

Dual N-Ch 60V Fast Switching MOSFETs
General Description

The QM6208S is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The QM6208S meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------|--|------------|-------|
| V_{DS} | Drain-Source Voltage | 60 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 3.5 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 2.7 | A |
| I_{DM} | Pulsed Drain Current ² | 7 | A |
| EAS | Single Pulse Avalanche Energy ³ | 10.73 | mJ |
| I_{AS} | Avalanche Current | 11.2 | A |
| $P_D @ T_C = 25^\circ C$ | Total Power Dissipation ⁴ | 2.1 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

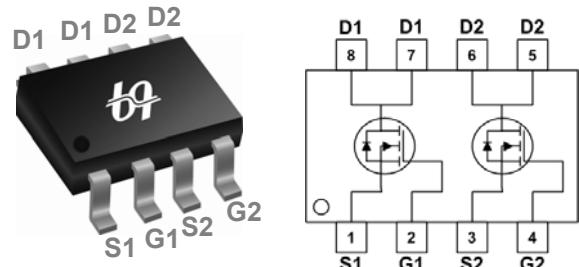
| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 85 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 60 | °C/W |

Product Summary


| BVDSS | RDS(on) | ID |
|-------|---------|------|
| 60V | 90mΩ | 3.5A |

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

Dual SOP8 Pin Configuration


Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|--|------|-------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 60 | --- | --- | V |
| △BV _{DSS} /△T _J | BV _{DSS} Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.054 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =3A | --- | 70 | 90 | mΩ |
| | | V _{GS} =4.5V, I _D =2A | --- | 80 | 100 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | 1.5 | 2.5 | V |
| △V _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -4.96 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =60V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =48V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =5A | --- | 7 | --- | S |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =48V, V _{GS} =4.5V, I _D =3A | --- | 3.99 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 1.31 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 1.78 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =3A | --- | 5.3 | --- | ns |
| T _r | Rise Time | | --- | 17.5 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 14.2 | --- | |
| T _f | Fall Time | | --- | 2.4 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 511 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 38 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 25 | --- | |

Guaranteed Avalanche Characteristics

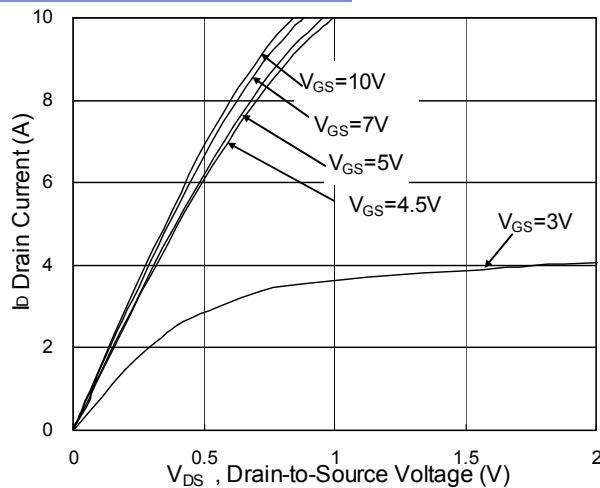
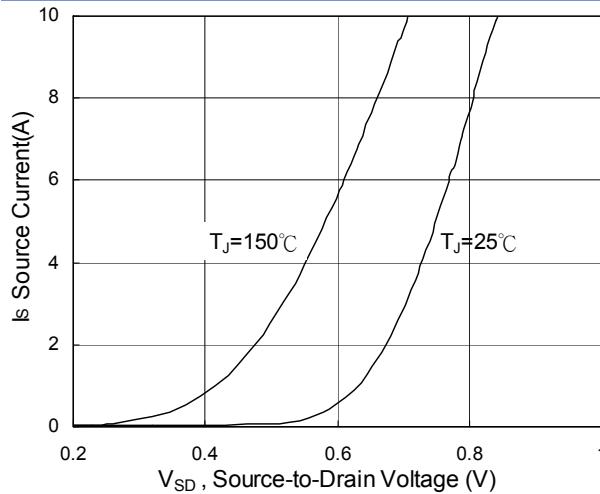
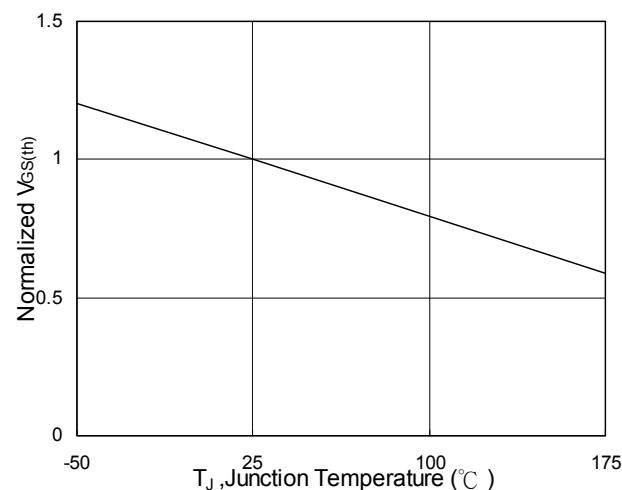
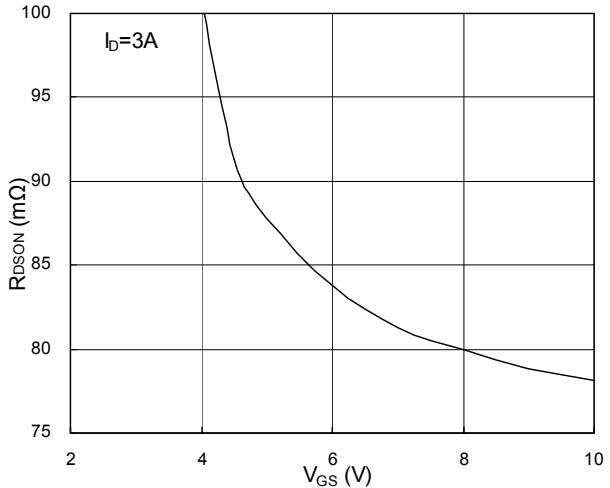
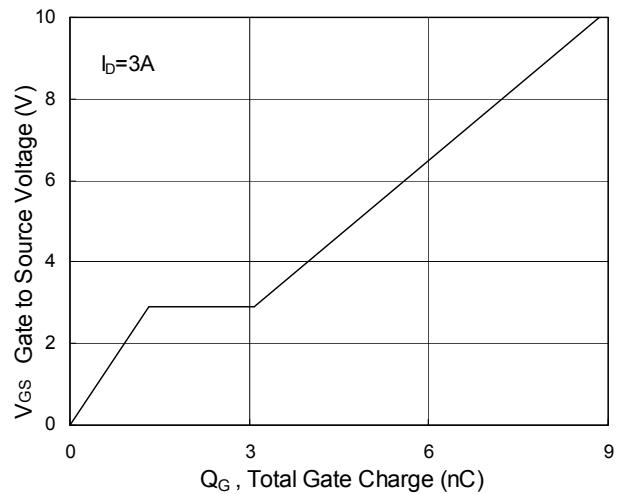
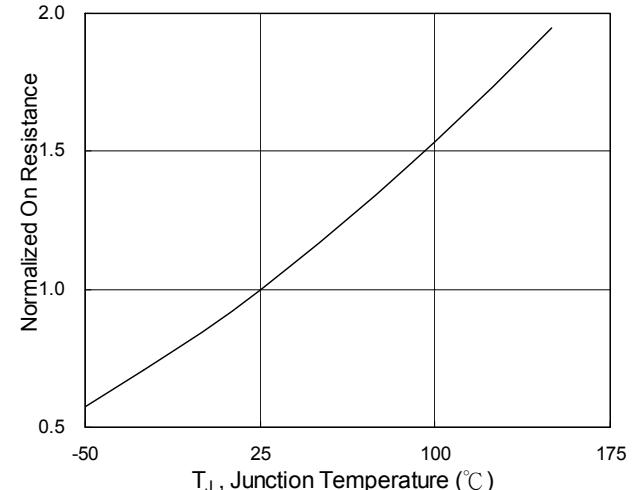
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------|--|--|------|------|------|------|
| EAS | Single Pulse Avalanche Energy ⁵ | V _{DD} =25V, L=0.1mH, I _{AS} =5A | 2.5 | --- | --- | mJ |

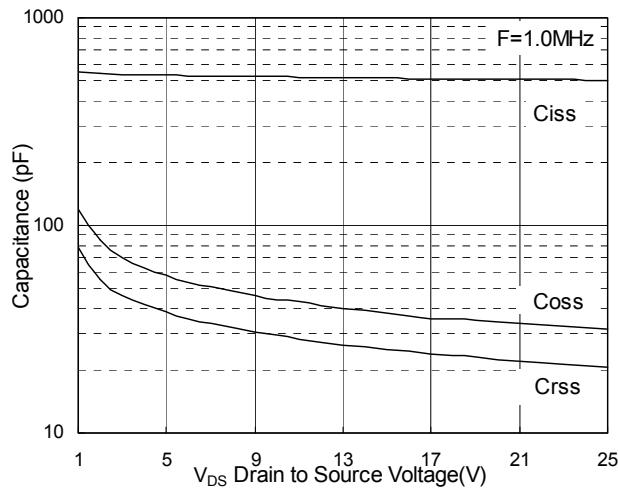
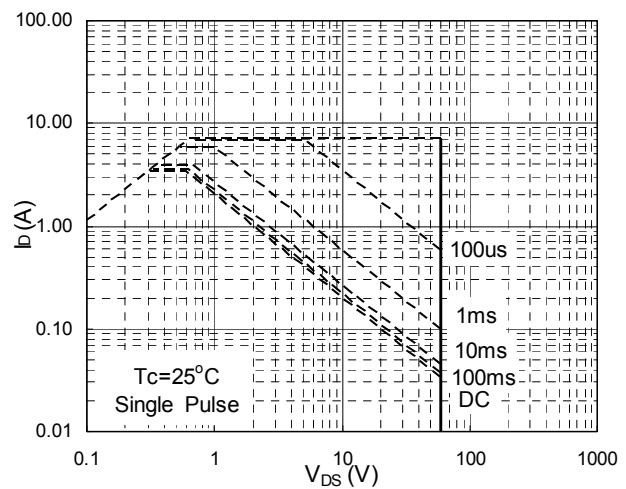
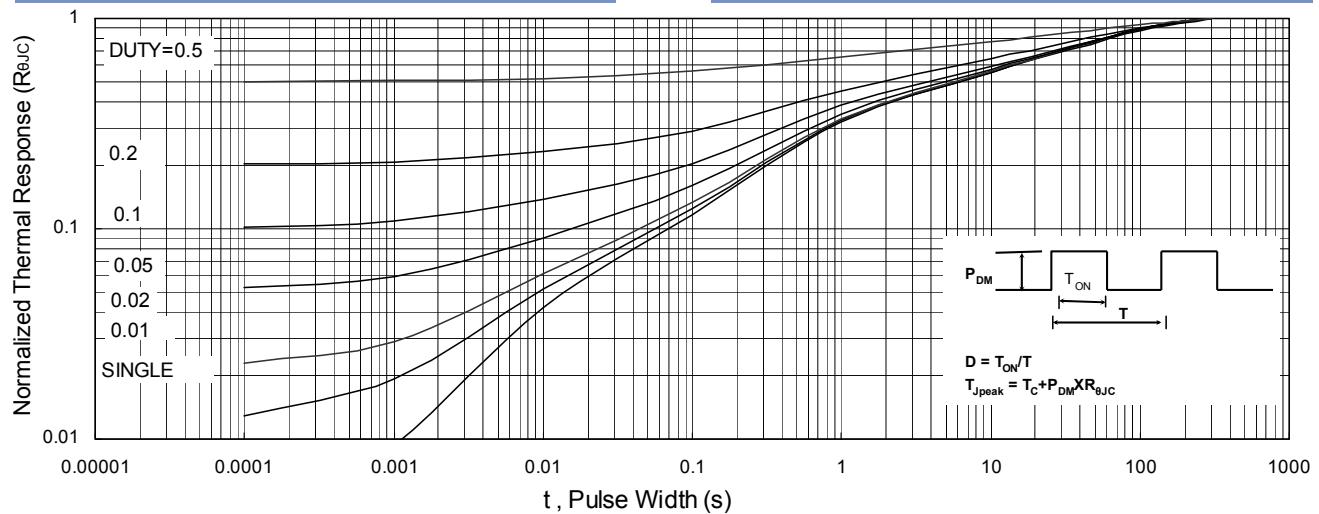
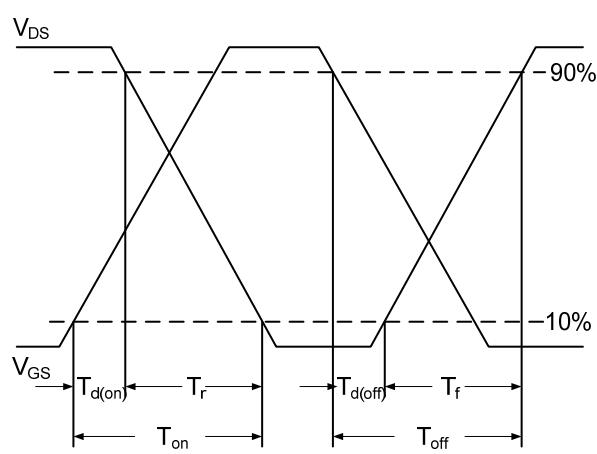
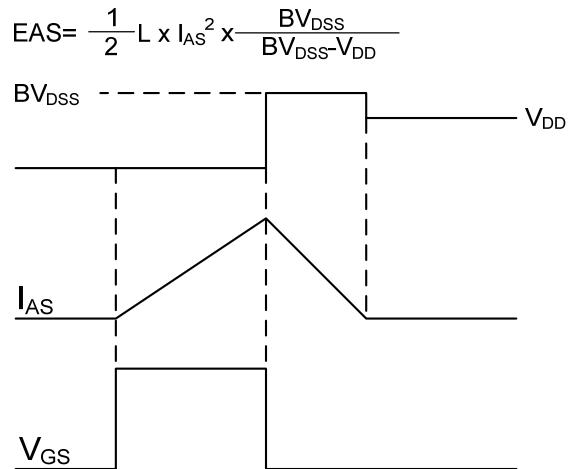
Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,6} | V _G =V _D =0V, Force Current | --- | --- | 3.5 | A |
| I _{SM} | Pulsed Source Current ^{2,6} | | --- | --- | 7 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |

Note :

- 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 Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=11.2A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The Min. value is 100% EAS tested guarantee.
- 6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Dual N-Ch 60V Fast Switching MOSFETs
Typical Characteristics

Fig.1 Typical Output Characteristics

Fig.3 Forward Characteristics of Reverse

Fig.5 Normalized $V_{GS(th)}$ v.s T_J

Fig.2 On-Resistance v.s Gate-Source

Fig.4 Gate-Charge Characteristics

Fig.6 Normalized R_{DSON} v.s T_J

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Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Waveform