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ON Semiconductor
NSS20200W6T1G

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sales@integrated-circuit.com

NSS20200W6

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

ON Semiconductor's e²PowerEdge 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 e²PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

- This is a Pb–Free Device

MAXIMUM RATINGS (T_A = 25°C)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	–20	Vdc
Collector-Base Voltage	V_{CBO}	–20	Vdc
Emitter-Base Voltage	V_{EBO}	–7.0	Vdc
Collector Current – Continuous	I_C	–2.0	A
Collector Current – Peak	I_{CM}	–3.0	A

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D (Note 1)	426 3.4	mW mW/°C
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$ (Note 1)	293	°C/W
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D (Note 2)	555 4.4	mW mW/°C
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$ (Note 2)	225	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	°C

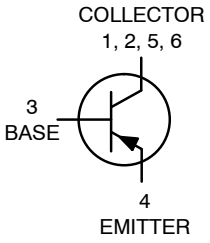
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

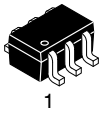
1. FR–4 @ 100 mm², 1 oz. copper traces.
2. FR–4 @ 500 mm², 1 oz. copper traces.

ON Semiconductor®

http://onsemi.com

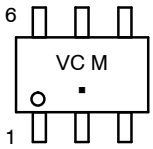
–20 VOLTS, 3.0 AMPS PNP LOW $V_{CE(sat)}$ TRANSISTOR EQUIVALENT $R_{DS(on)}$ 65 mΩ





SC–88/SOT–363
CASE 419B
STYLE 20

DEVICE MARKING



VC = Specific Device Code
M = Date Code
▪ = Pb–Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NSS20200W6T1G	SC–88 (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.

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)	$V_{(BR)CEO}$	−20	–	–	Vdc
Collector – Base Breakdown Voltage (I_C = −0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	−20	–	–	Vdc
Emitter – Base Breakdown Voltage (I_E = −0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	−7.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = −20 Vdc, I_E = 0)	I_{CBO}	–	–	−0.1	μAdc
Emitter Cutoff Current (V_{EB} = −7.0 Vdc)	I_{EBO}	–	–	−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) (I_C = −2.0 A, V_{CE} = −2.0 V)	h_{FE}	 250 220 200 160	 370 325 290 245	 – – – –	
Collector – Emitter Saturation Voltage (Note 3) (I_C = −0.1 A, I_B = −0.010 A) (Note 4) (I_C = −1.0 A, I_B = −0.100 A) (I_C = −1.0 A, I_B = −0.010 A) (I_C = −2.0 A, I_B = −0.200 A) (I_C = −2.0 A, I_B = −0.020 A)	$V_{CE(sat)}$	 – – – – –	 −0.010 −0.067 −0.102 −0.128 −0.177	 −0.014 −0.092 −0.126 −0.165 −0.215	V
Base – Emitter Saturation Voltage (Note 3) (I_C = −1.0 A, I_B = −0.01 A)	$V_{BE(sat)}$	–	–	−0.900	V
Base – Emitter Turn−on Voltage (Note 3) (I_C = −1.0 A, V_{CE} = −2.0 V)	$V_{BE(on)}$	–	–	−0.900	V
Cutoff Frequency (I_C = −100 mA, V_{CE} = −5.0 V, f = 100 MHz)	f_T	100	–	–	MHz
Input Capacitance (V_{EB} = −0.5 V, f = 1.0 MHz)	Cibo	–	–	330	pF
Output Capacitance (V_{CB} = −3.0 V, f = 1.0 MHz)	Cobo	–	–	90	pF
SWITCHING CHARACTERISTICS					
Delay (V_{CC} = −10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_d	–	–	65	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	–	–	320	ns
Fall (V_{CC} = −10 V, I_C = 750 mA, I_{B1} = 15 mA)	t_f	–	–	125	ns

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

NSS20200W6

TYPICAL CHARACTERISTICS

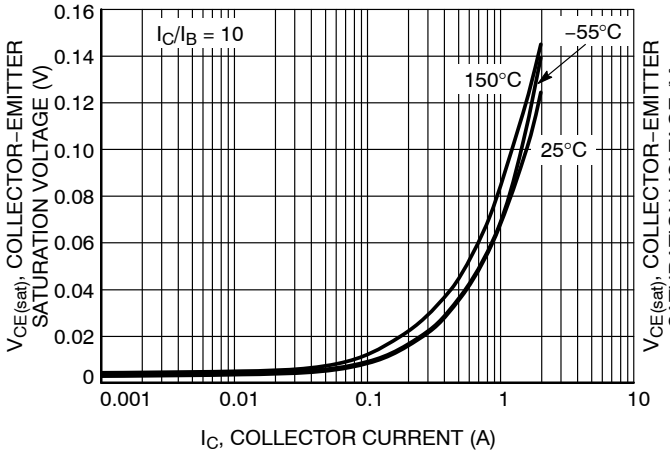


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

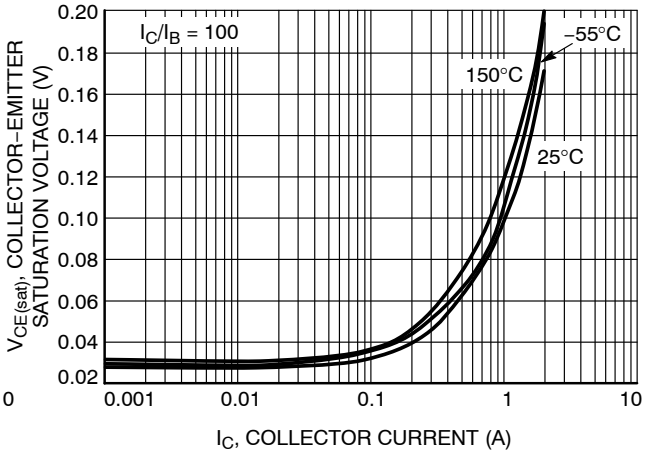


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

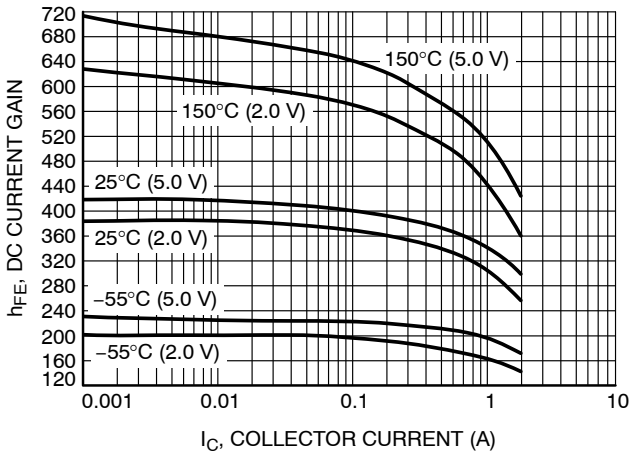


Figure 3. DC Current Gain vs. Collector Current

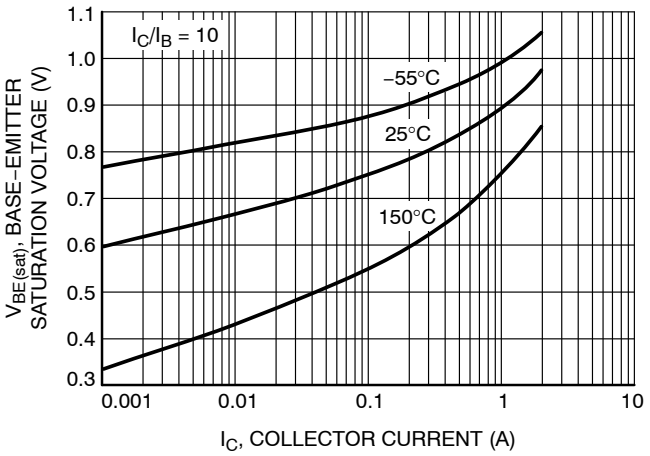


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

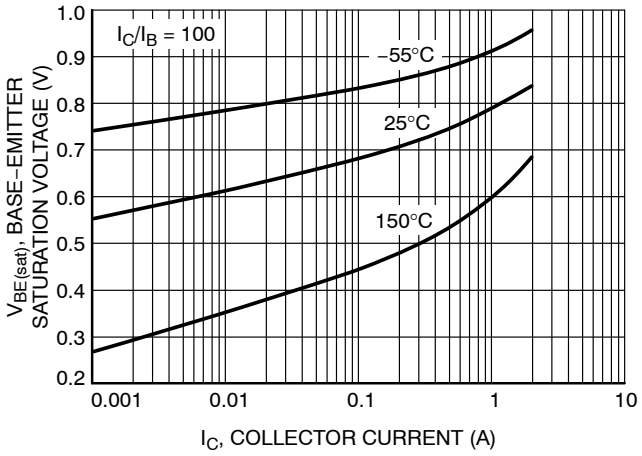


Figure 5. Base Emitter Saturation Voltage vs. Collector Current

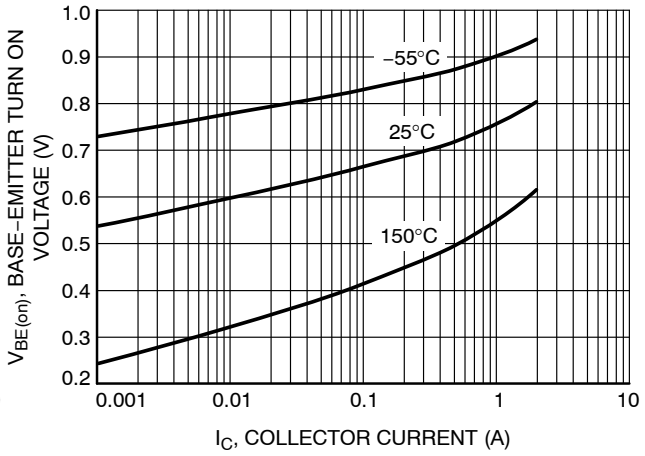


Figure 6. Base Emitter Turn−On Voltage vs. Collector Current

NSS20200W6

TYPICAL CHARACTERISTICS

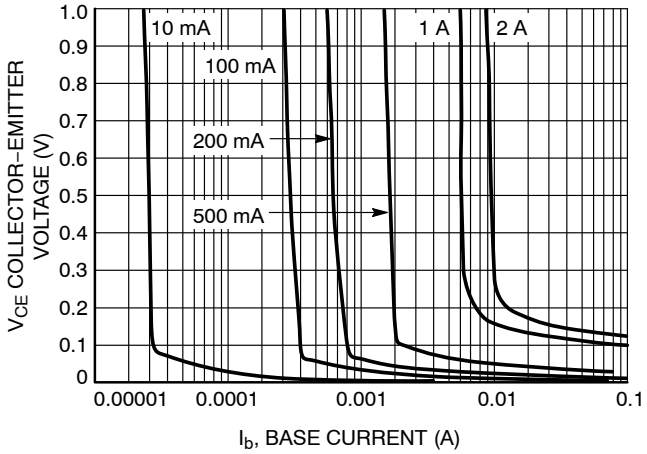


Figure 7. Saturation Region

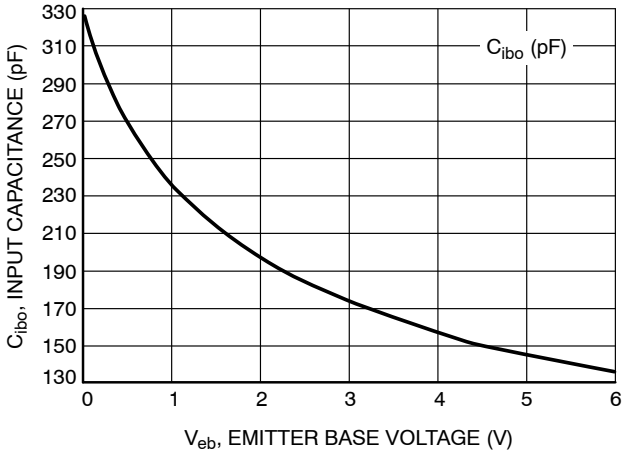


Figure 8. Input Capacitance

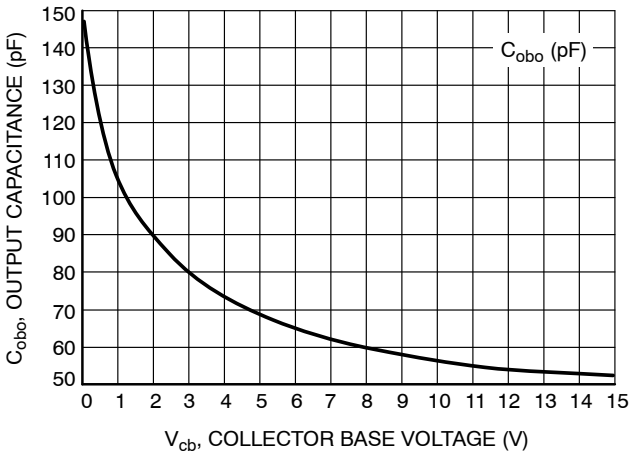


Figure 9. Output Capacitance

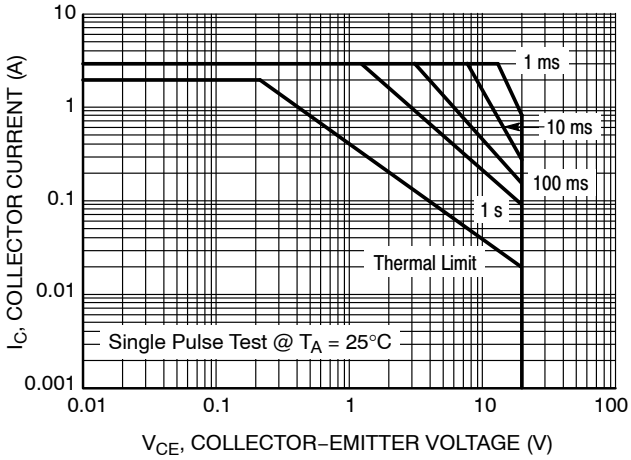
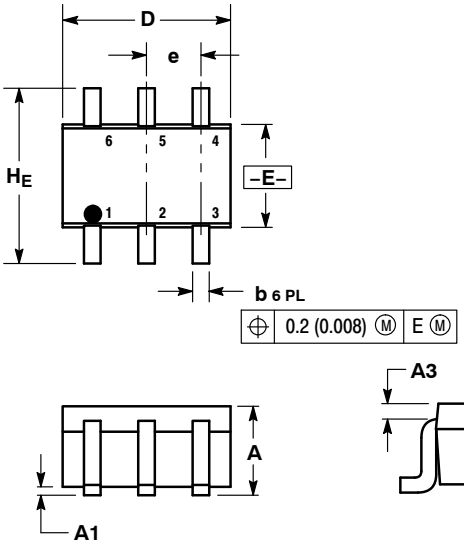


Figure 10. Safe Operating Area

NSS20200W6

PACKAGE DIMENSIONS

SC−88/SC70−6/SOT−363
CASE 419B−02
ISSUE W

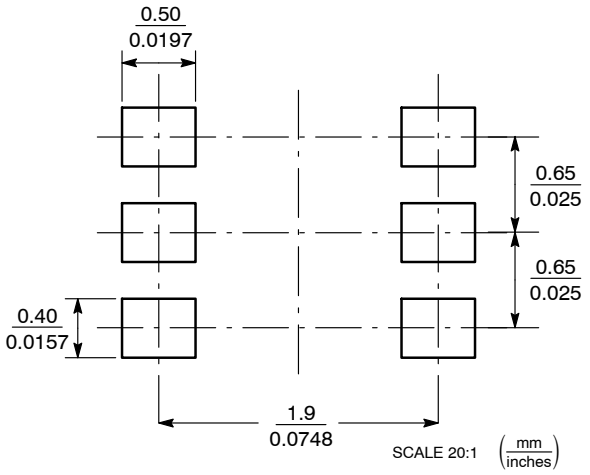


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3		0.20 REF			0.008 REF	
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e		0.65 BSC			0.026 BSC	
L	0.10	0.20	0.30	0.004	0.008	0.012
H_E	2.00	2.10	2.20	0.078	0.082	0.086

STYLE 20:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. 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.

PUBLICATION ORDERING INFORMATION

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