

MSHM60P14

P-Channel 60-V (D-S) MOSFET

Description

The device is using trench DMOS technology. This advanced technology has been especially tailored to minimize $R_{DS(ON)}$, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- $R_{DS(ON)}=70m\Omega @ V_{GS}=-10V$
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Typical Applications

- Notebook
- Load Switch
- Networking
- LED Lighting

Package type : PDFN 3.3X3.3

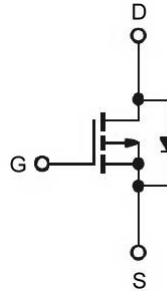
AEC-Q101 qualification available

Packing & Order Information

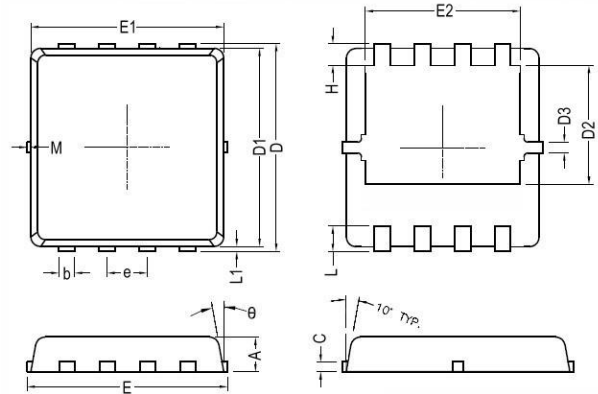
3,000/Reel



Graphic Symbol

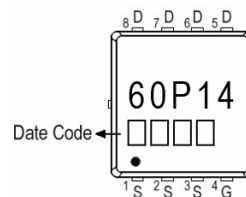


Package Dimension



| REF. | Millimeter | | | REF. | Millimeter | | |
|------|------------|------|------|----------|------------|------|------|
| | Min. | Nom. | Max. | | Min. | Nom. | Max. |
| A | 0.70 | 0.75 | 0.80 | E1 | 3.00 | 3.15 | 3.20 |
| b | 0.25 | 0.30 | 0.35 | E2 | 2.39 | 2.49 | 2.59 |
| C | 0.10 | 0.15 | 0.25 | e | 0.65 BSC | | |
| D | 3.25 | 3.35 | 3.45 | H | 0.30 | 0.39 | 0.50 |
| D1 | 3.00 | 3.10 | 3.20 | L | 0.30 | 0.40 | 0.50 |
| D2 | 1.78 | 1.88 | 1.98 | L1 | - | 0.13 | 0.20 |
| D3 | - | 0.13 | - | θ | - | 10° | 12° |
| E | 3.20 | 3.30 | 3.40 | M | - | - | 0.15 |

Marking



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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|----------------------------------|---|-------------|-------|
| V _{DS} | Drain-Source Voltage | -60 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D | Continuous Drain Current ¹ (T _C =25°C) | -14 | A |
| | Continuous Drain Current ¹ (T _C =100°C) | -9 | A |
| I _{DM} | Pulsed Drain Current ^{1,2} | -56 | A |
| I _{AS} | Single Pulse Avalanche Current, L =0.1mH ³ | -25 | A |
| E _{AS} | Single Pulse Avalanche Energy, L =0.1mH ³ | 31 | mJ |
| P _D | Power Dissipation ⁴ (T _C =25°C) | 34.7 | W |
| | Power Dissipation ⁴ (T _A =25°C) | 2 | W |
| T _J /T _{STG} | Operating Junction and Storage Temperature | -55 to +150 | °C |

Thermal Resistance Ratings

| Symbol | Parameter | Maximum | Units |
|------------------|--|---------|-------|
| R _{θJA} | Maximum Junction-to-Ambient ¹ | 62 | °C/W |
| R _{θJC} | Maximum Junction-to-Case ¹ | 3.6 | °C/W |

Electrical Characteristics (T_J=25°C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---------------------|--|---|------|------|------|-------|
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =-250μA | -1.2 | - | -2.5 | V |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =-250μA | -60 | - | - | V |
| g _{fs} | Forward Transconductance | V _{DS} =-10V, I _D =-3A | - | 7 | - | S |
| I _{GSS} | Gate-Source Leakage Current | V _{DS} =0V, V _{GS} =±20V | - | - | ±100 | nA |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =-48V, V _{GS} =0V, T _J =25°C | - | - | -1 | μA |
| | | V _{DS} =-48V, V _{GS} =0V, T _J =125°C | - | - | -10 | |
| R _{DS(on)} | Static Drain-Source On-Resistance ² | V _{GS} =-10V, I _D =-12A | - | - | 70 | mΩ |
| | | V _{GS} =-4.5V, I _D =-8A | - | - | 105 | |
| E _{AS} | Single Pulse Avalanche Energy ⁵ | V _{DD} =25V, L =0.1mH, I _{AS} =12A | 7.2 | - | - | mJ |
| V _{SD} | Diode Forward Voltage ² | I _S =-1A, V _{GS} =0V, T _J =25°C | - | - | -1.2 | V |
| I _S | Continuous Source Current ^{1,6} | V _G =V _D =0V, Force Current | - | - | -14 | A |
| I _{SM} | Pulsed Source Current ^{2,6} | | - | - | -28 | |

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Dynamic and Switching Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---------------------|---------------------------------|-------------------------|------|------|------|-------|
| Q _g | Total Gate Charge ² | V _{DS} = -30V | -- | 16.4 | -- | nC |
| Q _{gs} | Gate-Source Charge | I _D = -3A | -- | 3 | -- | |
| Q _{gd} | Gate-Drain Charge | V _{GS} = -4.5V | -- | 3.6 | -- | |
| t _{d(on)} | Turn-On Delay Time ² | V _{DS} = -15V | -- | 28 | -- | ns |
| t _r | Rise Time | I _D = -1A | -- | 19 | -- | |
| t _{d(off)} | Turn-Off Delay Time | V _{GS} = -10V | -- | 60 | -- | |
| t _f | Fall Time | R _G = 3.3Ω | -- | 8 | -- | |
| C _{ISS} | Input Capacitance | V _{DS} = -15V | -- | 1447 | -- | pF |
| C _{OSS} | Output Capacitance | V _{GS} = 0V | -- | 97.3 | -- | |
| C _{RSS} | Reverse Transfer Capacitance | f = 1.0MHz | -- | 70 | -- | |

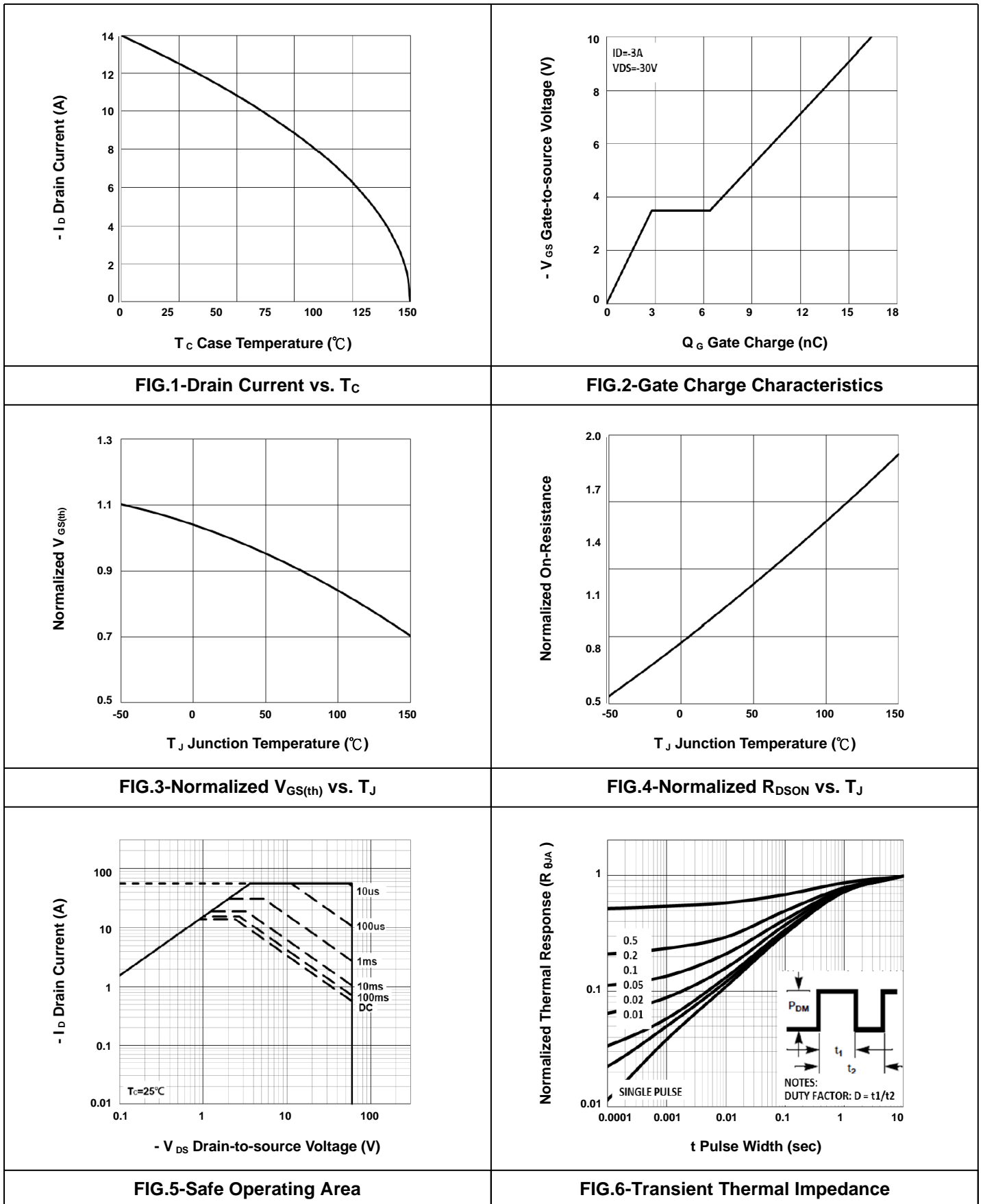
Notes

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. The EAS data shows maximum rating. The test condition is V_{DD} = -25V, V_{GS} = -10V, L = 0.1mH, I_{AS} = -25A.
4. The power dissipation is limited by 150°C junction temperature.
5. The Min. value is 100% EAS test guaranteed.
6. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

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• Typical Electrical Characteristics



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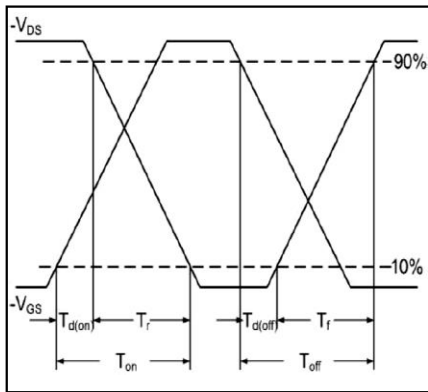


FIG.7-Switching Time Waveform

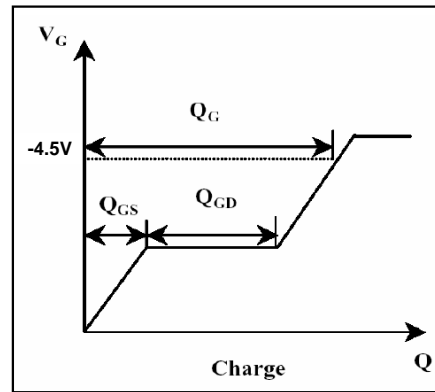


FIG.8-Gate Charge Waveform

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