

MJD2955 (PNP), MJD3055 (NPN)

Complementary Power Transistors

DPAK for Surface Mount Applications

Designed for general purpose amplifier and low speed switching applications.

Features

- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves (“-1” Suffix)
- Electrically Similar to MJE2955 and MJE3055
- High Current Gain–Bandwidth Product
- Epoxy Meets UL 94 V-0 @ 0.125 in
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Collector–Emitter Voltage	V_{CEO}	60	Vdc
Collector–Base Voltage	V_{CB}	70	Vdc
Emitter–Base Voltage	V_{EB}	5	Vdc
Collector Current	I_C	10	Adc
Base Current	I_B	6	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D^\dagger	20 0.16	W W/ $^\circ\text{C}$
Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.75 0.014	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
ESD – Human Body Model	HBM	3B	V
ESD – Machine Model	MM	C	V

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.

†Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.

1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

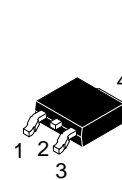
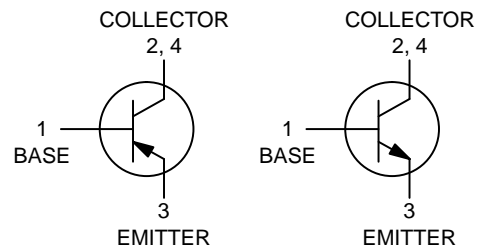


ON Semiconductor®

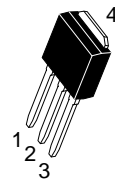
<http://onsemi.com>

SILICON POWER TRANSISTORS 10 AMPERES 60 VOLTS, 20 WATTS

COMPLEMENTARY

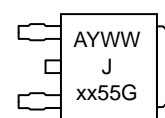


**DPAK
CASE 369C
STYLE 1**

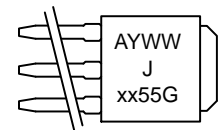


**IPAK
CASE 369D
STYLE 1**

MARKING DIAGRAMS



DPAK



IPAK

- A = Assembly Location
- Y = Year
- WW = Work Week
- Jxx55 = Device Code
x = 29 or 30
- G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

MJD2955 (PNP), MJD3055 (NPN)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	6.25	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	71.4	$^{\circ}C/W$

2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage (Note 3) ($I_C = 30 \text{ mAdc}$, $I_B = 0$)	$V_{CE(sus)}$	60	-	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$, $I_B = 0$)	I_{CEO}	-	50	μAdc
Collector Cutoff Current ($V_{CE} = 70 \text{ Vdc}$, $V_{EB(off)} = 1.5 \text{ Vdc}$) ($V_{CE} = 70 \text{ Vdc}$, $V_{EB(off)} = 1.5 \text{ Vdc}$, $T_C = 150^{\circ}C$)	I_{CEX}	-	$\frac{0.02}{2}$	mAdc
Collector Cutoff Current ($V_{CB} = 70 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 70 \text{ Vdc}$, $I_E = 0$, $T_C = 150^{\circ}C$)	I_{CBO}	-	$\frac{0.02}{2}$	mAdc
Emitter Cutoff Current ($V_{BE} = 5 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	-	0.5	mAdc

ON CHARACTERISTICS

DC Current Gain (Note 3) ($I_C = 4 \text{ Adc}$, $V_{CE} = 4 \text{ Vdc}$) ($I_C = 10 \text{ Adc}$, $V_{CE} = 4 \text{ Vdc}$)	h_{FE}	$\frac{20}{5}$	$\frac{100}{-}$	-
Collector-Emitter Saturation Voltage (Note 3) ($I_C = 4 \text{ Adc}$, $I_B = 0.4 \text{ Adc}$) ($I_C = 10 \text{ Adc}$, $I_B = 3.3 \text{ Adc}$)	$V_{CE(sat)}$	-	$\frac{1.1}{8}$	Vdc
Base-Emitter On Voltage (Note 3) ($I_C = 4 \text{ Adc}$, $V_{CE} = 4 \text{ Vdc}$)	$V_{BE(on)}$	-	1.8	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain – Bandwidth Product ($I_C = 500 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 500 \text{ kHz}$)	f_T	2	-	MHz
----------------------------------------------------------------------------------------------------------------------	-------	---	---	-----

3. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

MJD2955 (PNP), MJD3055 (NPN)

TYPICAL CHARACTERISTICS

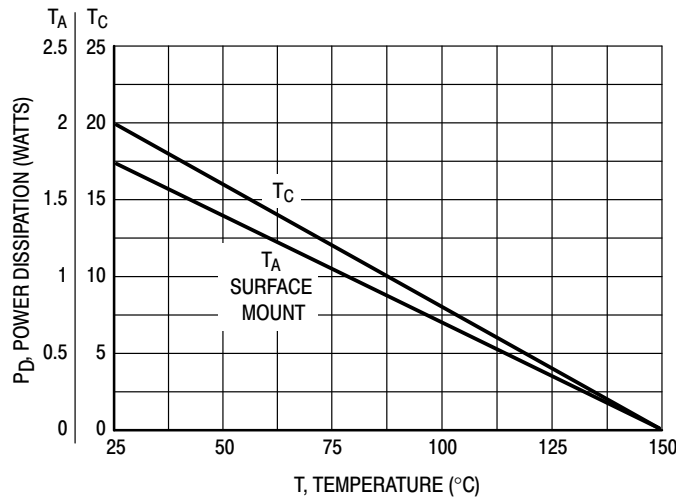


Figure 1. Power Derating

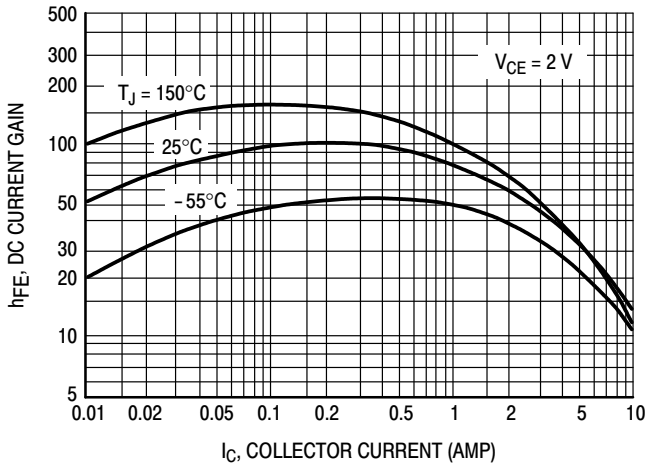


Figure 2. DC Current Gain

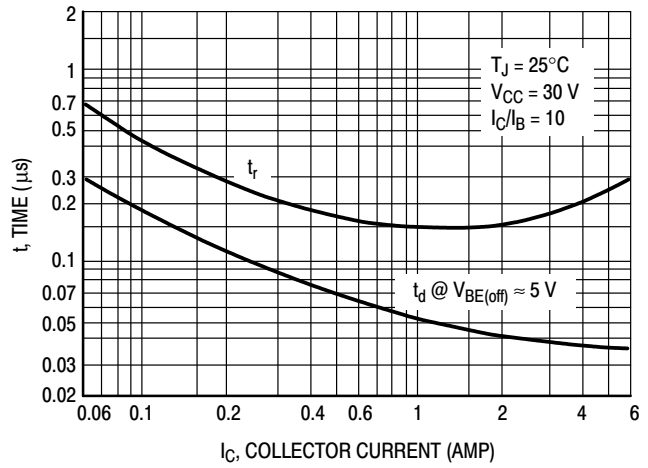


Figure 3. Turn-On Time

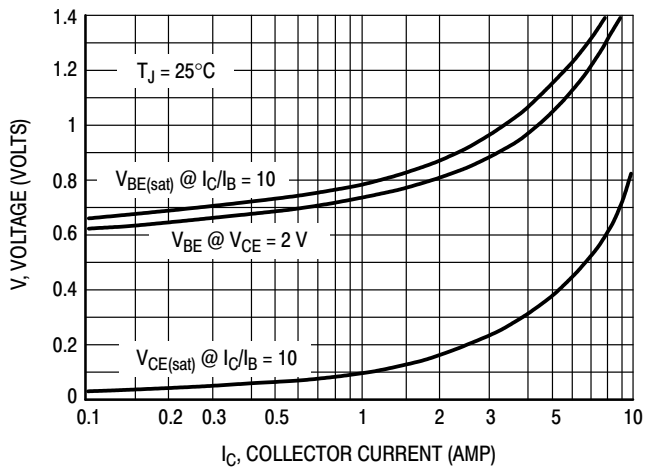


Figure 4. "On" Voltages, MJD3055

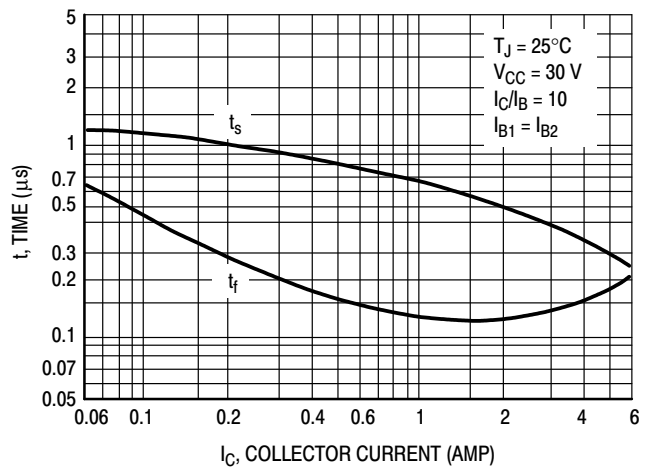


Figure 5. Turn-Off Time

MJD2955 (PNP), MJD3055 (NPN)

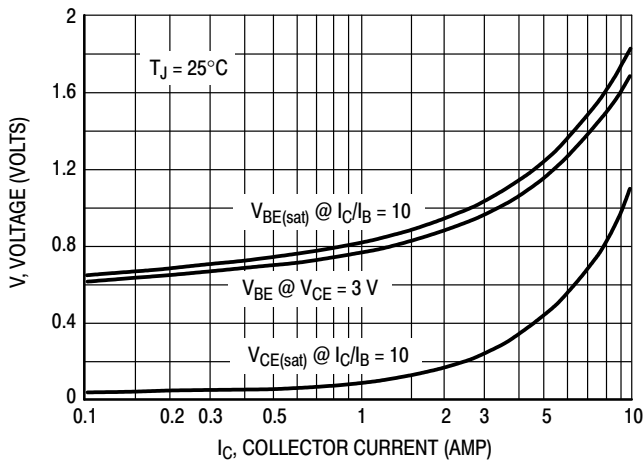


Figure 6. "On" Voltages, MJD2955

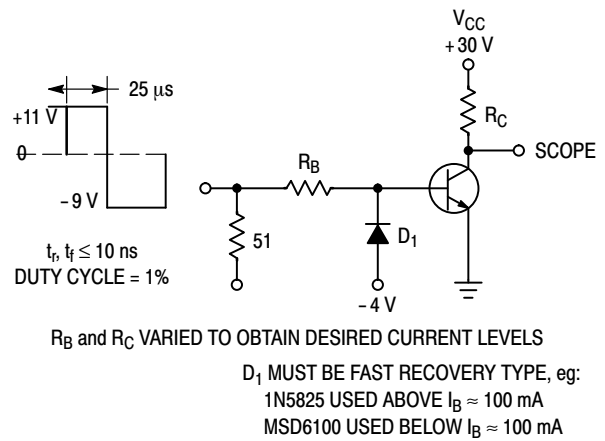


Figure 7. Switching Time Test Circuit

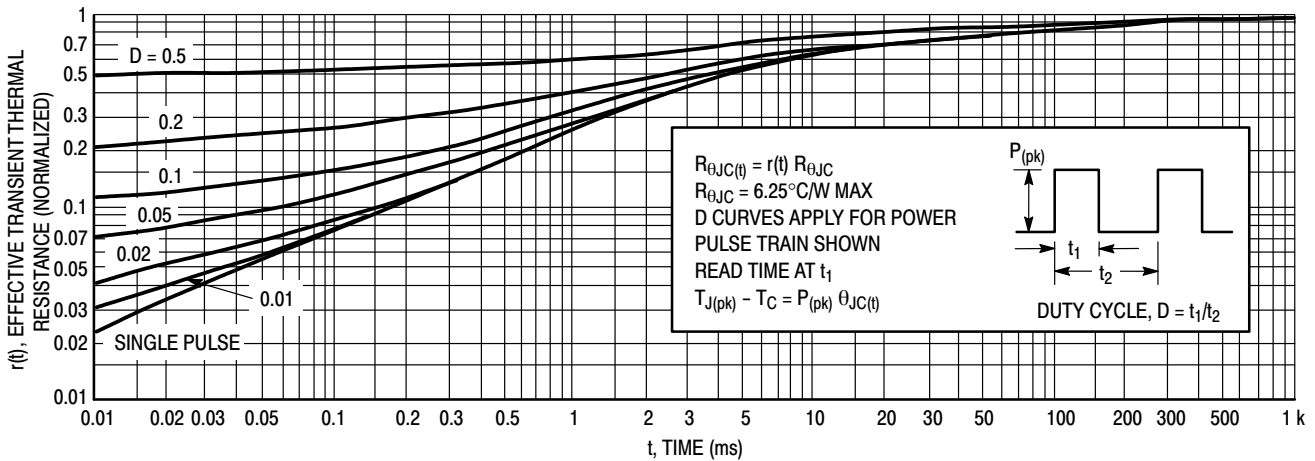


Figure 8. Thermal Response

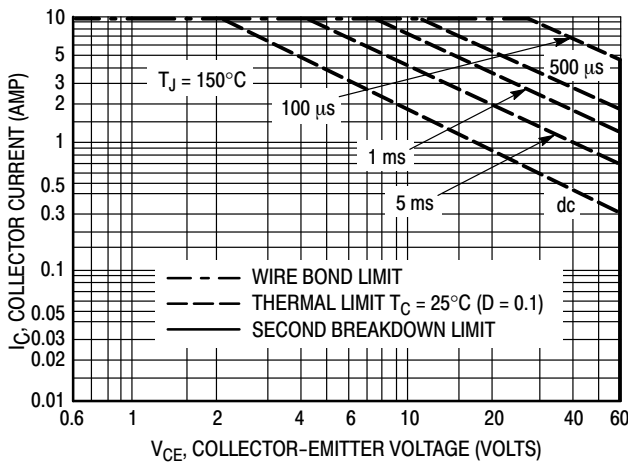


Figure 9. Maximum Forward Bias Safe Operating Area

Forward Bias Safe Operating Area Information

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 9 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 8. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

MJD2955 (PNP), MJD3055 (NPN)

ORDERING INFORMATION

Device	Package Type	Package	Shipping [†]
MJD2955G	DPAK (Pb-Free)	369C	75 Units / Rail
MJD2955-1G	IPAK (Pb-Free)	369D	75 Units / Rail
MJD2955T4G	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
NJVMJD2955T4G*	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
MJD3055G	DPAK (Pb-Free)	369C	75 Units / Rail
MJD3055T4G	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
NJVMJD3055T4G*	DPAK (Pb-Free)	369C	2,500 / 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.

*NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



IPAK CASE 369D-01 ISSUE C

DATE 15 DEC 2010

SCALE 1:1



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
G	0.090	BSC	2.29	BSC
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.180	0.215	4.45	5.45
S	0.025	0.040	0.63	1.01
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

- | | | | |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <p>STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR</p> | <p>STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN</p> | <p>STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE</p> | <p>STYLE 4:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE</p> |
| <p>STYLE 5:
PIN 1. GATE
2. ANODE
3. CATHODE
4. ANODE</p> | <p>STYLE 6:
PIN 1. MT1
2. MT2
3. GATE
4. MT2</p> | <p>STYLE 7:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR</p> | |

MARKING DIAGRAMS



- xxxxxxxxx = Device Code
A = Assembly Location
IL = Wafer Lot
Y = Year
WW = Work Week

DOCUMENT NUMBER:	98AON10528D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	IPAK (DPAK INSERTION MOUNT)	PAGE 1 OF 1

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

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