

Product Preview

TMOS V™
SO-8 for Surface Mount
N-Channel Enhancement-Mode Silicon Gate

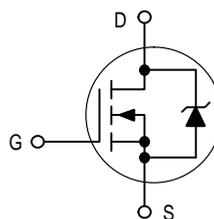
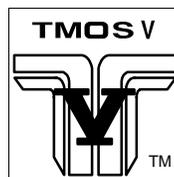
TMOS V is a new technology designed to achieve an on-resistance area product about one-half that of standard MOSFETs. This new technology more than doubles the present cell density of our 50 and 60 volt TMOS devices. Just as with our TMOS E-FET designs, TMOS V is designed to withstand high energy in the avalanche and commutation modes. Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional safety margin against unexpected voltage transients.

New Features of TMOS V

- On-resistance Area Product about One-half that of Standard MOSFETs with New Low Voltage, Low RDS(on) Technology
- Faster Switching than E-FET Predecessors

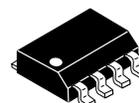
Features Common to TMOS V and TMOS E-FETS

- Avalanche Energy Specified
- IDSS and VDS(on) Specified at Elevated Temperature
- Static Parameters are the Same for both TMOS V and TMOS E-FET
- Miniature SO-8 Surface Mount Package – Saves Board Space
- Mounting Information for SO-8 Package Provided

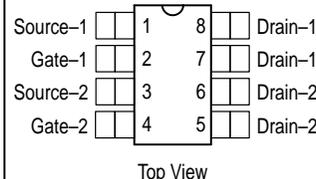


MMDF3N06VL

DUAL TMOS MOSFET
3.3 AMPERES
60 VOLTS
RDS(on) = 0.130 OHM



CASE 751-06, Style 11
SO-8



MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|--|-----------------------------------|------------|------|
| Drain-to-Source Voltage | V _{DSS} | 60 | Vdc |
| Drain-to-Gate Voltage, (R _{GS} = 1 MΩ) | V _{DGR} | 60 | Vdc |
| Gate-to-Source Voltage — Continuous | V _{GS} | ± 15 | Vdc |
| Drain Current — Continuous @ T _A = 25°C | I _D | 3.3 | Adc |
| — Continuous @ T _A = 100°C | I _D | 0.7 | |
| — Single Pulse (t _p ≤ 10 μs) | I _{DM} | 10 | Apk |
| Total Power Dissipation @ T _A = 25°C (1) | P _D | 2.0 | W |
| Operating and Storage Temperature Range | T _J , T _{stg} | -55 to 150 | °C |
| Single Pulse Drain-to-Source Avalanche Energy — Starting T _J = 25°C (V _{DD} = 25 Vdc, V _{GS} = 5.0 Vdc, Peak I _L = 3.3 Apk, L = 10 mH, R _G = 25 Ω) | E _{AS} | 54 | mJ |
| Thermal Resistance, Junction to Ambient (1) | R _{θJA} | 62.5 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 0.0625" from case for 10 seconds | T _L | 260 | °C |

DEVICE MARKING

2N6VL

(1) Mounted on G10/FR4 glass epoxy board using minimum recommended footprint.

ORDERING INFORMATION

| Device | Reel Size | Tape Width | Quantity |
|--------------|-----------|--------------------|----------|
| MMDF3N06VLR2 | 13" | 12mm embossed tape | 2500 |

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MMDF3N06VL

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|----------------------|---------|---------|-----------|--------------|
| Drain-to-Source Breakdown Voltage (V _{GS} = 0 Vdc, I _D = 0.25 mAdc) Temperature Coefficient (Positive) | V _{(BR)DSS} | 60 — | — 66 | — — | Vdc mV/°C |
| Zero Gate Voltage Drain Current (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc) (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc, T _J = 150°C) | I _{DSS} | — — | — — | 10 100 | μAdc |
| Gate-Body Leakage Current (V _{GS} = ± 15 Vdc, V _{DS} = 0 Vdc) | I _{GSS} | — | — | 100 | nAdc |

ON CHARACTERISTICS(1)

| | | | | | |
|---|---------------------|----------|------------|------------|--------------|
| Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μAdc) Threshold Temperature Coefficient (Negative) | V _{GS(th)} | 1.0 — | 1.5 3.0 | 2.0 — | Vdc mV/°C |
| Static Drain-to-Source On-Resistance (V _{GS} = 5.0 Vdc, I _D = 3.3 Adc) | R _{DS(on)} | — | 0.12 | 0.13 | Ohm |
| Drain-to-Source On-Voltage (V _{GS} = 5.0 Vdc, I _D = 3.3 Adc) (V _{GS} = 5.0 Vdc, I _D = 1.65 Adc, T _J = 150°C) | V _{DS(on)} | — — | — — | 0.5 0.4 | Vdc |
| Forward Transconductance (V _{DS} = 15 Vdc, I _D = 1.65 Adc) | g _{FS} | 1.0 | 3.0 | — | Mhos |

DYNAMIC CHARACTERISTICS

| | | | | | | |
|----------------------|---|------------------|---|-----|-----|----|
| Input Capacitance | (V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, f = 1.0 MHz) | C _{iss} | — | 340 | 480 | pF |
| Output Capacitance | | C _{oss} | — | 110 | 150 | |
| Transfer Capacitance | | C _{rss} | — | 27 | 50 | |

SWITCHING CHARACTERISTICS(2)

| | | | | | | |
|---------------------|---|---------------------|---|-----|----|----|
| Turn-On Delay Time | (V _{DD} = 30 Vdc, I _D = 3.3 Adc, V _{GS} = 5.0 Vdc, R _G = 9.1 Ω) | t _{d(on)} | — | 10 | 20 | ns |
| Rise Time | | t _r | — | 30 | 60 | |
| Turn-Off Delay Time | | t _{d(off)} | — | 32 | 60 | |
| Fall Time | | t _f | — | 28 | 60 | |
| Gate Charge | (V _{DS} = 48 Vdc, I _D = 3.3 Adc, V _{GS} = 5.0 Vdc) | Q _T | — | 9.0 | 20 | nC |
| | | Q ₁ | — | 1.5 | — | |
| | | Q ₂ | — | 4.3 | — | |
| | | Q ₃ | — | 3.5 | — | |

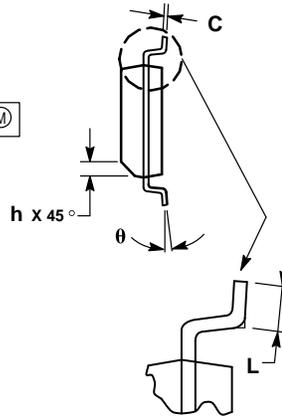
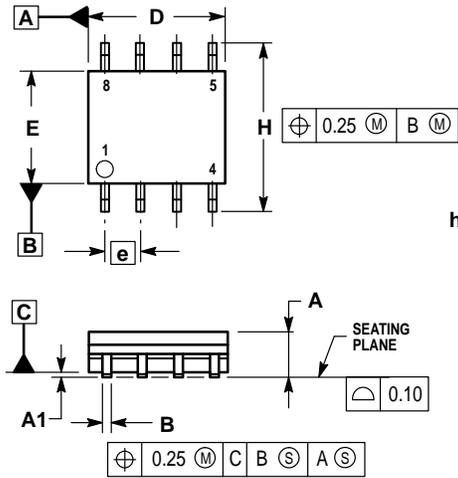
SOURCE-DRAIN DIODE CHARACTERISTICS

| | | | | | | |
|---------------------------------|--|-----------------|--------|--------------|----------|-----|
| Forward On-Voltage(1) | (I _S = 3.3 Adc, V _{GS} = 0 Vdc) (I _S = 3.3 Adc, V _{GS} = 0 Vdc, T _J = 150°C) | V _{SD} | — — | 0.84 0.67 | 1.2 — | Vdc |
| Reverse Recovery Time | (I _S = 3.3 Adc, V _{GS} = 0 Vdc, dI _S /dt = 100 A/μs) | t _{rr} | — | 58 | — | ns |
| | | t _a | — | 38 | — | |
| | | t _b | — | 20 | — | |
| Reverse Recovery Storage Charge | | Q _R | — | 0.11 | — | μC |

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

(2) Switching characteristics are independent of operating junction temperature.

PACKAGE DIMENSIONS



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | |
|----------|-------------|------|
| | MIN | MAX |
| A | 1.35 | 1.75 |
| A1 | 0.10 | 0.25 |
| B | 0.35 | 0.49 |
| C | 0.19 | 0.25 |
| D | 4.80 | 5.00 |
| E | 3.80 | 4.00 |
| e | 1.27 BSC | |
| H | 5.80 | 6.20 |
| h | 0.25 | 0.50 |
| L | 0.40 | 1.25 |
| θ | 0° | 7° |

STYLE 11:

- PIN 1. SOURCE 1
2. GATE 1
3. SOURCE 2
4. GATE 2
5. DRAIN 2
6. DRAIN 2
7. DRAIN 1
8. DRAIN 1

CASE 751-06
SO-8
ISSUE T

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