

RoHS

COMPLIANT

## ME4822-VB Datasheet

## N-Channel 30-V (D-S) MOSFET

| PRODUCT SUMMARY     |                                  |                                 |                       |  |  |  |
|---------------------|----------------------------------|---------------------------------|-----------------------|--|--|--|
| V <sub>DS</sub> (V) | R <sub>DS(on)</sub> (Ω)          | I <sub>D</sub> (A) <sup>a</sup> | Q <sub>g</sub> (Typ.) |  |  |  |
| 30                  | 0.008 at V <sub>GS</sub> = 10 V  | 13                              | 6.1 nC                |  |  |  |
| - 50                | 0.011 at V <sub>GS</sub> = 4.5 V | 11                              | 0.1 110               |  |  |  |

SO-8

Top View

8 D

D

6 D

5 D

S

S

S

G

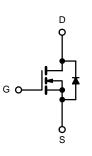
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#### FEATURES

- Halogen-free
- Trench Power MOSFET
- Optimized for High-Side Synchronous Rectifier Operation
- 100 % R<sub>g</sub> Tested
- 100 % UIS Tested

#### **APPLICATIONS**

Notebook CPU Core
High-Side Switch



N-Channel MOSFET

| ABSOLUTE MAXIMUM RATING                            | $\mathbf{P} \mathbf{I}_{A} = 25$ °C, unles | s otherwise no  | neu                 |    |  |
|--|--|-----------------|---------------------|----|--|
| Parameter  | Symbol                                     | Limit           | Unit                |    |  |
| Drain-Source Voltage                               | V <sub>DS</sub>                            | 30              | V                   |    |  |
| Gate-Source Voltage                                | V <sub>GS</sub>                            | ± 20            | - v                 |    |  |
|  | T <sub>C</sub> = 25 °C                     |                 | 13                  |    |  |
| Continuous Drain Current (T <sub>J</sub> = 150 °C) | T <sub>C</sub> = 70 °C                     | 1-              | 10                  |    |  |
| $Continuous Drain Current (1) = 150^{\circ} C)$    | T <sub>A</sub> = 25 °C                     | Ι <sub>D</sub>  | 9 <sup>b, c</sup>   |    |  |
|  | T <sub>A</sub> = 70 °C                     |                 | 7 <sup>b, c</sup>   | •  |  |
| Pulsed Drain Current                               | I <sub>DM</sub>                            | 45              | A                   |    |  |
| Outline Outline Decis Dis to Outline               | T <sub>C</sub> = 25 °C                     | L.              | 3.7                 |    |  |
| Continuous Source-Drain Diode Current              | T <sub>A</sub> = 25 °C                     | I <sub>S</sub>  | 2.0 <sup>b, c</sup> |    |  |
| Single Pulse Avalanche Current                     | L = 0.1 mH                                 | I <sub>AS</sub> | 20                  |    |  |
| Avalanche Energy                                   |  | E <sub>AS</sub> | 21                  | mJ |  |
|  | T <sub>C</sub> = 25 °C                     |                 | 4.1                 |    |  |
| Movimum Dower Dissinction                          | T <sub>C</sub> = 70 °C                     | Pn              | 2.5                 | w  |  |
| Maximum Power Dissipation                          | T <sub>A</sub> = 25 °C                     | 'D              | 2.2 <sup>b, c</sup> | v  |  |
|  | T <sub>A</sub> = 70 °C                     | Ē               | 1.3 <sup>b, c</sup> | 1  |  |
| Operating Junction and Storage Temperature Ra      | T <sub>J</sub> , T <sub>stq</sub>          | - 55 to 150     | °C                  |    |  |

| THERMAL RESISTANCE RATINGS                  |              |                   |         |         |      |  |
|---|--------------|-------------------|---------|---------|------|--|
| Parameter                                   |              | Symbol            | Typical | Maximum | Unit |  |
| Maximum Junction-to-Ambient <sup>b, d</sup> | t ≤ 10 s     | R <sub>thJA</sub> | 39      | 55      | °C/W |  |
| Maximum Junction-to-Foot (Drain)            | Steady State | R <sub>thJF</sub> | 25      | 29      | 0,00 |  |

Notes:

a. Base on T<sub>C</sub> = 25 °C.

b. Surface Mounted on 1" x 1" FR4 board.

c. t = 10 s. d. Maximum under Steady State conditions is 85 °C/W.



| <b>SPECIFICATIONS</b> $T_J = 25 \degree C$                                | 1                                      |   | NA:  | <b>T</b> | Marr  | 11    |
|---|--|---|------|----------|-------|-------|
| Parameter   | Symbol                                 | Test Conditions   | Min. | Тур.     | Max.  | Unit  |
| Static  |  | <u> </u>  | 20   |          |       |       |
| Drain-Source Breakdown Voltage<br>V <sub>DS</sub> Temperature Coefficient | V <sub>DS</sub>                        | $V_{GS} = 0 V, I_{D} = 250 \mu A$   | 30   |          |       | V     |
| 50 1  | $\Delta V_{DS}/T_{J}$                  | I <sub>D</sub> = 250 μA   |      | 26       |       | mV/°C |
| V <sub>GS(th)</sub> Temperature Coefficient                               | $\Delta V_{GS(th)}/T_J$                |   |      | - 6      |       |       |
| Gate-Source Threshold Voltage   | V <sub>GS(th)</sub>                    | $V_{DS} = V_{GS}, I_D = 250 \ \mu A$  | 1.0  |          | 3.0   | V     |
| Gate-Source Leakage   | I <sub>GSS</sub>                       | $V_{DS} = 0 V$ , $V_{GS} = \pm 20 V$  |      |          | ± 100 | nA    |
| Zero Gate Voltage Drain Current   | I <sub>DSS</sub>                       | $V_{DS} = 30$ V, $V_{GS} = 0$ V   |      |          | 1     | μA    |
|   | 500                                    | $V_{DS}$ = 30 V, $V_{GS}$ = 0 V, $T_{J}$ = 55 °C  |      |          | 10    |       |
| On-State Drain Current <sup>a</sup>                                       | I <sub>D(on)</sub>                     | $V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$   | 20   |          |       | A     |
| Drain-Source On-State Resistance <sup>a</sup>                             | R <sub>DS(on)</sub>                    | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 A   |      | 0.008    |       | Ω     |
| Drain-Source On-State Resistance  | · DS(on)                               | $V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 9 \text{ A}$   |      | 0.011    |       | 52    |
| Forward Transconductance <sup>a</sup>                                     | 9 <sub>fs</sub>                        | $V_{DS} = 15 \text{ V}, I_{D} = 10 \text{ A}$   |      | 50       |       | S     |
| Dynamic <sup>b</sup>  |  |   |      |          |       |       |
| Input Capacitance   | C <sub>iss</sub>                       |   |      | 800      |       | pF    |
| Output Capacitance  | C <sub>oss</sub>                       | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz  |      | 165      |       |       |
| Reverse Transfer Capacitance  | C <sub>rss</sub>                       |   |      | 73       |       |       |
| Total Gate Charge   | Q <sub>g</sub>                         | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 A                           | 15   | 23       | -     |       |
|   |  |   |      | 6.8      | 10.2  | nC    |
| Gate-Source Charge  | Q <sub>gs</sub>                        | $V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_{D} = 10 \text{ A}$                             |      | 2.5      |       |       |
| Gate-Drain Charge   | Q <sub>gd</sub>                        |   |      | 2.3      |       |       |
| Gate Resistance   | R <sub>g</sub>                         | f = 1 MHz   | 0.36 | 1.8      | 3.6   | Ω     |
| Turn-On Delay Time  | t <sub>d(on)</sub>                     |   |      | 16       | 23    | -     |
| Rise Time   | t <sub>r</sub>                         | $V_{DD}$ = 15 V, R <sub>I</sub> = 1.4 $\Omega$  |      | 12       | 16    |       |
| Turn-Off Delay Time   | t <sub>d(off)</sub>                    | $I_D \cong 9 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$                                |      | 16       | 22    |       |
| Fall Time   | t <sub>f</sub>                         | -   |      | 10       | 18    |       |
| Turn-On Delay Time  | t <sub>d(on)</sub>                     |   |      | 8        | 16    | ns    |
| Rise Time   | t <sub>r</sub>                         | $V_{DD}$ = 15 V, $R_{L}$ = 1.4 $\Omega$   |      | 10       | 20    | -     |
| Turn-Off Delay Time   | t <sub>d(off)</sub>                    | $I_D \cong 9 \text{ A}, \text{ V}_{\text{GEN}} = 10 \text{ V}, \text{ R}_{\text{g}} = 1 \Omega$ |      | 16       | 22    |       |
| Fall Time   | t <sub>f</sub>                         |   |      | 8        | 15    |       |
| Drain-Source Body Diode Characteris                                       |  |   |      | -        |       |       |
| Continuous Source-Drain Diode Current                                     | ۱ <sub>S</sub>                         | T <sub>C</sub> = 25 °C  |      | 1        | 10    |       |
| Pulse Diode Forward Current <sup>a</sup>                                  | I <sub>SM</sub>                        | -   |      |          | 50    | A     |
| Body Diode Voltage  | V <sub>SD</sub>                        | I <sub>S</sub> = 9 A  |      | 0.8      | 1.2   | V     |
| Body Diode Reverse Recovery Time  | t <sub>rr</sub>                        | <b>U</b> -  |      | 15       | 30    | ns    |
| Body Diode Reverse Recovery Charge  | Q <sub>rr</sub>                        |   |      | 6        | 12    | nC    |
| Reverse Recovery Fall Time  | t <sub>a</sub>                         | $I_F = 9 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^\circ\text{C}$         |      | 8        | 12    |       |
|   |  |   |      | 7        |       | ns    |
| NEVERSE NECOVERY KISE TIME  | erse Recovery Rise Time t <sub>b</sub> |   |      | 1        |       |       |

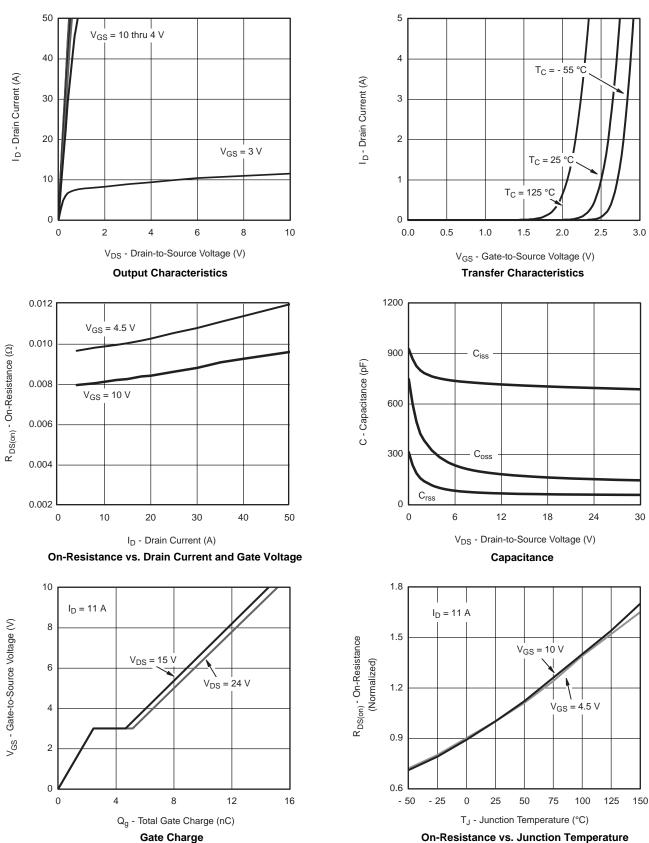
Notes:

a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %. b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

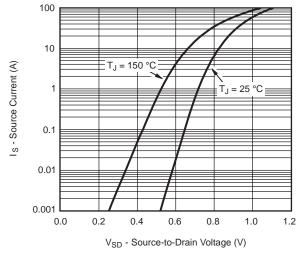




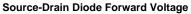


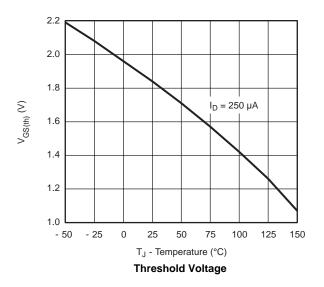
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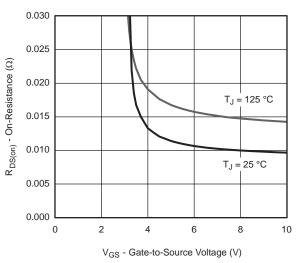




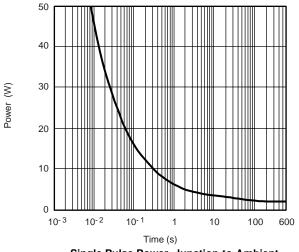
#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted







On-Resistance vs. Gate-to-Source Voltage

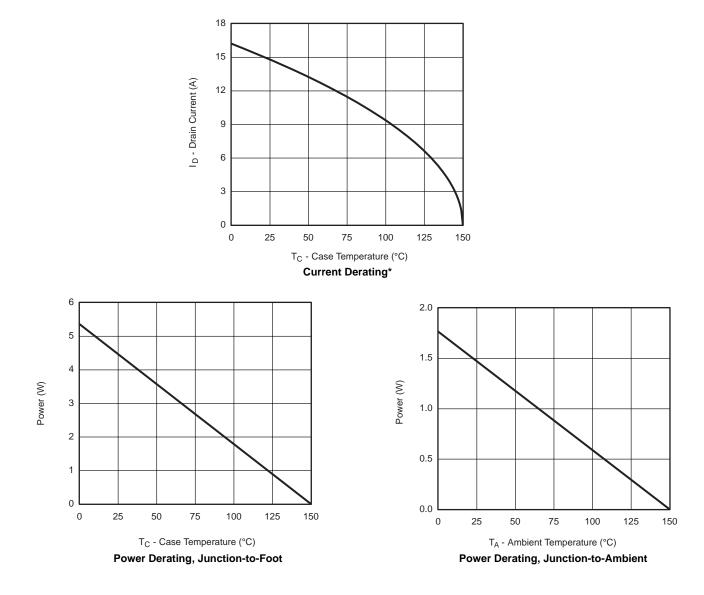








#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

Normalized Effective Transient Thermal Impedance

Normalized Effective Transient Thermal Impedance

2

1

0.1

0.01 10-4

> 2 1

0.1

0.01

10-4

0.2

0.1

0.05

0.02

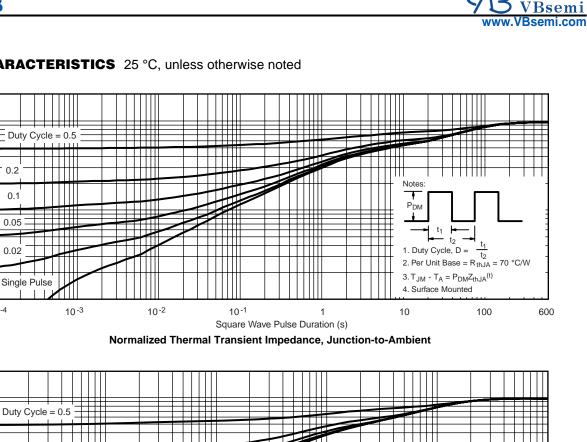
0.2

0.1

0.05

0.02

- 1 



#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Single Pulse

1.1.1

10<sup>-3</sup>

Square Wave Pulse Duration (s) Normalized Thermal Transient Impedance, Junction-to-Foot

+

10-1

1

10-2

10



### SOIC (NARROW): 8-LEAD

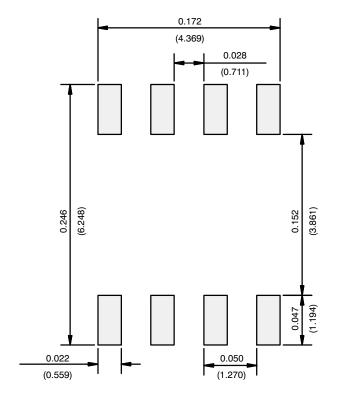




|   | MILLIMETERS |      | INC       | HES   |  |
|---|-------------|------|-----------|-------|--|
| DIM   | Min         | Max  | Min       | Max   |  |
| A   | 1.35        | 1.75 | 0.053     | 0.069 |  |
| A <sub>1</sub>                              | 0.10        | 0.20 | 0.004     | 0.008 |  |
| В   | 0.35        | 0.51 | 0.014     | 0.020 |  |
| С   | 0.19        | 0.25 | 0.0075    | 0.010 |  |
| D   | 4.80        | 5.00 | 0.189     | 0.196 |  |
| E   | 3.80        | 4.00 | 0.150     | 0.157 |  |
| е   | 1.27 BSC    |      | 0.050 BSC |       |  |
| Н   | 5.80        | 6.20 | 0.228     | 0.244 |  |
| h   | 0.25        | 0.50 | 0.010     | 0.020 |  |
| L   | 0.50        | 0.93 | 0.020     | 0.037 |  |
| q   | 0°          | 8°   | 0°        | 8°    |  |
| S   | 0.44        | 0.64 | 0.018     | 0.026 |  |
| ECN: C-06527-Rev. I, 11-Sep-06<br>DWG: 5498 |             |      |           |       |  |



#### **RECOMMENDED MINIMUM PADS FOR SO-8**



Recommended Minimum Pads Dimensions in Inches/(mm)



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