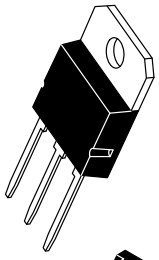
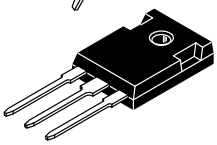
Complementary Silicon Power Transistors

TIP3055 (NPN), TIP2955 (PNP)

Designed for general−purpose switching and amplifier applications.



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

Features

- DC Current Gain −
  h_{FE} = 20−70 @ I_C
  = 4.0 Adc
- Collector−Emitter Saturation Voltage −
  $V_{CE(sat)}$ = 1.1 Vdc (Max) @ I_C
  = 4.0 Adc
- 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	Adc
I_B	Base Current	7.0	Adc
P_D	Total Power Dissipation @ T_C = 25°C Derate above 25°C	90 0.72	W W/°C
T_J, T_{stg}	Operating and Storage Junction Temperature Range	−65 to +150	°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.

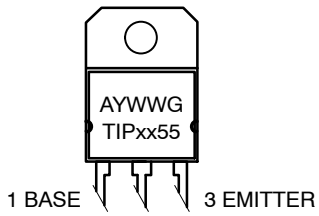
THERMAL CHARACTERISTICS

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

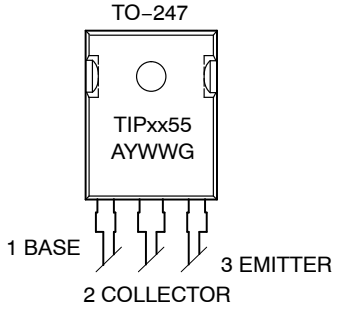
*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAM

TO−218



TO−247



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.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Max	Unit
OFF CHARACTERISTICS				
$V_{CEO(sus)}$	Collector−Emitter Sustaining Voltage (Note 1) (I_C = 30 mAdc, I_B = 0)	60	–	Vdc
I_{CER}	Collector Cutoff Current (V_{CE} = 70 Vdc, R_{BE} = 100 Ohms)	–	1.0	mAdc
I_{CEO}	Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0)	–	0.7	mAdc
I_{CEV}	Collector Cutoff Current (V_{CE} = 100 Vdc, $V_{BE(off)}$ = 1.5 Vdc)	–	5.0	mAdc
I_{EBO}	Emitter Cutoff Current (V_{BE} = 7.0 Vdc, I_C = 0)	–	5.0	mAdc
ON CHARACTERISTICS (Note 1)				
h_{FE}	DC Current Gain (I_C = 4.0 Adc, V_{CE} = 4.0 Vdc) (I_C = 10 Adc, V_{CE} = 4.0 Vdc)	 20 5.0	 70 –	–
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage (I_C = 4.0 Adc, I_B = 400 mAdc) (I_C = 10 Adc, I_B = 3.3 Adc)	 – –	 1.1 3.0	Vdc
$V_{BE(on)}$	Base−Emitter On Voltage (I_C = 4.0 Adc, V_{CE} = 4.0 Vdc)	–	1.8	Vdc
SECOND BREAKDOWN				
$I_{s/b}$	Second Breakdown Collector Current with Base Forward Biased (V_{CE} = 30 Vdc, t = 1.0 s; Nonrepetitive)	3.0	–	Adc
DYNAMIC CHARACTERISTICS				
f_T	Current Gain — Bandwidth Product (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f = 1.0 MHz)	2.5	–	MHz
h_{fe}	Small−Signal Current Gain (V_{CE} = 4.0 Vdc, I_C = 1.0 Adc, f = 1.0 kHz)	15	–	kHz

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

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

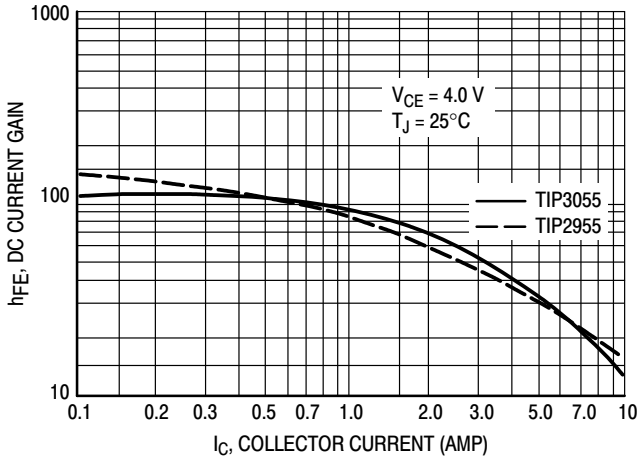


Figure 1. DC Current Gain

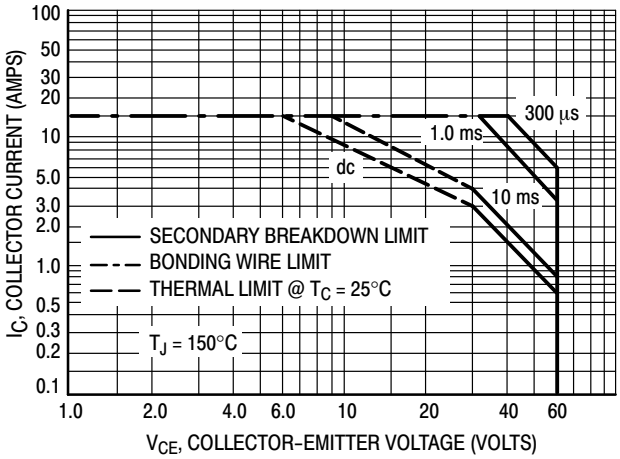


Figure 2. Maximum Rated Forward Bias Safe Operating Area

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°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

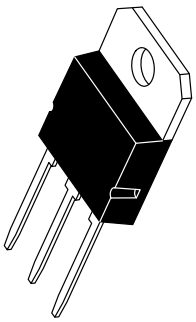
Device	Package	Shipping
TIP3055G	SOT−93 (TO−218) (Pb−Free)	30 Units / Rail
TIP2955G	SOT−93 (TO−218) (Pb−Free)	30 Units / Rail
TIP3055G	TO−247 (Pb−Free)	30 Units / Rail
TIP2955G	TO−247 (Pb−Free)	30 Units / Rail

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

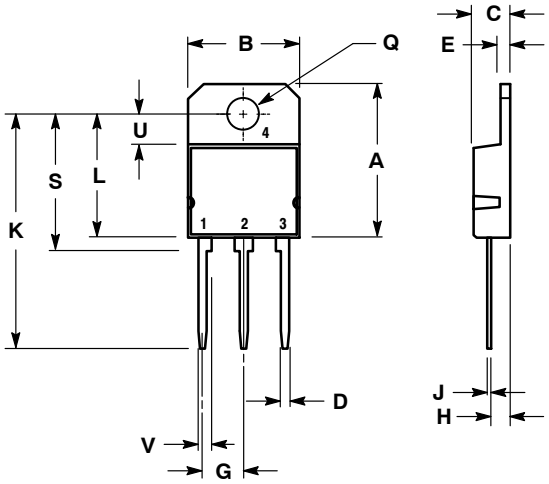
ON Semiconductor®

SOT−93 (TO−218)
CASE 340D−02
ISSUE E

DATE 01/03/2002



SCALE 1:1



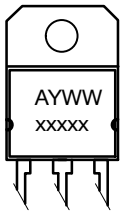
STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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.

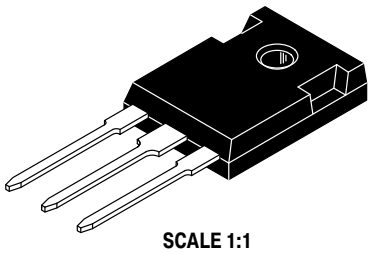
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	---	20.35	---	0.801
B	14.70	15.20	0.579	0.598
C	4.70	4.90	0.185	0.193
D	1.10	1.30	0.043	0.051
E	1.17	1.37	0.046	0.054
G	5.40	5.55	0.213	0.219
H	2.00	3.00	0.079	0.118
J	0.50	0.78	0.020	0.031
K	31.00 REF		1.220 REF	
L	---	16.20	---	0.638
Q	4.00	4.10	0.158	0.161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

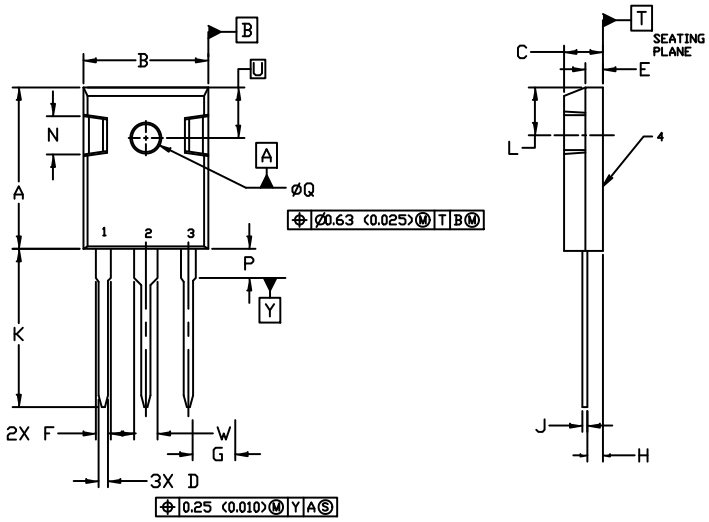
DOCUMENT NUMBER:	**98ASB42643B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	**SOT−93**		**PAGE 1 OF 1**



SCALE 1:1

TO−247
CASE 340L
ISSUE G

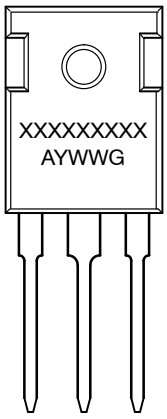
DATE 06 OCT 2021



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

	MILLIMETERS		INCHES	
DIM	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*



STYLE 1:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 2:
PIN 1. ANODE
2. CATHODE (S)
3. ANODE 2
4. CATHODES (S)

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

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

STYLE 5:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 6:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

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.

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DESCRIPTION:	TO−247	PAGE 1 OF 1

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