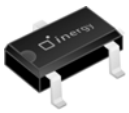
# iM2319



# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- ☑ Surface-mounted package
- ☑ Advanced trench cell design
- ☑ Advanced trench cell design
- ☑ ESD protected

### 1.2 Applications

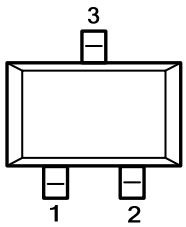
- ☑ Portable appliances
- ☑ High speed switch
- ☑ Battery management
- ☑ Low power DC to DC Converter

### 1.3 Quick reference

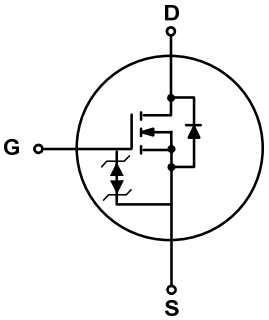
- ☑ BV ≧ 20 V
- ☑ $P_{tot}$ ≦ 1.4 W
- ☑ $I_D$ ≦ 6.8 A
- ☑ $R_{DS(ON)}$ ≦ 20 mΩ @ $V_{GS}$ = 4.5 V
- ☑ $R_{DS(ON)}$ ≦ 27 mΩ @ $V_{GS}$ = 2.5 V

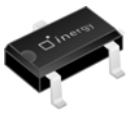
## 2. Pin Description

| Pin | Description |
|---|---|
| 1 | Gate(G) |
| 2 | Source(S) |
| 3 | Drain(D) |



Top View
SOT23-3L





## 3. Limiting Values

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | $T_A$ = 25 ℃ | - | 20 | V |
| $V_{GS}$ | Gate-Source Voltage | $T_A$ = 25 ℃ | - | ± 12 | V |
| $I_D$* | Drain Current | $T_A$ = 25 ℃, $V_{GS}$ = 10 V | - | 6.8 | A |
| | | $T_A$ = 100 ℃, $V_{GS}$ = 10 V | - | 4.3 | A |
| $I_{DM}$*,** | Pulsed Drain Current | $T_A$ = 25 ℃, $V_{GS}$ = 10 V | - | 27 | A |
| $P_{tot}$ | Total Power Dissipation | $T_A$ = 25 ℃ | - | 1.4 | W |
| $T_{stg}$ | Storage Temperature | | - 55 | 150 | ℃ |
| $T_J$ | Junction Temperature | | - 55 | 150 | ℃ |
| $I_S$ | Diode Forward Current | $T_A$ = 25 ℃ | - | 6.8 | A |
| $R_{\theta JA}$* | Thermal Resistance- Junction to Ambient | | - | 90 | ℃ / W |

Notes：

* Surface Mounted on 1 $in^2$ pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

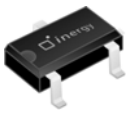
## 4. Marking Information

| Product Name | Marking |
|---|---|
| iM2319 | 2319X X: Date Code |

## 5. Ordering Code

| | |
|---|---|
| iM2319 □<br>└ Assembly Material | Assembly Material<br>G: Halogen and Lead Free Device |

Note: inergy defines " Green " as lead-free ( RoHS compliant ) and halogen free ( Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C )



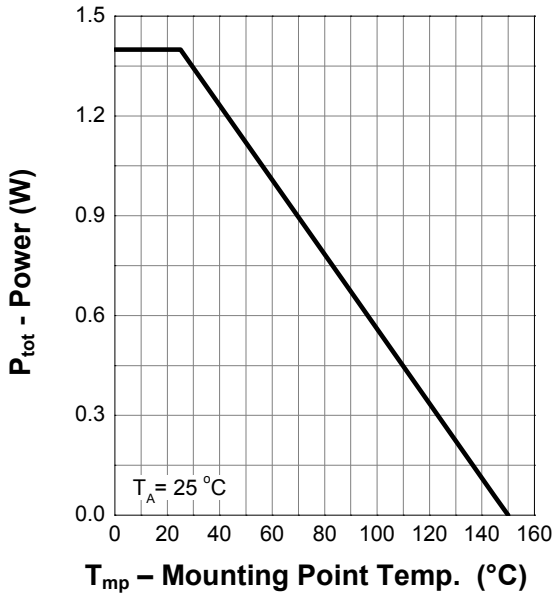
## 6. Electrical Characteristics ( $T_A$ = 25 °C Unless Otherwise Noted )

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Static Characteristics | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V, $I_{DS}$ = 250 µA | 20 | - | - | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_{DS}$ = 250 µA | 0.4 | 0.7 | 1.1 | V |
| $I_{DSS}$ | Drain Leakage Current | $V_{DS}$ = 16 V, $V_{GS}$ = 0 V | - | - | 1 | µA |
| | | $T_J$ = 85 °C | - | - | 30 | µA |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$ = ± 8 V, $V_{DS}$ = 0 V | - | - | ± 10 | µA |
| $R_{DS(ON)}$[a] | On-State Resistance | $V_{GS}$ = 4.5 V, $I_{DS}$ = 6.5 A | - | 16 | 20 | mΩ |
| | | $V_{GS}$ = 2.5 V, $I_{DS}$ = 4 A | - | 20 | 27 | |
| Diode Characteristics | | | | | | |
| $V_{SD}$[a] | Diode Forward Voltage | $I_{SD}$ = 6.5 A, $V_{GS}$ = 0 V | - | 0.7 | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$ = 6.5 A, $dI_{SD}/dt$ = 100 A/µs | - | 10.3 | - | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 0.16 | - | nC |
| Dynamic Characteristics[b] | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0 V, $V_{DS}$ = 10 V<br>Frequency = 1 MHz | - | 1074 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 120 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 108 | - | |
| $t_d$(on) | Turn-on Delay Time | $V_{DS}$ = 10 V, $V_{GEN}$ = 4.5 V,<br>$R_G$ = 4.5 Ω, $R_L$ = 1.53 Ω,<br>$I_{DS}$ = 6.5 A | - | 6.1 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 35 | - | |
| $t_d$(off) | Turn-off Delay Time | | - | 30 | - | |
| $t_f$ | Turn-off Fall Time | | - | 28 | - | |
| Gate Charge Characteristics[b] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 10 V, $V_{DS}$ = 10 V,<br>$I_{DS}$ = 6.5 A | - | 30 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 4 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 1.7 | - | |

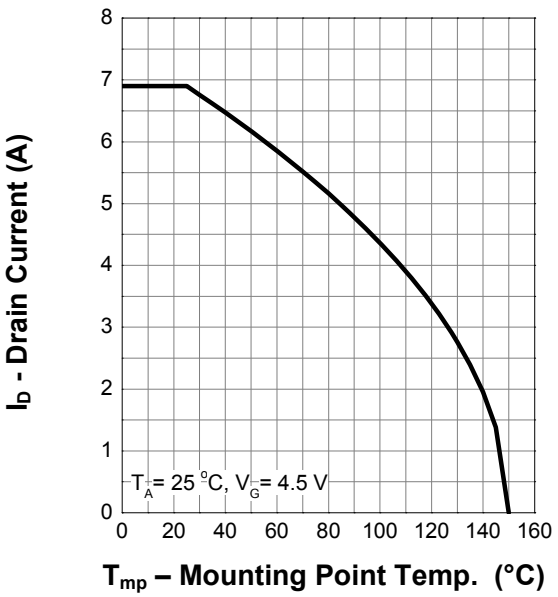
Notes : a : Pulse test ; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b : Guaranteed by design, not subject to production testing

## 7. Typical Characteristics

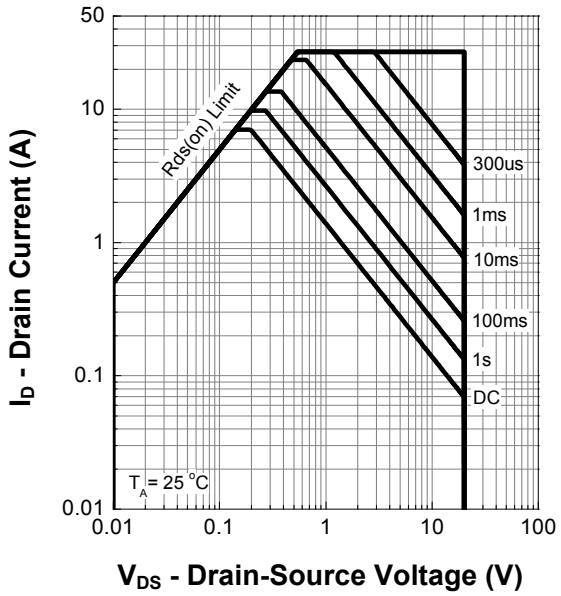
**Power Capability**



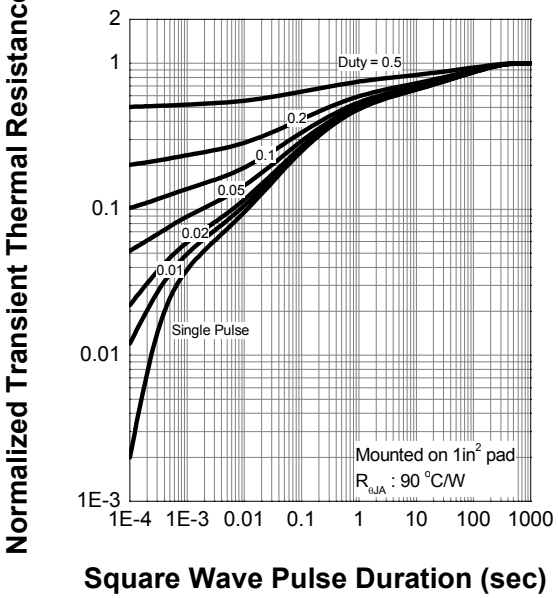

**Current Capability**




**Operating**

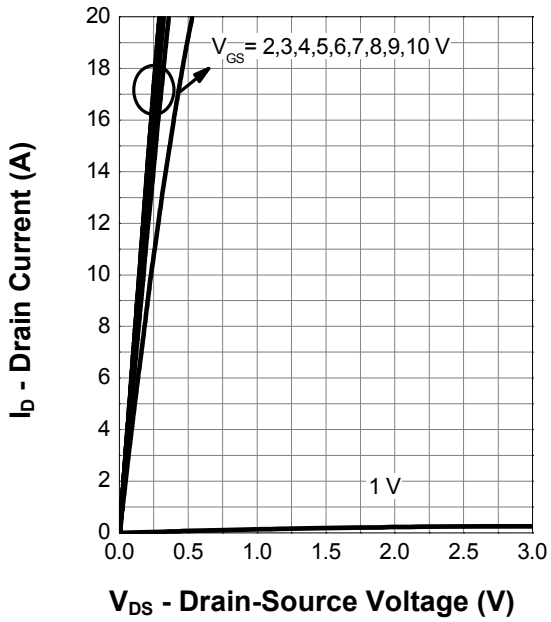



**Transient Thermal Impedance**

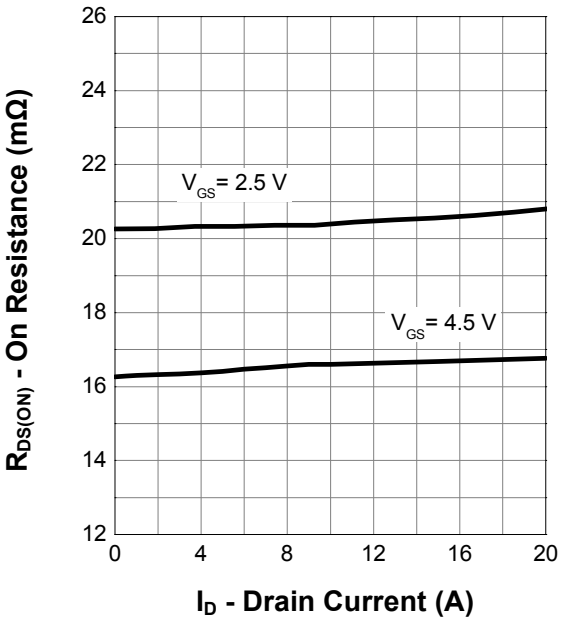


## 7. Typical Characteristics (cont.)

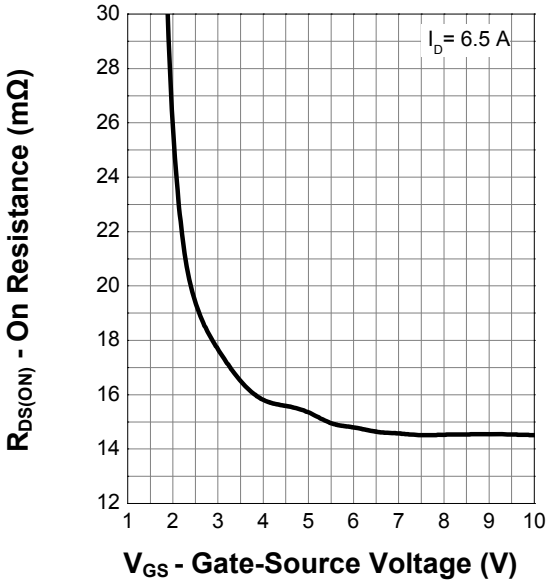
**Output Characteristics**



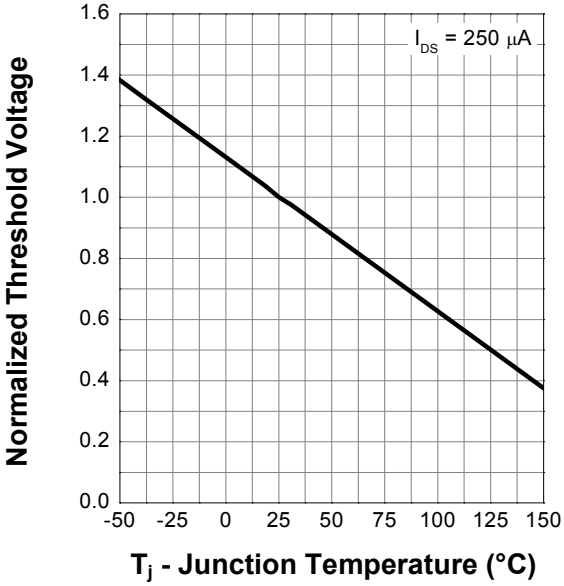

**On Resistance**




**Transfer Characteristics**

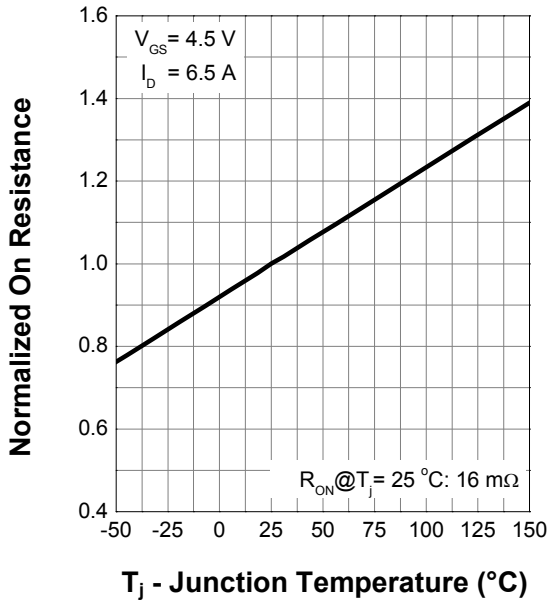



**Normalized Threshold Voltage**

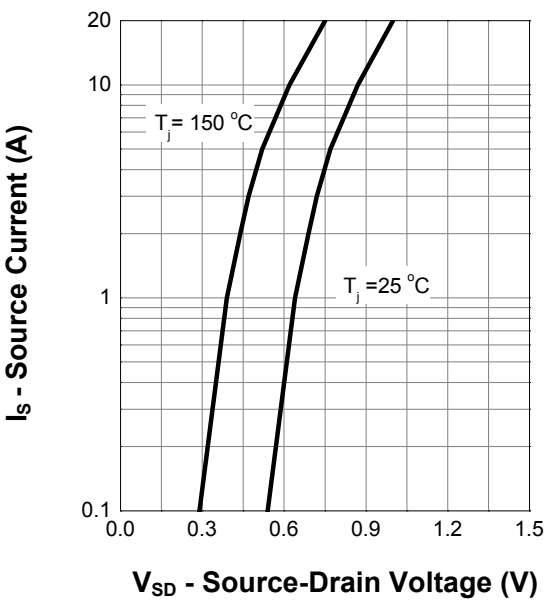


## 7. Typical Characteristics ( cont. )

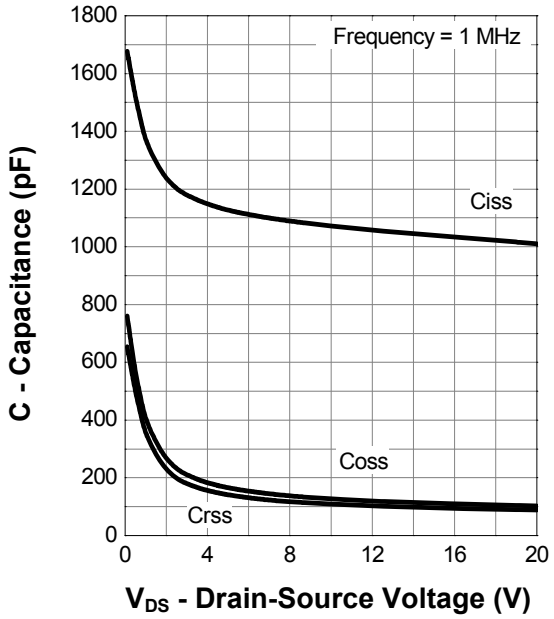
**Normalized On Resistance**



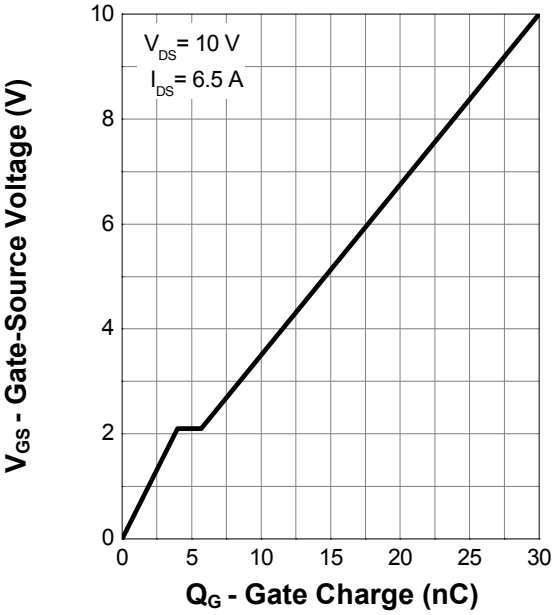

**Diode Forward Current**




**Capacitance**

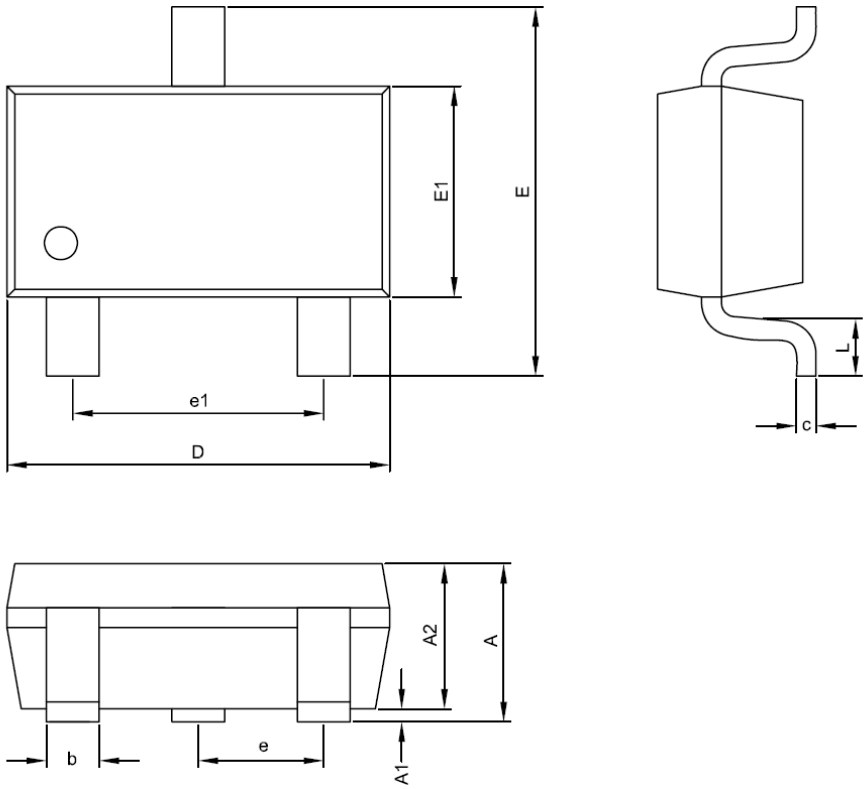



**Gate Charge**



## 8. Package Dimensions

### SOT23-3L




| Symbol | Dimensions In Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 1.00 | 1.45 |
| A1 | 0.00 | 0.15 |
| A2 | 1.00 | 1.30 |
| D | 2.70 | 3.10 |
| E | 2.60 | 3.00 |
| E1 | 1.50 | 1.70 |
| c | 0.08 | 0.25 |
| b | 0.30 | 0.50 |
| e | 0.95 BSC | |
| e1 | 1.90 BSC | |
| L | 0.30 | 0.60 |