

N-Channel 20-V (D-S) MOSFET



RoHS
COMPLIANT

| PRODUCT SUMMARY | | |
|-------------------|---------------------------|------------------------|
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | I_D (A) ^a |
| 20 | 0.004 @ $V_{GS} = 4.5$ V | 100 |
| | 0.005 @ $V_{GS} = 2.5$ V | 95 |

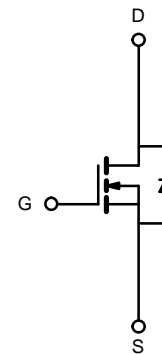
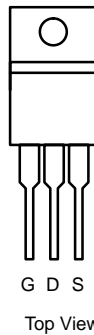
FEATURES

- TrenchFET[®] Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2011/65/EU

APPLICATIONS

- OR-ing
- Server
- DC/DC

TO-220AB



N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | |
|---|----------------|---------------------------|------------------|---|
| Parameter | Symbol | Limit | Unit | |
| Drain-Source Voltage | V_{DS} | 20 | V | |
| Gate-Source Voltage | V_{GS} | ± 12 | | |
| Continuous Drain Current ($T_J = 175^\circ\text{C}$) | I_D | $T_C = 25^\circ\text{C}$ | 100 | A |
| | | $T_C = 100^\circ\text{C}$ | 85 | |
| Pulsed Drain Current | I_{DM} | 260 | | |
| Avalanche Current | I_{AR} | 35 | | |
| Repetitive Avalanche Energy ^b | E_{AR} | 45 | mJ | |
| Power Dissipation | P_D | 125 ^a | W | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 175 | $^\circ\text{C}$ | |

| THERMAL RESISTANCE RATINGS | | | | |
|----------------------------|------------|---------------------------------|------|--------------------|
| Parameter | Symbol | Limit | Unit | |
| Junction-to-Ambient | R_{thJA} | PCB Mount (TO-263) ^c | 40 | $^\circ\text{C/W}$ |
| | | Free Air (TO-220AB) | 62.5 | |
| Junction-to-Case | R_{thJC} | 1.25 | | |

Notes:

- See SOA curve for voltage derating.
- Duty cycle $\leq 1\%$.
- When mounted on 1" square PCB (FR-4 material).

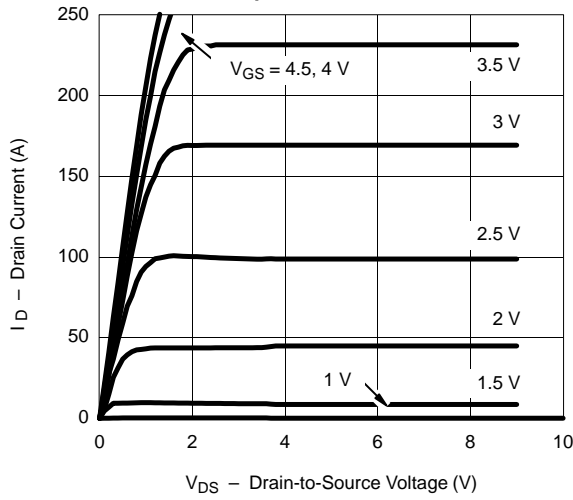
| MOSFET SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED) | | | | | | |
|---|----------------------|--|-----|-------|-------|------|
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 250 μA | 20 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _{DS} = 250 μA | 0.5 | | 1.5 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 12 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 20 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 20 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| | | V _{DS} = 20 V, V _{GS} = 0 V, T _J = 175 °C | | | 150 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 4.5 V | 120 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = 4.5 V, I _D = 30 A | | 0.004 | | Ω |
| | | V _{GS} = 4.5 V, I _D = 30 A, T _J = 125 °C | | 0.007 | | |
| | | V _{GS} = 4.5 V, I _D = 30 A, T _J = 175 °C | | 0.010 | | |
| | | V _{GS} = 2.5 V, I _D = 20 A | | 0.005 | | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = 5 V, I _D = 30 A | 20 | | | S |
| Dynamic^b | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 20 V, f = 1 MHz | | 6000 | | pF |
| Output Capacitance | C _{oss} | | | 1100 | | |
| Reversen Transfer Capacitance | C _{riss} | | | 600 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 85 A | | 65 | 130 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 13 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 14 | | |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 10 V, R _L = 0.12 Ω I _D = 85 A, V _{GEN} = 4.5 V, R _G = 2.5 Ω | | 25 | 40 | ns |
| Rise Time ^c | t _r | | | 120 | 180 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 80 | 120 | |
| Fall Time ^c | t _f | | | 100 | 150 | |
| Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b | | | | | | |
| Pulsed Current | I _{SM} | | | | 240 | A |
| Forward Voltage ^a | V _{SD} | I _F = 100 A, V _{GS} = 0 V | | 1.2 | 1.5 | V |
| Reverse Recovery Time | t _{rr} | I _F = 50 A, di/dt = 100 A/μs | | 45 | 100 | ns |

Notes:

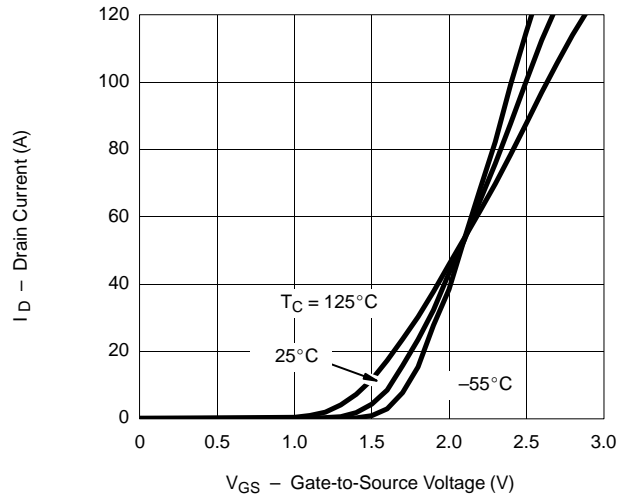
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

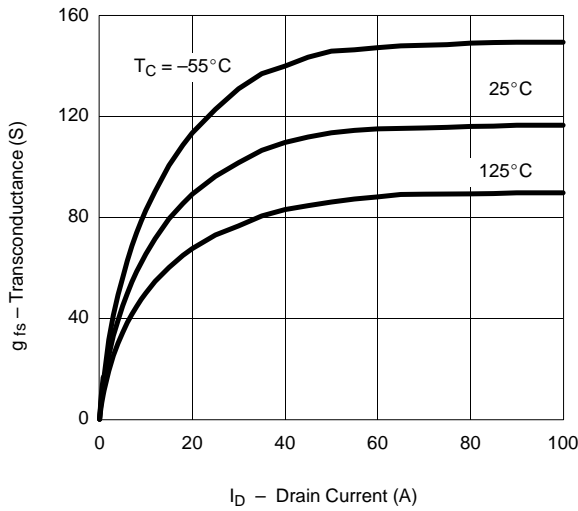
Output Characteristics



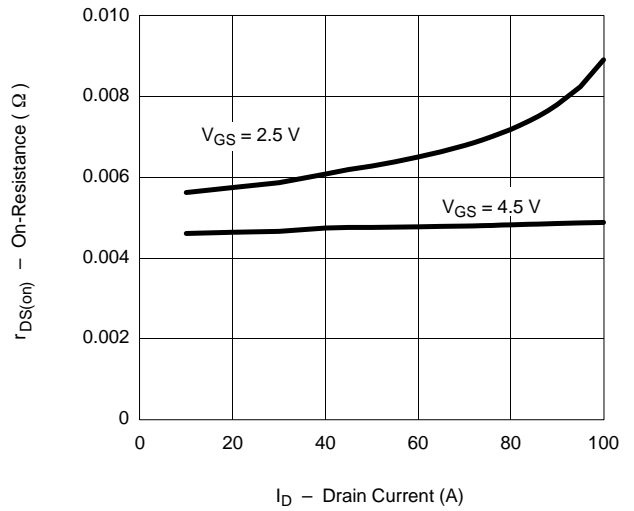
Transfer Characteristics



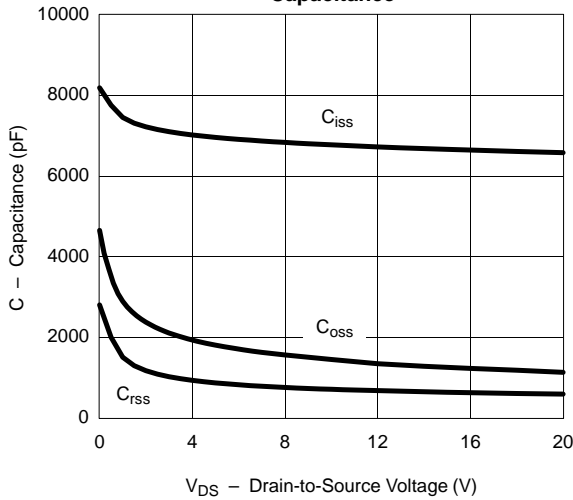
Transconductance



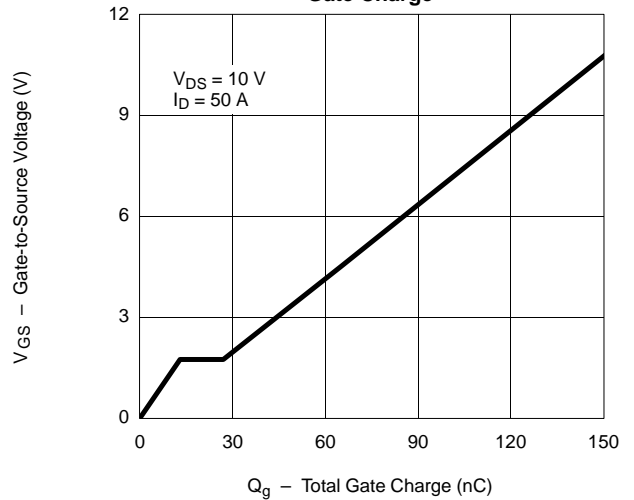
On-Resistance vs. Drain Current



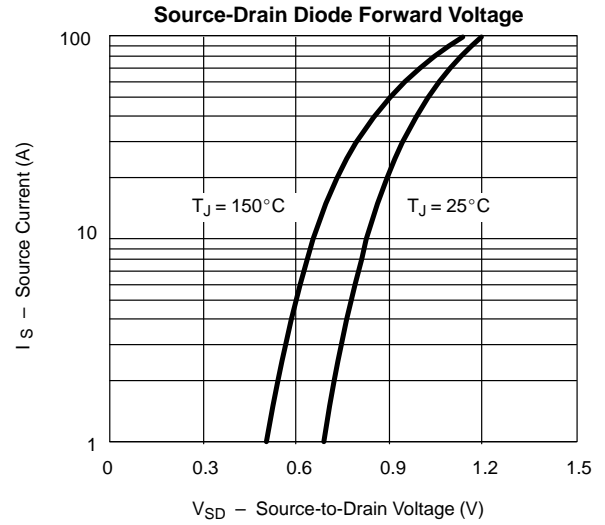
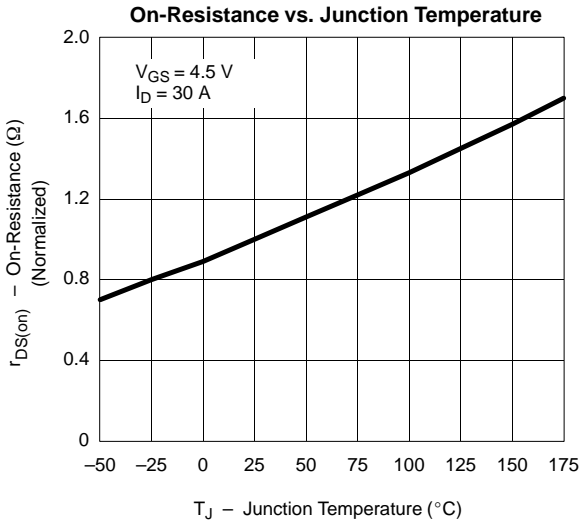
Capacitance



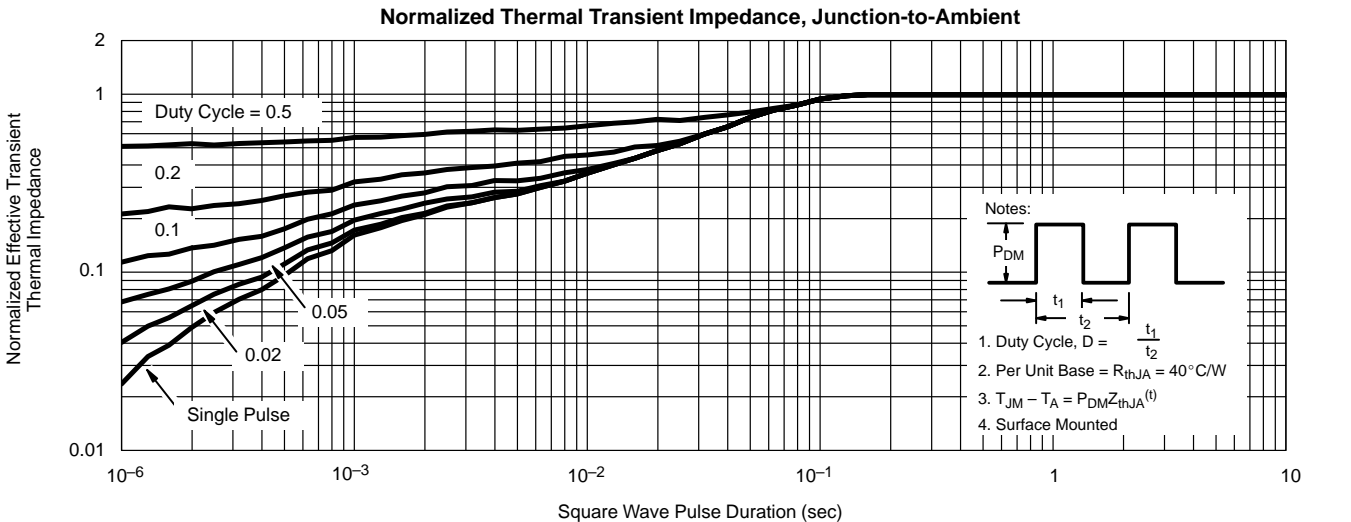
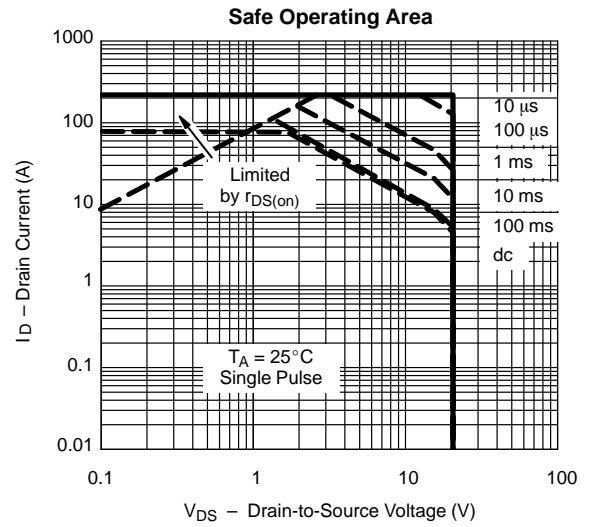
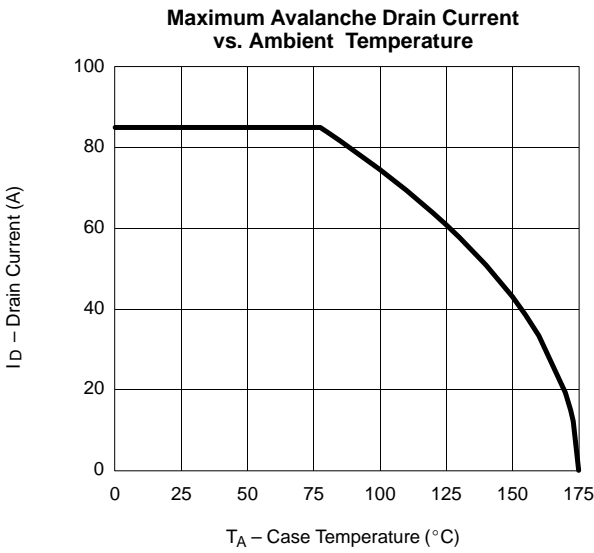
Gate Charge



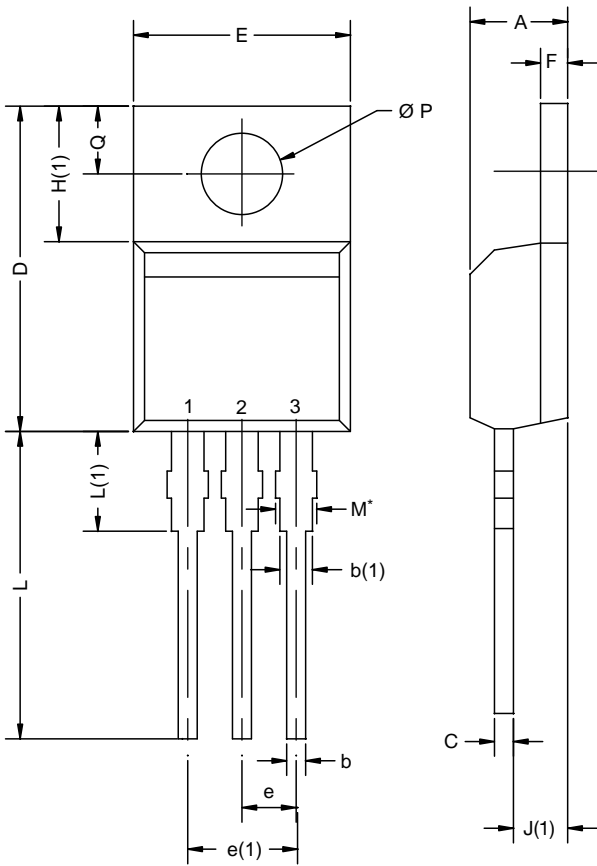
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



THERMAL RATINGS



TO-220AB



| DIM. | MILLIMETERS | | INCHES | |
|-----------------|-------------|-------|--------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 4.25 | 4.65 | 0.167 | 0.183 |
| b | 0.69 | 1.01 | 0.027 | 0.040 |
| b(1) | 1.20 | 1.73 | 0.047 | 0.068 |
| c | 0.36 | 0.61 | 0.014 | 0.024 |
| D | 14.85 | 15.49 | 0.585 | 0.610 |
| E | 10.04 | 10.51 | 0.395 | 0.414 |
| e | 2.41 | 2.67 | 0.095 | 0.105 |
| e(1) | 4.88 | 5.28 | 0.192 | 0.208 |
| F | 1.14 | 1.40 | 0.045 | 0.055 |
| H(1) | 6.09 | 6.48 | 0.240 | 0.255 |
| J(1) | 2.41 | 2.92 | 0.095 | 0.115 |
| L | 13.35 | 14.02 | 0.526 | 0.552 |
| L(1) | 3.32 | 3.82 | 0.131 | 0.150 |
| $\varnothing P$ | 3.54 | 3.94 | 0.139 | 0.155 |
| Q | 2.60 | 3.00 | 0.102 | 0.118 |

ECN: X12-0208-Rev. N, 08-Oct-12
DWG: 5471

Notes

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
Heatsink hole for HVM

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