C  
STYLE 1**

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
1C30E = Device Code  
G = Pb-Free

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NSS1C300ET4G	DPAK (Pb-Free)	2500/ Tape & Reel
NSV1C300ET4G	DPAK (Pb-Free)	2500/ Tape & Reel

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

# NSS1C300ET4G

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	10	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	89.3	$^{\circ}\text{C}/\text{W}$

2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = -10 \text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	-100			Vdc
Collector-Base Breakdown Voltage ( $I_C = -0.1 \text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-140			Vdc
Emitter-Base Breakdown Voltage ( $I_E = -0.1 \text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-6.0			Vdc
Collector Cutoff Current ( $V_{CB} = -140 \text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$			-0.1	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = -6.0 \text{ Vdc}$ )	$I_{EBO}$			-0.1	$\mu\text{Adc}$

### ON CHARACTERISTICS

DC Current Gain (Note 3) ( $I_C = -0.1 \text{ A}$ , $V_{CE} = -2.0 \text{ V}$ ) ( $I_C = -0.5 \text{ A}$ , $V_{CE} = -2.0 \text{ V}$ ) ( $I_C = -1.0 \text{ A}$ , $V_{CE} = -2.0 \text{ V}$ ) ( $I_C = -3.0 \text{ A}$ , $V_{CE} = -2.0 \text{ V}$ )	$h_{FE}$	180 180 120 50		360	
Collector-Emitter Saturation Voltage (Note 3) ( $I_C = -0.1 \text{ A}$ , $I_B = -10 \text{ mA}$ ) ( $I_C = -1.0 \text{ A}$ , $I_B = -0.100 \text{ A}$ ) ( $I_C = -2.0 \text{ A}$ , $I_B = -0.200 \text{ A}$ ) ( $I_C = -3.0 \text{ A}$ , $I_B = -0.300 \text{ A}$ )	$V_{CE(sat)}$			-0.070 -0.150 -0.250 -0.400	V
Base-Emitter Saturation Voltage (Note 3) ( $I_C = -1.0 \text{ A}$ , $I_B = -0.1 \text{ A}$ )	$V_{BE(sat)}$			-1.0	V
Base-Emitter Turn-on Voltage (Note 3) ( $I_C = -1.0 \text{ A}$ , $V_{CE} = -2.0 \text{ V}$ )	$V_{BE(on)}$			-0.900	V
Cutoff Frequency ( $I_C = -500 \text{ mA}$ , $V_{CE} = -10 \text{ V}$ , $f = 100 \text{ MHz}$ )	$f_T$		100		MHz
Input Capacitance ( $V_{EB} = 5.0 \text{ V}$ , $f = 1.0 \text{ MHz}$ )	$C_{ibo}$		360		pF
Output Capacitance ( $V_{CB} = 10 \text{ V}$ , $f = 1.0 \text{ MHz}$ )	$C_{obo}$		60		pF

3. Pulsed Condition: Pulse Width = 300 msec, Duty Cycle  $\leq 2\%$ .

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## TYPICAL CHARACTERISTICS

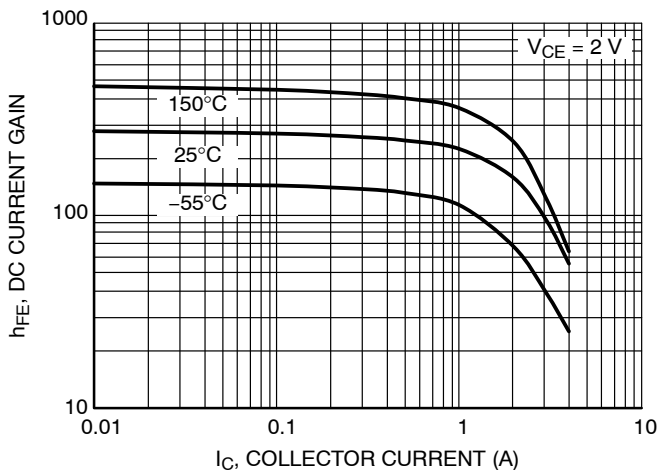


Figure 1. DC Current Gain

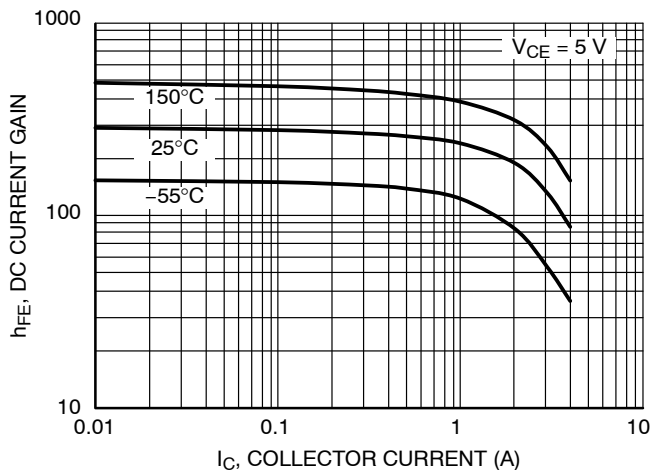


Figure 2. DC Current Gain

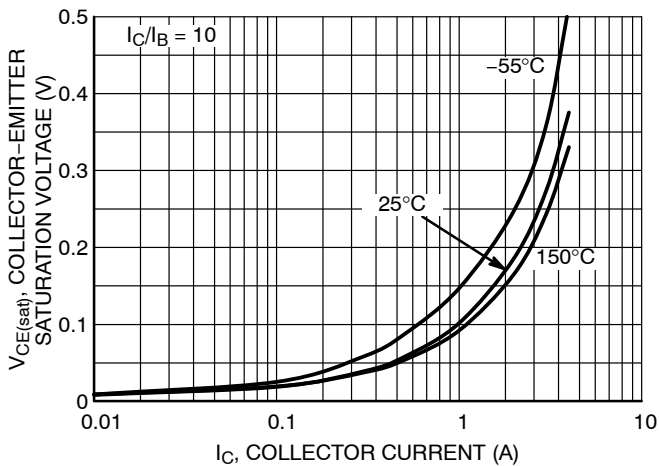


Figure 3. Collector-Emitter Saturation Voltage

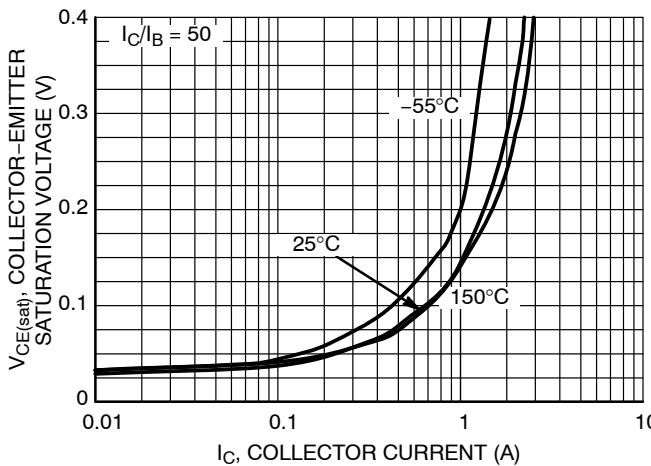


Figure 4. Collector-Emitter Saturation Voltage

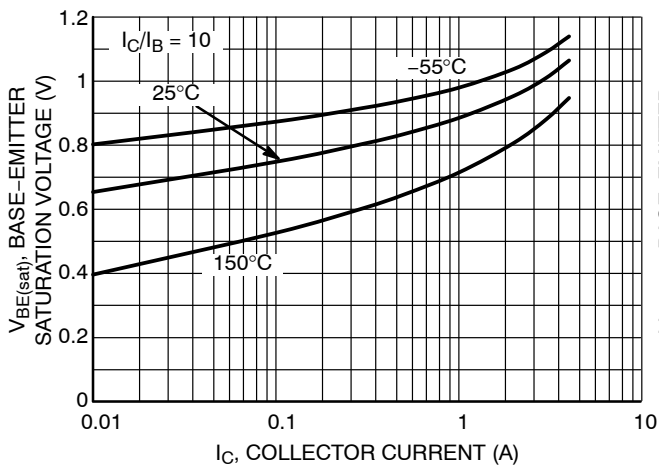


Figure 5. Base-Emitter Saturation Voltage

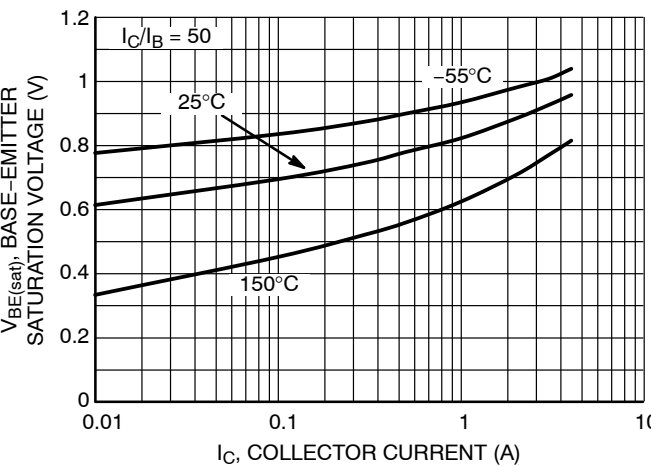


Figure 6. Base-Emitter Saturation Voltage

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## TYPICAL CHARACTERISTICS

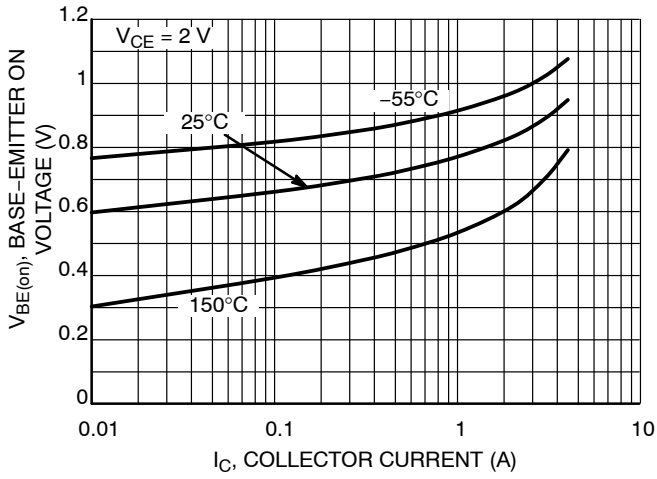


Figure 7. Base-Emitter On Voltage

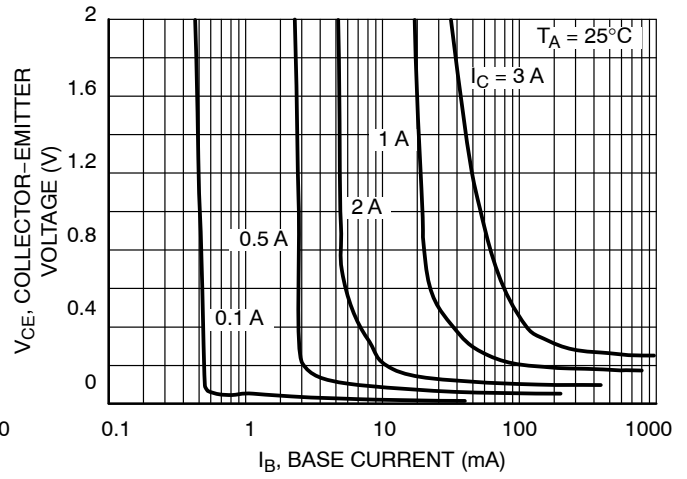


Figure 8. Collector Saturation Region

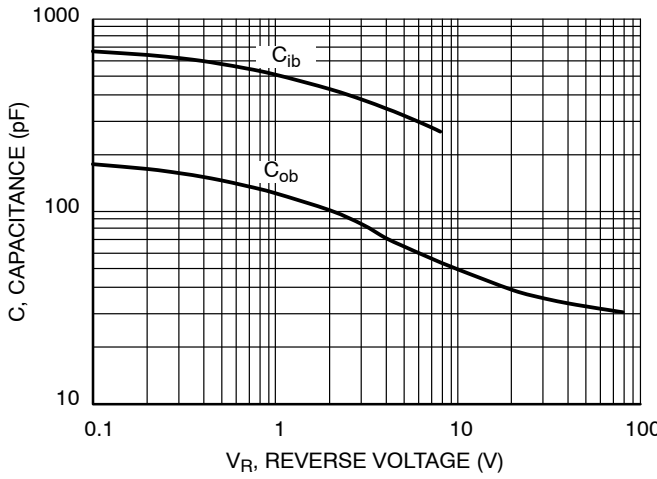


Figure 9. Capacitance

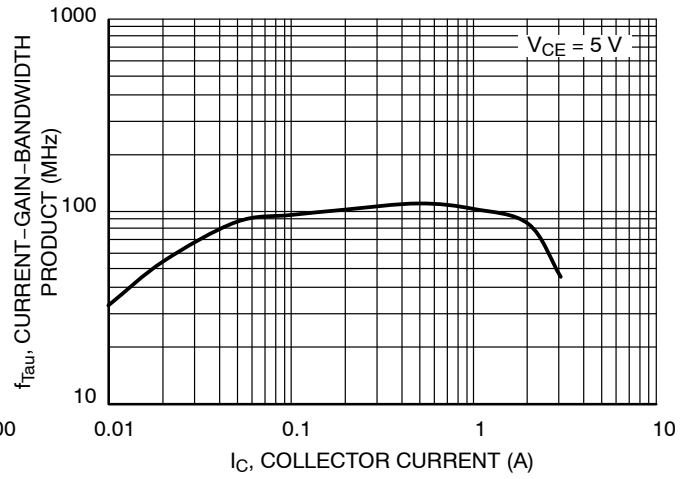


Figure 10. Current-Gain-Bandwidth Product

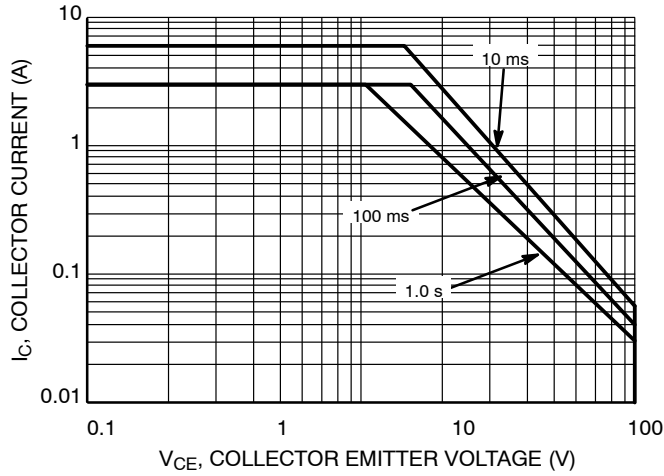
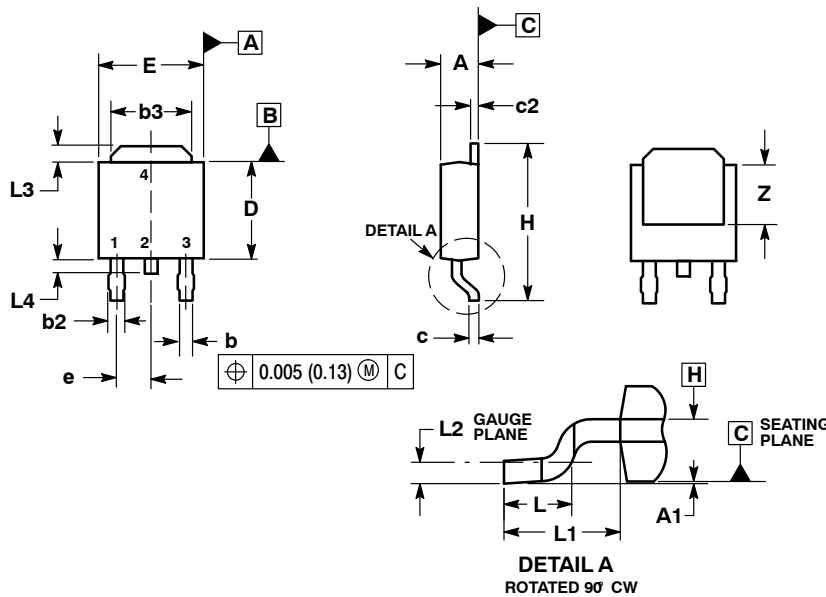


Figure 11. Safe Operating Area

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## PACKAGE DIMENSIONS

### DPAK (SINGLE GAUGE) CASE 369C ISSUE D

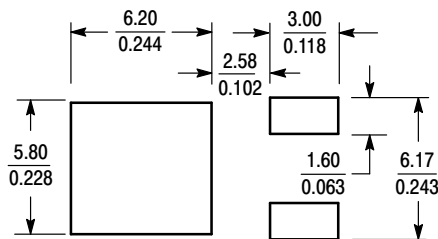


#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.030	0.045	0.76	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090	BSC	2.29	BSC
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.108	REF	2.74	REF
L2	0.020	BSC	0.51	BSC
L3	0.035	0.050	0.89	1.27
L4	---	0.040	---	1.01
Z	0.155	---	3.93	---

#### SOLDERING FOOTPRINT\*



SCALE 3:1  $\left(\frac{\text{mm}}{\text{inches}}\right)$

#### STYLE 1:

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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

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