NSS12100UW3TCG

12 V, 1 A, Low $V_{CE(sat)}$ PNP Transistor

ON Semiconductor's e^2PowerEdge 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 application 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^2PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

Features

- High Current Capability (1 A)
- High Power Handling (Up to 740 mW)
- Low $V_{CE(s)}$ (200 mV Typical @ 500 mA)
- Small Size
- Low Noise
- This is a Pb-Free Device

Benefits

- High Specific Current and Power Capability Reduces Required PCB Area
- Reduced Parasitic Losses Increases Battery Life

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}	-5.0	Vdc
Collector Current - Continuous - Peak	I_C I_{CM}	-1.0 -2.0	Adc
Electrostatic Discharge	ESD	HBM Class 3B MM Class 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.

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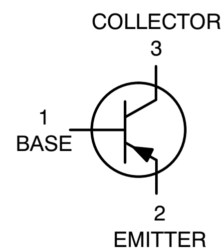
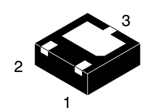
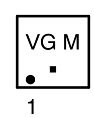
12 VOLTS, 1.0 AMPS
PNP LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 400 mΩ





WDFN3
CASE 506AU

MARKING DIAGRAM



VG = Specific Device Code
M = Date Code
▪ = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NSS12100UW3TCG	WDFN3 (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 Specifications Brochure, BRD8011/D.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation, T_A = 25°C Derate above 25°C	P_D (Note 1)	740 6.0	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 1)	169	°C/W
Total Device Dissipation, T_A = 25°C Derate above 25°C	P_D (Note 2)	1.1 9.0	W mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 2)	110	°C/W
Thermal Resistance, Junction-to-Lead 6	$R_{\theta JL}$ (Note 2)	33	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

1. FR−4 @ 100 mm^2, 1 oz copper traces.
2. FR−4 @ 500 mm^2, 1 oz copper traces.

ELECTRICAL CHARACTERISTICS (T_J = 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)	$V_{(BR)EBO}$	−5.0	−	−	Vdc
Collector Cutoff Current, (V_{CB} = −12 Vdc, I_E = 0)	I_{CBO}	−	−0.02	−0.1	μAdc
Emitter Cutoff Current, (V_{CES} = −5.0 Vdc, I_E = 0)	I_{EBO}	−	−0.03	−0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain (Note 3) (I_C = −10 mA, V_{CE} = −2.0 V) (I_C = −500 mA, V_{CE} = −2.0 V) (I_C = −1.0 A, V_{CE} = −2.0 V)	h_{FE}	 200 100 75	 − − −	 400 250 −	
Collector−Emitter Saturation Voltage (Note 3) (I_C = −0.05 A, I_B = −0.005 A) (Note 4) (I_C = −0.1 A, I_B = −0.002 A) (I_C = −0.1 A, I_B = −0.010 A) (I_C = −0.5 A, I_B = −0.050 A) (I_C = −1.0 A, I_B = −0.100 A)	$V_{CE(sat)}$	 − − − − −	 −0.030 −0.080 −0.050 −0.200 −0.400	 −0.040 −0.100 −0.060 −0.225 −0.440	V
Base−Emitter Saturation Voltage (Note 3) (I_C = −1.0 A, I_B = −0.01 A)	$V_{BE(sat)}$	 −	 −0.95	 −1.15	V
Base−Emitter Turn−on Voltage (Note 3) (I_C = −2.0 A, V_{CE} = −1.0 V)	$V_{BE(on)}$	 −	 −1.05	 −1.20	V
Input Capacitance (V_{EB} = −0.5 V, f = 1.0 MHz)	Cibo	−	40	50	pF
Output Capacitance (V_{CB} = −3.0 V, f = 1.0 MHz)	Cobo	−	15	20	pF
SWITCHING CHARACTERISTICS					
Delay (V_{CC} = −10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_d	−	−	20	ns
Rise (V_{CC} = −10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_r	−	−	90	ns
Storage (V_{CC} = −10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_s	−	−	140	ns
Fall (V_{CC} = −10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_f	−	−	100	ns
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain − Bandwidth Product, (I_C = −100 mA, V_{CE} = −5 Vdc, f = 100 MHz)	f_T	200	−	−	MHz
Noise Figure, (I_C = −0.2 mA, V_{CE} = −5 Vdc, R_S = 2 kΩ, f = 1 kHz, BW = 200Hz)	NF	−	−	5.0	dB

3. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%.
4. Guaranteed by design but not tested.

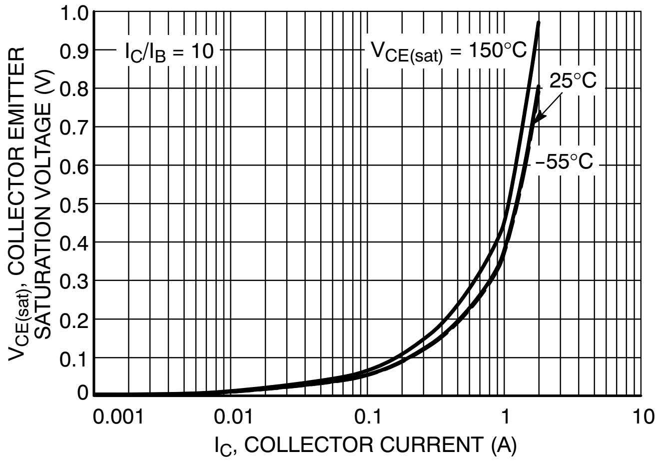


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

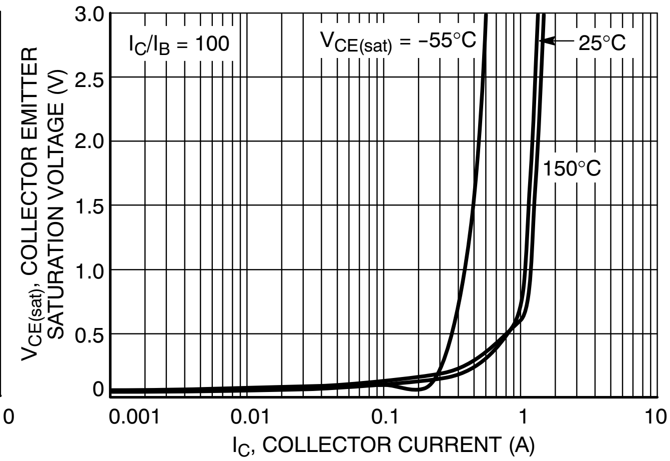


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

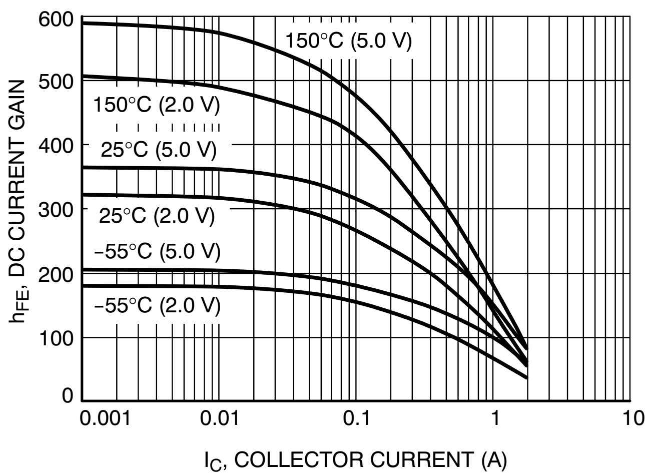


Figure 3. DC Current Gain vs. Collector Current

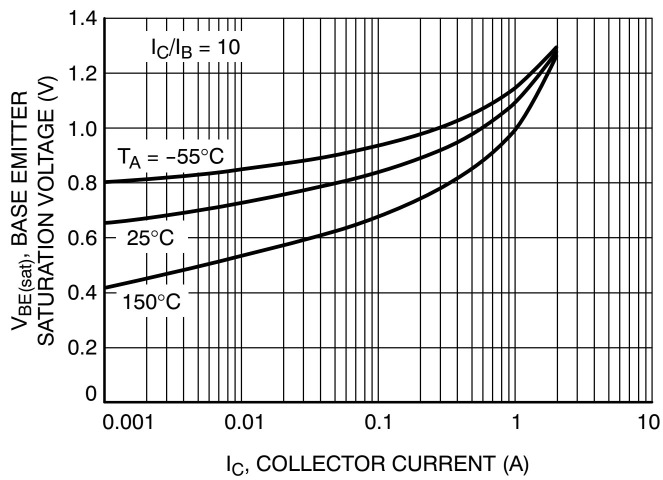


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

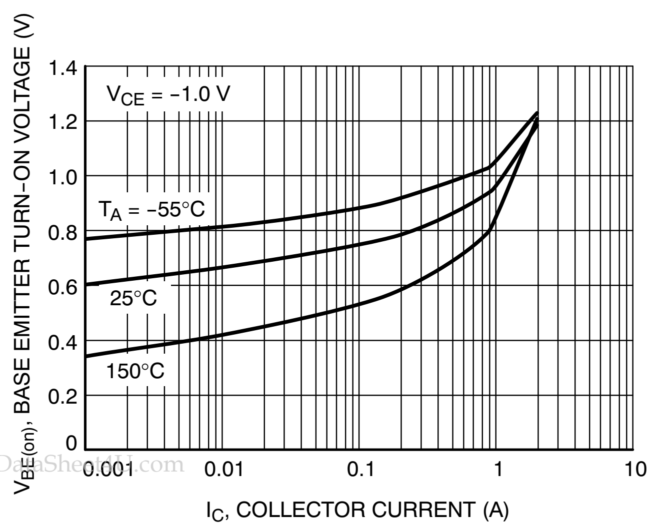


Figure 5. Base Emitter Turn−On Voltage vs. Collector Current

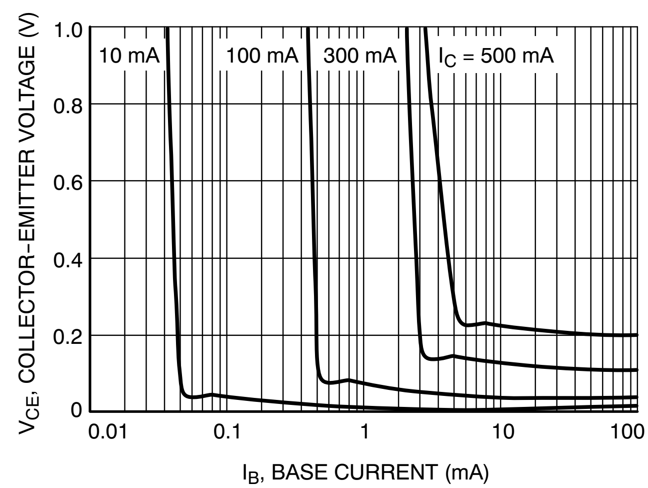


Figure 6. Saturation Region

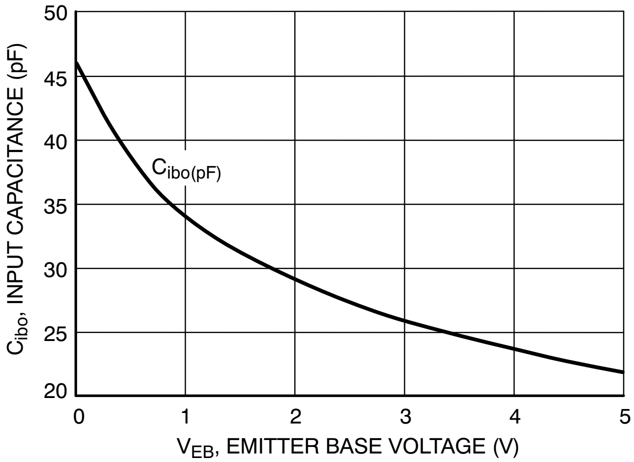


Figure 7. Input Capacitance

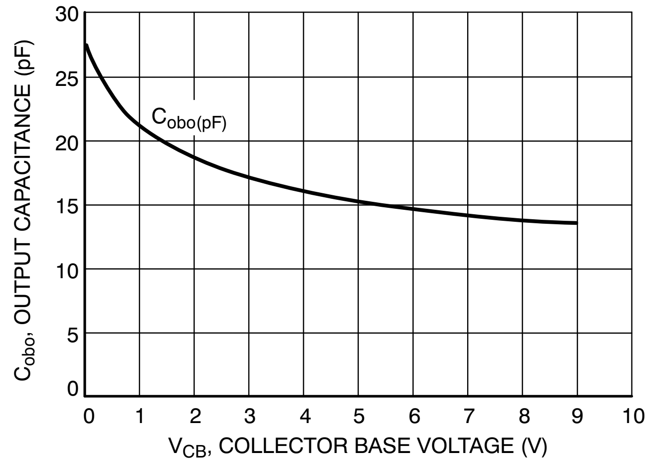
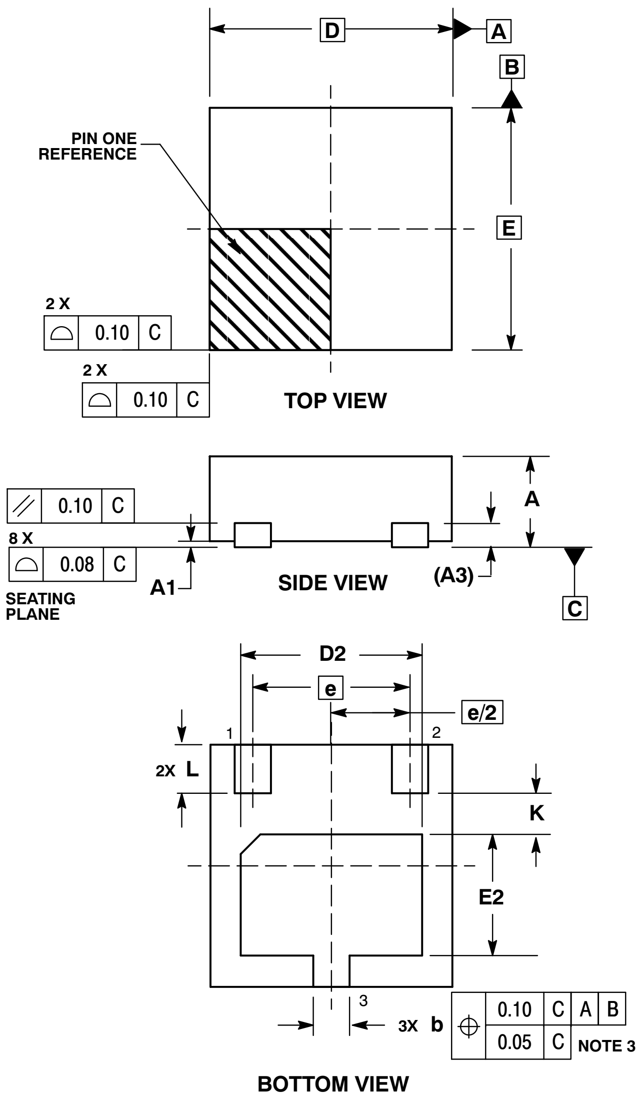


Figure 8. Output Capacitance

PACKAGE DIMENSIONS

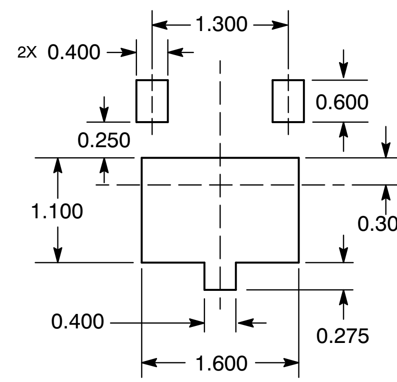
WDFN3
CASE 506AU-01
ISSUE O



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994 .
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00		0.05	0.000		0.002
A3		0.20 REF			0.008 REF	
b	0.25	0.30	0.35	0.010	0.012	0.014
D		2.00 BSC			0.079 BSC	
D2	1.40	1.50	1.60	0.055	0.059	0.063
E		2.00 BSC			0.079 BSC	
E2	0.90	1.00	1.10	0.035	0.039	0.043
e		1.30 BSC			0.051 BSC	
K		0.35 REF			0.014 REF	
L	0.35	0.40	0.45	0.014	0.016	0.018

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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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