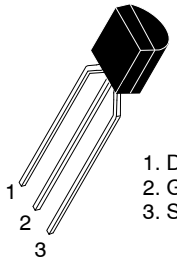
# P-Channel Switch

# J176, MMBFJ176




1. Drain
2. Gate
3. Source

**TO-92 3 LF**
**CASE 135AR**


1. Drain
2. Source
3. Gate

**SOT-23**
**(TO-236)**
**CASE 318**

Source & Drain are interchangeable.

## Description

This device is designed for low-level analog switching sample-and-hold circuits and chopper-stabilized amplifiers. Sourced from process 88.

## ABSOLUTE MAXIMUM RATINGS (Note 1, Note 2)

Values are at $T_A$ = 25 °C unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DG}$ | Drain-Gate Voltage | –30 | V |
| $V_{GS}$ | Gate-Source Voltage | 30 | V |
| $I_{GF}$ | Forward Gate Current | 50 | mA |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | –55 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.

1. These ratings are based on a maximum junction temperature of 150 °C.
2. These are steady-state limits. ON Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.

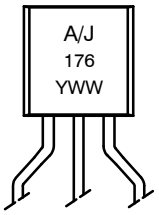
## THERMAL CHARACTERISTICS

Values are at $T_A$ = 25 °C unless otherwise noted.

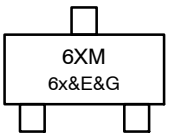
| Symbol | Parameter | Max. | | Unit |
|---|---|---|---|---|
| | | J176 (Note 3) | MMBFJ176, (Note 3) | |
| $P_D$ | Total Device Dissipation | 350 | 225 | mW |
| | Derate Above 25 °C | 2.8 | 1.8 | mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 125 | – | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357 | 556 | °C/W |

3. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## MARKING DIAGRAMS




A = Assembly Site
J176 = Specific Device Code
Y = Year of Production (Last Number)
WW = Work Week Number




6X = Specific Device Code
M = Assembly Operation Month

## ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

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**ELECTRICAL CHARACTERISTICS** Values are at $T_A$ = 25 °C unless otherwise noted.

| Symbol | Parameter | Conditions | | Min. | Max. | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| $V_{(BR)GSS}$ | Gate-Source Breakdown Voltage | $I_G$ = 1.0 μA, $V_{DS}$ = 0 | | 30 | – | V |
| $I_{GSS}$ | Gate Reverse Current | $V_{GS}$ = 20 V, $V_{DS}$ = 0 | | – | 1.0 | nA |
| $V_{GS(off)}$ | Gate-Source Cut-Off Voltage | $V_{DS}$ = −15 V, $I_D$ = −10 nA | J176 / MMBFJ176 | 1.0 | 4.0 | V |
| **ON CHARACTERISTICS** | | | | | | |
| $I_{DSS}$ | Zero-Gate Voltage Drain Current (Note 4) | $V_{DS}$ = −15 V, $I_{GS}$ = 0 | J176 / MMBFJ176 | −2.0 | −25.0 | mA |
| $r_{DS(on)}$ | Drain-Source On Resistance | $V_{DS}$ ≤ 0.1 V, $V_{GS}$ = 0 | J176 / MMBFJ176 | – | 250 | Ω |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2.0%.

## TYPICAL CHARACTERISTICS

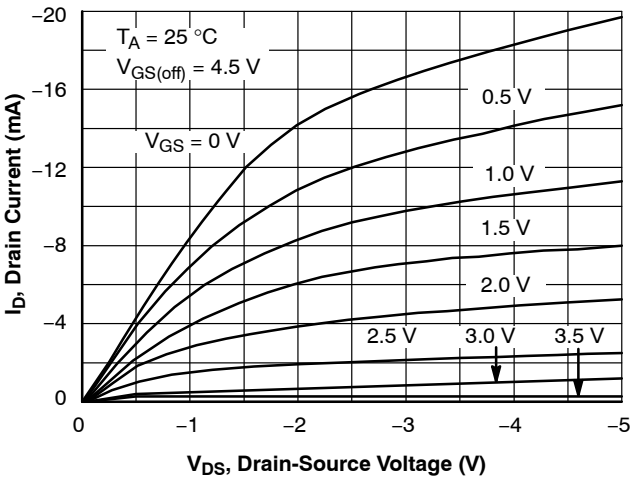


**Figure 1. Common Drain-Source**

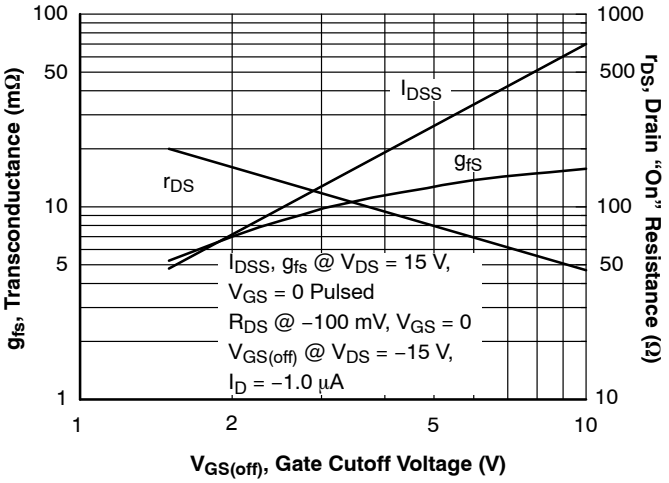


**Figure 2. Parameter Interactions**




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## TYPICAL CHARACTERISTICS (continued)

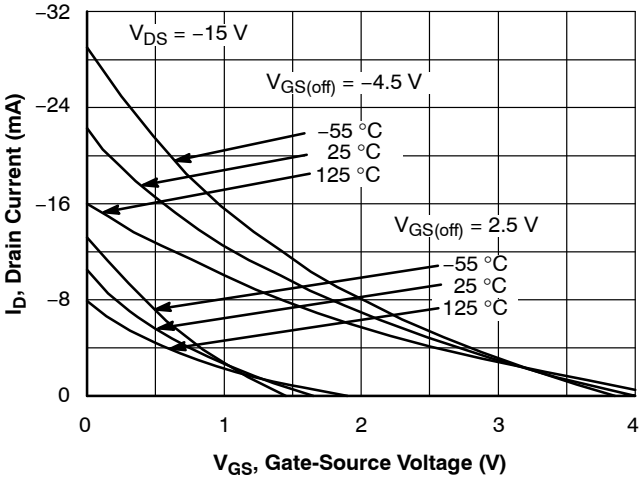


**Figure 3. Transfer Characteristics**

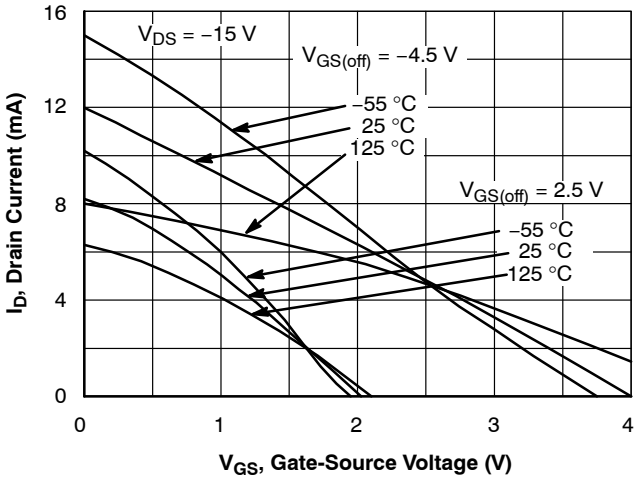


**Figure 4. Transfer Characteristics**

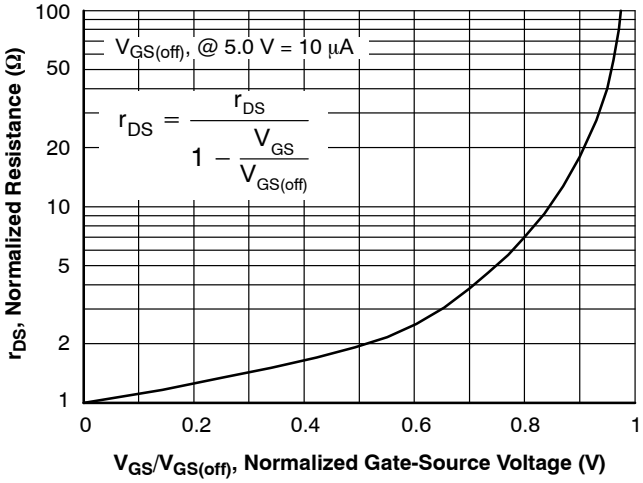


**Figure 5. Normalized Drain Resistance vs. Bias Voltage**

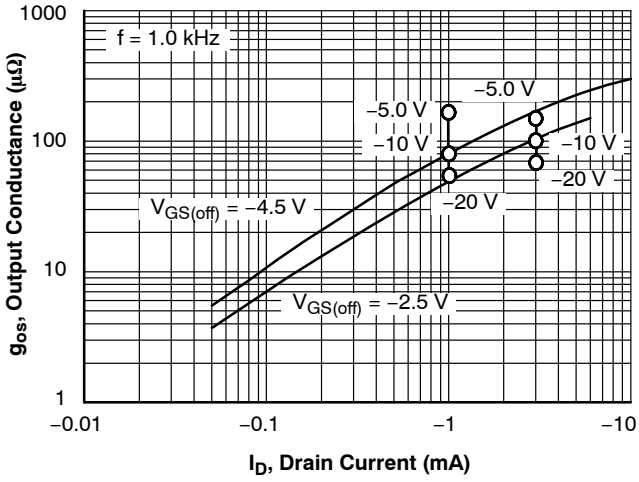


**Figure 6. Output Conductance vs. Drain Current**

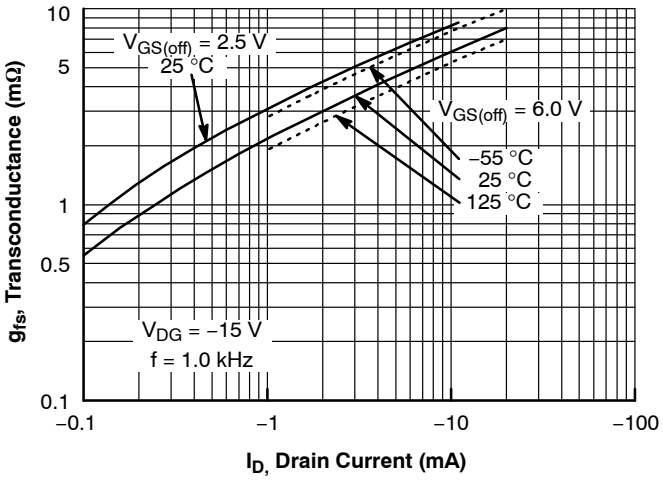


**Figure 7. Transconductance vs. Drain Current**

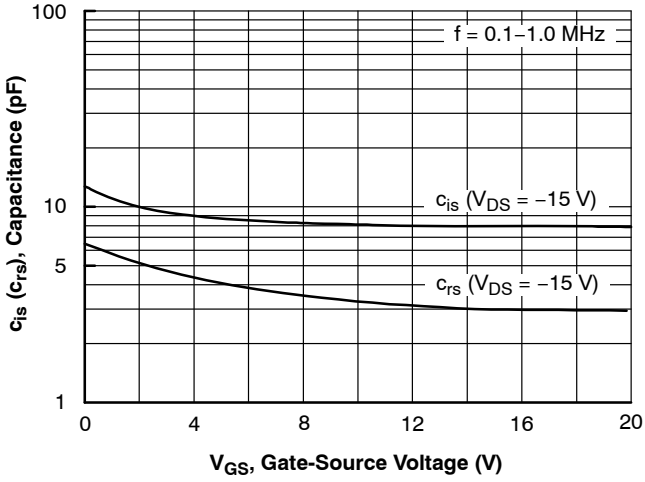


**Figure 8. Capacitance vs. Voltage**




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## TYPICAL CHARACTERISTICS (continued)

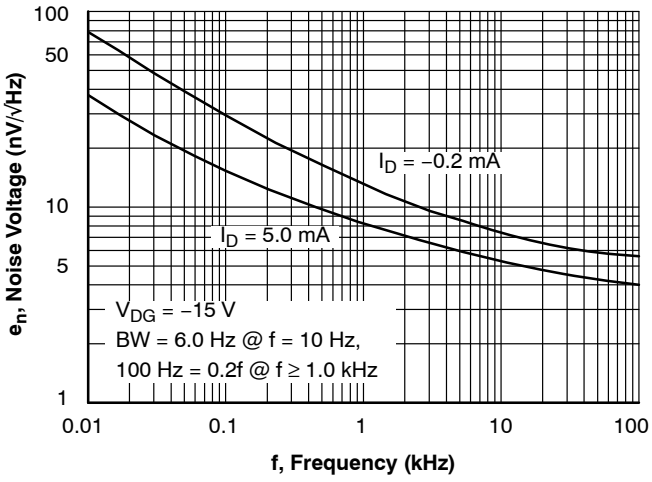


Figure 9. Noise Voltage vs. Frequency

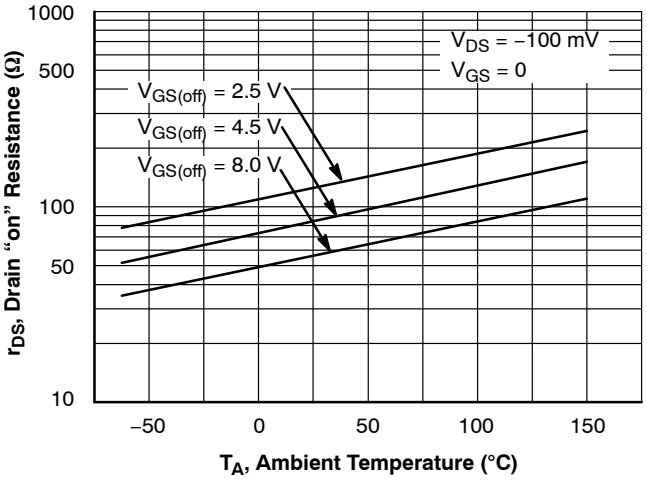


Figure 10. Channel Resistance vs. Temperature

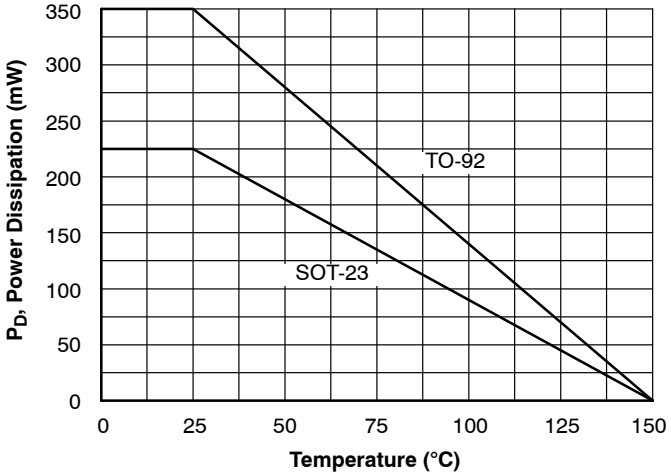


Figure 11. Power Dissipation vs. Ambient Temperature

## ORDERING INFORMATION

| Part Number | Marking | Package | Packing Method† | Min Order Qty / Immediate Pack Qty |
|---|---|---|---|---|
| J176-D74Z | J176 | TO-92 3 LF | Fan-Fold | 2000 |
| MMBFJ176 | 6X | SOT-23 (TO-236) | Tape and Reel | 3000 |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



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## REVISION HISTORY

| Revision | Description of Changes | Date |
|---|---|---|
| 3 | Converted the Document to **onsemi** format. | 1/26/2026 |

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



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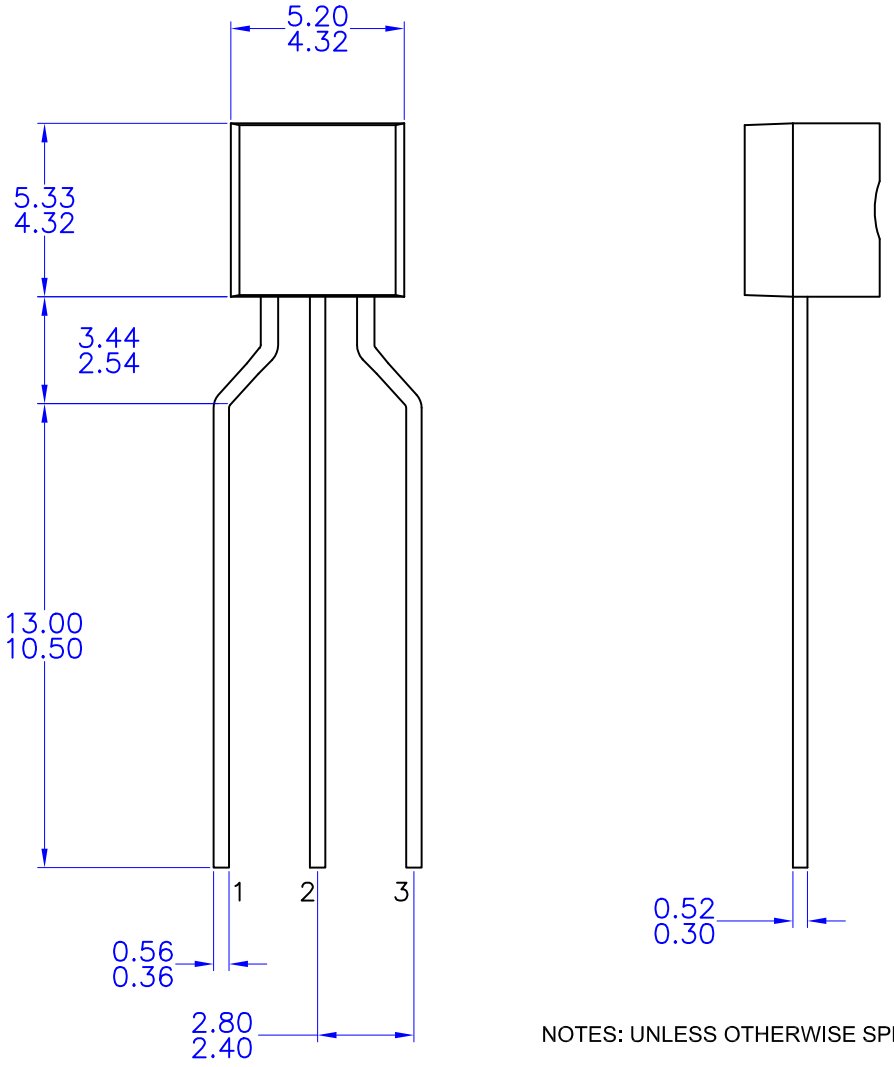
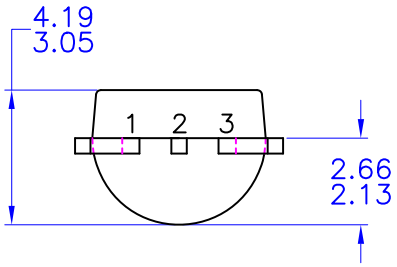
**TO−92 3 4.83x4.76 LEADFORMED**
CASE 135AR
ISSUE O

DATE 30 SEP 2016




NOTES: UNLESS OTHERWISE SPECIFIED

A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DRAWING CONFORMS TO ASME Y14.5M-1994

| | | |
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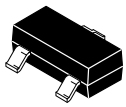
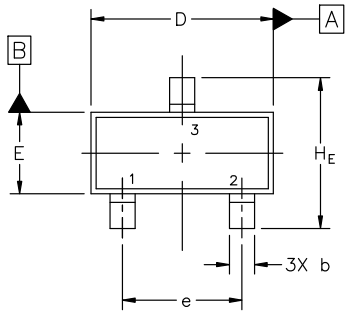


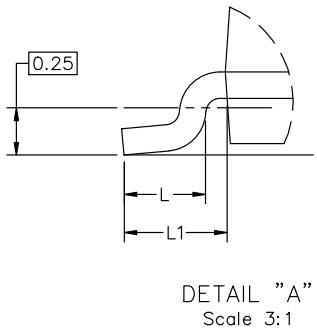
**SCALE 4:1**

**SOT−23 (TO−236) 2.90x1.30x1.00 1.90P**
CASE 318
ISSUE AU

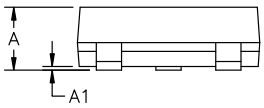
DATE 14 AUG 2024



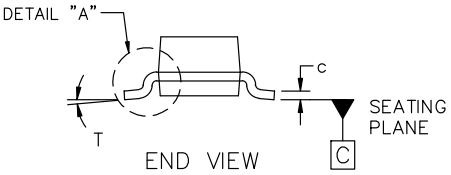

TOP VIEW




DETAIL "A"
Scale 3:1




SIDE VIEW

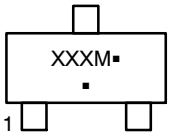



END VIEW

| MILLIMETERS | | | |
|---|---|---|---|
| DIM | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.37 | 0.44 | 0.50 |
| c | 0.08 | 0.14 | 0.20 |
| D | 2.80 | 2.90 | 3.04 |
| E | 1.20 | 1.30 | 1.40 |
| e | 1.78 | 1.90 | 2.04 |
| L | 0.30 | 0.43 | 0.55 |
| L1 | 0.35 | 0.54 | 0.69 |
| $H_E$ | 2.10 | 2.40 | 2.64 |
| T | 0° | −−− | 10° |

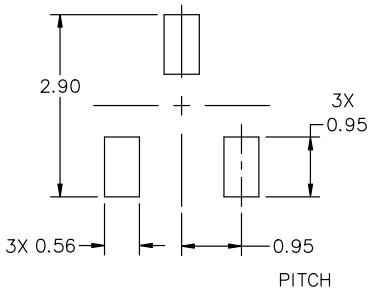
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

**GENERIC**
**MARKING DIAGRAM***




XXX = Specific Device Code
M = Date Code
▪ = 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.




RECOMMENDED
MOUNTING FOOTPRINT

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

**STYLES ON PAGE 2**

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CASE 318
ISSUE AU

DATE 14 AUG 2024

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE−ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE




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