# 2N5471 (SILICON)
# thru
# 2N5476

## P-CHANNEL JUNCTION FIELD-EFFECT TRANSISTORS

Depletion mode Junction Field-Effect Transistors designed for general-purpose amplifier and switching applications.

- High Gate-Source Breakdown Voltage —
  $V_{(BR)GSS}$ = 40 Vdc (Min) for All Types
- High DC Input Resistance —
  $I_{GSS}$ = 100 pAdc (Max) @ $V_{GS}$ = 10 Vdc
- Low Reverse Transfer Capacitance —
  $C_{rss}$ = 1.0 pF (Max) @ $V_{DS}$ = -15 Vdc
- Tight $I_{DSS}$ Range for Easier Circuit Design
- Drain and Source Interchangeable

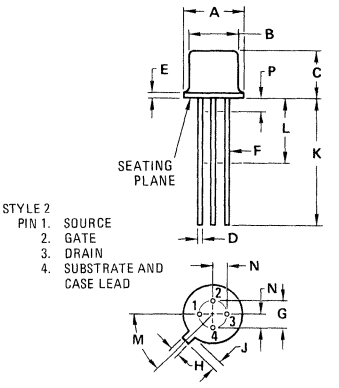
## P-CHANNEL

## JUNCTION FIELD-EFFECT TRANSISTORS

*MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Gate Voltage | $V_{DG}$ | 40 | Vdc |
| Reverse Gate-Source Voltage | $V_{GSR}$ | 40 | Vdc |
| Forward Gate Current | $I_{GF}$ | 10 | mAdc |
| Total Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 300<br>2.0 | mW<br>mW/°C |
| Operating Channel Temperature Range | $T_{channel}$ | -65 to +175 | °C |
| Storage Temperature Range | $T_{stg}$ | -65 to +200 | °C |

*Indicates JEDEC Registered Data.




STYLE 2
PIN 1. SOURCE
2. GATE
3. DRAIN
4. SUBSTRATE AND CASE LEAD

| DIM | MILLIMETERS MIN | MILLIMETERS MAX | INCHES MIN | INCHES MAX |
|---|---|---|---|---|
| A | 5.31 | 5.84 | 0.209 | 0.230 |
| B | 4.52 | 4.95 | 0.178 | 0.195 |
| C | 4.32 | 5.33 | 0.170 | 0.210 |
| D | 0.41 | 0.53 | 0.016 | 0.021 |
| E | – | 0.76 | – | 0.030 |
| F | 0.41 | 0.48 | 0.016 | 0.019 |
| G | 2.54 BSC | | 0.100 BSC | |
| H | 0.91 | 1.17 | 0.036 | 0.046 |
| J | 0.71 | 1.22 | 0.028 | 0.048 |
| K | 12.70 | – | 0.500 | – |
| L | 6.35 | – | 0.250 | – |
| M | 45° BSC | | 45° BSC | |
| N | 1.27 BSC | | 0.050 BSC | |
| P | – | 1.27 | – | 0.050 |

ALL JEDEC dimensions and notes apply

CASE 20-03
TO-72

***ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted.)

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Gate-Source Breakdown Voltage ($I_G$ = 10 μAdc, $V_{DS}$ = 0) | | $V_{(BR)GSS}$ | 40 | – | Vdc |
| Gate-Source Cutoff Voltage | | $V_{GS(off)}$ | | | Vdc |
| ($V_{DS}$ = -15 Vdc, $I_D$ = -10 nAdc) | 2N5471 | | 0.5 | 4.0 | |
| | 2N5472 | | 0.7 | 4.0 | |
| | 2N5473 | | 0.9 | 6.0 | |
| | 2N5474 | | 1.2 | 7.0 | |
| | 2N5475 | | 1.5 | 8.0 | |
| | 2N5476 | | 2.0 | 9.0 | |
| Reverse Gate Current | | $I_{GSS}$ | | | nAdc |
| ($V_{GS}$ = 10 Vdc, $V_{DS}$ = 0) | | | – | 0.1 | |
| ($V_{GS}$ = 20 Vdc, $V_{DS}$ = 0) | | | – | 0.5 | |
| ($V_{GS}$ = 20 Vdc, $V_{DS}$ = 0, $T_A$ = 150°C) | | | – | 1.0 | μAdc |
| **ON CHARACTERISTICS** | | | | | |
| Zero-Gate Voltage Drain Current (1) | | $I_{DSS}$ | | | mAdc |
| ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0) | 2N5471 | | 0.02 | 0.06 | |
| | 2N5472 | | 0.05 | 0.12 | |
| | 2N5473 | | 0.10 | 0.25 | |
| | 2N5474 | | 0.20 | 0.50 | |
| | 2N5475 | | 0.40 | 1.0 | |
| | 2N5476 | | 0.80 | 2.0 | |
| Gate-Source Voltage | | $V_{GS}$ | | | Vdc |
| ($V_{DS}$ = -15 Vdc, $I_D$ = 2.0 μAdc) | 2N5471 | | 0.5 | 3.0 | |
| ($V_{DS}$ = -15 Vdc, $I_D$ = 5.0 μAdc) | 2N5472 | | 0.7 | 3.5 | |
| ($V_{DS}$ = -15 Vdc, $I_D$ = 10 μAdc) | 2N5473 | | 0.9 | 4.5 | |
| ($V_{DS}$ = -15 Vdc, $I_D$ = 20 μAdc) | 2N5474 | | 1.2 | 6.0 | |
| ($V_{DS}$ = -15 Vdc, $I_D$ = 40 μAdc) | 2N5475 | | 1.5 | 7.5 | |
| ($V_{DS}$ = -15 Vdc, $I_D$ = 80 μAdc) | 2N5476 | | 2.0 | 8.0 | |
| **SMALL-SIGNAL CHARACTERISTICS** | | | | | |
| Forward Transfer Admittance (1) | | $\|y_{fs}\|$ | | | μmhos |
| ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0, f = 1.0 kHz) | 2N5471 | | 60 | 180 | |
| | 2N5472 | | 90 | 225 | |
| | 2N5473 | | 120 | 300 | |
| | 2N5474 | | 160 | 400 | |
| | 2N5475 | | 200 | 500 | |
| | 2N5476 | | 260 | 650 | |
| Output Admittance (1) | | $\|y_{os}\|$ | | | μmhos |
| ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0, f = 1.0 kHz) | 2N5471 | | – | 1.0 | |
| | 2N5472 | | – | 1.0 | |
| | 2N5473 | | – | 2.5 | |
| | 2N5474 | | – | 2.5 | |
| | 2N5475 | | – | 5.0 | |
| | 2N5476 | | – | 10 | |
| Input Capacitance ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0, 140 kHz ≤ f ≤ 1.0 MHz) | | $C_{iss}$ | – | 5.0 | pF |
| Reverse Transfer Capacitance ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0, 140 kHz ≤ f ≤ 1.0 MHz) | | $C_{rss}$ | – | 1.0 | pF |
| Common-Source Noise Figure ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0, $R_S$ = 1.0 Megohm, f = 1.0 kHz, BW = 1.0 Hz) | | NF | – | 2.5 | dB |
| Equivalent Short-Circuit Input Noise Voltage ($V_{DS}$ = -15 Vdc, $V_{GS}$ = 0, f = 1.0 kHz, BW = 1.0 Hz) | | $e_n$ | – | 110 | $nV/\sqrt{Hz}$ |

(1) Pulse Test: Pulse Width ≤ 630 ms, Duty Cycle ≤ 2.0%.

*Indicates JEDEC Registered Data.

## TYPICAL SMALL-SIGNAL CHARACTERISTICS

($T_{channel}$ = 25°C)

**FIGURE 1 – FORWARD TRANSFER ADMITTANCE**

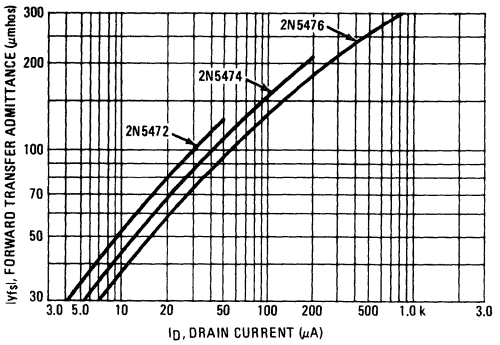
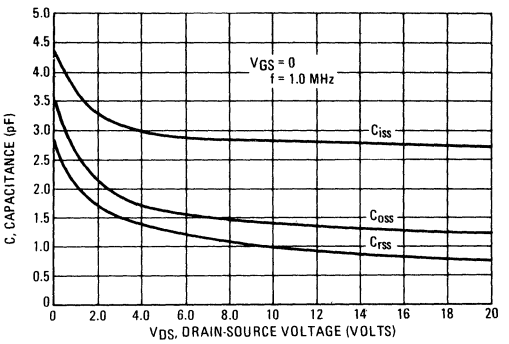



**FIGURE 2 – CAPACITANCE**




## TYPICAL NOISE FIGURE

**FIGURE 3 – EFFECTS OF FREQUENCY**

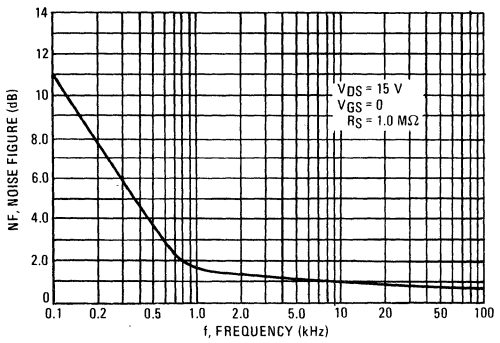



**FIGURE 4 – EFFECTS OF SOURCE RESISTANCE**

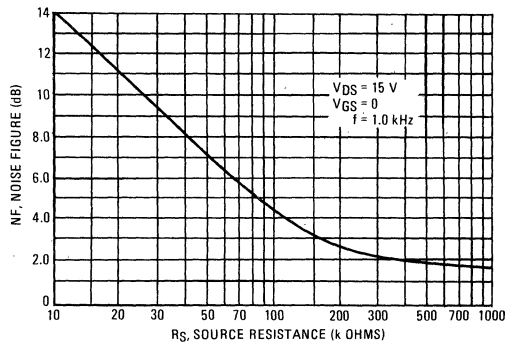
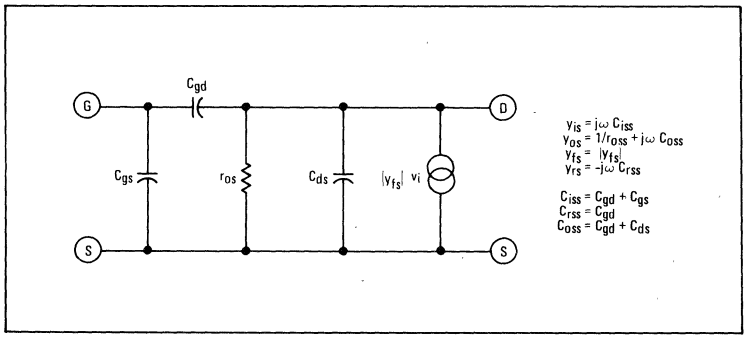



**FIGURE 5 – LOW FREQUENCY CIRCUIT MODEL**



## TYPICAL LIMIT TRANSFER CHARACTERISTICS
(TEMPERATURES NOTED ARE $T_{channel}$)

FIGURE 6 – 2N5471

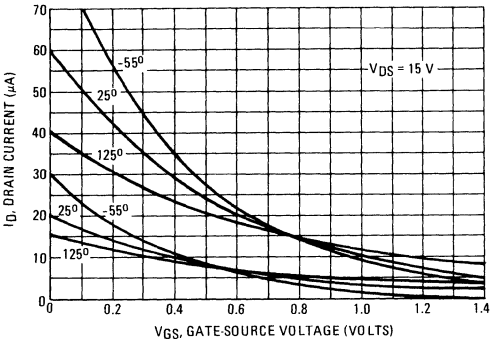



FIGURE 7 – 2N5472

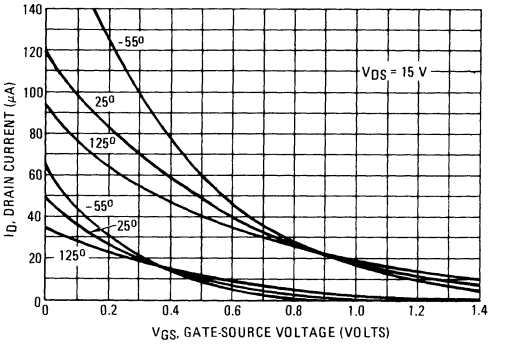



FIGURE 8 – 2N5473

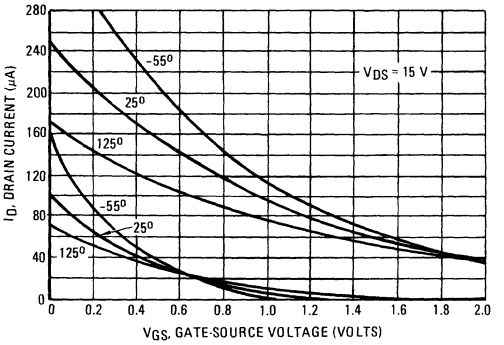



FIGURE 9 – 2N5474

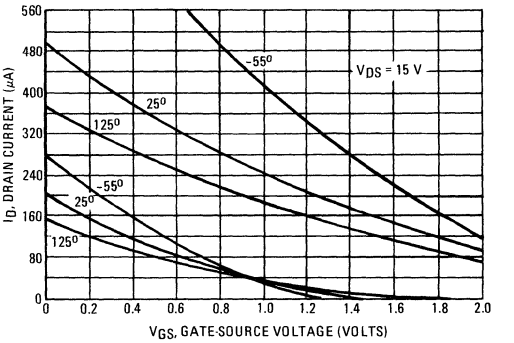



FIGURE 10 – 2N5475

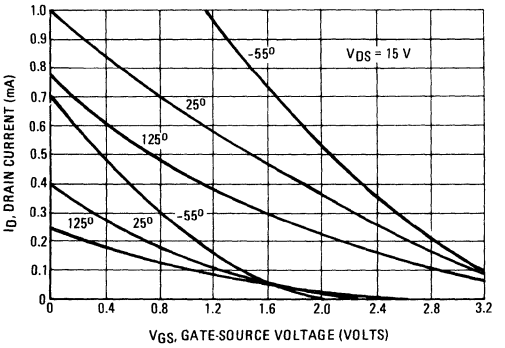



FIGURE 11 – 2N5476