

# 2N5457, 2N5458

## JFETs - General Purpose

### N-Channel – Depletion

N-Channel Junction Field Effect Transistors, depletion mode (Type A) designed for audio and switching applications.

#### Features

- N-Channel for Higher Gain
- Drain and Source Interchangeable
- High AC Input Impedance
- High DC Input Resistance
- Low Transfer and Input Capacitance
- Low Cross-Modulation and Intermodulation Distortion
- Plastic Encapsulated Package
- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

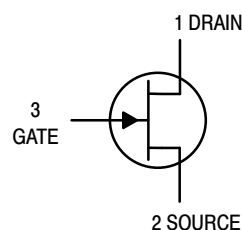
| Rating                                                                                 | Symbol    | Value       | Unit                       |
|----------------------------------------------------------------------------------------|-----------|-------------|----------------------------|
| Drain-Source Voltage                                                                   | $V_{DS}$  | 25          | Vdc                        |
| Drain-Gate Voltage                                                                     | $V_{DG}$  | 25          | Vdc                        |
| Reverse Gate-Source Voltage                                                            | $V_{GSR}$ | -25         | Vdc                        |
| Gate Current                                                                           | $I_G$     | 10          | mAdc                       |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$     | 310<br>2.82 | mW<br>mW/ $^\circ\text{C}$ |
| Operating Junction Temperature                                                         | $T_J$     | 135         | $^\circ\text{C}$           |
| Storage Temperature Range                                                              | $T_{stg}$ | -65 to +150 | $^\circ\text{C}$           |

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.

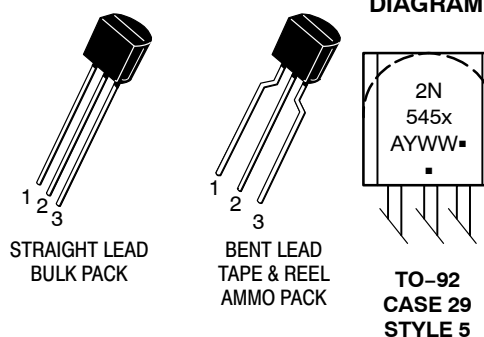


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#### MARKING DIAGRAM



2N545x = Device Code  
x = 7 or 8

A = Assembly Location

Y = Year

WW = Work Week

▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

| Device  | Package            | Shipping       |
|---------|--------------------|----------------|
| 2N5457  | TO-92              | 1000 Units/Box |
| 2N5457G | TO-92<br>(Pb-Free) | 1000 Units/Box |
| 2N5458  | TO-92              | 1000 Units/Box |
| 2N5458G | TO-92<br>(Pb-Free) | 1000 Units/Box |

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

## 2N5457, 2N5458

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

| Characteristic                                                                                                                                     |                  | Symbol        | Min          | Typ          | Max          | Unit             |
|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|--------------|--------------|--------------|------------------|
| <b>OFF CHARACTERISTICS</b>                                                                                                                         |                  |               |              |              |              |                  |
| Gate–Source Breakdown Voltage<br>( $I_G = -10\ \mu\text{Adc}$ , $V_{DS} = 0$ )                                                                     |                  | $V_{(BR)GSS}$ | -25          | –            | –            | Vdc              |
| Gate Reverse Current<br>( $V_{GS} = -15\ \text{Vdc}$ , $V_{DS} = 0$ )<br>( $V_{GS} = -15\ \text{Vdc}$ , $V_{DS} = 0$ , $T_A = 100^\circ\text{C}$ ) |                  | $I_{GSS}$     | –<br>–       | –<br>–       | -1.0<br>-200 | nAdc             |
| Gate–Source Cutoff Voltage<br>( $V_{DS} = 15\ \text{Vdc}$ , $i_D = 10\ \text{nAdc}$ )                                                              | 2N5457<br>2N5458 | $V_{GS(off)}$ | -0.5<br>-1.0 | –<br>–       | -6.0<br>-7.0 | Vdc              |
| Gate–Source Voltage<br>( $V_{DS} = 15\ \text{Vdc}$ , $i_D = 100\ \mu\text{Adc}$ )<br>( $V_{DS} = 15\ \text{Vdc}$ , $i_D = 200\ \mu\text{Adc}$ )    | 2N5457<br>2N5458 | $V_{GS}$      | –<br>–       | -2.5<br>-3.5 | –<br>–       | Vdc              |
| <b>ON CHARACTERISTICS</b>                                                                                                                          |                  |               |              |              |              |                  |
| Zero–Gate–Voltage Drain Current (Note 1)<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ )                                                           | 2N5457<br>2N5458 | $I_{DSS}$     | 1.0<br>2.0   | 3.0<br>6.0   | 5.0<br>9.0   | mAdc             |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                                     |                  |               |              |              |              |                  |
| Forward Transfer Admittance (Note 1)<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1\ \text{kHz}$ )                                         | 2N5457<br>2N5458 | $ Y_{fs} $    | 1000<br>1500 | 3000<br>4000 | 5000<br>5500 | $\mu\text{mhos}$ |
| Output Admittance Common Source (Note 1)<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1\ \text{kHz}$ )                                     |                  | $ Y_{os} $    | –            | 10           | 50           | $\mu\text{mhos}$ |
| Input Capacitance<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1\ \text{kHz}$ )                                                            |                  | $C_{iss}$     | –            | 4.5          | 7.0          | pF               |
| Reverse Transfer Capacitance<br>( $V_{DS} = 15\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1\ \text{kHz}$ )                                                 |                  | $C_{rss}$     | –            | 1.5          | 3.0          | pF               |

1. Pulse Width  $\leq 630\ \text{ms}$ , Duty Cycle  $\leq 10\%$ .

# 2N5457, 2N5458

## TYPICAL CHARACTERISTICS For 2N5457 Only

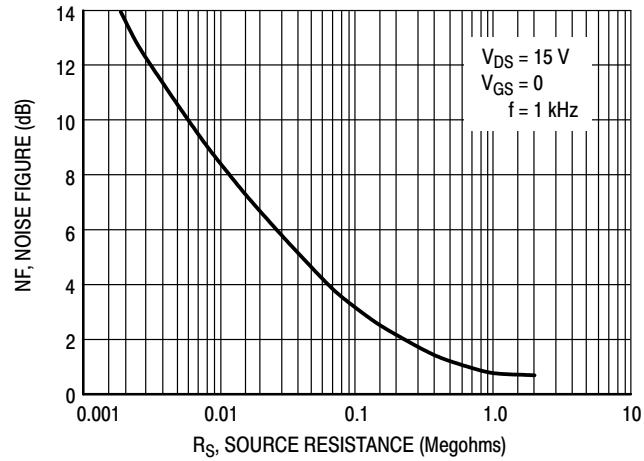


Figure 1. Noise Figure versus Source Resistance

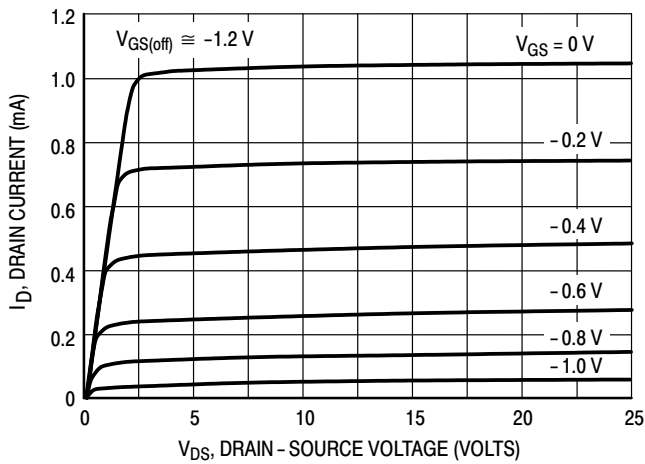


Figure 2. Typical Drain Characteristics

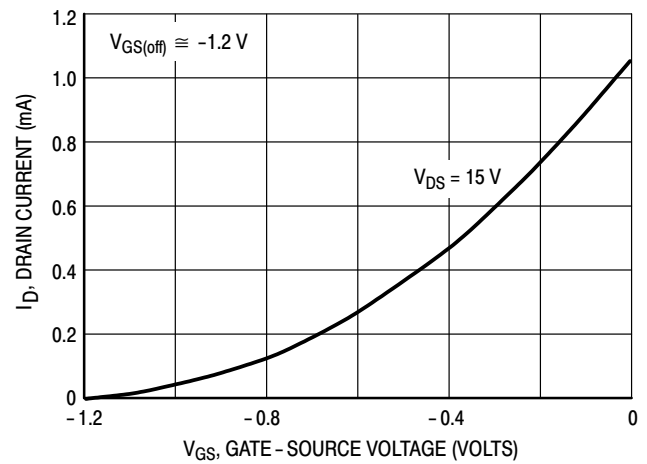


Figure 3. Common Source Transfer Characteristics

## 2N5457, 2N5458

### TYPICAL CHARACTERISTICS For 2N5457 Only

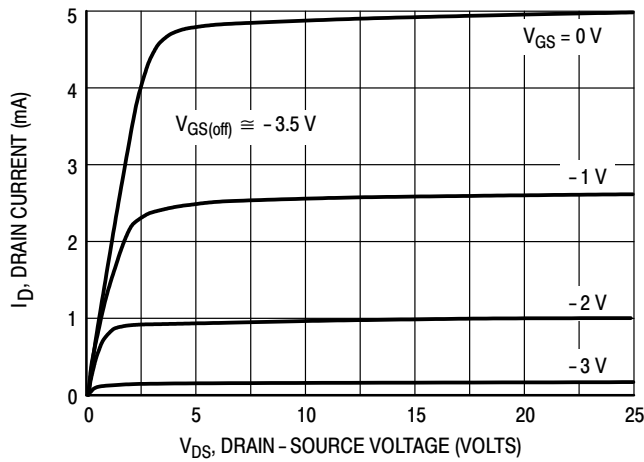


Figure 4. Typical Drain Characteristics

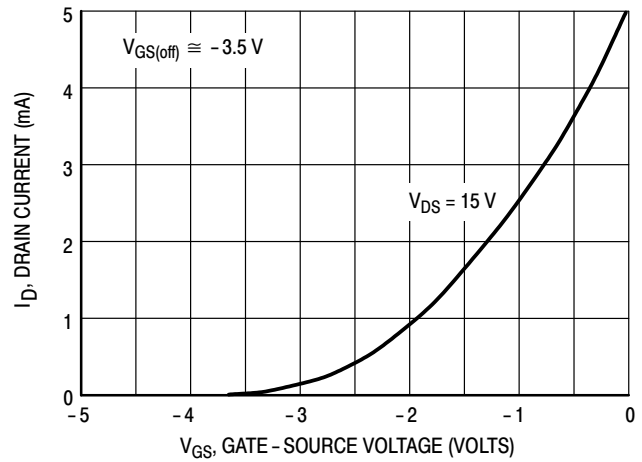


Figure 5. Common Source Transfer Characteristics

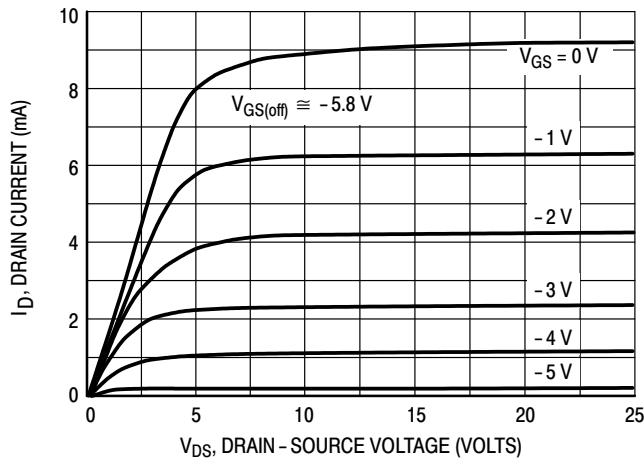


Figure 6. Typical Drain Characteristics

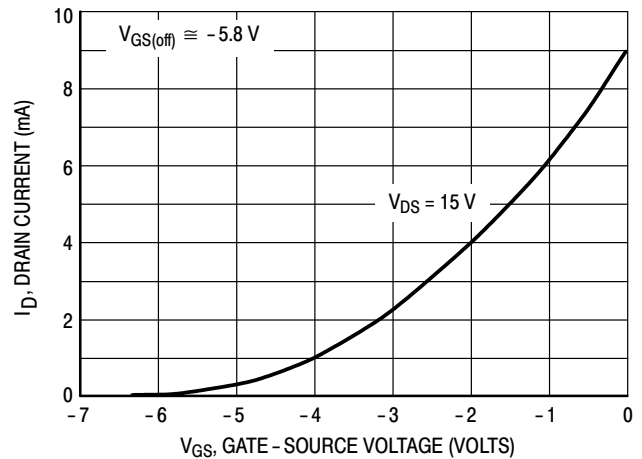


Figure 7. Common Source Transfer Characteristics

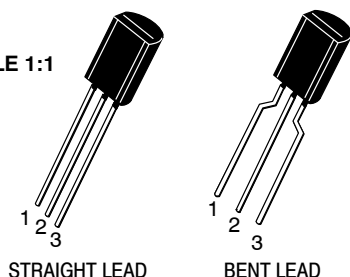
NOTE: Note: Graphical data is presented for dc conditions. Tabular data is given for pulsed conditions (Pulse Width = 630 ms, Duty Cycle = 10%). Under dc conditions, self heating in higher  $I_{DSS}$  units reduces  $I_{DSS}$ .

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

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ON

SCALE 1:1

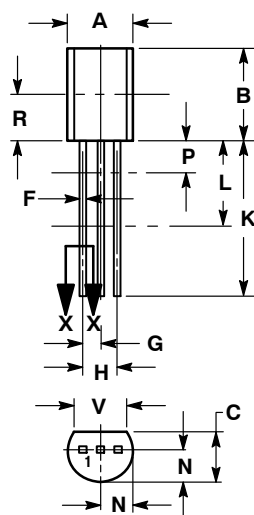


STRAIGHT LEAD

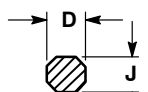
BENT LEAD

## TO-92 (TO-226) 1 WATT CASE 29-10 ISSUE A

DATE 08 MAY 2012



STRAIGHT LEAD

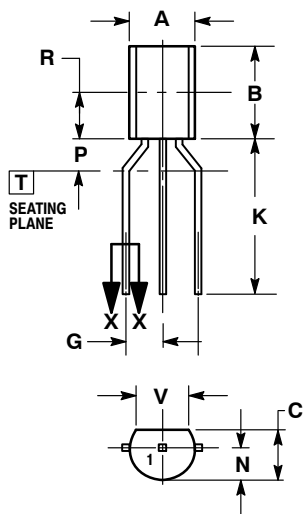


SECTION X-X

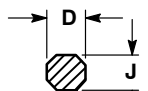
### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.44        | 5.21 |
| B   | 0.290  | 0.310 | 7.37        | 7.87 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.018  | 0.021 | 0.46        | 0.53 |
| F   | 0.016  | 0.019 | 0.41        | 0.48 |
| G   | 0.045  | 0.055 | 1.15        | 1.39 |
| H   | 0.095  | 0.105 | 2.42        | 2.66 |
| J   | 0.018  | 0.024 | 0.46        | 0.61 |
| K   | 0.500  | ---   | 12.70       | ---  |
| L   | 0.250  | ---   | 6.35        | ---  |
| N   | 0.080  | 0.105 | 2.04        | 2.66 |
| P   | ---    | 0.100 | ---         | 2.54 |
| R   | 0.135  | ---   | 3.43        | ---  |
| V   | 0.135  | ---   | 3.43        | ---  |



BENT LEAD



SECTION X-X

### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.44        | 5.21 |
| B   | 0.290  | 0.310 | 7.37        | 7.87 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.018  | 0.021 | 0.46        | 0.53 |
| G   | 0.094  | 0.102 | 2.40        | 2.80 |
| J   | 0.018  | 0.024 | 0.46        | 0.61 |
| K   | 0.500  | ---   | 12.70       | ---  |
| N   | 0.080  | 0.105 | 2.04        | 2.66 |
| P   | ---    | 0.100 | ---         | 2.54 |
| R   | 0.135  | ---   | 3.43        | ---  |
| V   | 0.135  | ---   | 3.43        | ---  |

## STYLES ON PAGE 2

|                  |                       |                                                                                                                                                                                     |
|------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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**TO-92 (TO-226) 1 WATT**  
**CASE 29-10**  
**ISSUE A**

DATE 08 MAY 2012

|                                                                        |                                                                             |                                                                     |                                                                        |                                                                    |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>STYLE 1:</b><br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR           | <b>STYLE 2:</b><br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR                | <b>STYLE 3:</b><br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE           | <b>STYLE 4:</b><br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE            | <b>STYLE 5:</b><br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE            |
| <b>STYLE 6:</b><br>PIN 1. GATE<br>2. SOURCE & SUBSTRATE<br>3. DRAIN    | <b>STYLE 7:</b><br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE                     | <b>STYLE 8:</b><br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE & SUBSTRATE | <b>STYLE 9:</b><br>PIN 1. BASE 1<br>2. EMITTER<br>3. BASE 2            | <b>STYLE 10:</b><br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| <b>STYLE 11:</b><br>PIN 1. ANODE<br>2. CATHODE & ANODE<br>3. CATHODE   | <b>STYLE 12:</b><br>PIN 1. MAIN TERMINAL 1<br>2. GATE<br>3. MAIN TERMINAL 2 | <b>STYLE 13:</b><br>PIN 1. ANODE 1<br>2. GATE<br>3. CATHODE 2       | <b>STYLE 14:</b><br>PIN 1. EMITTER<br>2. COLLECTOR<br>3. BASE          | <b>STYLE 15:</b><br>PIN 1. ANODE 1<br>2. CATHODE<br>3. ANODE 2     |
| <b>STYLE 16:</b><br>PIN 1. ANODE<br>2. GATE<br>3. CATHODE              | <b>STYLE 17:</b><br>PIN 1. COLLECTOR<br>2. BASE<br>3. EMITTER               | <b>STYLE 18:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. NOT CONNECTED  | <b>STYLE 19:</b><br>PIN 1. GATE<br>2. ANODE<br>3. CATHODE              | <b>STYLE 20:</b><br>PIN 1. NOT CONNECTED<br>2. CATHODE<br>3. ANODE |
| <b>STYLE 21:</b><br>PIN 1. COLLECTOR<br>2. EMITTER<br>3. BASE          | <b>STYLE 22:</b><br>PIN 1. SOURCE<br>2. GATE<br>3. DRAIN                    | <b>STYLE 23:</b><br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN            | <b>STYLE 24:</b><br>PIN 1. EMITTER<br>2. COLLECTOR/ANODE<br>3. CATHODE | <b>STYLE 25:</b><br>PIN 1. MT 1<br>2. GATE<br>3. MT 2              |
| <b>STYLE 26:</b><br>PIN 1. V <sub>CC</sub><br>2. GROUND 2<br>3. OUTPUT | <b>STYLE 27:</b><br>PIN 1. MT<br>2. SUBSTRATE<br>3. MT                      | <b>STYLE 28:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE           | <b>STYLE 29:</b><br>PIN 1. NOT CONNECTED<br>2. ANODE<br>3. CATHODE     | <b>STYLE 30:</b><br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE           |
| <b>STYLE 31:</b><br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE               | <b>STYLE 32:</b><br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER               | <b>STYLE 33:</b><br>PIN 1. RETURN<br>2. INPUT<br>3. OUTPUT          | <b>STYLE 34:</b><br>PIN 1. INPUT<br>2. GROUND<br>3. LOGIC              | <b>STYLE 35:</b><br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER      |

|                         |                              |                                                                                                                                                                                     |
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