Siliconix

# SUB60N06-08

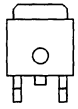
## N-Channel Enhancement-Mode Transistor

## 175°C Maximum Junction Temperature

### Product Summary

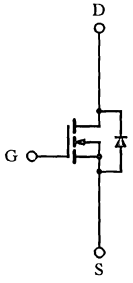
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | $I_D$ (A) |
|---|---|---|
| 60 | 0.008 | 60[a] |

**TO-263**



G D S
Top View

DRAIN connected to TAB




N-Channel MOSFET

### Absolute Maximum Ratings ($T_C$ = 25°C Unless Otherwise Noted)

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current ($T_J$ = 175°C) | $T_C$ = 25°C | $I_D$ | 60[a] | A |
| | $T_C$ = 125°C | | 55 | |
| Pulsed Drain Current | | $I_{DM}$ | 240 | |
| Avalanche Current | | $I_{AR}$ | 60 | |
| Repetitive Avalanche Energy[b] | L = 0.1 mH | $E_{AR}$ | 180 | mJ |
| Power Dissipation | $T_C$ = 25°C | $P_D$ | 150 | W |
| | $T_A$ = 25°C[c] | | 3.7 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −55 to 175 | °C |

### Thermal Resistance Ratings

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Junction-to-Ambient, PCB Mount[c] | $R_{thJA}$ | 40 | °C/W |
| Junction-to-Case | $R_{thJC}$ | 1.0 | |

Notes
a. Package limited.
b. Duty cycle ≤ 1%.
c. When mounted on 1" square PCB (FR-4 material).

## Specifications ($T_J$ = 25°C Unless Otherwise Noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 250 µA | 60 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | 2.0 | 3.0 | 4.0 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 48 V, $V_{GS}$ = 0 V | | | 25 | µA |
| | | $V_{DS}$ = 48 V, $V_{GS}$ = 0 V, $T_J$ = 125°C | | | 250 | |
| | | $V_{DS}$ = 48 V, $V_{GS}$ = 0 V, $T_J$ = 175°C | | | 500 | |
| On-State Drain Current[b] | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 10 V | 60 | | | A |
| Drain-Source On-State Resistance[b] | $r_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 30 A | | | 0.008 | Ω |
| | | $V_{GS}$ = 10 V, $I_D$ = 30 A, $T_J$ = 125°C | | | 0.012 | |
| | | $V_{GS}$ = 10 V, $I_D$ = 30 A, $T_J$ = 175°C | | | 0.016 | |
| Forward Transconductance[b] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 30 A | 30 | | | S |
| **Dynamic[a]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 4300 | | pF |
| Output Capacitance | $C_{oss}$ | | | 1000 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 400 | | |
| Total Gate Charge[c] | $Q_g$ | $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 60 A | | 110 | 150 | nC |
| Gate-Source Charge[c] | $Q_{gs}$ | | | 25 | | |
| Gate-Drain Charge[c] | $Q_{gd}$ | | | 50 | | |
| Turn-On Delay Time[c] | $t_{d(on)}$ | $V_{DD}$ = 30 V, $R_L$ = 0.47 Ω<br>$I_D$ ≅ 60 A, $V_{GEN}$ = 10 V, $R_G$ = 2.5 Ω | | 20 | 40 | ns |
| Rise Time[c] | $t_r$ | | | 120 | 200 | |
| Turn-Off Delay Time[c] | $t_{d(off)}$ | | | 65 | 120 | |
| Fall Time[c] | $t_f$ | | | 30 | 60 | |
| **Source-Drain Diode Ratings and Characteristics ($T_C$ = 25°C)[a]** | | | | | | |
| Continuous Current | $I_S$ | | | | 60 | A |
| Pulsed Current | $I_{SM}$ | | | | 240 | |
| Forward Voltage[b] | $V_{SD}$ | $I_F$ = 60 A, $V_{GS}$ = 0 V | | 1.0 | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 60 A, di/dt = 100 A/µs | | 67 | 120 | ns |
| Peak Reverse Recovery Current | $I_{RM(REC)}$ | | | 4.7 | 8 | A |
| Reverse Recovery Charge | $Q_{rr}$ | | | 0.16 | 0.48 | µC |

Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test: pulse width ≤ 300 µsec, duty cycle ≤ 2%.
c. Independent of operating temperature.