

# Complementary Silicon Power Transistors

## TIP3055 (NPN), TIP2955 (PNP)

Designed for general-purpose switching and amplifier applications.

### Features

- DC Current Gain –  
 $h_{FE} = 20-70 @ I_C$   
 $= 4.0 A_{dc}$
- Collector–Emitter Saturation Voltage –  
 $V_{CE(sat)} = 1.1 V_{dc} (Max) @ I_C$   
 $= 4.0 A_{dc}$
- Excellent Safe Operating Area
- These are Pb–Free Devices\*

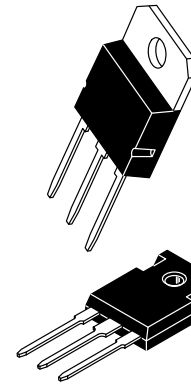
### MAXIMUM RATINGS

Symbol	Rating	Value	Unit
$V_{CEO}$	Collector – Emitter Voltage	60	Vdc
$V_{CER}$	Collector – Emitter Voltage	70	Vdc
$V_{CB}$	Collector – Base Voltage	100	Vdc
$V_{EB}$	Emitter – Base Voltage	7.0	Vdc
$I_C$	Collector Current – Continuous	1.5	A <sub>dc</sub>
$I_B$	Base Current	7.0	A <sub>dc</sub>
$P_D$	Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	90 0.72	W W/ $^\circ C$
$T_J, T_{stg}$	Operating and Storage Junction Temperature Range	–65 to +150	$^\circ C$

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.

### THERMAL CHARACTERISTICS

Symbol	Characteristic	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction–to–Case	1.39	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction–to–Ambient	35.7	$^\circ C/W$



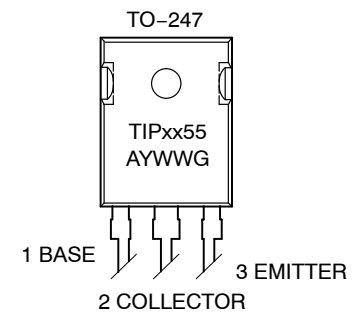
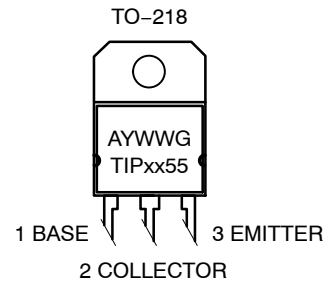
SOT-93 (TO-218)  
CASE 340D  
STYLE 1

TO-247  
CASE 340L  
STYLE 3

**NOTE:** Effective June 2012 this device will be available only in the TO-247 package. Reference FPCN# 16827.

## 15 AMPERE POWER TRANSISTORS COMPLEMENTARY SILICON 60 VOLTS, 90 WATTS

### MARKING DIAGRAM



TIPxx55 = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb–Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

\*For additional information on our Pb–Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, [SOLDERM/D](#).

# TIP3055 (NPN), TIP2955 (PNP)

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

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

### OFF CHARACTERISTICS

$V_{CEO(sus)}$	Collector–Emitter Sustaining Voltage (Note 1) ( $I_C = 30\text{ mA}$ , $I_B = 0$ )	60	–	Vdc
$I_{CER}$	Collector Cutoff Current ( $V_{CE} = 70\text{ Vdc}$ , $R_{BE} = 100\text{ Ohms}$ )	–	1.0	mA
$I_{CEO}$	Collector Cutoff Current ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ )	–	0.7	mA
$I_{CEV}$	Collector Cutoff Current ( $V_{CE} = 100\text{ Vdc}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ )	–	5.0	mA
$I_{EBO}$	Emitter Cutoff Current ( $V_{BE} = 7.0\text{ Vdc}$ , $I_C = 0$ )	–	5.0	mA

### ON CHARACTERISTICS (Note 1)

$h_{FE}$	DC Current Gain ( $I_C = 4.0\text{ A}$ , $V_{CE} = 4.0\text{ Vdc}$ ) ( $I_C = 10\text{ A}$ , $V_{CE} = 4.0\text{ Vdc}$ )	20 5.0	70 –	–
$V_{CE(sat)}$	Collector–Emitter Saturation Voltage ( $I_C = 4.0\text{ A}$ , $I_B = 400\text{ mA}$ ) ( $I_C = 10\text{ A}$ , $I_B = 3.3\text{ A}$ )	– –	1.1 3.0	Vdc
$V_{BE(on)}$	Base–Emitter On Voltage ( $I_C = 4.0\text{ A}$ , $V_{CE} = 4.0\text{ Vdc}$ )	–	1.8	Vdc

### SECOND BREAKDOWN

$I_{s/b}$	Second Breakdown Collector Current with Base Forward Biased ( $V_{CE} = 30\text{ Vdc}$ , $t = 1.0\text{ s}$ ; Nonrepetitive)	3.0	–	A
-----------	---------------------------------------------------------------------------------------------------------------------------------	-----	---	---

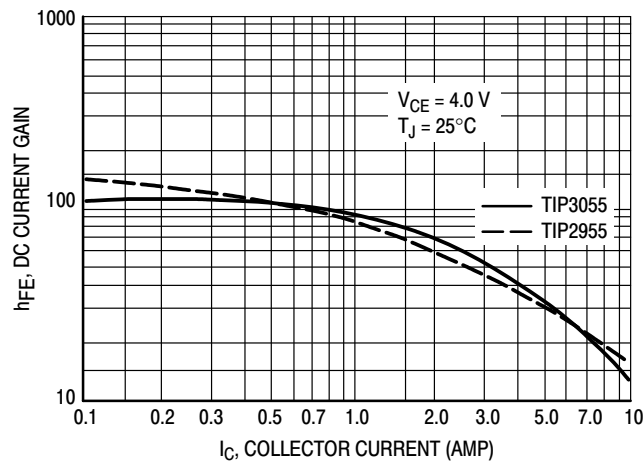
### DYNAMIC CHARACTERISTICS

$f_T$	Current Gain — Bandwidth Product ( $I_C = 0.5\text{ A}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )	2.5	–	MHz
$h_{fe}$	Small–Signal Current Gain ( $V_{CE} = 4.0\text{ Vdc}$ , $I_C = 1.0\text{ A}$ , $f = 1.0\text{ kHz}$ )	15	–	kHz

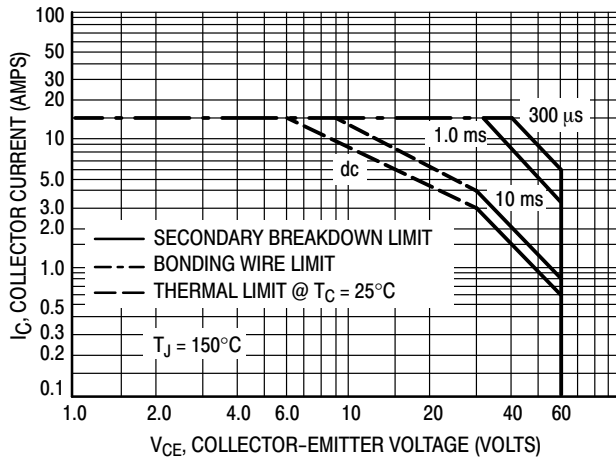
For additional design curves, refer to electrical characteristics curves of 2N3055.

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

## TIP3055 (NPN), TIP2955 (PNP)



**Figure 1. DC Current Gain**



**Figure 2. Maximum Rated Forward Bias Safe Operating Area**

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 2 is based on  $T_C = 25^\circ\text{C}$ ;  $T_{J(pk)}$  is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% but must be derated for temperature.

### ORDERING INFORMATION

Device	Package	Shipping
TIP3055G	SOT-93 (TO-218) (Pb-Free)	30 Units / Rail
TIP2955G	SOT-93 (TO-218) (Pb-Free)	30 Units / Rail
TIP3055G	TO-247 (Pb-Free)	30 Units / Rail
TIP2955G	TO-247 (Pb-Free)	30 Units / Rail

# MECHANICAL CASE OUTLINE

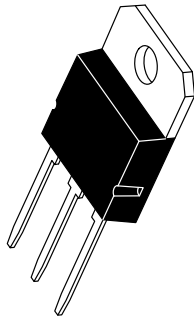
## PACKAGE DIMENSIONS

ON Semiconductor®

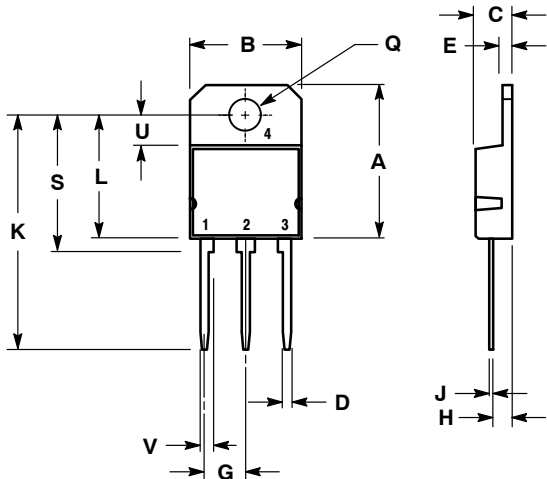


### SOT-93 (TO-218) CASE 340D-02 ISSUE E

DATE 01/03/2002



SCALE 1:1



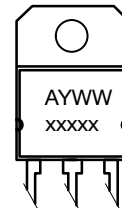
STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

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

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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	20.35	---	0.801
B	14.70	15.20	0.579	0.598
C	4.70	4.90	0.185	0.193
D	1.10	1.30	0.043	0.051
E	1.17	1.37	0.046	0.054
G	5.40	5.55	0.213	0.219
H	2.00	3.00	0.079	0.118
J	0.50	0.78	0.020	0.031
K	31.00 REF		1.220 REF	
L	---	16.20	---	0.638
Q	4.00	4.10	0.158	0.161
S	17.80	18.20	0.701	0.717
U	4.00 REF		0.157 REF	
V	1.75 REF		0.069	

### MARKING DIAGRAM

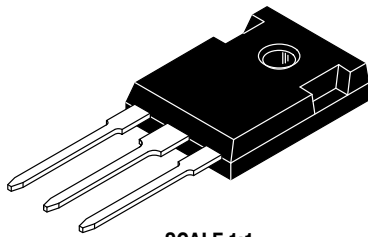


A = Assembly Location  
Y = Year  
WW = Work Week  
xxxxx = Device Code

<b>DOCUMENT NUMBER:</b>	<b>98ASB42643B</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SOT-93</b>	<b>PAGE 1 OF 1</b>

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.

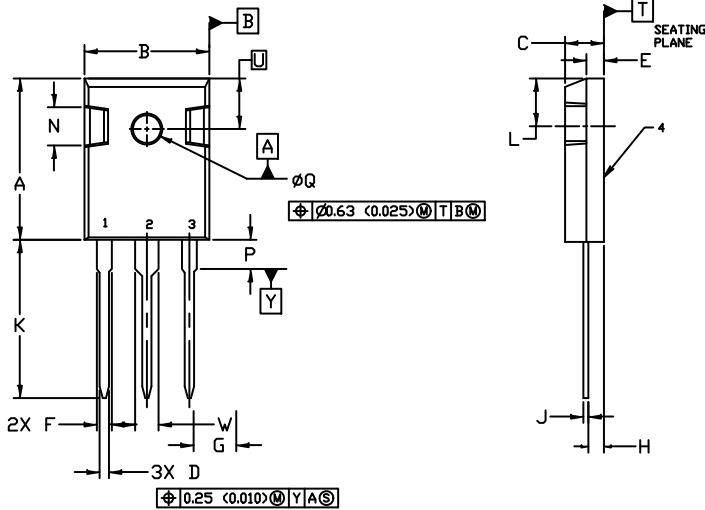
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



TO-247  
CASE 340L  
ISSUE G

DATE 06 OCT 2021

SCALE 1:1

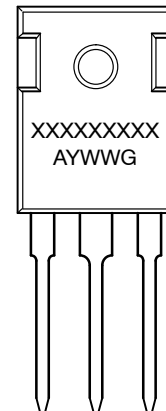


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER

DIM	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	20.32	21.08	0.800	0.830
B	15.75	16.26	0.620	0.640
C	4.70	5.30	0.185	0.209
D	1.00	1.40	0.040	0.055
E	1.90	2.60	0.075	0.102
F	1.65	2.13	0.065	0.084
G	5.45	BSC	0.215	BSC
H	1.50	2.49	0.059	0.098
J	0.40	0.80	0.016	0.031
K	19.81	20.83	0.780	0.820
L	5.40	6.20	0.212	0.244
N	4.32	5.49	0.170	0.216
P	----	4.50	----	0.177
Q	3.55	3.65	0.140	0.144
U	6.15	BSC	0.242	BSC
W	2.87	3.12	0.113	0.123

GENERIC  
MARKING DIAGRAM\*



- |                                                                          |                                                                                                      |                                                                                  |                                                                                  |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <p>STYLE 1:<br/>PIN 1. GATE<br/>2. DRAIN<br/>3. SOURCE<br/>4. DRAIN</p>  | <p>STYLE 2:<br/>PIN 1. ANODE<br/>2. CATHODE (S)<br/>3. ANODE 2<br/>4. CATHODES (S)</p>               | <p>STYLE 3:<br/>PIN 1. BASE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> | <p>STYLE 4:<br/>PIN 1. GATE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> |
| <p>STYLE 5:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. GATE<br/>4. ANODE</p> | <p>STYLE 6:<br/>PIN 1. MAIN TERMINAL 1<br/>2. MAIN TERMINAL 2<br/>3. GATE<br/>4. MAIN TERMINAL 2</p> |                                                                                  |                                                                                  |

- XXXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*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.

DOCUMENT NUMBER:	98ASB15080C	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TO-247	PAGE 1 OF 1

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the 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. onsemi 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](http://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](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)