

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

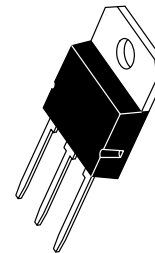
| Rating | Symbol | Value | Unit |
|---|----------------|----------------|--------------------------|
| Collector – Emitter Voltage | V_{CEO} | 60 | Vdc |
| Collector – Emitter Voltage | V_{CER} | 70 | Vdc |
| Collector – Base Voltage | V_{CB} | 100 | Vdc |
| Emitter – Base Voltage | V_{EB} | 7.0 | Vdc |
| 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°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

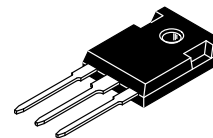
| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|--------------------|
| Thermal Resistance, Junction–to–Case | $R_{\theta JC}$ | 1.39 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction–to–Ambient | $R_{\theta JA}$ | 35.7 | $^\circ\text{C/W}$ |

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.

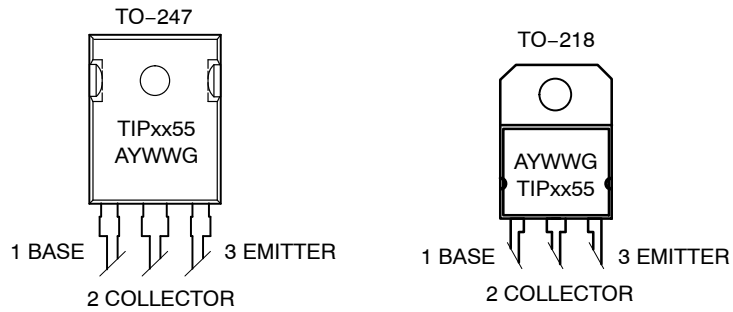
ORDERING INFORMATION

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 |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

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

ON CHARACTERISTICS (Note 1)

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

DYNAMIC CHARACTERISTICS

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

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

1. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.

TIP3055 (NPN), TIP2955 (PNP)

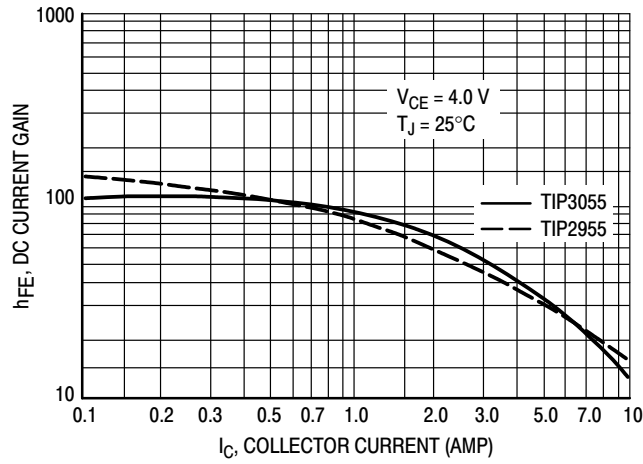


Figure 1. DC Current Gain

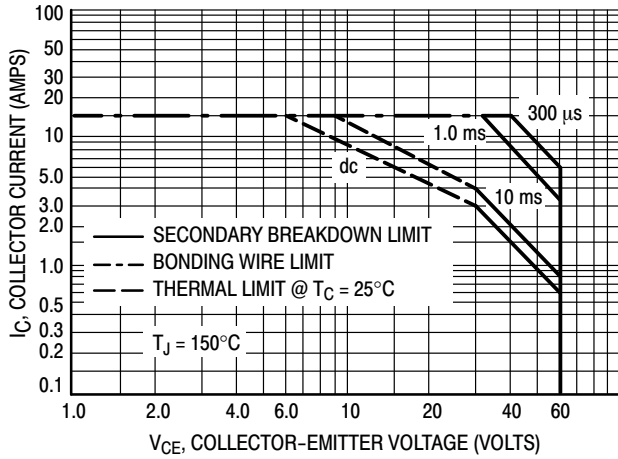


Figure 2. Maximum Rated Forward Bias Safe Operating Area

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

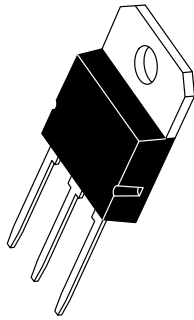
PACKAGE DIMENSIONS

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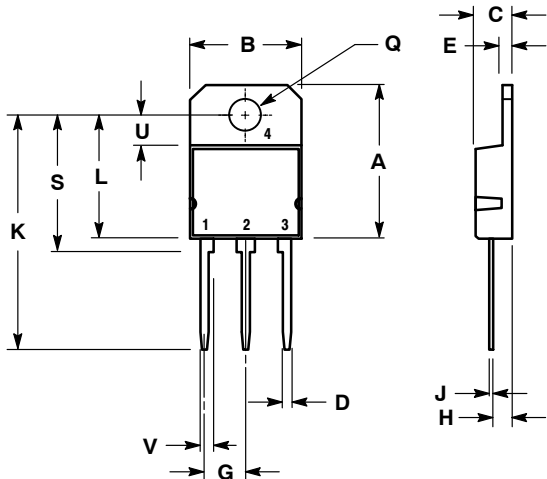


SOT-93 (TO-218) CASE 340D-02 ISSUE E

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

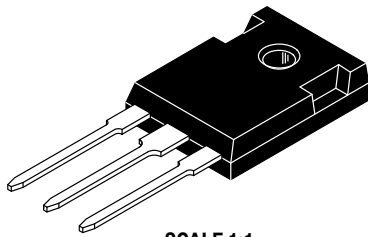


A = Assembly Location
Y = Year
WW = Work Week
xxxxx = Device Code

| | | |
|-------------------------|--------------------|--|
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| DESCRIPTION: | SOT-93 | PAGE 1 OF 1 |

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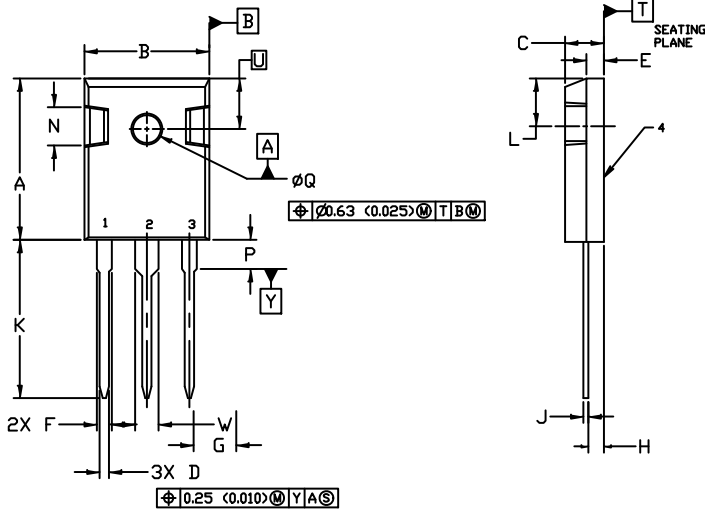
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



TO-247
CASE 340L
ISSUE G

DATE 06 OCT 2021

SCALE 1:1

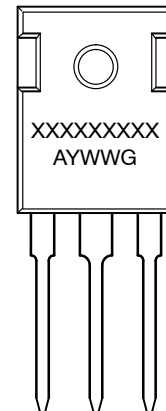


NOTES:

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

- XXXXXX = 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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