

NSS60600MZ4

Low $V_{CE(sat)}$ Transistor, PNP, 60 V, 6.0 A, SOT-223 Package

ON Semiconductor's e²PowerEdge 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 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.

Features

- Complementary to NSS60601MZ4
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant*

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	-60	Vdc
Collector-Base Voltage	V_{CBO}	-100	Vdc
Emitter-Base Voltage	V_{EBO}	-6.0	Vdc
Collector Current - Continuous	I_C	-6.0	A
Collector Current - Peak	I_{CM}	-12.0	A

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.

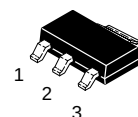
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



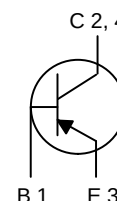
ON Semiconductor®

www.onsemi.com

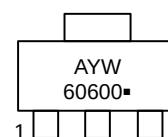
**-60 VOLTS, 6.0 AMPS
2.0 WATTS
PNP LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 50 mΩ**



**SOT-223
CASE 318E
STYLE 1**

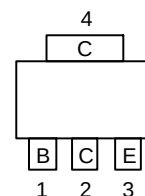


MARKING DIAGRAM



A = Assembly Location
Y = Year
W = Work Week
60600 = Specific Device Code
■ = Pb-Free Package

PIN ASSIGNMENT



Top View Pinout

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

NSS60600MZ4

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 1)	800 6.5	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 1)	155	$^\circ\text{C/W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 2)	2 15.6	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 2)	64	$^\circ\text{C/W}$
Total Device Dissipation (Single Pulse < 10 sec.)	$P_{D\text{single}}$ (Note 3)	710	mW
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

1. FR-4 @ 7.6 mm², 1 oz. copper traces.
2. FR-4 @ 645 mm², 1 oz. copper traces.
3. Thermal response.

ORDERING INFORMATION

Device	Package	Shipping [†]
NSS60600MZ4T1G	SOT-223 (Pb-Free)	1,000 / Tape & Reel
NSV60600MZ4T1G	SOT-223 (Pb-Free)	1,000 / Tape & Reel
NSS60600MZ4T3G	SOT-223 (Pb-Free)	4,000 / Tape & Reel
NSV60600MZ4T3G	SOT-223 (Pb-Free)	4,000 / 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.

NSS60600MZ4

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}	–60	–	–	Vdc
Collector – Base Breakdown Voltage (I _C = –0.1 mAdc, I _E = 0)	V _{(BR)CBO}	–100	–	–	Vdc
Emitter – Base Breakdown Voltage (I _E = –0.1 mAdc, I _C = 0)	V _{(BR)EBO}	–6.0	–	–	Vdc
Collector Cutoff Current (V _{CB} = –100 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 4) (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) (I _C = –6.0 A, V _{CE} = –2.0 V)	h _{FE}	150 120 100 70	– – – –	– 360 – –	–
Collector – Emitter Saturation Voltage (Note 4) (I _C = –0.1 A, I _B = –2.0 mA) (I _C = –1.0 A, I _B = –0.100 A) (I _C = –2.0 A, I _B = –0.200 A) (I _C = –3.0 A, I _B = –60 mA) (I _C = –6.0 A, I _B = –0.6 A)	V _{CE(sat)}	– – – – –	– –0.050 –0.100 – –	–0.050 –0.070 –0.120 –0.250 –0.350	V
Base – Emitter Saturation Voltage (Note 4) (I _C = –1.0 A, I _B = –0.1 A)	V _{BE(sat)}	–	–	–1.0	V
Base – Emitter Turn-on Voltage (Note 4) (I _C = –1.0 A, V _{CE} = –2.0 V)	V _{BE(on)}	–	–	–0.900	V
Cutoff Frequency (I _C = –500 mA, V _{CE} = –10 V, f = 1.0 MHz)	f _T	100	–	–	MHz
Input Capacitance (V _{EB} = 5.0 V, f = 1.0 MHz)	C _{ibo}	–	360	–	pF
Output Capacitance (V _{CB} = 10 V, f = 1.0 MHz)	C _{obo}	–	60	–	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	–	180	–	ns
Storage (V _{CC} = –30 V, I _C = 750 mA, I _{B1} = 15 mA)	t _s	–	540	–	ns
Fall (V _{CC} = –30 V, I _C = 750 mA, I _{B1} = 15 mA)	t _f	–	145	–	ns

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.

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

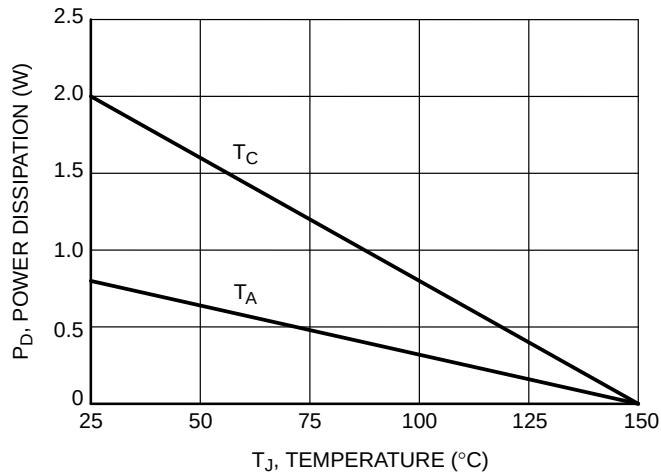


Figure 1. Power Derating

TYPICAL CHARACTERISTICS

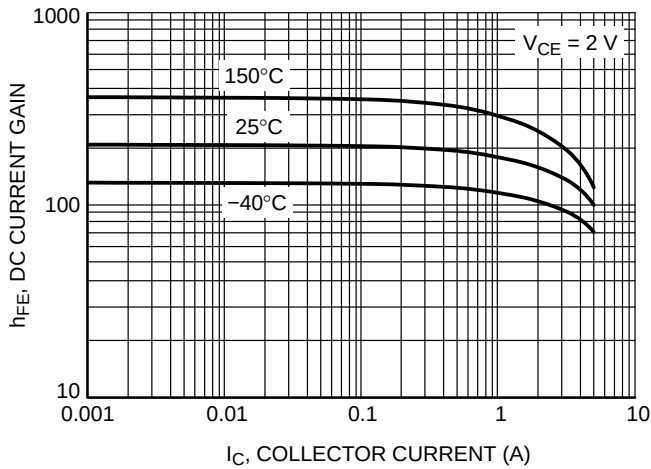


Figure 2. DC Current Gain

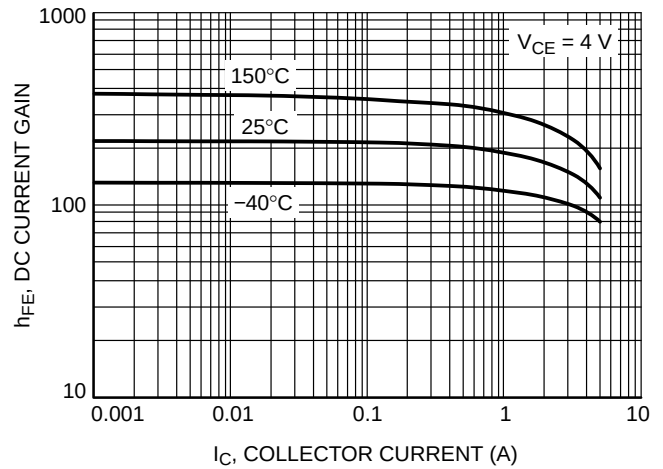


Figure 3. DC Current Gain

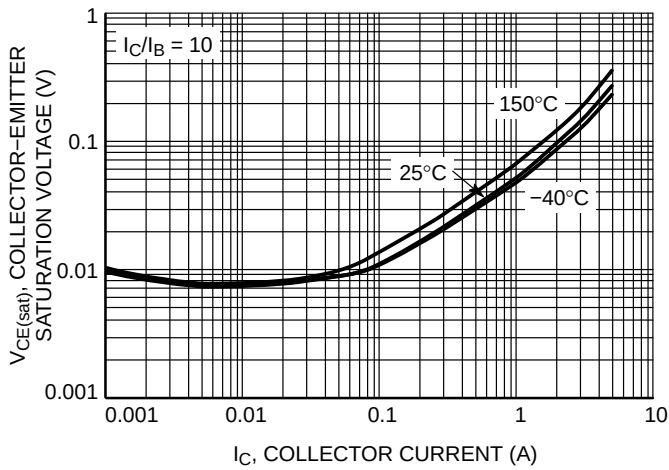


Figure 4. Collector-Emitter Saturation Voltage

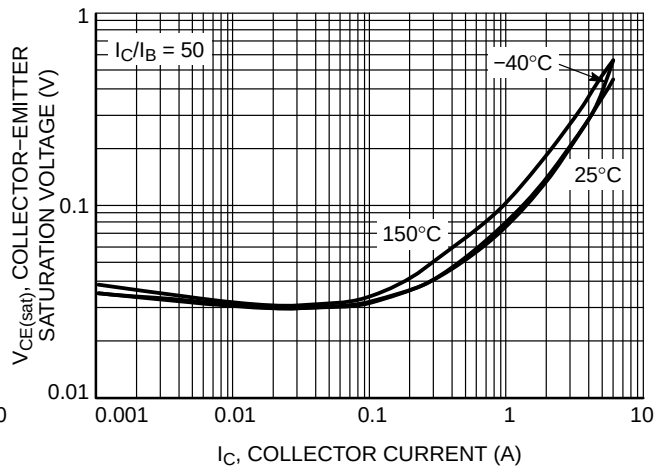


Figure 5. Collector-Emitter Saturation Voltage

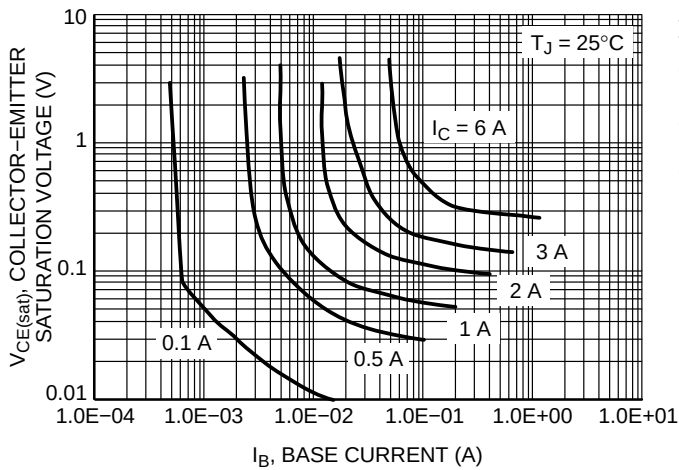


Figure 6. Collector Saturation Region

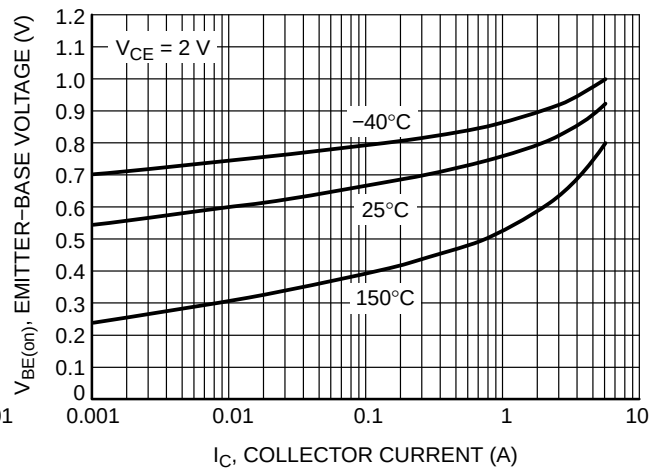


Figure 7. $V_{BE(on)}$ Voltage

TYPICAL CHARACTERISTICS

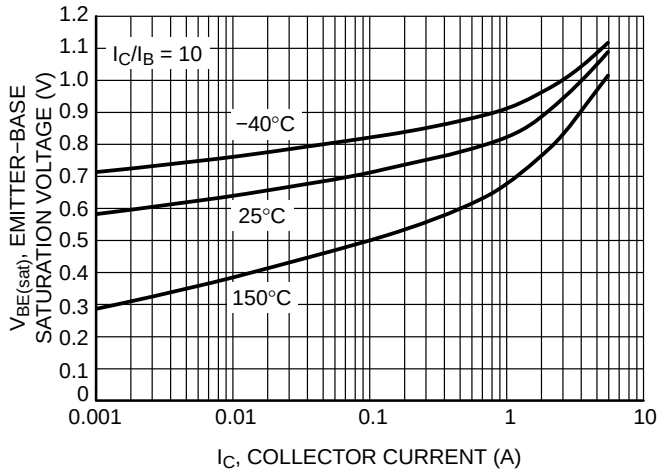


Figure 8. Base-Emitter Saturation Voltage

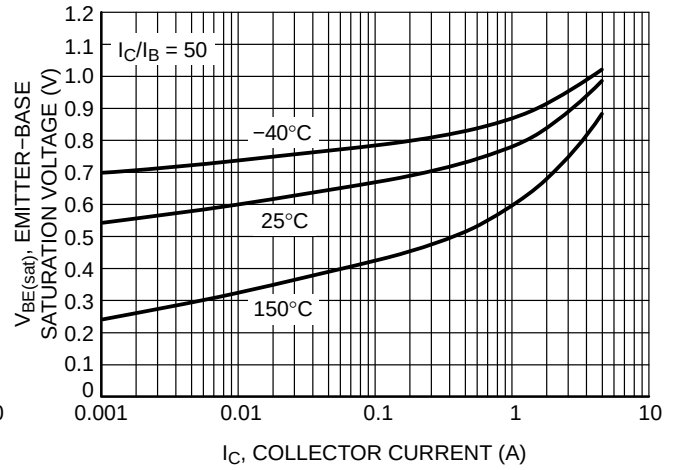


Figure 9. Base-Emitter Saturation Voltage

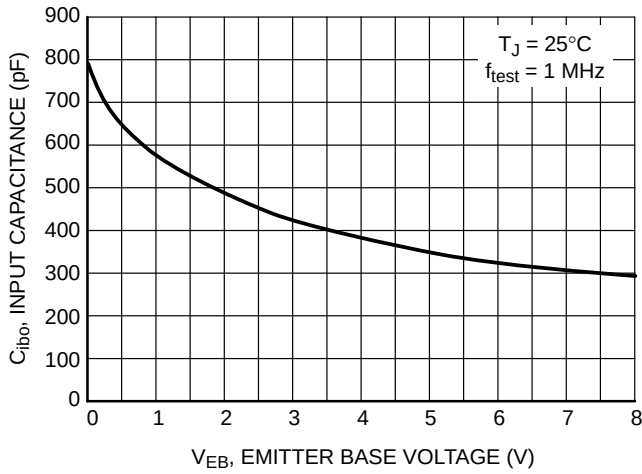


Figure 10. Input Capacitance

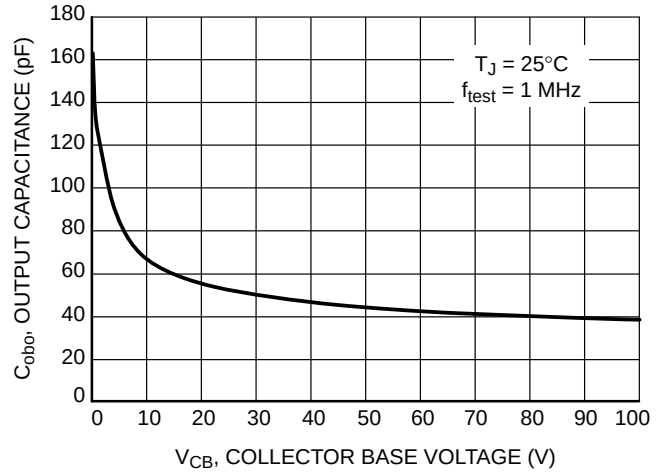


Figure 11. Output Capacitance

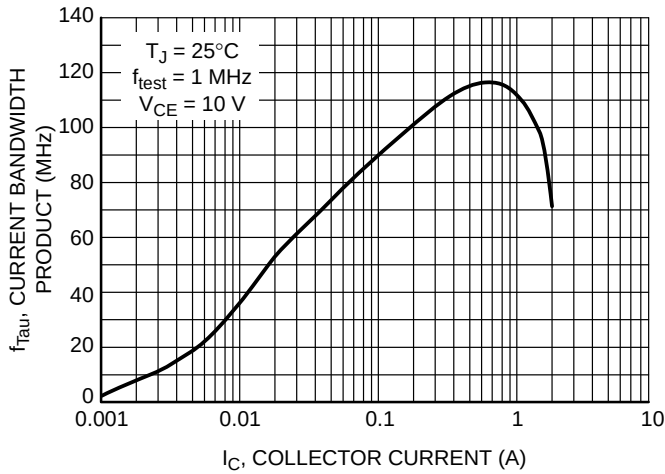


Figure 12. Current-Gain Bandwidth Product

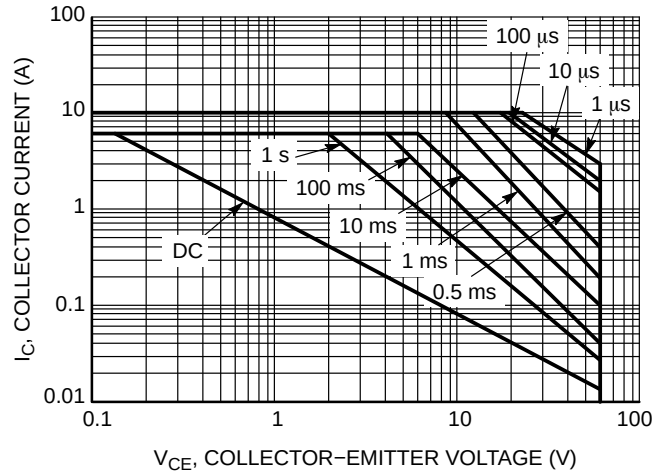


Figure 13. Safe Operating Area

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales