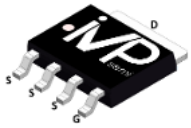
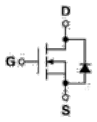
**LFPAK56**



**Symbol**



| Parameter | Value | Unit |
|---|---|---|
| $V_{DS}$ | 30 | V |
| $R_{DS(ON)-Max}$ | 0.56 | mΩ |
| $I_D$ | 400 | A |

## Key Features

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% Avalanche / Rg Tested

## Applications

- Power Load Switch
- Oring FETs

## Ordering Information

| Ordering part Number | Marking code | Package | Form |
|---|---|---|---|
| VPLMDF7111 | 7111 | LFPAK56 | Tape & Reel |

## Absolute Maximum Ratings (Tj = 25°C, unless otherwise specified)

| Parameter | | Symbol | N-Channel | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Maximum Junction Temperature | | $T_J$ | 175 | °C |
| Storage Temperature Range | | $T_{STG}$ | -55 to 175 | °C |
| Diode Continuous Forward Current | $T_C$=25°C | $I_S$ | 70 | A |
| Pulse Drain Current Tested | $T_C$=25°C | $I_{DM}$ | 1058(1) | A |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | 400 | A |
| | $T_C$=100°C | | 300 | |
| Maximum Power Dissipation | $T_C$=25°C | $P_D$ | 167 | W |
| | $T_C$=100°C | | 83 | |
| Continuous Drain Current | $T_A$=25°C | $I_D$(2) | 60 | A |
| | $T_A$=70°C | | 50 | |
| Maximum Power Dissipation | $T_A$=25°C | $P_D$(2) | 3.3 | W |
| | $T_A$=70°C | | 2.3 | |
| Avalanche Current, Single pulse | L=0.1mH | $I_{AS}$(3) | 63 | A |
| | L=0.5mH | | 40 | |
| Avalanche Energy, Single pulse | L=0.1mH | $E_{AS}$(3) | 198 | mJ |
| | L=0.5mH | | 397 | |

## Thermal Characteristics

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Thermal Resistance-Junction to Case | Steady State | $R_{\theta JC}$ | 0.9 | °C/W |
| Thermal Resistance-Junction to Ambient | Steady State | $R_{\theta JA}$ (2) | 45 | °C/W |

- (1) Max. current is limited by junction temperature.
- (2) Surface Mounted on 1in² FR-4 board with 1oz.
- (3) UIS tested and pulse width are limited by maximum junction temperature 175°C

## Electrical Characteristics (Tj = 25°C, unless otherwise specified)

### Static Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 30 | - | - | V | $V_{GS}$=0V, $I_{DS}$=250uA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | - | - | 1 | uA | $V_{DS}$=24V, $V_{GS}$=0V |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1 | 1.5 | 2 | V | $V_{DS}$=$V_{GS}$, $I_{DS}$=250uA |
| Gate Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$=±20V, $V_{DS}$=0V |
| Drain-Source On-state Resistance | $R_{DS(ON)}$ (4) | - | 0.47 | 0.57 | mΩ | $V_{GS}$=10V, $I_{DS}$=20A |
| | | - | 0.8 | 1.05 | | $V_{GS}$=4.5V, $I_{DS}$=15A |
| Forward Transconductance | $g_{fs}$ | - | 2.6 | - | S | $V_{DS}$=5V, $I_{DS}$=10A |

### Dynamic Characteristics(5)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Gate Resistance | $R_G$ | - | 0.6 | - | Ω | $V_{GS}$=0V,$V_{DS}$=0V, Freq.=1MHz |
| Input Capacitance | $C_{iss}$ | - | 7406 | - | pF | $V_{GS}$=0V, $V_{DS}$=15V, Freq.=1MHz |
| Output Capacitance | $C_{oss}$ | - | 5106 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 106 | - | | |
| Turn-on Delay Time | $t_{d(ON)}$ | - | 19 | - | nS | $V_{GS}$=10V,$V_{DS}$=15V, $I_D$=1A, $R_{GEN}$=1Ω |
| Turn-on Rise Time | $t_r$ | - | 11 | - | | |
| Turn-off Delay Time | $t_{d(OFF)}$ | - | 55 | - | | |
| Turn-off Fall Time | $t_f$ | - | 102 | - | | |

### Gate Charge Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Total Gate Charge | $Q_g$ | - | 48 | - | nC | $V_{GS}$=4.5V,$V_{DS}$=15V, $I_D$=20A |
| | | - | 100 | - | | $V_{GS}$=10V,$V_{DS}$=15V, $I_D$=20A |
| Gate-Source Charge | $Q_{gs}$ | - | 24 | - | | |
| Gate-Drain Charge | $Q_{gd}$ | - | 11 | - | | |

### Source Drain Diode Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Diode Forward Voltage | $V_{SD}$ (4) | - | 0.7 | 1.1 | V | $I_{SD}$=10A, $V_{GS}$=0V |
| Reverse Recovery Time | $t_{rr}$ | - | 72 | - | nS | $I_F$=10A, $V_R$=15V & $dI_F/dt$=100A/μs |
| Reverse Recovery Charge | $Q_{rr}$ | - | 105 | - | nC | |

- (4) Pulse test (pulse width ≤ 300us, duty cycle ≤ 2%).
- (5) Guaranteed by design, not subject to production test

## Electrical Characteristics Diagrams

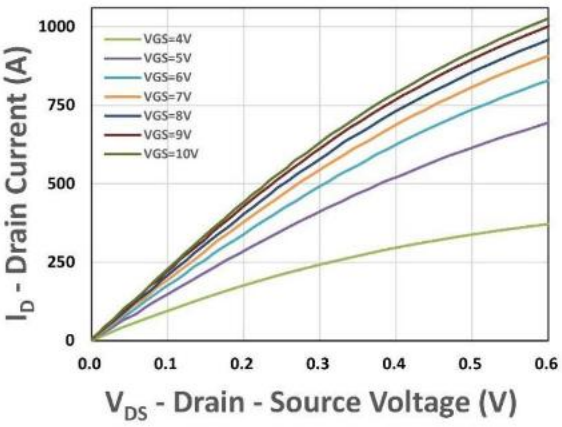



Figure 1. Output Characteristics

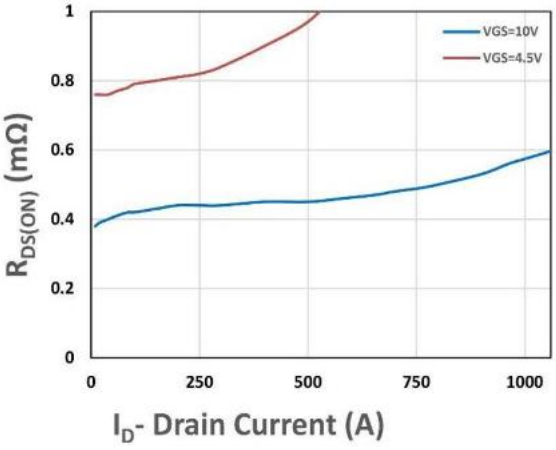



Figure 2. On-Resistance vs. ID

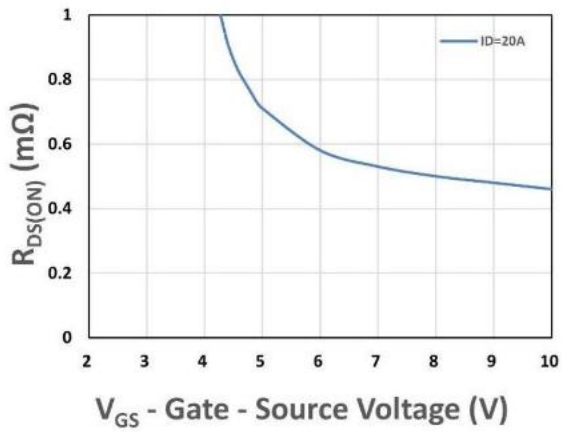



Figure 3. On-Resistance vs. VGS

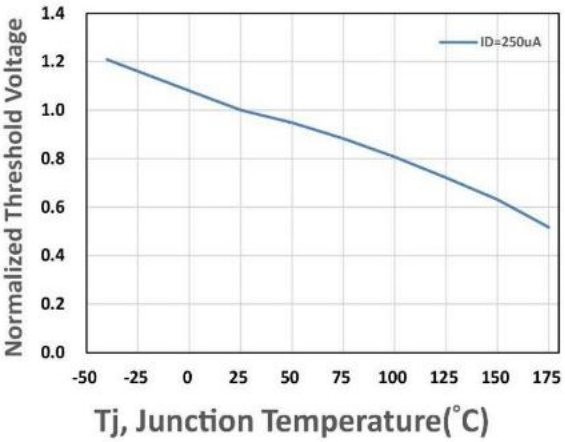



Figure 4. Gate Threshold Voltage

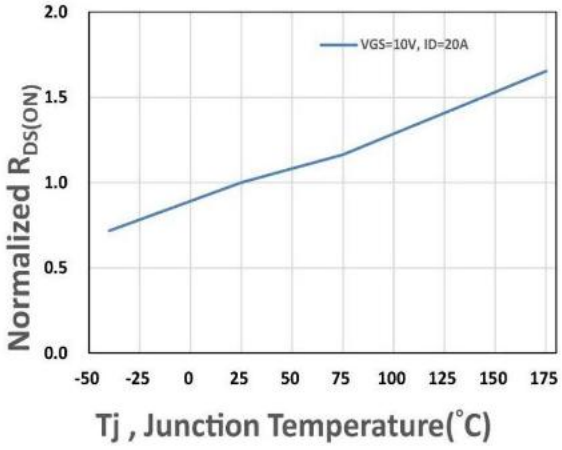



Figure 5. Drain-Source On Resistance

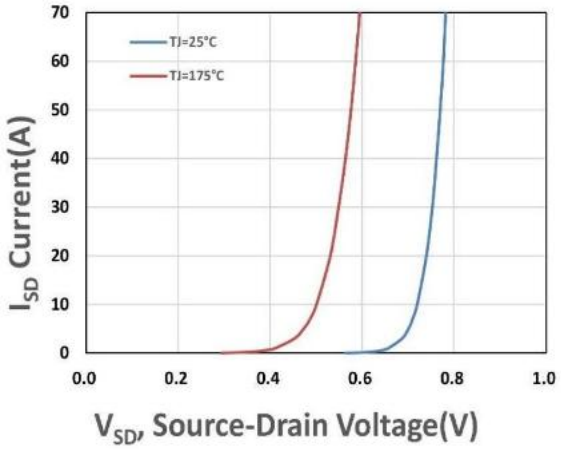



Figure 6. Source-Drain Diode Forward

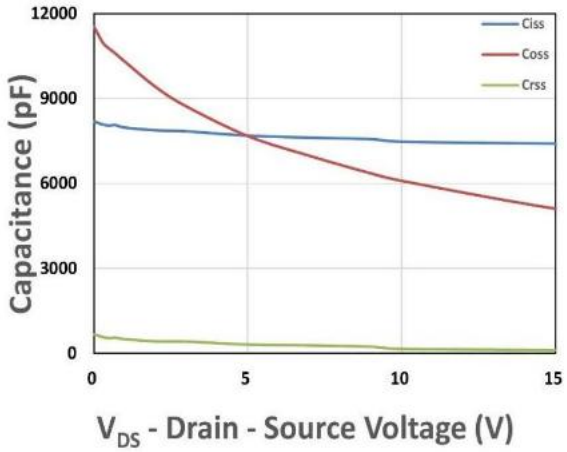



Figure 7. Capacitance

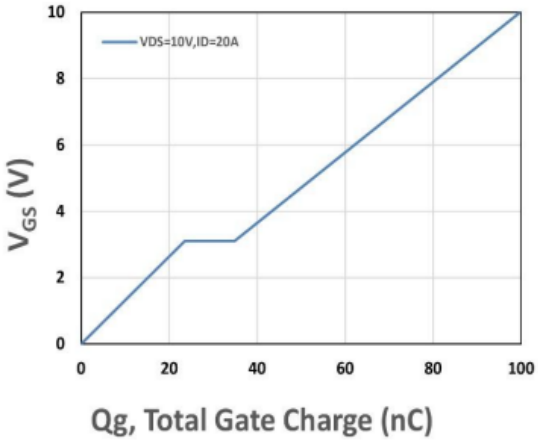



Figure 8. Gate Charge Characteristics

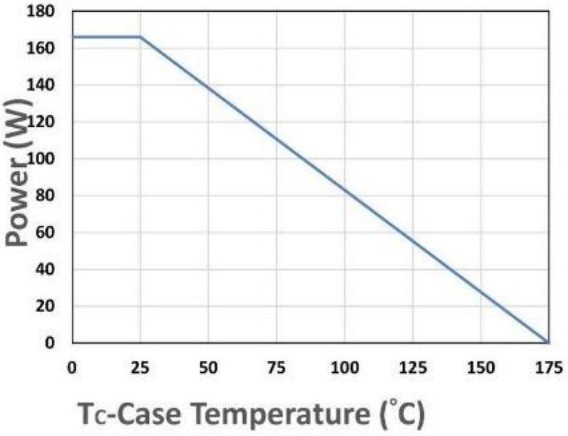



Figure 9. Power Dissipation

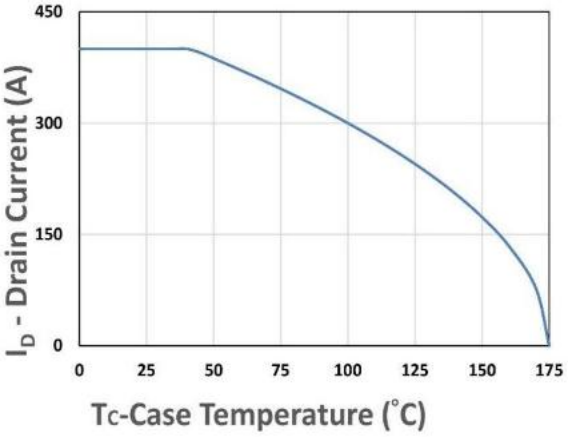



Figure 10. Drain Current

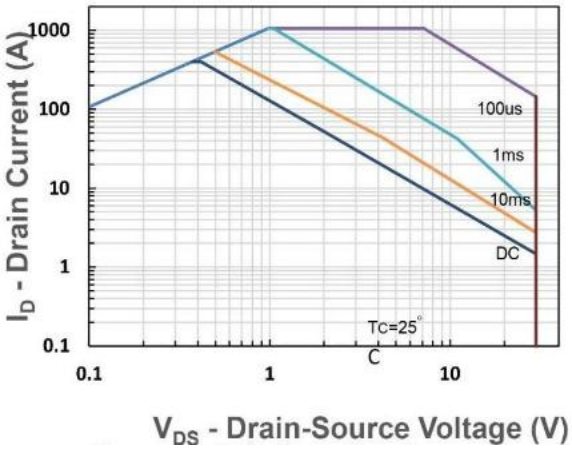



Figure 11. Safe Operating Area

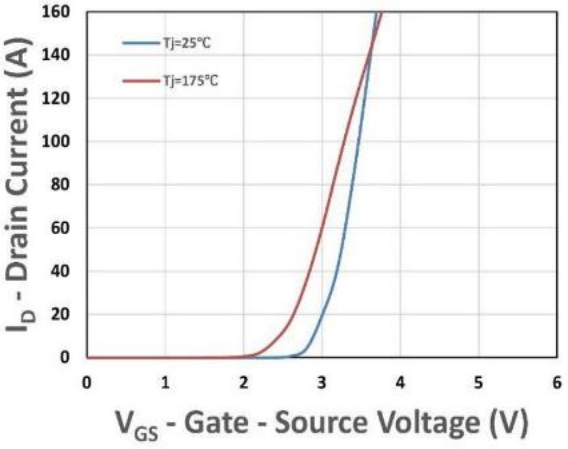



Figure 12. Transfer Characteristics

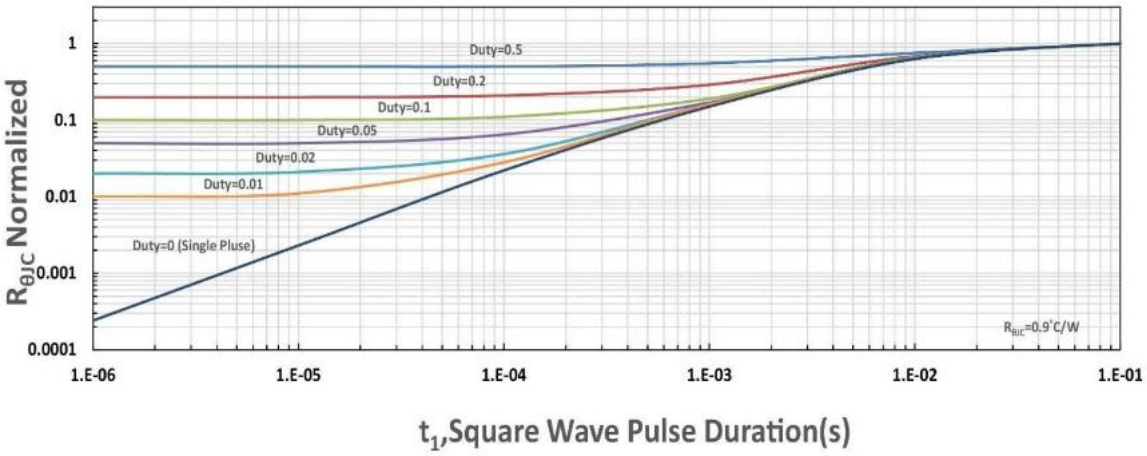
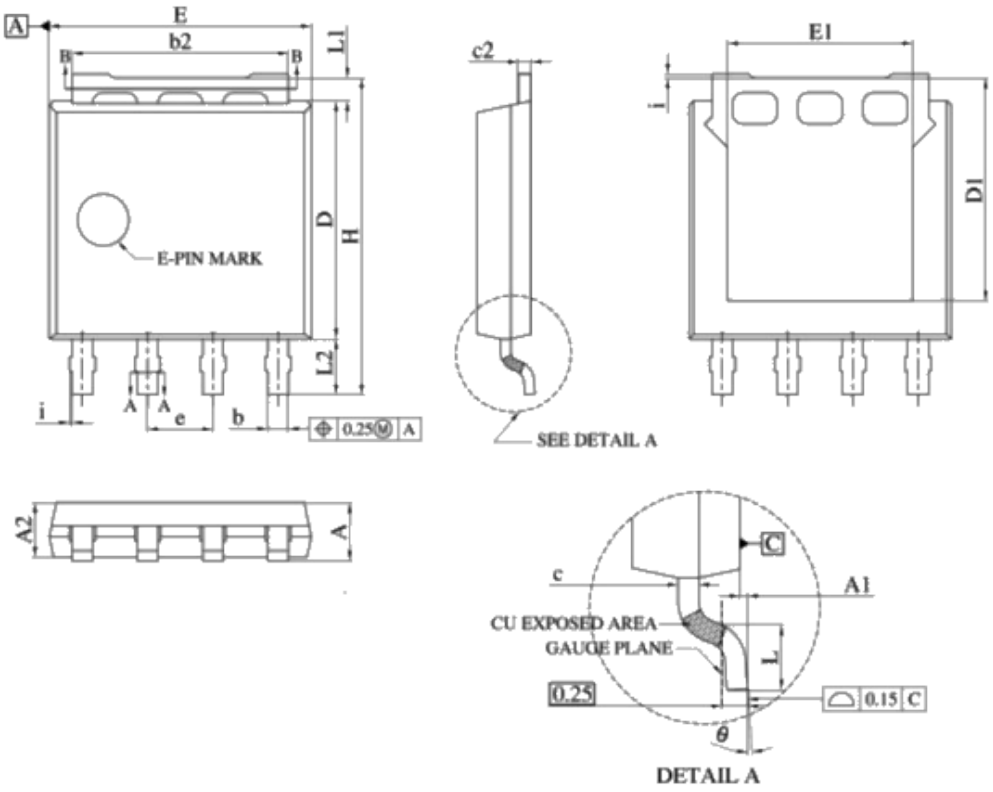


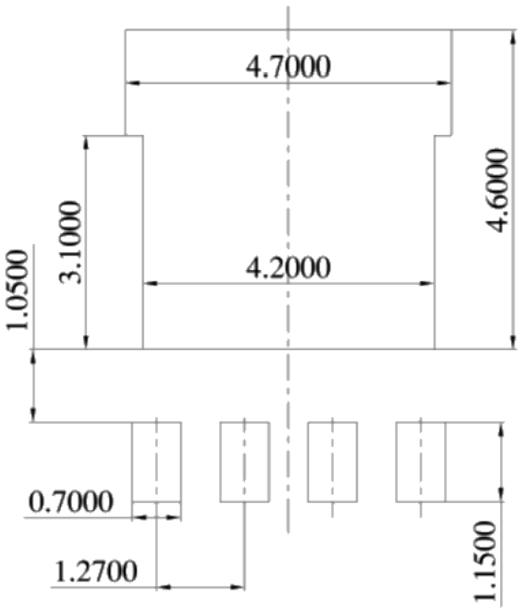

**Figure 13. $R_{\theta JC}$ Transient Thermal Impedance**

## Package Information (LFPAK56)




**Outline dimensions in mm**

| Unit:mm | Min | Typ | Max |
|---|---|---|---|
| A | 1.000 | - | 1.300 |
| A1 | 0.000 | 0.075 | 0.150 |
| A2 | 0.980 | 1.050 | 1.120 |
| b | 0.350 | 0.420 | 0.500 |
| b2 | 4.020 | 4.230 | 4.410 |
| c | 0.190 | 0.220 | 0.250 |
| c2 | 0.240 | 0.270 | 0.300 |
| D | 4.450 | - | 4.700 |
| D1 | - | - | 4.450 |
| E | 4.950 | - | 5.300 |
| E1 | 3.500 | - | 3.700 |
| e | 1.27 BSC | | |
| H | 5.950 | - | 6.250 |
| i | - | - | 0.250 |
| L | 0.400 | - | 0.850 |
| L1 | 0.270 | - | 0.570 |
| L2 | 0.800 | - | 1.300 |
| θ | 0° | - | 8° |




**Suggested Pad Layout (Unit:mm)**

## Disclaimer

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