

Complementary Silicon Plastic Power Transistors

2N6107, 2N6109, 2N6111 (PNP), 2N6288, 2N6292 (NPN)

These devices are designed for use in general-purpose amplifier and switching applications.

Features

- High DC Current Gain
- High Current Gain – Bandwidth Product
- TO-220 Compact Package
- These Devices are Pb-Free and are RoHS Compliant*

MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage 2N6111, 2N6288 2N6109 2N6107, 2N6292	V_{CEO}	30 50 70	Vdc
Collector–Base Voltage 2N6111, 2N6288 2N6109 2N6107, 2N6292	V_{CB}	40 60 80	Vdc
Emitter–Base Voltage	V_{EB}	5.0	Vdc
Collector Current – Continuous	I_C	7.0	Adc
Collector Current – Peak	I_{CM}	10	Adc
Base Current	I_B	3.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150	$^\circ\text{C}$

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.

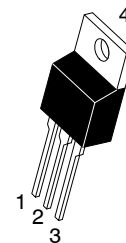
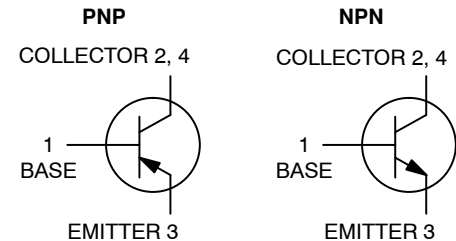
1. Indicates JEDEC Registered Data.

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.125	$^\circ\text{C}/\text{W}$

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

7 AMPERE POWER TRANSISTORS COMPLEMENTARY SILICON 30 – 50 – 70 VOLTS, 40 WATTS



TO-220
CASE 221A
STYLE 1

MARKING DIAGRAM



2N6xxx = Specific Device Code
xxx = See Table on Page 4
G = Pb-Free Package
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering, marking, and shipping information in the package dimensions section on page 4 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 4.

2N6107, 2N6109, 2N6111 (PNP), 2N6288, 2N6292 (NPN)

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted) (Note 2)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (Note 3) ($I_C = 100\text{ mA}$, $I_B = 0$) 2N6111, 2N6288 2N6109 2N6107, 2N6292	$V_{CE(sus)}$	30 50 70	– – –	Vdc
Collector Cutoff Current ($V_{CE} = 20\text{ Vdc}$, $I_B = 0$) 2N6111, 2N6288 ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$) 2N6109 ($V_{CE} = 60\text{ Vdc}$, $I_B = 0$) 2N6107, 2N6292	I_{CEO}	– – –	1.0 1.0 1.0	mA
Collector Cutoff Current ($V_{CE} = 40\text{ Vdc}$, $V_{EB(off)} = 1.5\text{ Vdc}$) 2N6111, 2N6288 ($V_{CE} = 60\text{ Vdc}$, $V_{EB(off)} = 1.5\text{ Vdc}$) 2N6109 ($V_{CE} = 80\text{ Vdc}$, $V_{EB(off)} = 1.5\text{ Vdc}$) 2N6107, 2N6292 ($V_{CE} = 30\text{ Vdc}$, $V_{EB(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) 2N6111, 2N6288 ($V_{CE} = 50\text{ Vdc}$, $V_{EB(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) 2N6109 ($V_{CE} = 70\text{ Vdc}$, $V_{EB(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) 2N6107, 2N6292	I_{CEX}	– – – – – – –	100 100 100 2.0 2.0 2.0	μA mA
Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	–	1.0	mA
ON CHARACTERISTICS (Note 3)				
DC Current Gain ($I_C = 2.0\text{ A}$, $V_{CE} = 4.0\text{ Vdc}$) 2N6107, 2N6292 ($I_C = 2.5\text{ A}$, $V_{CE} = 4.0\text{ Vdc}$) 2N6109 ($I_C = 3.0\text{ A}$, $V_{CE} = 4.0\text{ Vdc}$) 2N6111, 2N6288 ($I_C = 7.0\text{ A}$, $V_{CE} = 4.0\text{ Vdc}$) All Devices	h_{FE}	30 30 30 2.3	150 150 150 –	–
Collector-Emitter Saturation Voltage ($I_C = 7.0\text{ A}$, $I_B = 3.0\text{ A}$)	$V_{CE(sat)}$	–	3.5	Vdc
Base-Emitter On Voltage ($I_C = 7.0\text{ A}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	–	3.0	Vdc
DYNAMIC CHARACTERISTICS				
Current Gain – Bandwidth Product (Note 4) ($I_C = 500\text{ mA}$, $V_{CE} = 4.0\text{ Vdc}$, $f_{test} = 1.0\text{ MHz}$) 2N6288, 2N6292 2N6107, 2N6109, 2N6111	f_T	4.0 10	– –	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	–	250	pF
Small-Signal Current Gain ($I_C = 0.5\text{ A}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 50\text{ kHz}$)	h_{fe}	20	–	–

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.

2. Indicates JEDEC Registered Data.

3. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

4. $f_T = |h_{fe}| \cdot f_{test}$



2N6107, 2N6109, 2N6111 (PNP), 2N6288, 2N6292 (NPN)

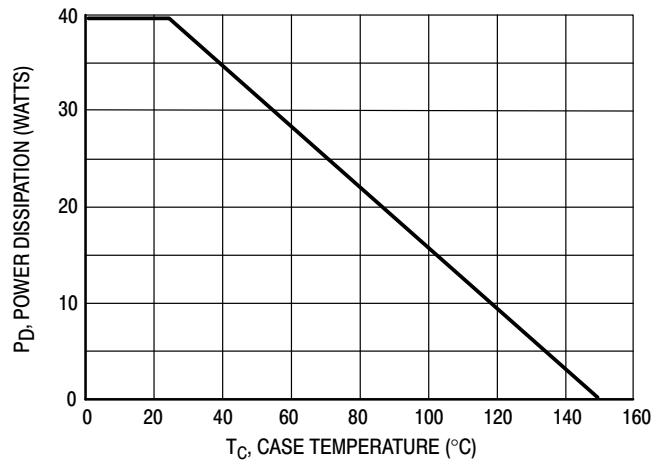


Figure 1. Power Derating

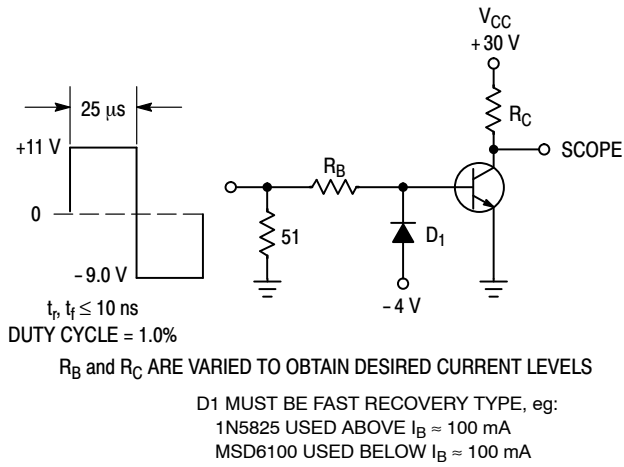


Figure 2. Switching Time Test Circuit

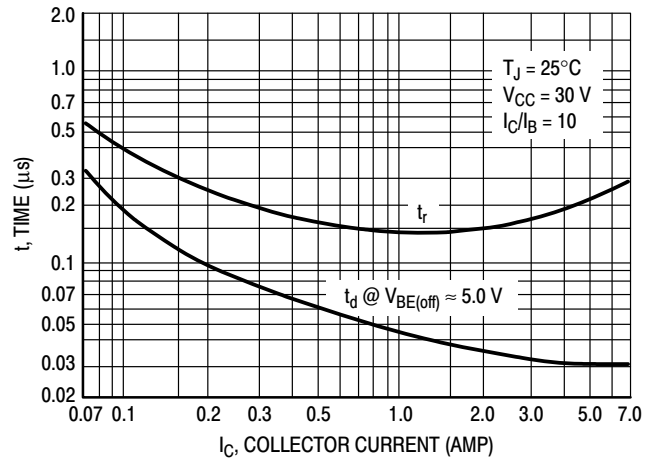


Figure 3. Turn-On Time

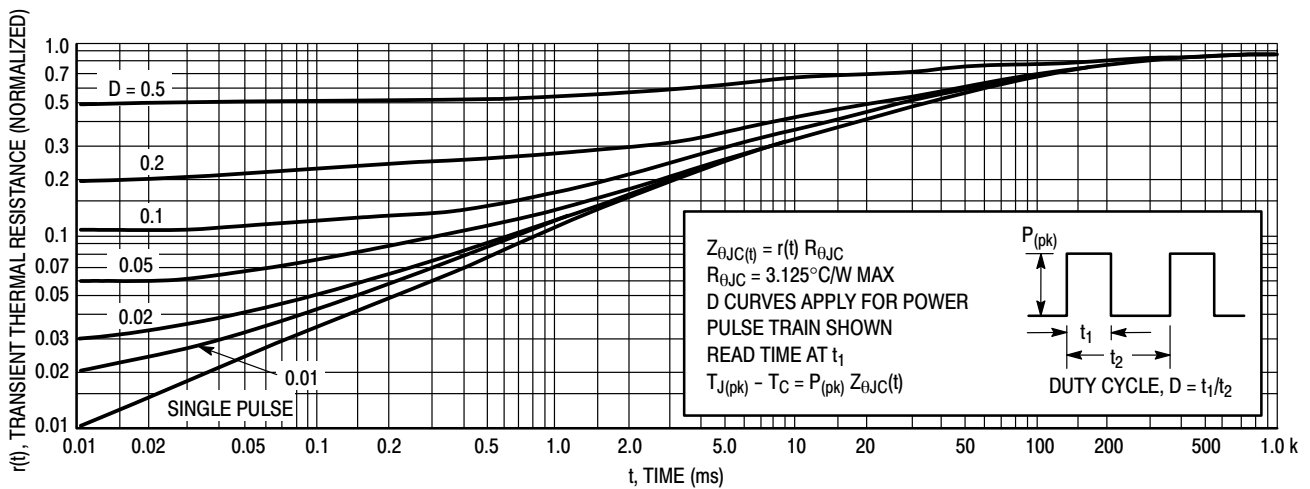


Figure 4. Thermal Response

2N6107, 2N6109, 2N6111 (PNP), 2N6288, 2N6292 (NPN)

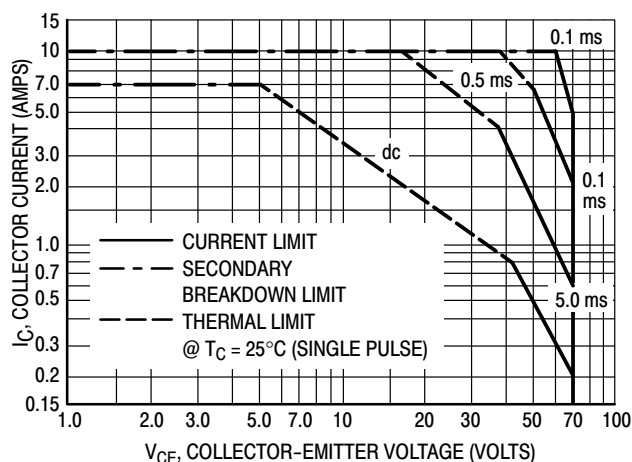


Figure 5. Active-Region Safe Operating Area

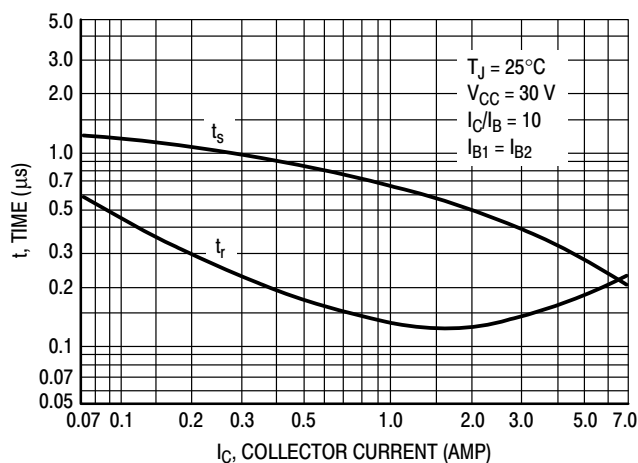


Figure 6. Turn-Off Time

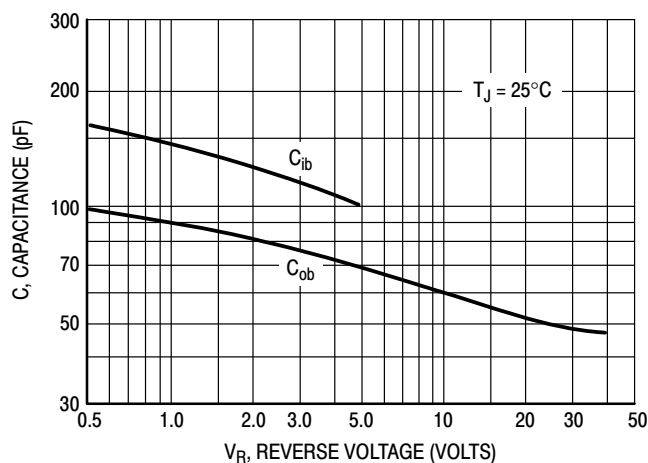


Figure 7. Capacitance

ORDERING INFORMATION

Device	Device Marking	Package	Shipping
2N6292G	2N6292	TO-220 (Pb-Free)	50 Units / Rail

DISCONTINUED (Note 5)

2N6107G	2N6107	TO-220 (Pb-Free)	50 Units / Rail
2N6109G	2N6109	TO-220 (Pb-Free)	50 Units / Rail
2N6111G	2N6111	TO-220 (Pb-Free)	50 Units / Rail
2N6288G	2N6288	TO-220 (Pb-Free)	50 Units / Rail

5. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

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