30 V, 0.7 A, Low $V_{CE(sat)}$ NPN Transistor

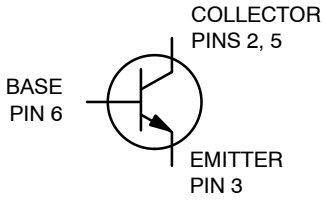
NSS30071MR6

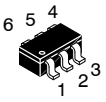
30 VOLTS
0.7 AMPS
NPN LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 200 mΩ

onsemi'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.

- These Devices are Pb−Free and are RoHS Compliant





SC−74
CASE 318F
STYLE 2

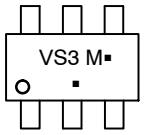
MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	30	V
Collector−Base Voltage	V_{CBO}	40	V
Emitter−Base Voltage	V_{EBO}	5.0	V
Collector Current	I_C	700	mA
Base Current	I_B	350	mA
Total Power Dissipation @ T_C = 25°C Total Power Dissipation @ T_C = 85°C Thermal Resistance − Junction−to−Ambient (Note 1)	P_D P_D $R_{\theta JA}$	342 178 366	mW mW °C/W
Total Power Dissipation @ T_C = 25°C Total Power Dissipation @ T_C = 85°C Thermal Resistance − Junction−to−Ambient (Note 2)	P_D P_D $R_{\theta JA}$	665 346 188	mW mW °C/W
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°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. Minimum FR−4 or G−10 PCB, Operating to Steady State.
2. Mounted onto a 2″ square FR−4 Board (1″ sq 2 oz Cu 0.06″ thick single sided), Operating to Steady State.

MARKING DIAGRAM



VS3 = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NSS30071MR6T1G	SC−74 (Pb−Free)	10000/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.

April, 2024 − Rev. 2
Publication Order Number:
NSS30071MR6/D

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

Symbol	Characteristic		Min	Typ	Max	Unit
OFF CHARACTERISTICS						
$V_{(BR)CBO}$	Collector – Base Breakdown Voltage	(I_C = 100 μAdc)	40	–	–	Vdc
$V_{(BR)CEO}$	Collector – Emitter Breakdown Voltage	(I_C = 10 mAdc)	30	–	–	Vdc
$V_{(BR)EBO}$	Emitter–Base Breakdown Voltage	(I_E = 100 μAdc)	5.0	–	–	Vdc
I_{CBO}	Collector Cutoff Current	(V_{CB} = 25 Vdc, I_E = 0 Adc) (V_{CB} = 25 Vdc, I_E = 0 Adc, T_A = 125°C)	– –	– –	1.0 10	μAdc
I_{EBO}	Emitter Cutoff Current	(V_{EB} = 5.0 Vdc, I_C = 0 Adc)	–	–	10	μAdc
ON CHARACTERISTICS						
h_{FE}	DC Current Gain	(V_{CE} = 3.0 Vdc, I_C = 100 mAdc)	150	–	–	Vdc
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	(I_C = 500 mAdc, I_B = 50 mAdc)	–	–	0.25	Vdc
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	(I_C = 700 mAdc, I_B = 70 mAdc)	–	–	0.4	Vdc
$V_{BE(sat)}$	Base–Emitter Saturation Voltage	(I_C = 700 mAdc, I_B = 70 mAdc)	–	–	1.1	Vdc
$V_{BE(on)}$	Base–Emitter Turn–On Voltage	(I_C = 700 mAdc, V_{CE} = 1.0 Vdc)	–	–	1.0	Vdc

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.

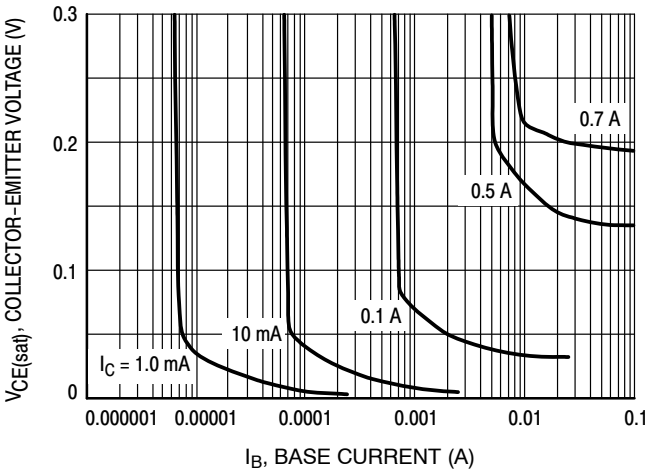


Figure 1. Collector Saturation Region

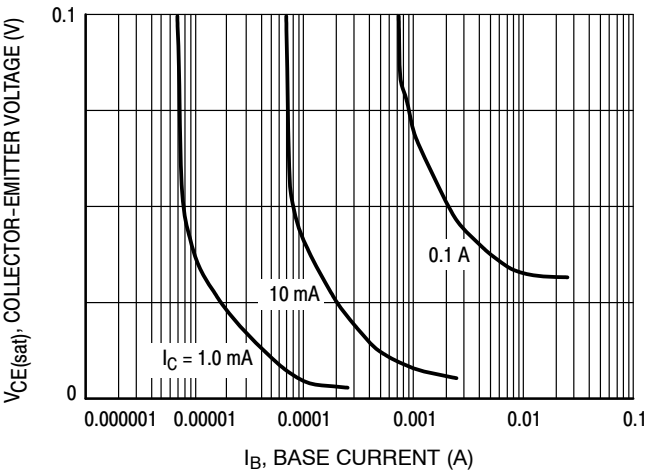


Figure 2. Collector Saturation Region

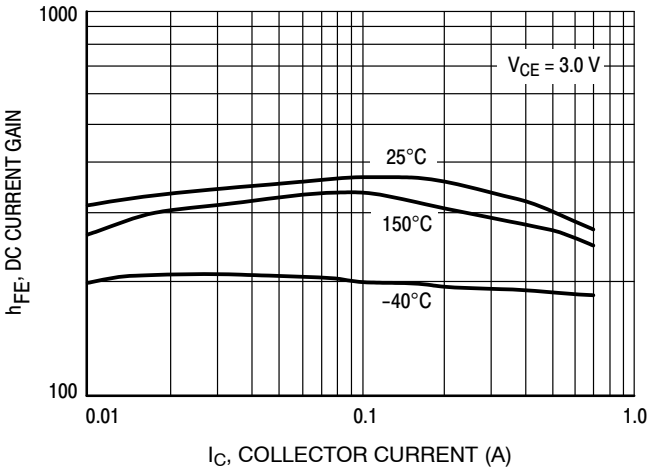


Figure 3. DC Current Gain

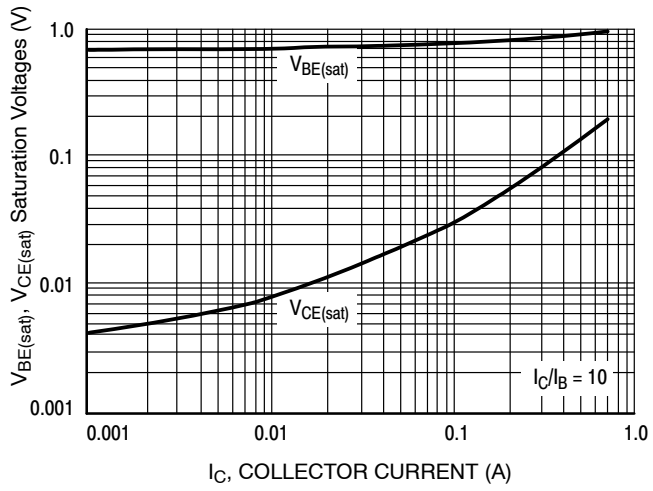


Figure 4. “SAT” Voltages

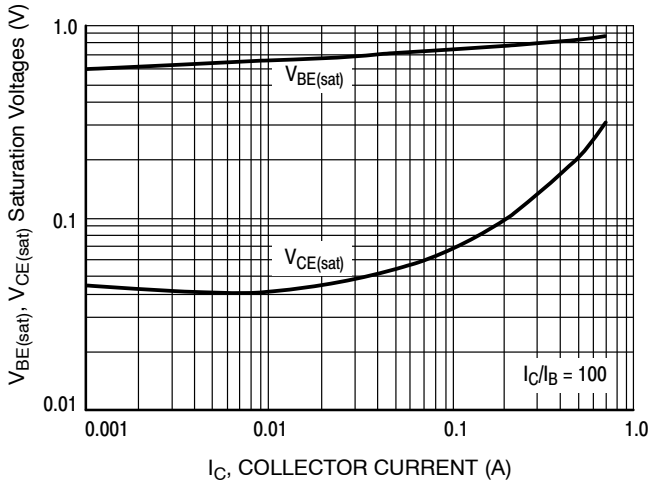


Figure 5. “SAT” Voltages

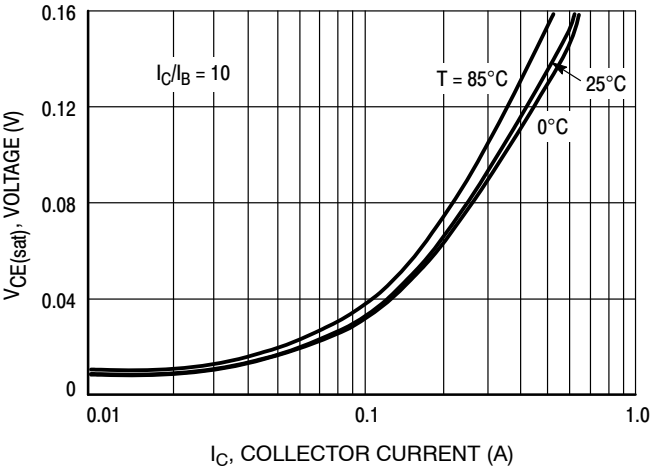


Figure 6. Collector−Emitter Saturation Voltage

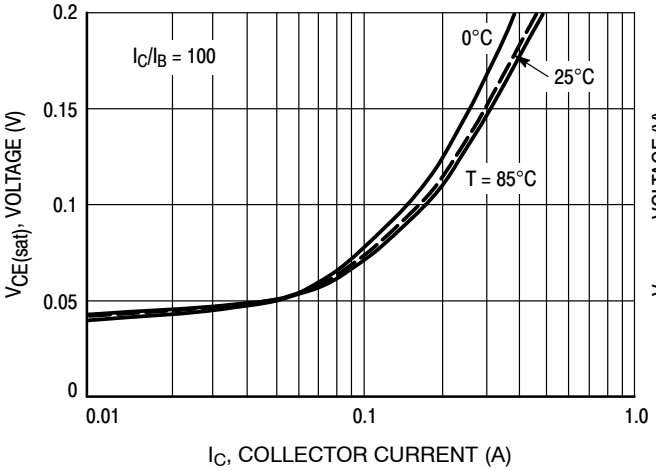


Figure 7. Collector−Emitter Saturation Voltage

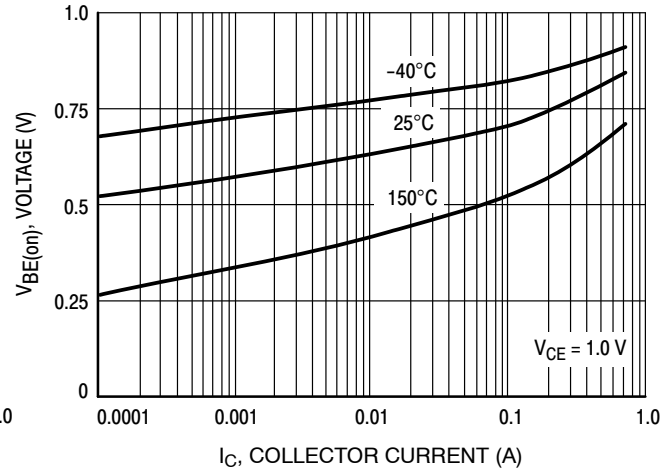


Figure 8. $V_{BE(on)}$ Voltage

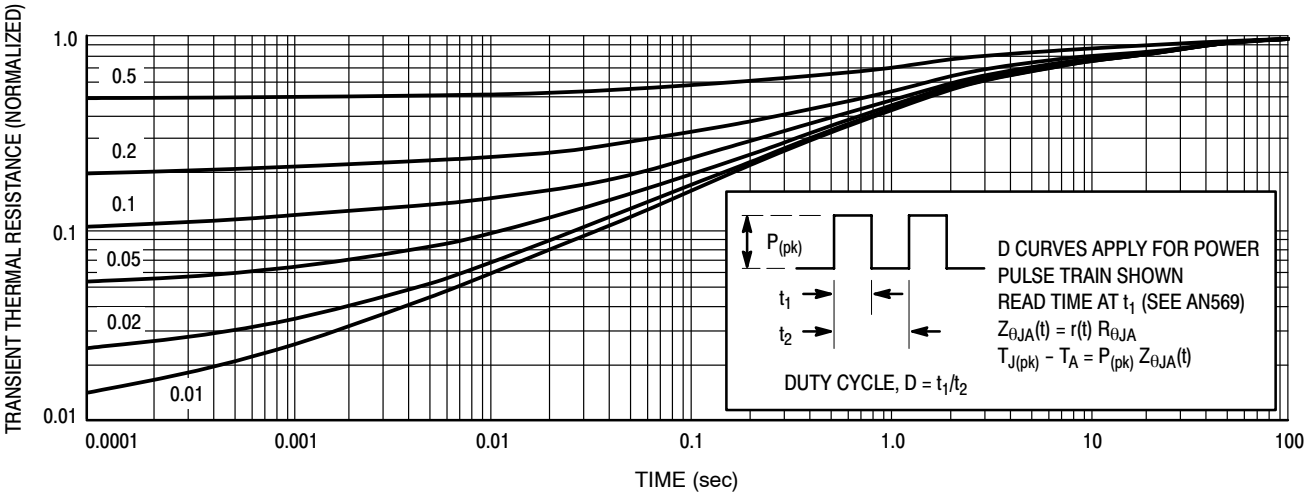


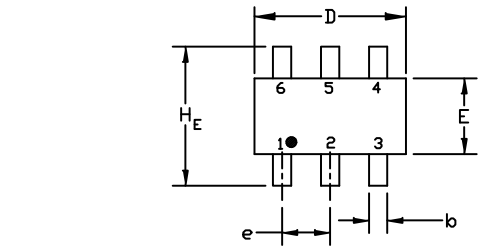
Figure 9. Thermal Response Curve

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

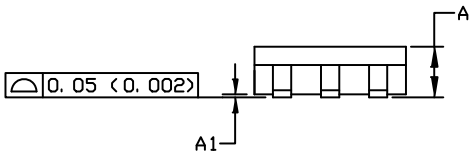
SCALE 2:1

SC−74
CASE 318F
ISSUE P

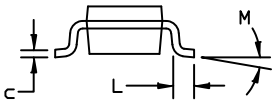
DATE 07 OCT 2021



TOP VIEW



SIDE VIEW

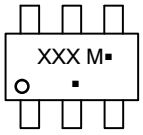


END VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
2. CONTROLLING DIMENSION: INCHES
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.

	MILLIMETERS			INCHES		
DIM	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
H_E	2.50	2.75	3.00	0.099	0.108	0.118
L	0.20	0.40	0.60	0.008	0.016	0.024
M	0°	---	10°	0°	---	10°

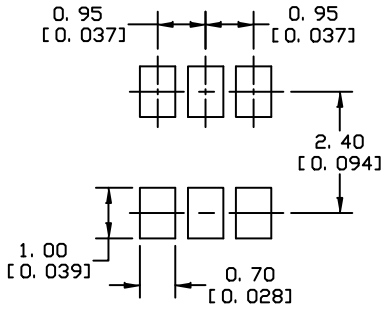
GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*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.



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

SOLDERING FOOTPRINT

STYLE 1:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

STYLE 2:
PIN 1. NO CONNECTION
2. COLLECTOR
3. EMITTER
4. NO CONNECTION
5. COLLECTOR
6. BASE

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

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

STYLE 5:
PIN 1. CHANNEL 1
2. ANODE
3. CHANNEL 2
4. CHANNEL 3
5. CATHODE
6. CHANNEL 4

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 8:
PIN 1. EMITTER 1
2. BASE 2
3. COLLECTOR 2
4. EMITTER 2
5. BASE 1
6. COLLECTOR 1

STYLE 9:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

STYLE 10:
PIN 1. ANODE/CATHODE
2. BASE
3. EMITTER
4. COLLECTOR
5. ANODE
6. CATHODE

STYLE 11:
PIN 1. EMITTER
2. BASE
3. ANODE/CATHODE
4. ANODE
5. CATHODE
6. COLLECTOR

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