

# TIP3055 (NPN), TIP2955 (PNP)



**ON Semiconductor®**

<http://onsemi.com>

## Complementary Silicon Power Transistors

Designed for general-purpose switching and amplifier applications.

### Features

- DC Current Gain –  

$$h_{FE} = 20-70 @ I_C$$

$$= 4.0 \text{ Adc}$$
- Collector–Emitter Saturation Voltage –  

$$V_{CE(sat)} = 1.1 \text{ Vdc (Max) @ } I_C$$

$$= 4.0 \text{ Adc}$$
- Excellent Safe Operating Area
- These are Pb–Free Devices\*

### MAXIMUM RATINGS

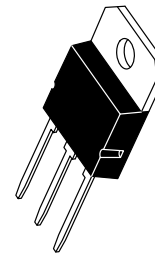
Rating	Symbol	Value	Unit
Collector – Emitter Voltage	$V_{CEO}$	60	Vdc
Collector – Emitter Voltage	$V_{CER}$	70	Vdc
Collector – Base Voltage	$V_{CB}$	100	Vdc
Emitter – Base Voltage	$V_{EB}$	7.0	Vdc
Collector Current – Continuous	$I_C$	1.5	Adc
Base Current	$I_B$	7.0	Adc
Total Power Dissipation @ $T_C =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

### THERMAL CHARACTERISTICS

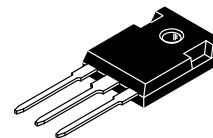
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	1.39	$^\circ\text{C/W}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	35.7	$^\circ\text{C/W}$

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.

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



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.

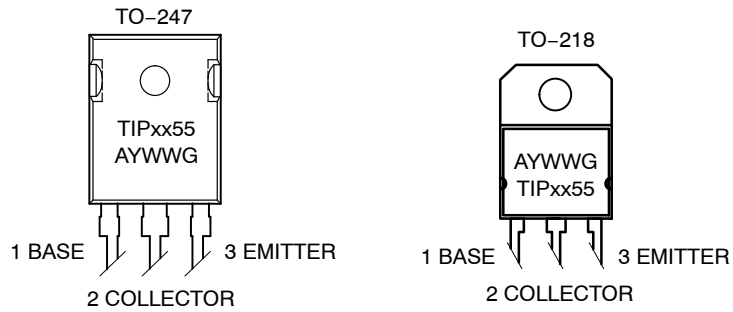
### ORDERING INFORMATION

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

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

# TIP3055 (NPN), TIP2955 (PNP)

## MARKING DIAGRAMS



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

## 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

## TIP3055 (NPN), TIP2955 (PNP)

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

Characteristic	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

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

#### ON CHARACTERISTICS (Note 1)

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

#### SECOND BREAKDOWN

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

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

NOTE: 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)

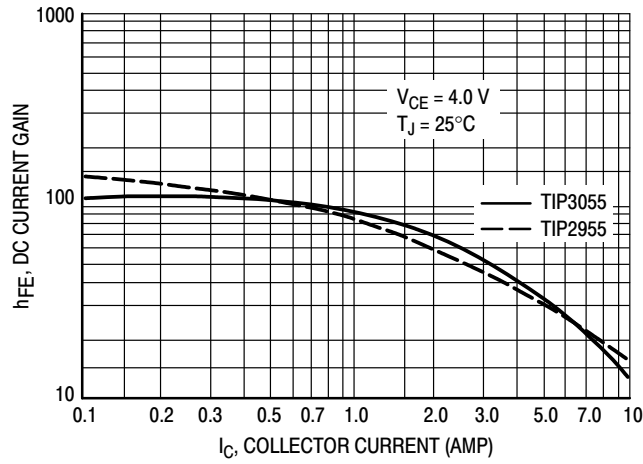


Figure 1. DC Current Gain

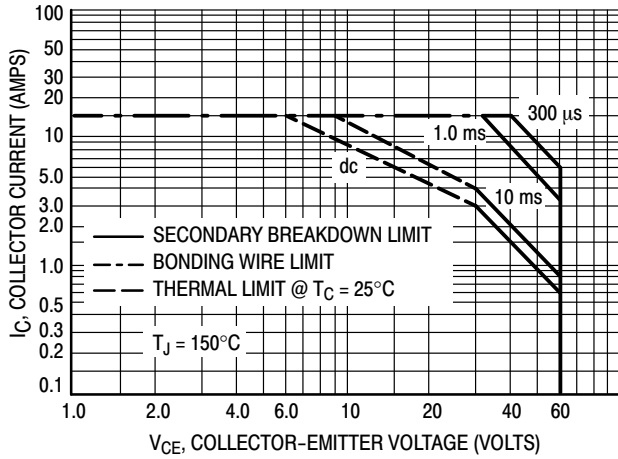


Figure 2. Maximum Rated Forward Bias Safe Operating Area

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.

# MECHANICAL CASE OUTLINE

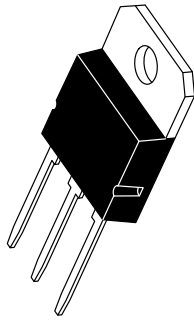
## PACKAGE DIMENSIONS

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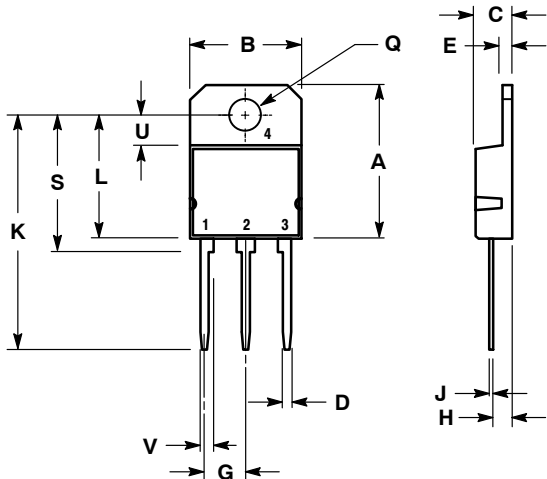


### SOT-93 (TO-218) CASE 340D-02 ISSUE E

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



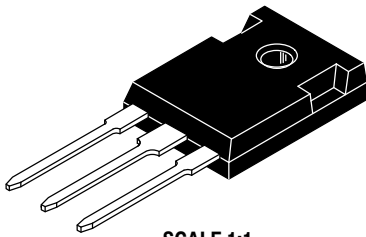
A = Assembly Location  
Y = Year  
WW = Work Week  
xxxxx = Device Code

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DESCRIPTION:	SOT-93	PAGE 1 OF 1

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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

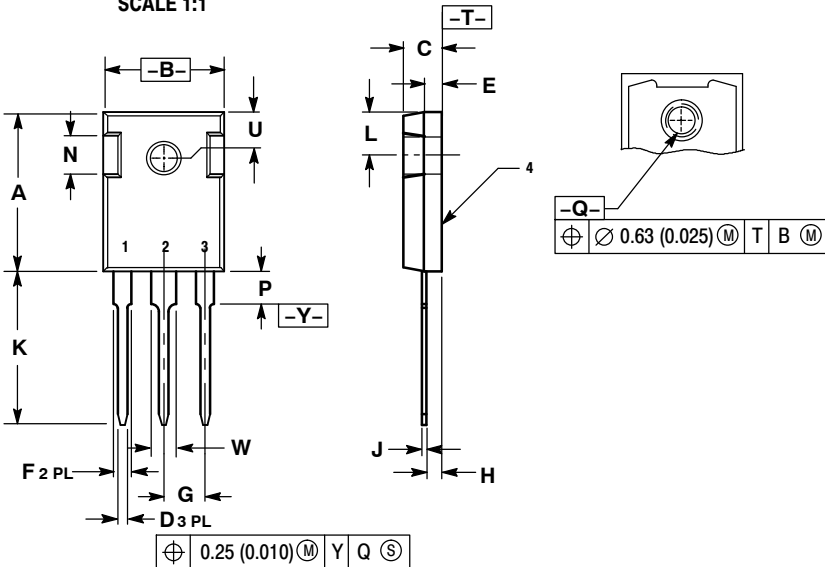
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TO-247  
CASE 340L-02  
ISSUE F

DATE 26 OCT 2011

SCALE 1:1

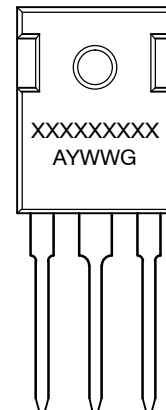


NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- 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\*



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

- |  |  |  |  |
|--|--|--|--|
| <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> |  |  |

\*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.

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NEW STANDARD:		
DESCRIPTION:	TO-247	PAGE 1 OF 2



ISSUE	REVISION	DATE
D	CHANGE OF OWNERSHIP FROM MOTOROLA TO ON SEMICONDUCTOR. DIM A WAS 20.80–21.46/0.819–0.845. DIM K WAS 19.81–20.32/0.780–0.800. UPDATED STYLE 1, ADDED STYLES 2, 3, & 4. REQ. BY L. HAYES.	25 AUG 2000
E	DIM E MINIMUM WAS 2.20/0.087. DIM K MINIMUM WAS 20.06/0.790. ADDED GENERIC MARKING DIAGRAM. REQ. BY S. ALLEN.	26 FEB 2010
F	ADDED STYLES 5 AND 6. REQ. BY J. PEREZ.	26 OCT 2011

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