NSS40302PDR2G

Complementary 40 V, 6.0 A, Low $V_{CE(sat)}$ Transistor

ON Semiconductor's e^2PowerEdge 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 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

- Halide Free
- This is a Pb−Free Device

MAXIMUM RATINGS (T_A = 25°C)

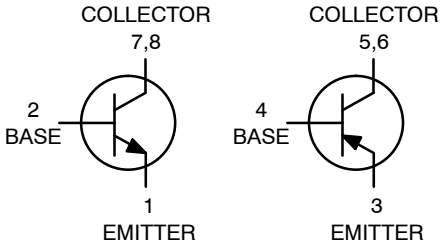
Rating		Symbol	Max	Unit
Collector-Emitter Voltage	NPN PNP	V_{CEO}	40 −40	Vdc
Collector-Base Voltage	NPN PNP	V_{CBO}	40 −40	Vdc
Emitter-Base Voltage	NPN PNP	V_{EBO}	6.0 −7.0	Vdc
Collector Current − Continuous	NPN PNP	I_C	3.0 −3.0	A
Collector Current − Peak	NPN PNP	I_{CM}	6.0 −6.0	A
Electrostatic Discharge		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.

ON Semiconductor®

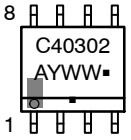
http://onsemi.com

40 VOLTS, 6.0 AMPS COMPLEMENTARY LOW $V_{CE(sat)}$ TRANSISTOR EQUIVALENT $R_{DS(on)}$ 80 mΩ



SOIC−8
CASE 751
STYLE 16

DEVICE MARKING



C40302 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NSS40302PDR2G	SOIC−8 (Pb−Free)	2500 / 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.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
SINGLE HEATED			
Total Device Dissipation (Note 1) T_A = 25°C Derate above 25°C	P_D	576 4.6	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	217	°C/W
Total Device Dissipation (Note 2) T_A = 25°C Derate above 25°C	P_D	676 5.4	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	185	°C/W
DUAL HEATED (Note 3)			
Total Device Dissipation (Note 1) T_A = 25°C Derate above 25°C	P_D	653 5.2	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	191	°C/W
Total Device Dissipation (Note 2) T_A = 25°C Derate above 25°C	P_D	783 6.3	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	160	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

1. FR−4 @ 10 mm^2, 1 oz. copper traces, still air.
2. FR−4 @ 100 mm^2, 1 oz. copper traces, still air.
3. Dual heated values assume total power is the sum of two equally powered devices.

NPN 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)	$V_{(BR)CEO}$	40	–	–	Vdc
Collector – Base Breakdown Voltage (I_C = 0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	40	–	–	Vdc
Emitter – Base Breakdown Voltage (I_E = 0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	6.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 40 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 5)	h_{FE}				
(I_C = 10 mA, V_{CE} = 2.0 V)		200	400	–	
(I_C = 500 mA, V_{CE} = 2.0 V)		200	350	–	
(I_C = 1.0 A, V_{CE} = 2.0 V)		180	340	–	
(I_C = 2.0 A, V_{CE} = 2.0 V)		180	320	–	
Collector – Emitter Saturation Voltage (Note 5)	$V_{CE(sat)}$				V
(I_C = 0.1 A, I_B = 0.010 A)		–	0.008	0.011	
(I_C = 1.0 A, I_B = 0.100 A)		–	0.044	0.060	
(I_C = 1.0 A, I_B = 0.010 A)		–	0.080	0.115	
(I_C = 2.0 A, I_B = 0.200 A)		–	0.082	0.115	
Base – Emitter Saturation Voltage (Note 5) (I_C = 1.0 A, I_B = 0.01 A)	$V_{BE(sat)}$	–	0.780	0.900	V
Base – Emitter Turn–on Voltage (Note 5) (I_C = 0.1 A, V_{CE} = 2.0 V)	$V_{BE(on)}$	–	0.650	0.750	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	–	320	450	pF
Output Capacitance (V_{CB} = 3.0 V, f = 1.0 MHz)	Cobo	–	40	50	pF
SWITCHING CHARACTERISTICS					
Delay (V_{CC} = 30 V, I_C = 750 mA, I_{B1} = 15 mA)	t_d	–	–	100	ns
Rise (V_{CC} = 30 V, I_C = 750 mA, I_{B1} = 15 mA)	t_r	–	–	100	ns
Storage (V_{CC} = 30 V, I_C = 750 mA, I_{B1} = 15 mA)	t_s	–	–	780	ns
Fall (V_{CC} = 30 V, I_C = 750 mA, I_{B1} = 15 mA)	t_f	–	–	110	ns

4. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%.

PNP 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)	$V_{(BR)CEO}$	−40	–	–	Vdc
Collector – Base Breakdown Voltage (I_C = −0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	−40	–	–	Vdc
Emitter – Base Breakdown Voltage (I_E = −0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	−7.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = −40 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 5)	h_{FE}				
(I_C = −10 mA, V_{CE} = −2.0 V)		250	380	–	
(I_C = −500 mA, V_{CE} = −2.0 V)		220	340	–	
(I_C = −1.0 A, V_{CE} = −2.0 V)		180	300	–	
(I_C = −2.0 A, V_{CE} = −2.0 V)		150	230	–	
Collector – Emitter Saturation Voltage (Note 5)	$V_{CE(sat)}$				V
(I_C = −0.1 A, I_B = −0.010 A)		–	−0.013	−0.017	
(I_C = −1.0 A, I_B = −0.100 A)		–	−0.075	−0.095	
(I_C = −1.0 A, I_B = −0.010 A)		–	−0.130	−0.170	
(I_C = −2.0 A, I_B = −0.200 A)		–	−0.135	−0.170	
Base – Emitter Saturation Voltage (Note 5) (I_C = −1.0 A, I_B = −0.01 A)	$V_{BE(sat)}$	–	−0.780	−0.900	V
Base – Emitter Turn−on Voltage (Note 5) (I_C = −0.1 A, V_{CE} = −2.0 V)	$V_{BE(on)}$	–	−0.660	−0.750	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	–	250	300	pF
Output Capacitance (V_{CB} = −3.0 V, f = 1.0 MHz)	Cobo	–	50	65	pF
SWITCHING CHARACTERISTICS					
Delay (V_{CC} = −30 V, I_C = −750 mA, I_{B1} = −15 mA)	t_d	–	–	60	ns
Rise (V_{CC} = −30 V, I_C = −750 mA, I_{B1} = −15 mA)	t_r	–	–	120	ns
Storage (V_{CC} = −30 V, I_C = −750 mA, I_{B1} = −15 mA)	t_s	–	–	400	ns
Fall (V_{CC} = −30 V, I_C = −750 mA, I_{B1} = −15 mA)	t_f	–	–	130	ns

5. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%.

NPN TYPICAL CHARACTERISTICS

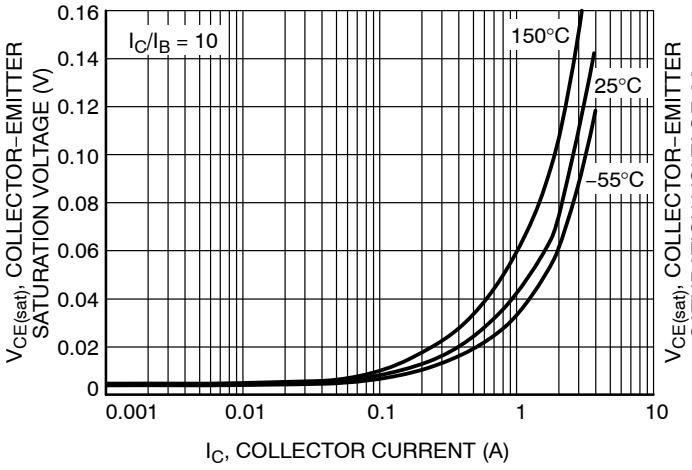


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

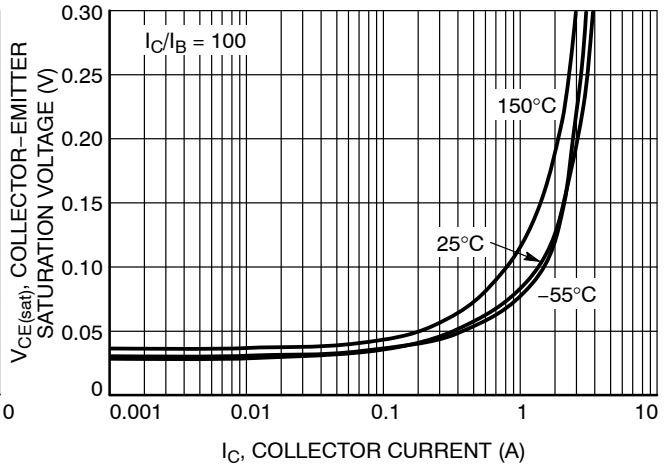


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

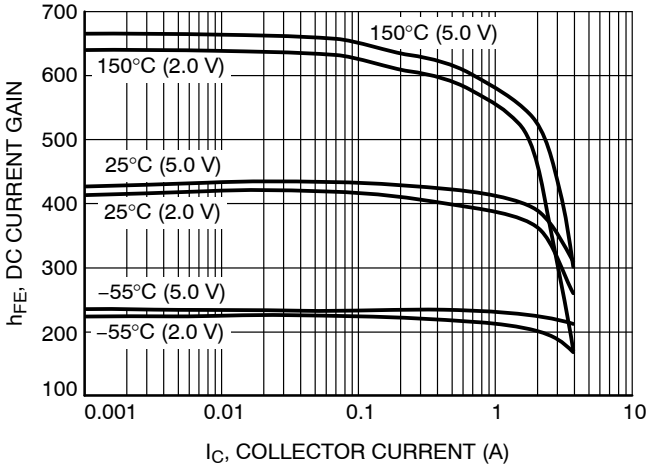


Figure 3. DC Current Gain vs. Collector Current

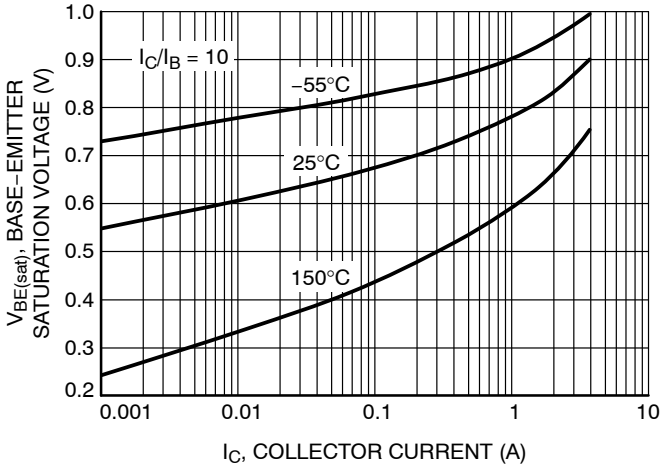


Figure 4. Base Emitter Saturation Voltage vs. Collector Current

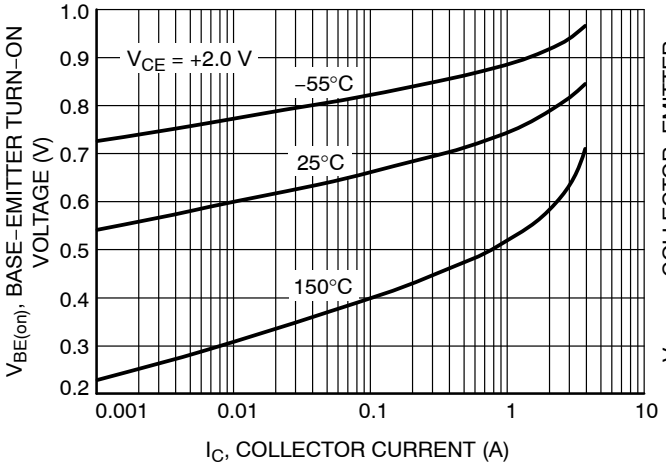


Figure 5. Base Emitter Turn−On Voltage vs. Collector Current

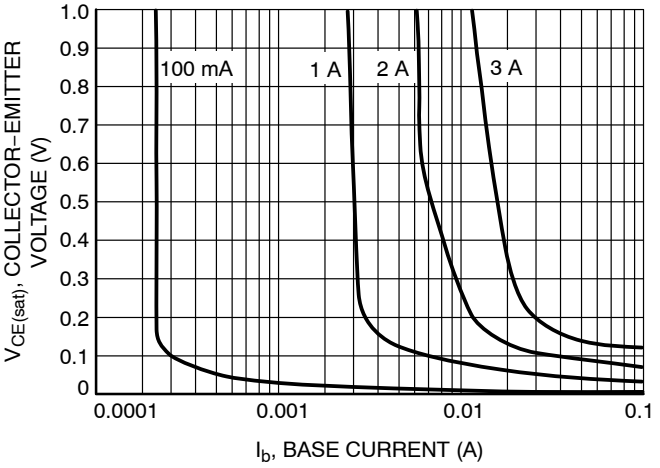


Figure 6. Saturation Region

NPN TYPICAL CHARACTERISTICS

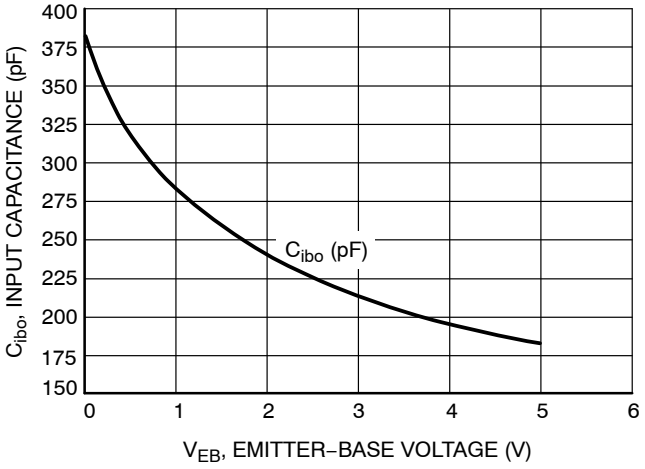


Figure 7. Input Capacitance

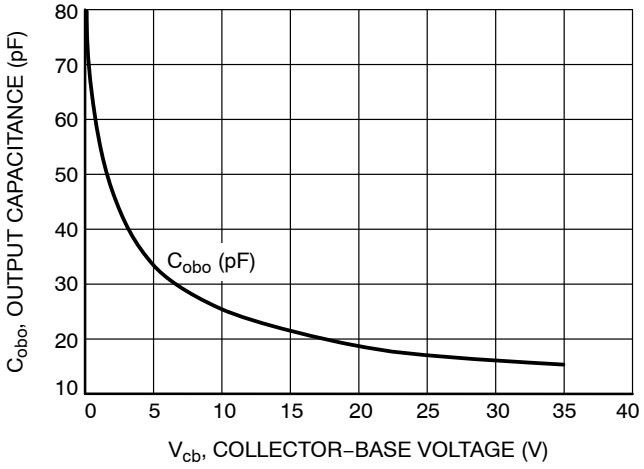


Figure 8. Output Capacitance

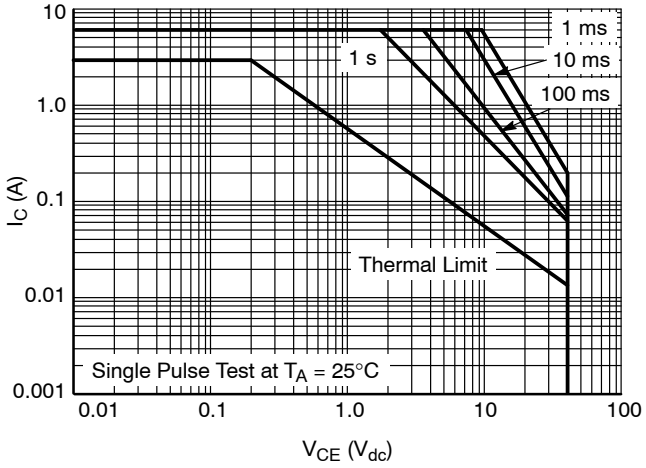


Figure 9. Safe Operating Area

PNP TYPICAL CHARACTERISTICS

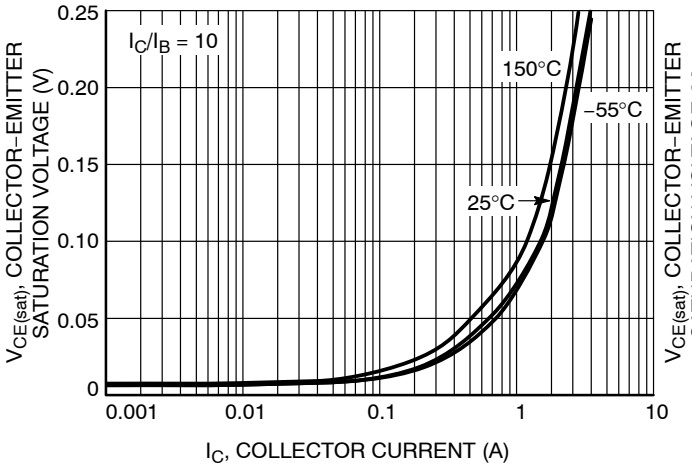


Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

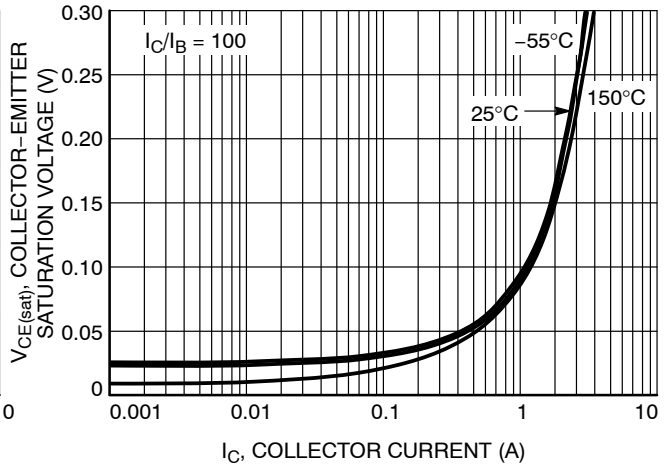


Figure 11. Collector Emitter Saturation Voltage vs. Collector Current

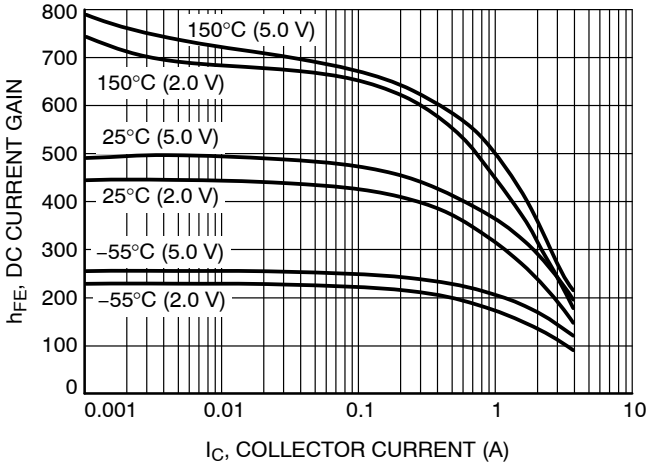


Figure 12. DC Current Gain vs. Collector Current

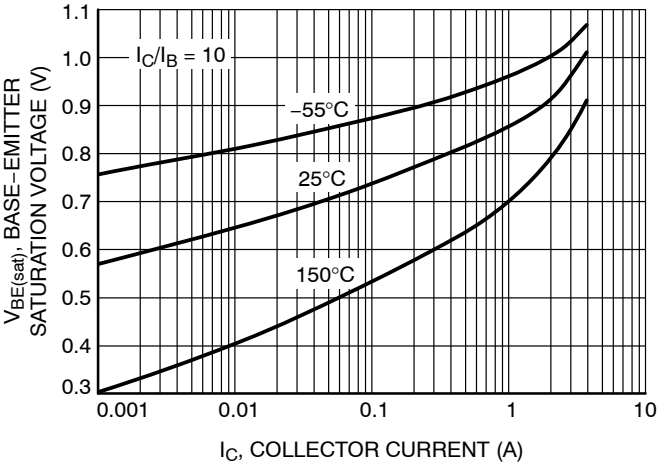


Figure 13. Base Emitter Saturation Voltage vs. Collector Current

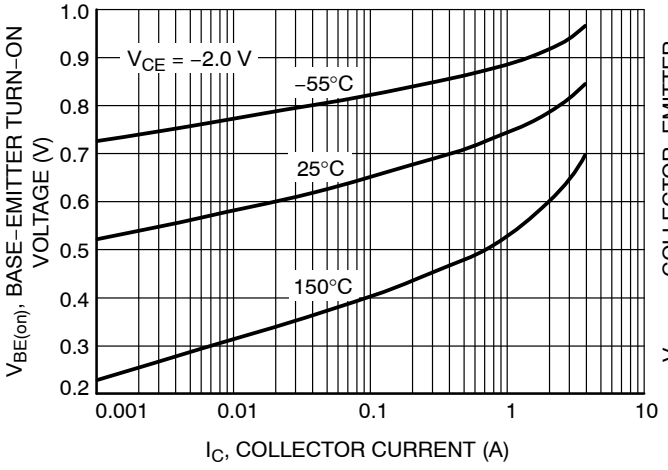


Figure 14. Base Emitter Turn−On Voltage vs. Collector Current

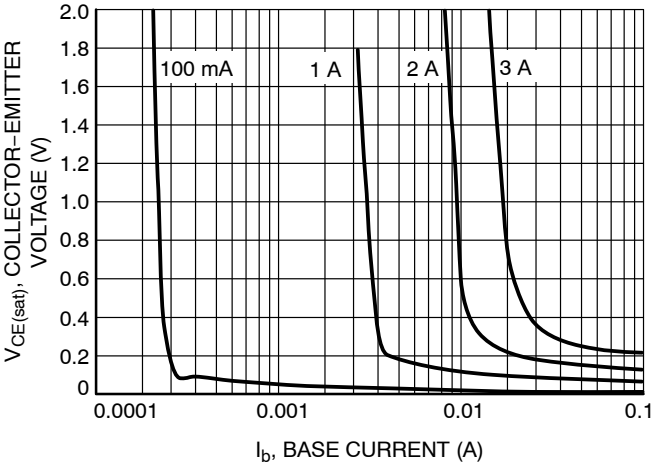


Figure 15. Saturation Region

PNP TYPICAL CHARACTERISTICS

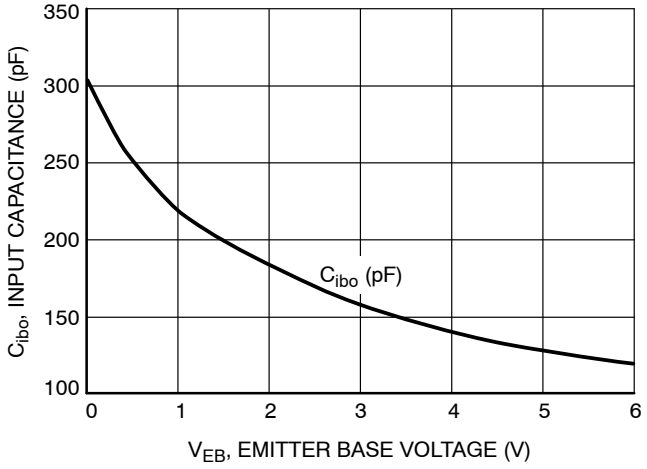


Figure 16. Input Capacitance

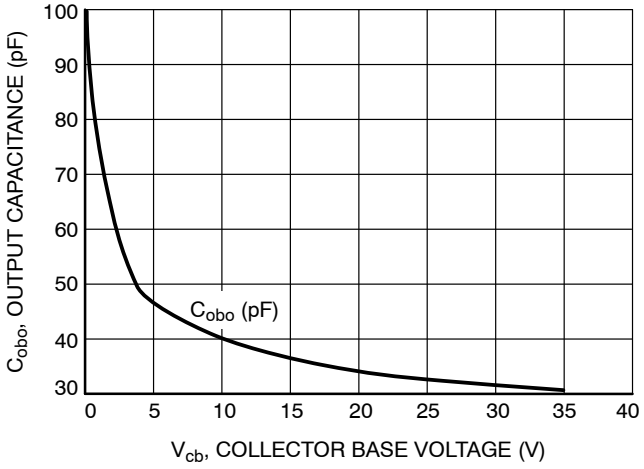


Figure 17. Output Capacitance

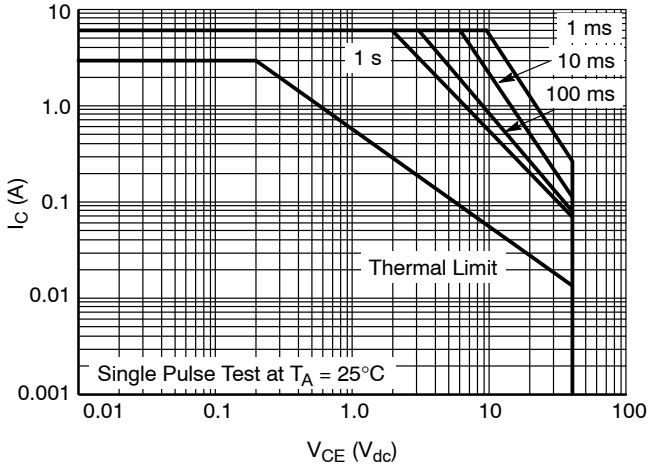
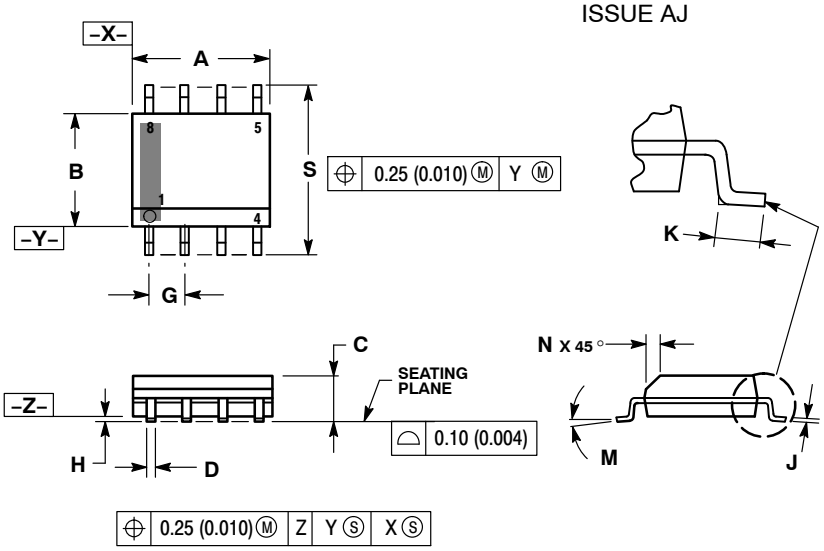


Figure 18. Safe Operating Area

PACKAGE DIMENSIONS

SOIC−8 NB
CASE 751−07
ISSUE AJ

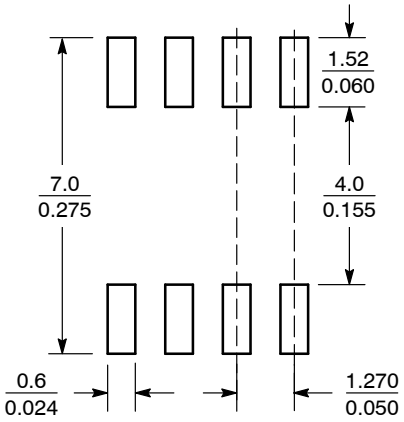


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751−01 THRU 751−06 ARE OBSOLETE. NEW STANDARD IS 751−07.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

STYLE 16:
PIN 1. EMITTER, DIE #1
2. BASE, DIE #1
3. EMITTER, DIE #2
4. BASE, DIE #2
5. COLLECTOR, DIE #2
6. COLLECTOR, DIE #2
7. COLLECTOR, DIE #1
8. COLLECTOR, DIE #1

SOLDERING FOOTPRINT*



SCALE 6:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*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
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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Europe, Middle East and Africa Technical Support:
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Japan Customer Focus Center
Phone: 81−3−5773−3850

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

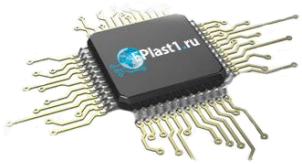
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.