# IFN410, IFN411, IFN412

## N-Channel Matched Dual Silicon Junction Field-Effect Transistor

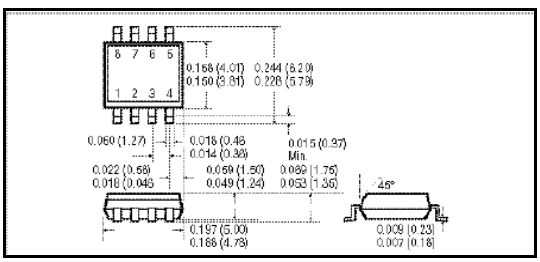
- **Improved Replacements for the U410, U411, & U412**
- **Low Noise Differential Amplifier**
- **Differential Amplifier**
- **Wide-Band Amplifier**

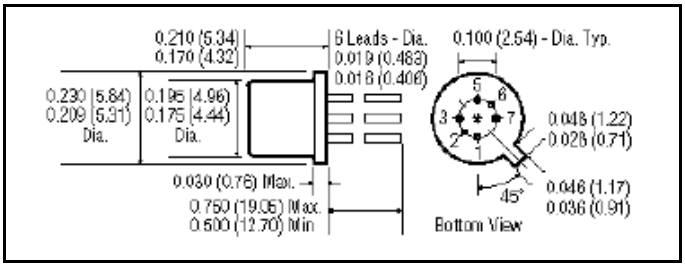
**Absolute maximum ratings at $T_A = 25^oC$**

| | |
|---|---|
| Reverse Gate Source & Gate Drain Voltage | -40V |
| Continuous Forward Gate Current | 50 mA |
| Continuous Device Power Dissipation | 375 mW |
| Power Derating | 3.0 mW/$^o$C |
| Operating Temperature Range | -55°C to +125°C |
| Storage Temperature Range | -65$^o$C to +150$^o$C |

| At 25°C free air temperature<br>Static Electrical Characteristics | | 410, 411, 412<br>Min | Typ | Max | Unit | Process NJ16<br>Test Conditions | |
|---|---|---|---|---|---|---|---|
| Gate Source Breakdown Voltage | $V_{(BR)GSS}$ | -40 | | | V | $I_G$ = -1uA, $V_{DS}$ = 0 V | |
| Gate Reverse Current | $I_{GSS}$ | | | -0.2 | nA | $V_{GS}$ = -30 V, $V_{DS}$ = 0 V | |
| Gate Source Cutoff Voltage | $V_{GS(OFF)}$ | -0.5 | | -3.5 | V | $V_{DS}$ = 20 V, $I_D$ = 1 nA | |
| Gate Source Voltage | $V_{GS}$ | -0.2 | | -3 | V | $V_{DS}$ = 20 V, $I_D$ = 200 uA | |
| Drain Saturation Current (pulsed) | $I_{DSS}$ | 0.5 | | 5 | mA | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V | |
| Gate Current | $I_G$ | | | -200 | pA | $V_{DS}$ = 10 V, $I_D$ = 200 uA | |
| **Dynamic Electrical Characteristics** | | | | | | | |
| Common-Source Forward Transconductance | $g_{fs}$ | 1<br>0.6 | | 4<br>1.2 | mS | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V<br>$V_{DS}$ = 20 V, $I_D$ = 200 uA | f = 1 kHz |
| Common-Source Output Conductance | $g_{os}$ | | | 20<br>5 | uS | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V<br>$V_{DS}$ = 20 V, $I_D$ = 200 uA | f = 1 kHz |
| Common-Source Input Capacitance | $C_{iss}$ | | | 4.5 | pF | $V_{DS}$ = 20V, $V_{GS}$ = 0 V | f = 1 MHz |
| Common-Source Reverse Transfer Capacitance | $C_{rss}$ | | | 1.2 | pF | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V | f = 1 MHz |
| Equivalent Short Circuit Input Noise Voltage | ~$e_N$ | | | 50 | nV/√Hz | $V_{DS}$ = 20 V, $I_D$ = 200uA | f = 100 Hz |

| Matching Characteristics | | 410 | 411 | 412 | Units | Test Conditions |
|---|---|---|---|---|---|---|
| Differential Gate-Source Voltage | $\lvert V_{GS1}-V_{GS2} \rvert$ | 10 | 20 | 40 | mV | $V_{DG}$ = 20 V, $I_D$ = -200 uA |
| Differential Gate Source Voltage with Temperature | $\frac{\Delta \lvert V_{GS1}-V_{GS2} \rvert}{\Delta T}$ | 10 | 25 | 80 | µV/°C | $V_{DG}$ = 20 V, $I_D$ = 200 µA<br>25°C to 85°C |
| Common Mode Rejection Rate | CMRR (typ) | 80 | 80 | 70 | dB | $V_{DD}$ = 10 V to $V_{DD}$ = 20 V<br>$I_D$ = 200 uA |




**SOIC-8 Package** SMPU410, SMPU411, SMPU412

**Pin Configuration** 1-G1, 2-D1, 3-S1, 4-G2, 5-G2, 6-D2, 7-S2, 8-G1

**TO-71**: IFN410, IFN 411, IFN 412,

**Pin Configuration** 1-S1, 2-D1, 3-G1, 4-S2, 5-D2, 6-G2

Dimensions in Inches (mm)

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