**MOTOROLA**
**SEMICONDUCTOR TECHNICAL DATA**

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by MRF185/D

## The RF MOSFET Line

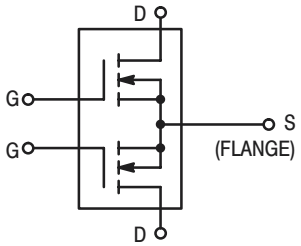
# RF Power Field-Effect Transistor

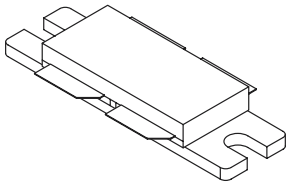
## N–Channel Enhancement–Mode Lateral MOSFET

# MRF185

- High Gain, Rugged Device
- Broadband Performance from HF to 1 GHz
- Bottom Side Source Eliminates DC Isolators, Reducing Common Mode Inductances

**1.0 GHz, 85 W, 28 V**
**LATERAL N–CHANNEL**
**BROADBAND**
**RF POWER MOSFET**



**CASE 375B–04, STYLE 1**
**NI–860**

**MAXIMUM RATINGS**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain–Source Voltage | $V_{DSS}$ | 65 | Vdc |
| Gate–Source Voltage | $V_{GS}$ | ±20 | Vdc |
| Storage Temperature Range | $T_{stg}$ | – 65 to +150 | °C |
| Operating Junction Temperature | $T_J$ | 200 | °C |
| Total Device Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 250<br>1.45 | Watts<br>W/°C |

**THERMAL CHARACTERISTICS**

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 0.7 | °C/W |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Drain–Source Breakdown Voltage<br>($V_{GS}$ = 0 Vdc, $I_D$ = 1 μAdc) | $V_{(BR)DSS}$ | 65 | – | – | Vdc |
| Zero Gate Voltage Drain Current<br>($V_{DS}$ = 28 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | – | – | 1 | μAdc |
| Gate–Source Leakage Current<br>($V_{GS}$ = 20 Vdc, $V_{DS}$ = 0 Vdc) | $I_{GSS}$ | – | – | 1 | μAdc |

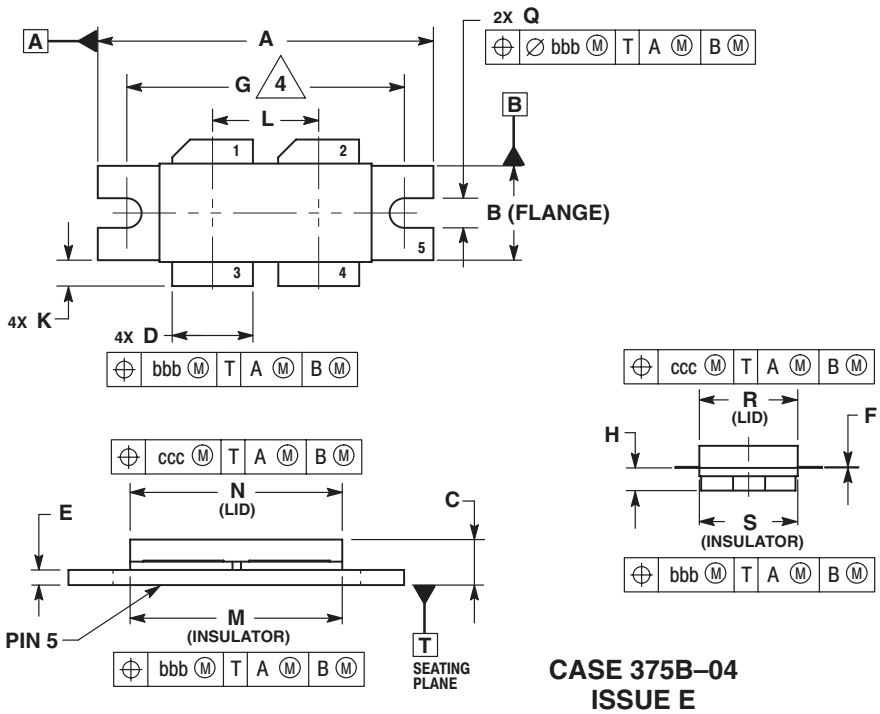
NOTE – **CAUTION** – MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

REV 5

**ELECTRICAL CHARACTERISTICS – continued** ($T_C$ = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **ON CHARACTERISTICS** | | | | | |
| Gate Quiescent Voltage ($V_{DS}$ = 26 V, $I_D$ = 300 mA per side) | $V_{GS(Q)}$ | 3 | 4 | 5 | Vdc |
| Delta Quiescent Voltage between sides ($V_{DS}$ = 26 V, $I_D$ = 300 mA per side) | $\Delta V_{GS(Q)}$ | – | 0.15 | 0.3 | Vdc |
| Drain–Source On–Voltage ($V_{GS}$ = 10 V, $I_D$ = 3 A per side) | $V_{DS(on)}$ | – | 0.75 | 1 | Vdc |
| Forward Transconductance ($V_{DS}$ = 10 V, $I_D$ = 3 A per side) | $g_{fs}$ | 1.6 | 2 | – | s |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| Output Capacitance ($V_{DS}$ = 28 V, $V_{GS}$ = 0 V, f = 1 MHz) | $C_{oss}$ | – | 38 | – | pF |
| Reverse Transfer Capacitance ($V_{DS}$ = 28 V, $V_{GS}$ = 0 V, f = 1 MHz) | $C_{rss}$ | – | 4.6 | 6 | pF |
| **FUNCTIONAL CHARACTERISTICS** | | | | | |
| Common Source Power Gain ($V_{DD}$ = 28 V, $P_{out}$ = 85 W, f = 960 MHz, $I_{DQ}$ = 600 mA) | $G_{ps}$ | 11 | 14 | – | dB |
| Drain Efficiency ($V_{DD}$ = 28 V, $P_{out}$ = 85 W, f = 960 MHz, $I_{DQ}$ = 600 mA) | $\eta$ | 45 | 53 | – | % |
| Load Mismatch ($V_{DD}$ = 28 Vdc, $P_{out}$ = 85 W, f = 960 MHz, $I_{DQ}$ = 600 mA, Load VSWR 5:1 at All Phase Angles) | $\Psi$ | No Degradation in Output Power | | | |

## PACKAGE DIMENSIONS




**CASE 375B–04**
**ISSUE E**
**NI–860**

NOTES:
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION H IS MEASURED 0.030 (0.762) AWAY FROM PACKAGE BODY.
4. RECOMMENDED BOLT CENTER DIMENSION OF 1.140 (28.96) BASED ON M3 SCREW.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 1.335 | 1.345 | 33.91 | 34.16 |
| B | 0.380 | 0.390 | 9.65 | 9.91 |
| C | 0.180 | 0.224 | 4.57 | 5.69 |
| D | 0.325 | 0.335 | 8.26 | 8.51 |
| E | 0.060 | 0.070 | 1.52 | 1.78 |
| F | 0.004 | 0.006 | 0.10 | 0.15 |
| G | 1.100 BSC | | 27.94 BSC | |
| H | 0.097 | 0.107 | 2.46 | 2.72 |
| K | 0.085 | 0.115 | 2.16 | 2.92 |
| L | 0.425 BSC | | 10.80 BSC | |
| M | 0.852 | 0.868 | 21.64 | 22.05 |
| N | 0.851 | 0.869 | 21.62 | 22.07 |
| Q | 0.118 | 0.138 | 3.00 | 3.51 |
| R | 0.395 | 0.405 | 10.03 | 10.29 |
| S | 0.394 | 0.406 | 10.01 | 10.31 |
| bbb | 0.010 REF | | 0.25 REF | |
| ccc | 0.015 REF | | 0.38 REF | |

STYLE 1:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. GATE
5. SOURCE

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