NSS12201LT1G

12 V, 4.0 A, Low $V_{CE(sat)}$ NPN Transistor

ON Semiconductor’s e^{2}PowerEdge family of low $V_{CE(sat)}$ transistors are miniature 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^{2}PowerEdge devices to be driven directly from PMU’s control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS (T_A = 25°C)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	12	Vdc
Collector-Base Voltage	V_{CBO}	12	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	Vdc
Collector Current − Continuous	I_C	2.0	A
Collector Current − Peak	I_{CM}	4.0	A
Electrostatic Discharge	ESD	HBM Class 3B MM Class C	

MAXIMUM RATINGS (T_A = 25°C)

Rating	Symbol	Max	Unit

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D (Note 1)	460 3.7	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$ (Note 1)	270	°C/W
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D (Note 2)	540 4.3	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$ (Note 2)	230	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°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. FR−4 @ 100 mm^2, 1 oz. copper traces.
2. FR−4 @ 500 mm^2, 1 oz. copper traces.

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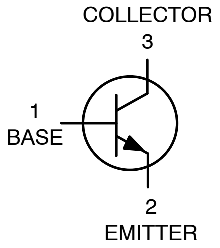
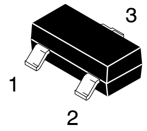
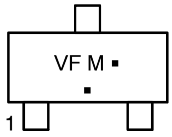
12 VOLTS, 4.0 AMPS NPN LOW $V_{CE(sat)}$ TRANSISTOR EQUIVALENT $R_{DS(on)}$ 35 mΩ





SOT−23 (TO−236)
CASE 318
STYLE 6

MARKING DIAGRAM



VF = Specific Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
NSS12201LT1G	SOT−23 (Pb−Free)	3000/Tape & Reel

†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.

August, 2009 − Rev. 5

Publication Order Number:
NSS12201L/D

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	12	–	–	Vdc
Collector – Base Breakdown Voltage (I_C = 0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	12	–	–	Vdc
Emitter – Base Breakdown Voltage (I_E = 0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	6.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 12 Vdc, I_E = 0)	I_{CBO}	–	–	0.1	μAdc
Emitter Cutoff Current (V_{EB} = 6.0 Vdc)	I_{EBO}	–	–	0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain (Note 3)	h_{FE}				
(I_C = 10 mA, V_{CE} = 2.0 V)		200	–	–	
(I_C = 500 mA, V_{CE} = 2.0 V)		200	330	–	
(I_C = 1.0 A, V_{CE} = 2.0 V)		200	–	–	
(I_C = 2.0 A, V_{CE} = 2.0 V)		200	–	–	
Collector – Emitter Saturation Voltage (Note 3)	$V_{CE(sat)}$				V
(I_C = 0.1 A, I_B = 0.01 A)		–	0.003	0.008	
(I_C = 1.0 A, I_B = 0.100 A)		–	0.035	0.050	
(I_C = 1.0 A, I_B = 0.010 A)		–	0.053	0.080	
(I_C = 2.0 A, I_B = 0.2 A)		–	0.068	0.090	
Base – Emitter Saturation Voltage (Note 3) (I_C = 1.0 A, I_B = 10 mA)	$V_{BE(sat)}$	–	0.760	0.900	V
Base – Emitter Turn–on Voltage (Note 3) (I_C = 1.0 A, V_{CE} = 2.0 V)	$V_{BE(on)}$	–	0.750	0.900	V
Cutoff Frequency (I_C = 100 mA, V_{CE} = 5.0 V, f = 100 MHz)	f_T	150	–	–	MHz
Input Capacitance (V_{EB} = 0.5 V, f = 1.0 MHz)	Cibo	–	–	450	pF
Output Capacitance (V_{CB} = 3.0 V, f = 1.0 MHz)	Cobo	–	–	75	pF
SWITCHING CHARACTERISTICS					
Delay (V_{CC} = 10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_d	–	–	100	ns
Rise (V_{CC} = 10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_r	–	–	100	ns
Storage (V_{CC} = 10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_s	–	–	350	ns
Fall (V_{CC} = 10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_f	–	–	110	ns

3. Pulsed Condition: Pulse Width = 300 msec, Duty Cycle ≤ 2%.

TYPICAL CHARACTERISTICS

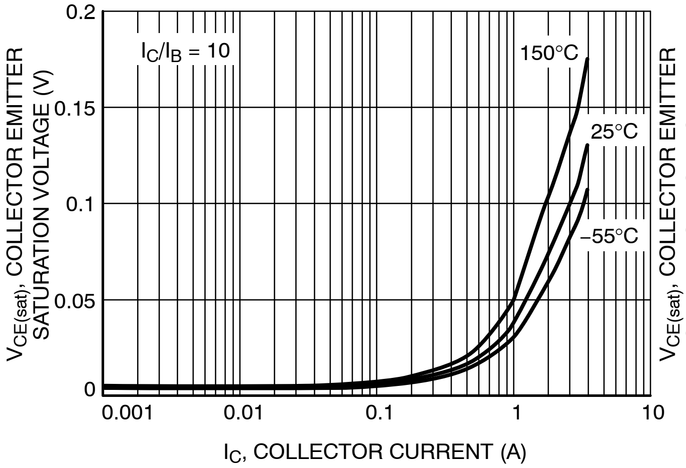


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

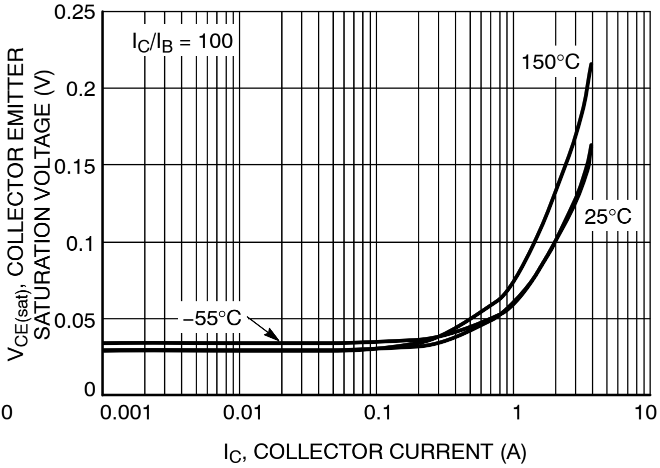


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

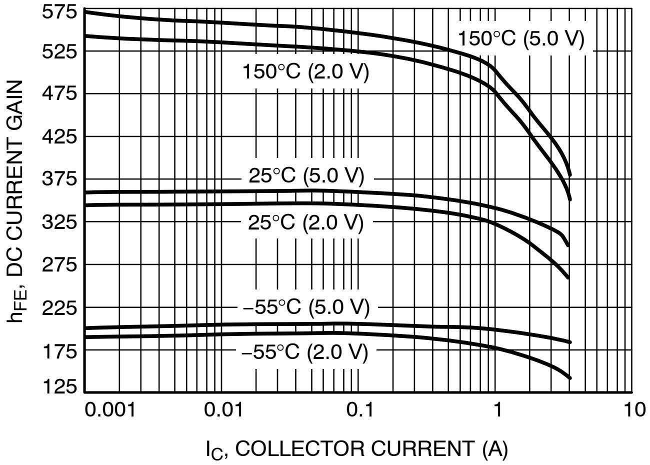


Figure 3. DC Current Gain vs. Collector Current

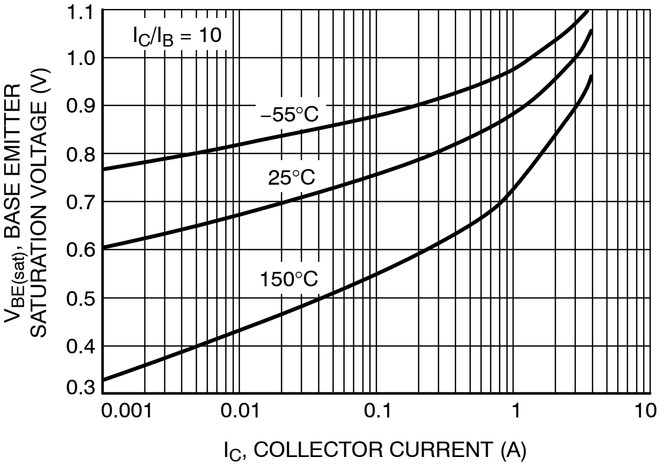


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

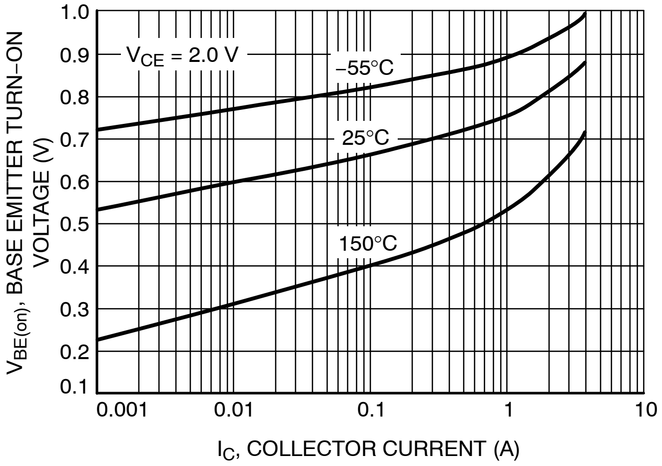


Figure 5. Base Emitter Turn−On Voltage vs. Collector Current

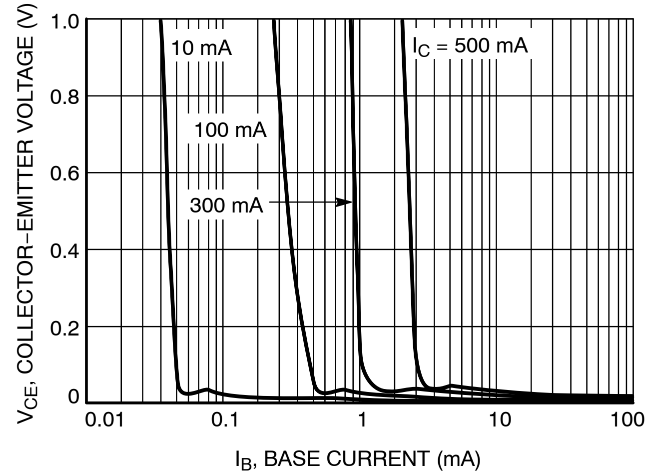


Figure 6. Saturation Region

TYPICAL CHARACTERISTICS

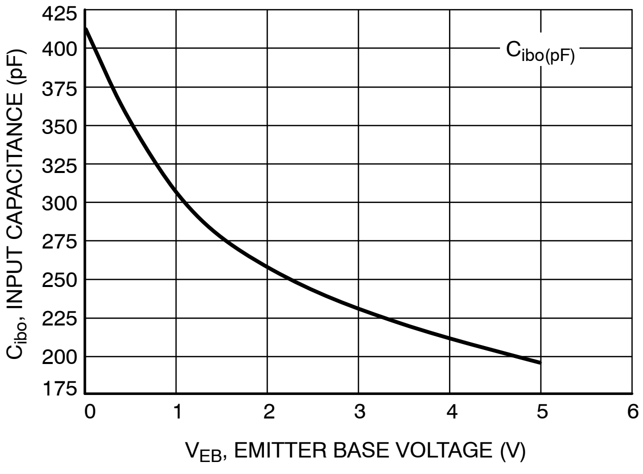


Figure 7. Input Capacitance

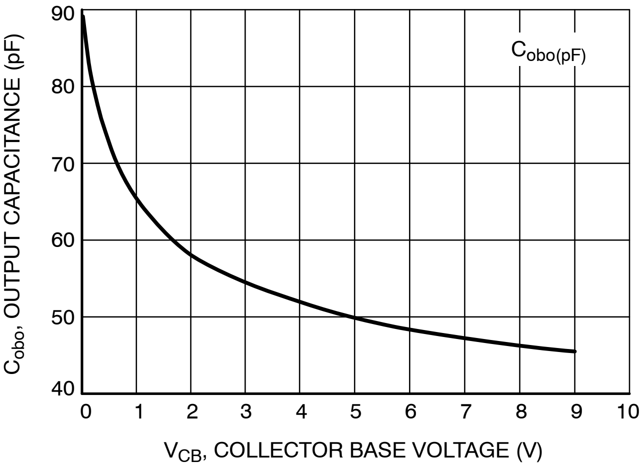


Figure 8. Output Capacitance

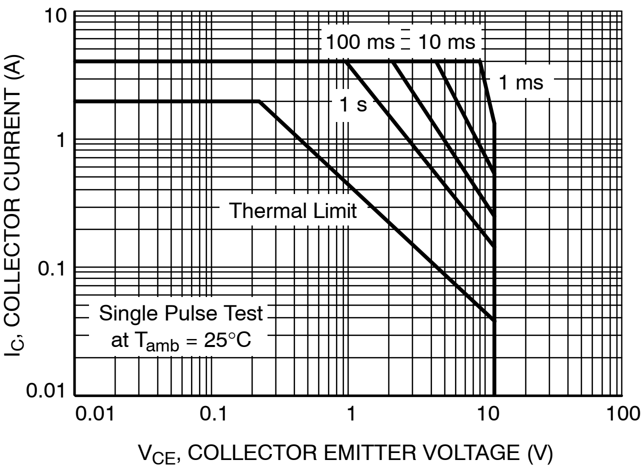
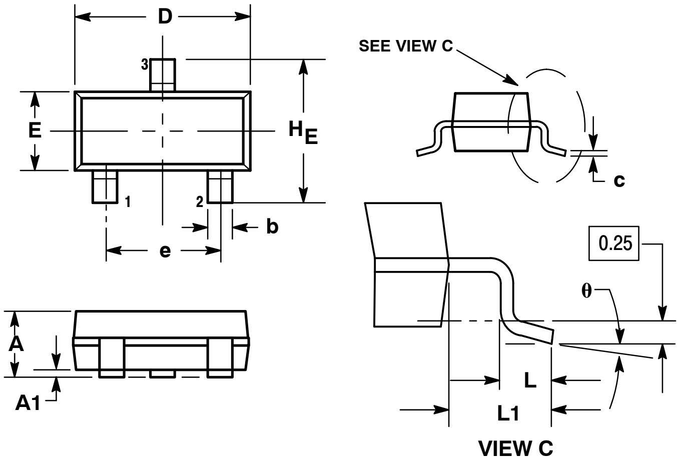


Figure 9. Safe Operating Area

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AN

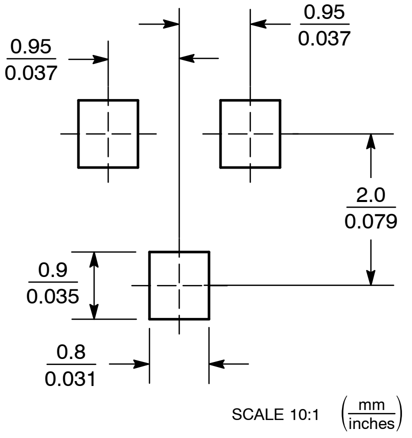


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	MILLIMETERS			INCHES		
DIM	**MIN**	**NOM**	**MAX**	**MIN**	**NOM**	**MAX**
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104

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

SOLDERING 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.

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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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