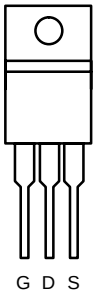
# N-Channel 60-V (D-S), 175°C MOSFET

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | $I_D$ (A) |
| 60 | 0.008 | 75[a] |

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

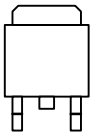
**TO-220AB**



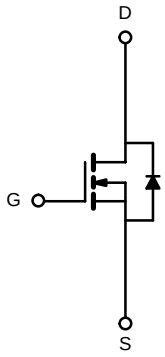

Top View
SUP75N06-08

DRAIN connected to TAB

**TO-263**




Top View
SUB75N06-08




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 | $I_D$ | 75[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 | $E_{AR}$ | 280 | mJ |
| Power Dissipation | $T_C$ = 25°C (TO-220AB and TO-263) | $P_D$ | 250[c] | W |
| | $T_A$ = 25°C (TO-263)[d] | | 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 (TO-263)[d] | $R_{thJA}$ | 40 | °C/W |
| | Free Air (TO-220AB) | | 62.5 | |
| Junction-to-Case | | $R_{thJC}$ | 0.6 | |

Notes
a. Package limited.
b. Duty cycle ≤ 1%.
c. See SOA curve for voltage derating.
d. When mounted on 1" square PCB (FR-4 material).

For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

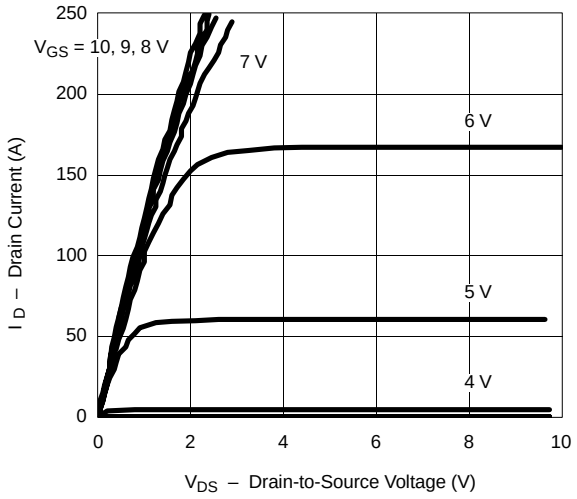
## SPECIFICATIONS ($T_J$ = 25°C UNLESS OTHERWISE NOTED)

| 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 | $I_{DSS}$ | $V_{DS}$ = 60 V, $V_{GS}$ = 0 V | | | 1 | µA |
| | | $V_{DS}$ = 60 V, $V_{GS}$ = 0 V, $T_J$ = 125°C | | | 50 | |
| | | $V_{DS}$ = 60 V, $V_{GS}$ = 0 V, $T_J$ = 175°C | | | 150 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 10 V | 120 | | | A |
| Drain-Source On-State Resistance[a] | $r_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 30 A | | 0.007 | 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[a] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 30 A | 30 | | | S |
| **Dynamic[b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 4800 | | pF |
| Output Capacitance | $C_{oss}$ | | | 910 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 270 | | |
| Total Gate Charge[c] | $Q_g$ | $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 75 A | | 85 | 120 | nC |
| Gate-Source Charge[c] | $Q_{gs}$ | | | 28 | | |
| Gate-Drain Charge[c] | $Q_{gd}$ | | | 26 | | |
| Turn-On Delay Time[c] | $t_{d(on)}$ | $V_{DD}$ = 30 V, $R_L$ = 0.47 Ω<br>$I_D$ ≅ 75 A, $V_{GEN}$ = 10 V, $R_G$ = 2.5 Ω | | 20 | 40 | ns |
| Rise Time[c] | $t_r$ | | | 95 | 200 | |
| Turn-Off Delay Time[c] | $t_{d(off)}$ | | | 65 | 120 | |
| Fall Time[c] | $t_f$ | | | 20 | 60 | |
| **Source-Drain Diode Ratings and Characteristics ($T_C$ = 25°C)[b]** | | | | | | |
| Continuous Current | $I_S$ | | | | 75 | A |
| Pulsed Current | $I_{SM}$ | | | | 240 | |
| Forward Voltage[a] | $V_{SD}$ | $I_F$ = 75 A , $V_{GS}$ = 0 V | | 1.0 | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 75 A, di/dt = 100 A/µs | | 67 | 120 | ns |
| Peak Reverse Recovery Current | $I_{RM(REC)}$ | | | 6 | 8 | A |
| Reverse Recovery Charge | $Q_{rr}$ | | | 0.2 | 0.48 | µC |

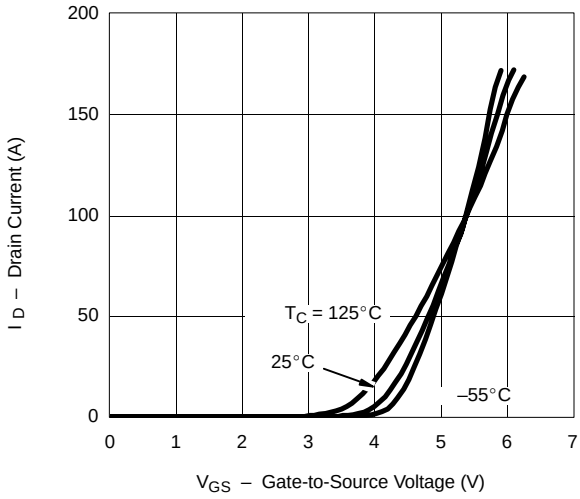
Notes
a. Pulse test: pulse width ≤ 300 µsec, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

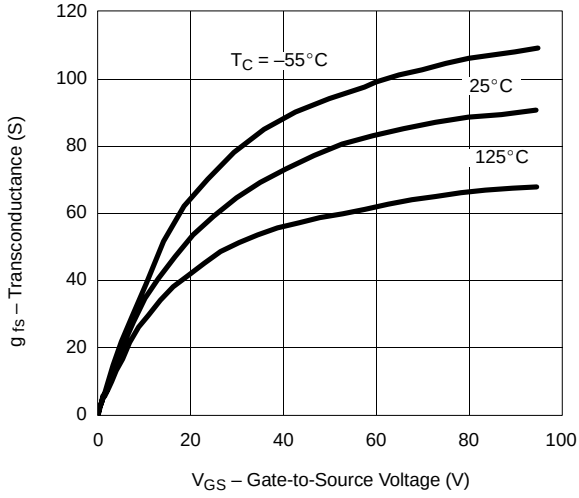
### Output Characteristics



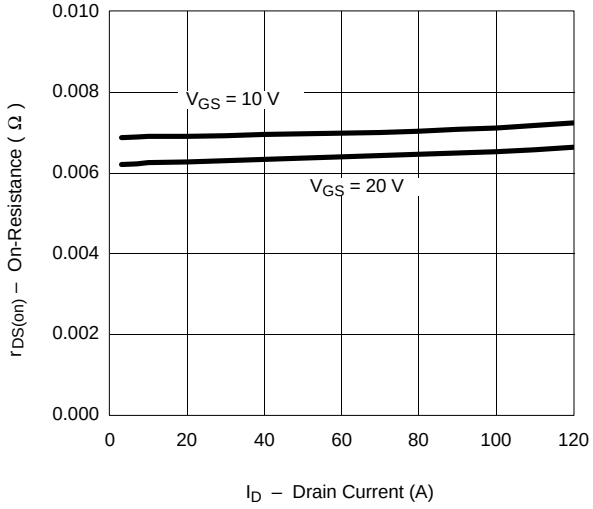

### Transfer Characteristics



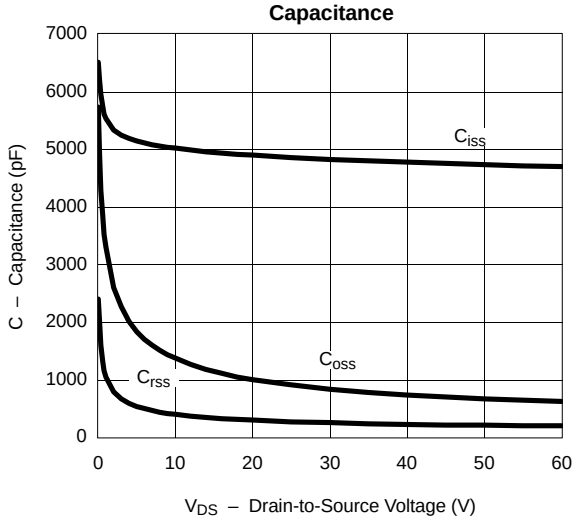

### Transconductance



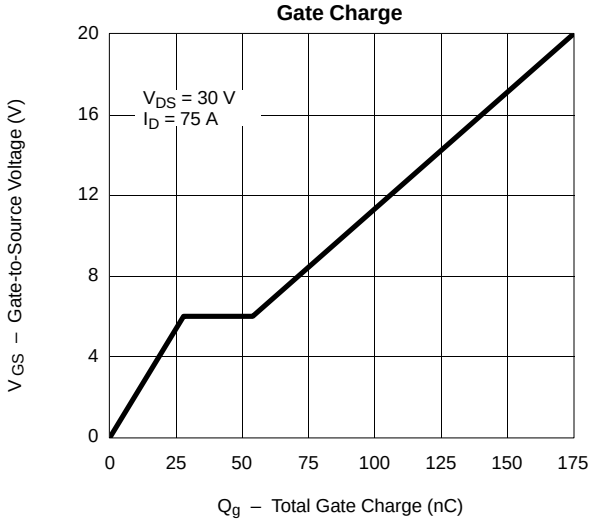

### On-Resistance vs. Drain Current




### Capacitance

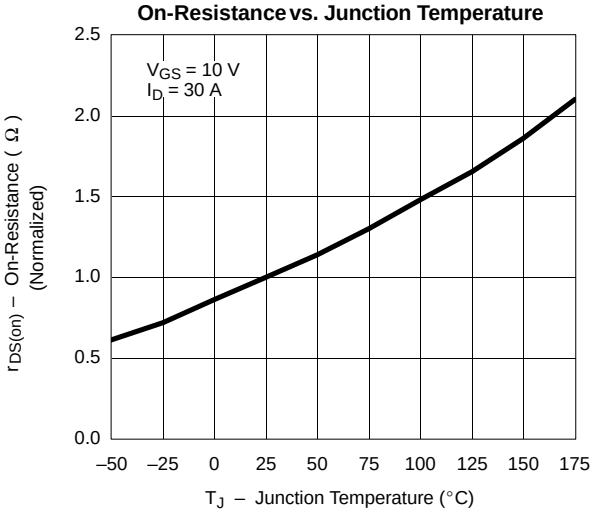



### Gate Charge

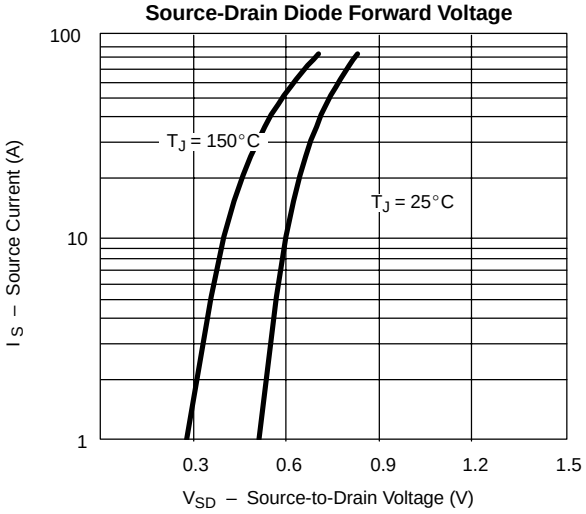


## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

**On-Resistance vs. Junction Temperature**

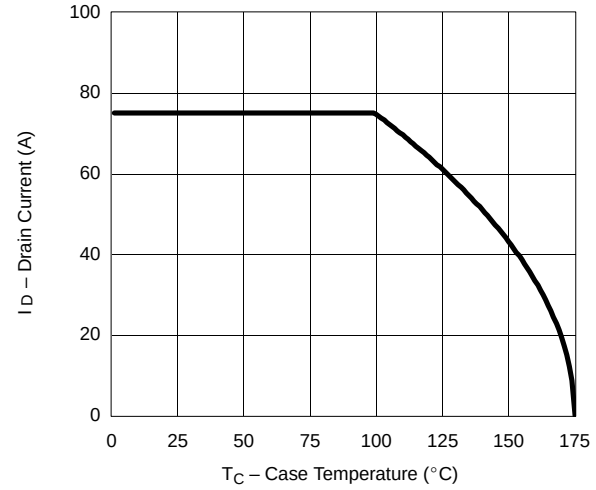



**Source-Drain Diode Forward Voltage**

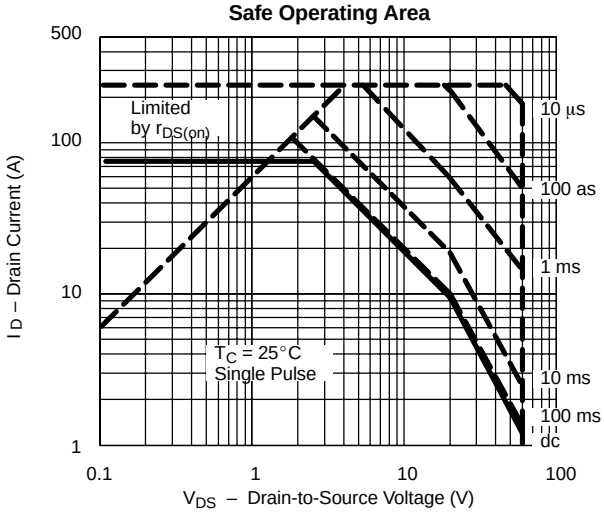



## THERMAL RATINGS

**Maximum Avalanche and Drain Current vs. Case Temperature**




**Safe Operating Area**




**Normalized Thermal Transient Impedance, Junction-to-Case**