

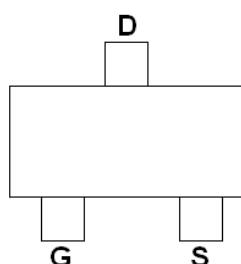
## GENERAL DESCRIPTION

The ME2320D2 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching and low in-line power loss are needed in a very small outline surface mount package.

## PIN CONFIGURATION

(SOT-23)

Top View



Ordering Information:ME2320D2(Pb-Free)

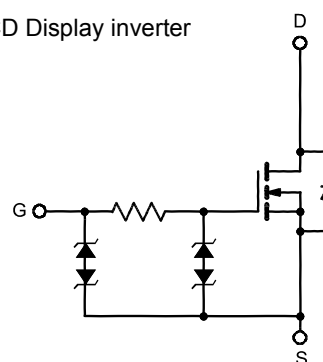
ME2320D2-G(Green product-Halogen free)

## FEATURES

- $R_{DS(ON)}=21m\Omega @V_{GS}=4.5V$
- $R_{DS(ON)}=25m\Omega @V_{GS}=2.5V$
- $R_{DS(ON)}=40m\Omega @V_{GS}=1.8V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- ESD Protection HBM  $\geq 2KV$

## APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter



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

| Parameter                               |                  | Symbol          | Maximum Ratings | Unit         |
|-----------------------------------------|------------------|-----------------|-----------------|--------------|
| Drain-Source Voltage                    |                  | $V_{DS}$        | 20              | V            |
| Gate-Source Voltage                     |                  | $V_{GS}$        | $\pm 8$         | V            |
| Continuous Drain Current                | $T_A=25^\circ C$ | $I_D$           | 6.4             | A            |
|                                         | $T_A=70^\circ C$ |                 | 5.1             |              |
| Pulsed Drain Current                    |                  | $I_{DM}$        | 26              | A            |
| Maximum Power Dissipation               | $T_A=25^\circ C$ | $P_D$           | 1.4             | W            |
|                                         | $T_A=70^\circ C$ |                 | 0.9             |              |
| Operating Junction Temperature          |                  | $T_J$           | -55 to 150      | $^\circ C$   |
| Thermal Resistance-Junction to Ambient* |                  | $R_{\theta JA}$ | 90              | $^\circ C/W$ |

\* The device mounted on 1in<sup>2</sup> FR4 board with 2 oz copper



## N-Channel 20V (D-S) MOSFET , ESD Protection

Electrical Characteristics (T<sub>A</sub>=25°C Unless Otherwise Specified)

| Symbol               | Parameter                               | Limit                                                                                    | Min | Typ  | Max | Unit |
|----------------------|-----------------------------------------|------------------------------------------------------------------------------------------|-----|------|-----|------|
| <b>STATIC</b>        |                                         |                                                                                          |     |      |     |      |
| V <sub>(BR)DSS</sub> | Drain-Source Breakdown Voltage          | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μA                                              | 20  |      |     | V    |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage                  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA                                | 0.4 |      | 1   | V    |
| I <sub>GSS</sub>     | Gate Leakage Current                    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±4.5V                                              |     |      | ±1  | μA   |
|                      |                                         | V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V                                                |     |      | ±10 |      |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current         | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                                                |     |      | 1   | μA   |
| R <sub>DS(ON)</sub>  | Drain-Source On-Resistance <sup>a</sup> | V <sub>GS</sub> =4.5V, I <sub>D</sub> = 6.5A                                             |     | 17   | 21  | mΩ   |
|                      |                                         | V <sub>GS</sub> =2.5V, I <sub>D</sub> = 5.5A                                             |     | 20   | 25  |      |
|                      |                                         | V <sub>GS</sub> =1.8V, I <sub>D</sub> = 5A                                               |     | 30   | 40  |      |
| V <sub>SD</sub>      | Diode Forward Voltage                   | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                                  |     | 0.6  | 1   | V    |
| <b>DYNAMIC</b>       |                                         |                                                                                          |     |      |     |      |
| Q <sub>g</sub>       | Total Gate Charge                       | V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5, I <sub>D</sub> =6.5A                         |     | 10   |     | nC   |
| Q <sub>gs</sub>      | Gate-Source Charge                      |                                                                                          |     | 0.9  |     |      |
| Q <sub>gd</sub>      | Gate-Drain Charge                       |                                                                                          |     | 3    |     |      |
| C <sub>iss</sub>     | Input Capacitance                       | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz                                        |     | 378  |     | pF   |
| C <sub>oss</sub>     | Output Capacitance                      |                                                                                          |     | 73   |     |      |
| C <sub>rss</sub>     | Reverse Transfer Capacitance            |                                                                                          |     | 21   |     |      |
| t <sub>d(on)</sub>   | Turn-On Delay Time                      | V <sub>DS</sub> =10V, R <sub>L</sub> = 1.5Ω<br>V <sub>GS</sub> =5V, R <sub>GEN</sub> =3Ω |     | 250  |     | ns   |
| t <sub>r</sub>       | Turn-On Rise Time                       |                                                                                          |     | 420  |     |      |
| t <sub>d(off)</sub>  | Turn-Off Delay Time                     |                                                                                          |     | 3950 |     |      |
| t <sub>f</sub>       | Turn-Off Fall Time                      |                                                                                          |     | 3700 |     |      |

Notes: a. Pulse test; pulse width ≤ 300us, duty cycle ≤ 2%

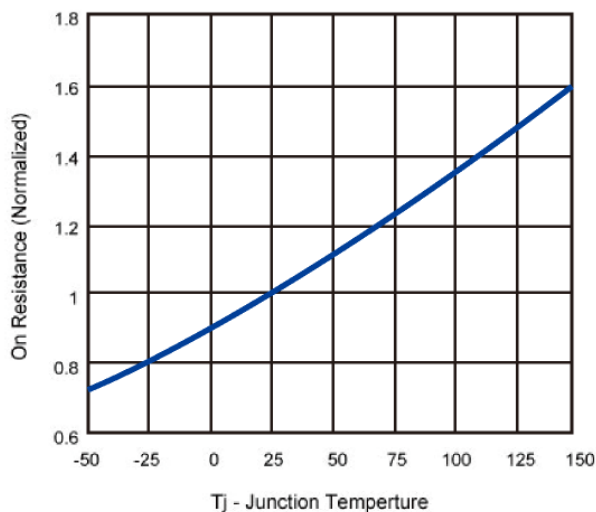
b. Matsuki Electric/ Force mos reserves the right to improve product design, functions and reliability without notice.



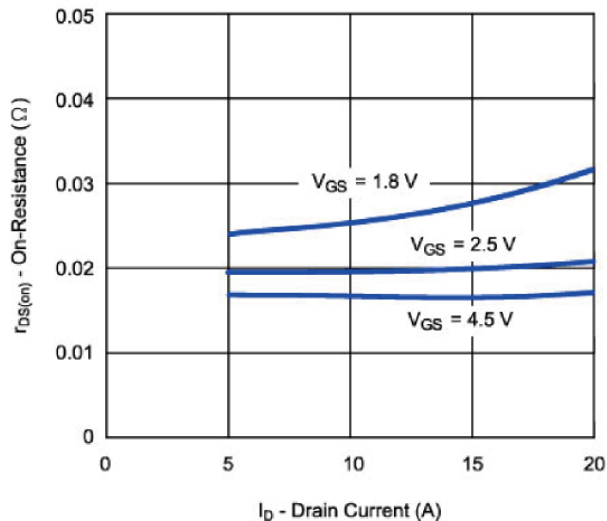
N-Channel 20V (D-S) MOSFET , ESD Protection

Typical Characteristics (T<sub>J</sub> =25°C Noted)

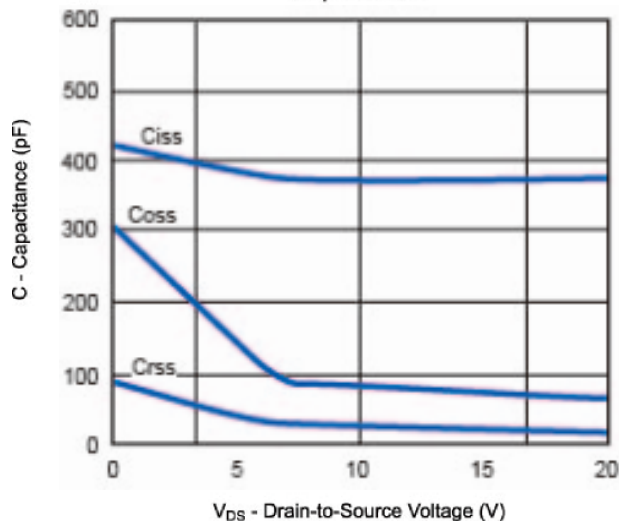
On Resistance vs. Junction Temperature



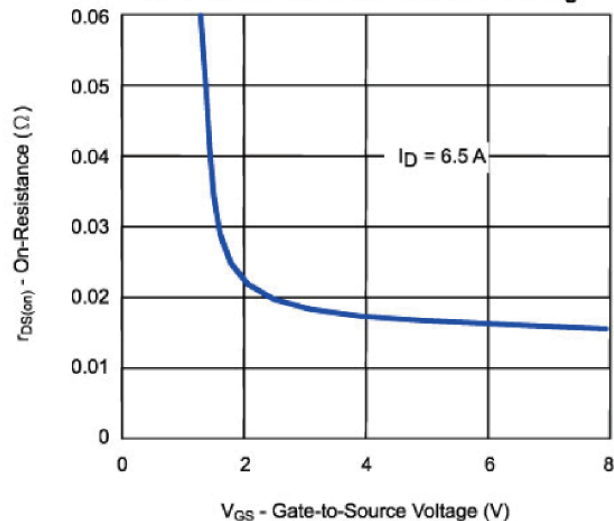
On-Resistance vs. Drain Current



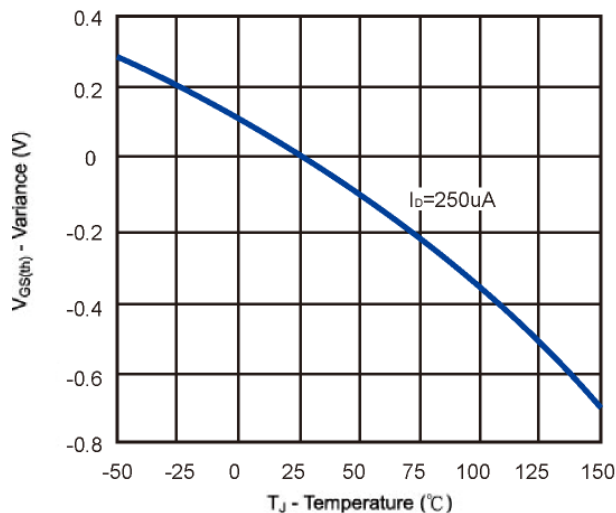
Capacitance



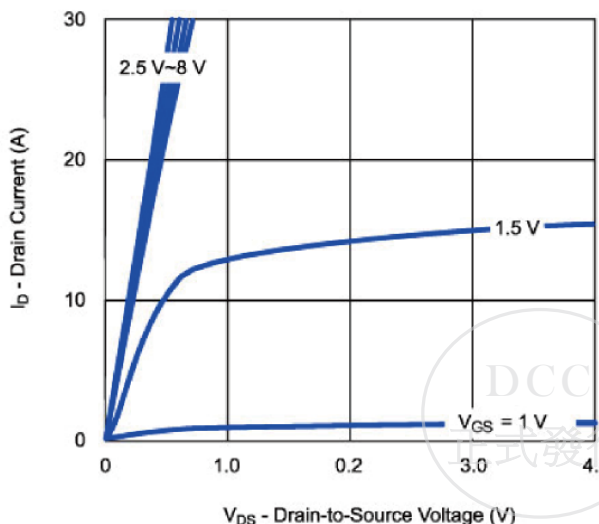
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

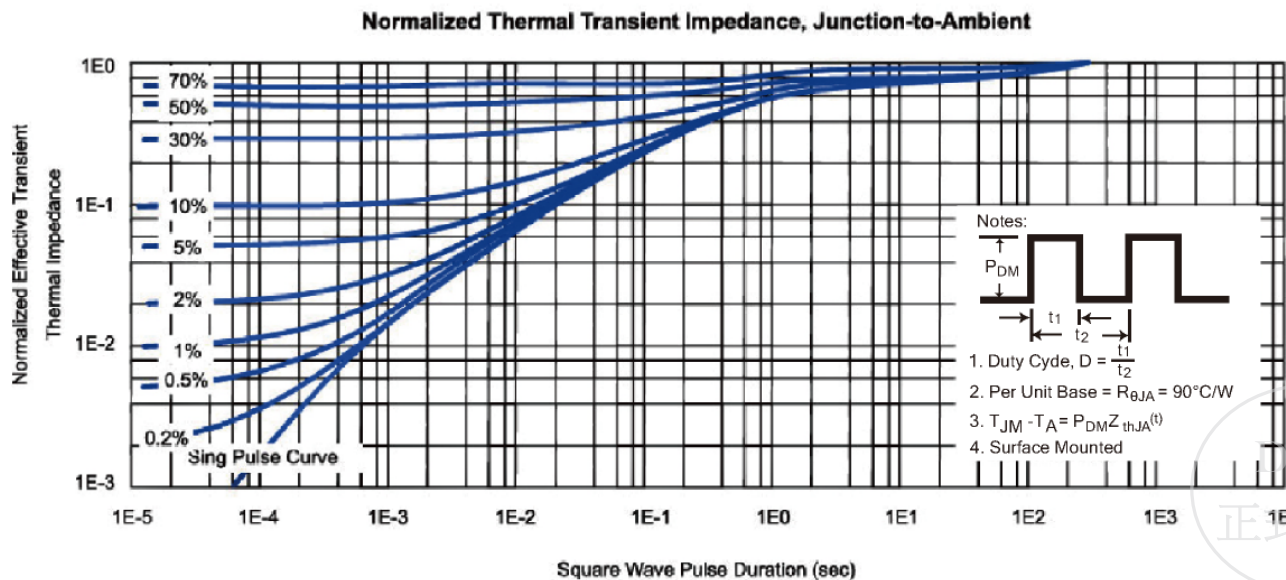
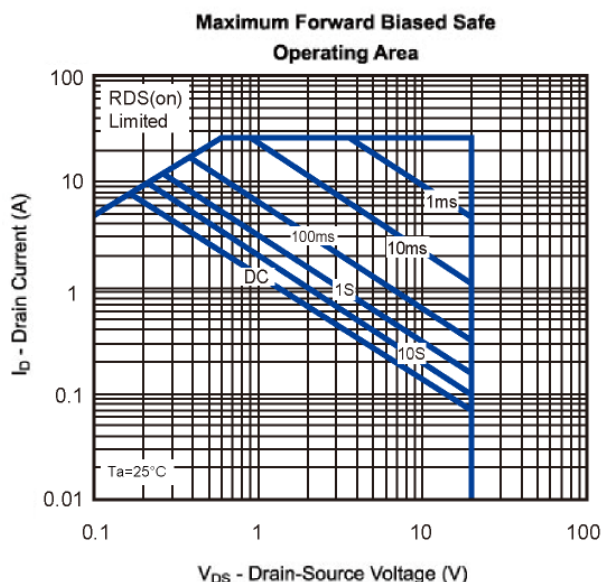
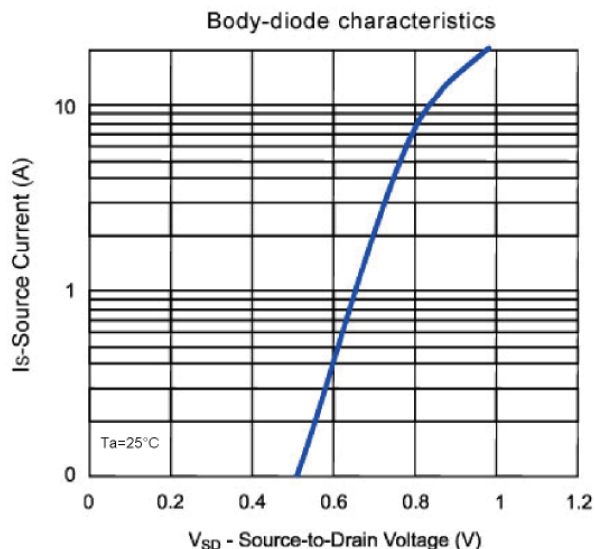
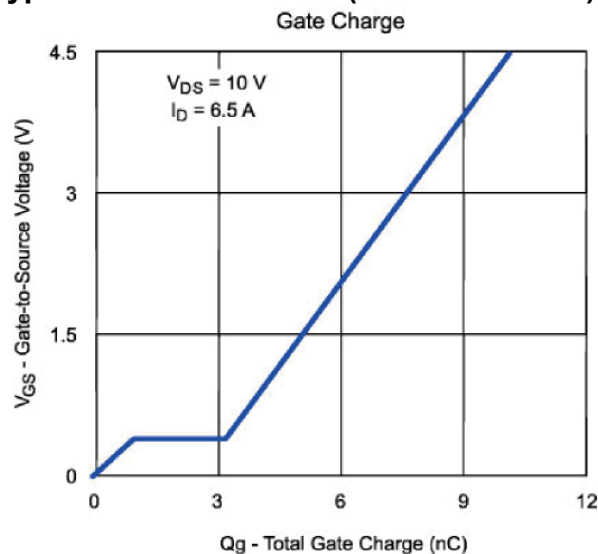


On-Region Characteristics

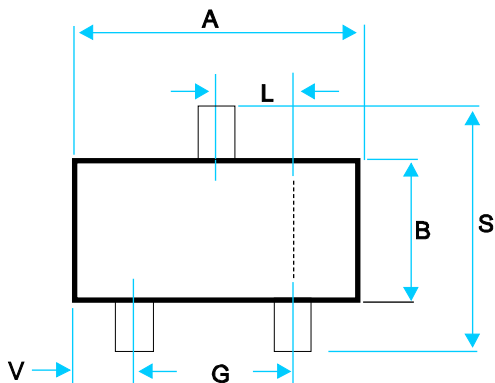


**N-Channel 20V (D-S) MOSFET , ESD Protection**

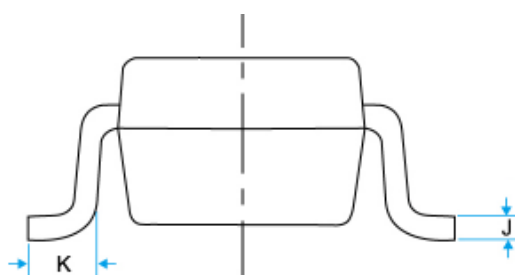
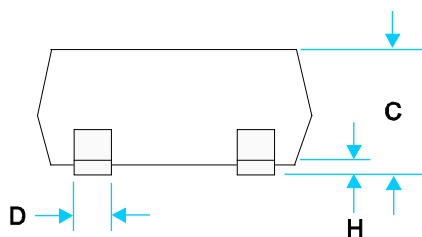
**Typical Characteristics (T<sub>J</sub> =25°C Noted)**



## SOT-23 Package Outline



| DIM | MILLIMETERS (mm) |      |
|-----|------------------|------|
|     | MIN              | MAX  |
| A   | 2.800            | 3.00 |
| B   | 1.200            | 1.70 |
| C   | 0.900            | 1.30 |
| D   | 0.350            | 0.50 |
| G   | 1.780            | 2.04 |
| H   | 0.010            | 0.15 |
| J   | 0.085            | 0.20 |
| K   | 0.300            | 0.65 |
| L   | 0.890            | 1.02 |
| S   | 2.100            | 3.00 |
| V   | 0.450            | 0.60 |



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