

General Description

The QM2710D is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

The QM2710D meet the RoHS and Green Product requirement with full function reliability approved.

Features

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

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------|---|------------|-------|
| V_{DS} | Drain-Source Voltage | 20 | V |
| V_{GS} | Gate-Source Voltage | ± 16 | V |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 22 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 14 | A |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 7 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 5.5 | A |
| I_{DM} | Pulsed Drain Current ² | 60 | A |
| $P_D @ T_C = 25^\circ C$ | Total Power Dissipation ³ | 21 | W |
| $P_D @ T_A = 25^\circ C$ | Total Power Dissipation ³ | 2 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |

Product Summary

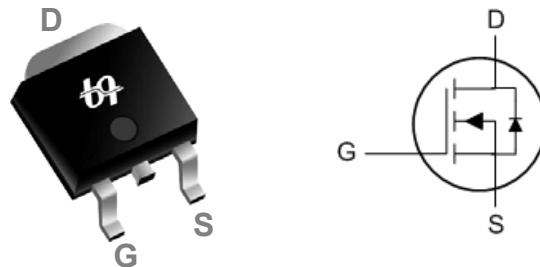


| BVDSS | RDS(on) | ID |
|-------|---------|-----|
| 20V | 28mΩ | 22A |

Applications

- High Frequency Point-of-Load Synchronous Small power switching for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

TO-252 Pin Configuration



Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | --- | 62 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 6 | °C/W |

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

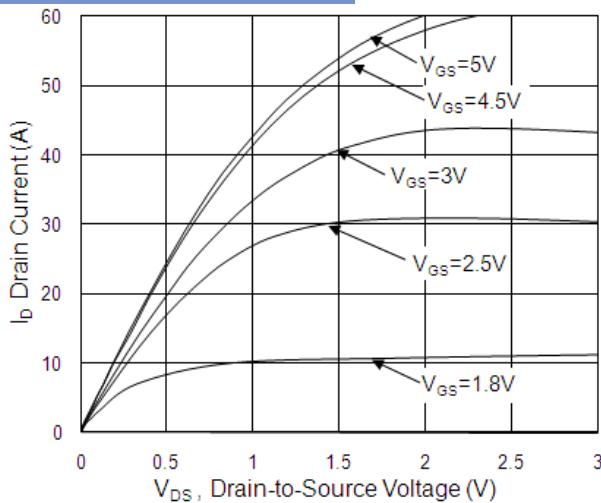
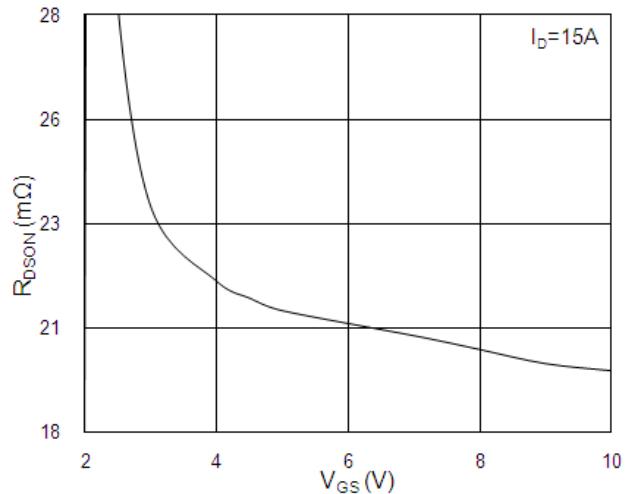
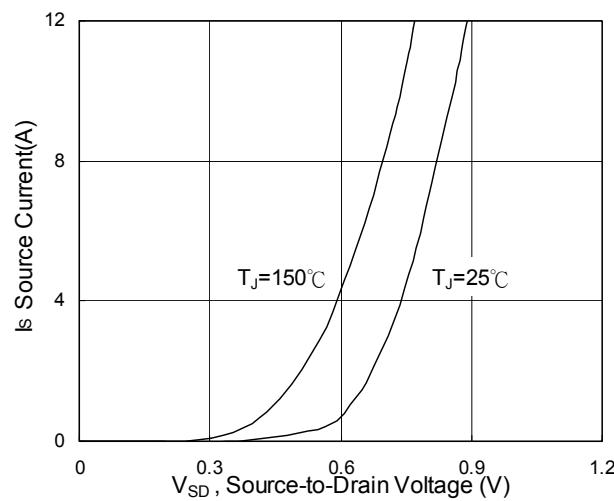
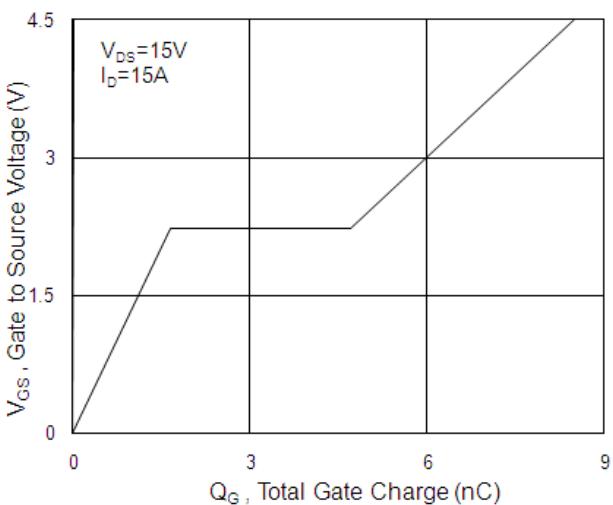
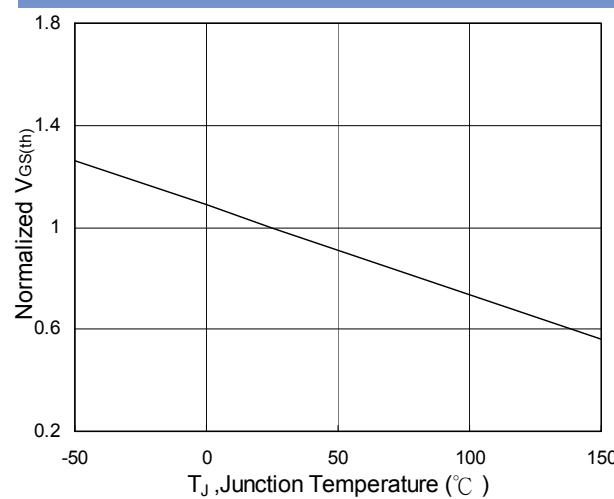
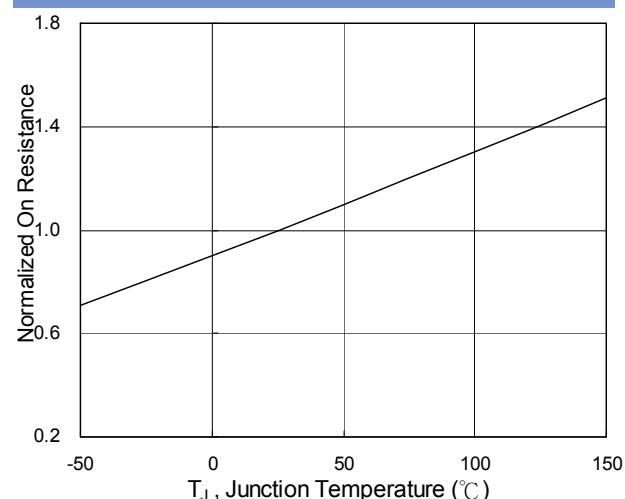
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|--|------|-------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 20 | --- | --- | V |
| △BV _{DSS} /△T _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.019 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =4.5V, I _D =15A | --- | 22 | 28 | mΩ |
| | | V _{GS} =2.5V, I _D =10A | --- | 30 | 38 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 0.5 | 0.7 | 1.2 | V |
| △V _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -2.9 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =16V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =16V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±16V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =15A | --- | 24.2 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 1.8 | 3.6 | Ω |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =15V, V _{GS} =4.5V, I _D =15A | --- | 8.5 | 11.9 | nC |
| Q _{gs} | Gate-Source Charge | | --- | 1.64 | 2.3 | |
| Q _{gd} | Gate-Drain Charge | | --- | 3.1 | 4.3 | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =10V, V _{GS} =10V, R _G =3.3Ω | --- | 4.8 | 9.6 | ns |
| T _r | Rise Time | | --- | 28.6 | 51 | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 19.6 | 39 | |
| T _f | Fall Time | | --- | 8.8 | 17.6 | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 574 | 804 | pF |
| C _{oss} | Output Capacitance | | --- | 68.7 | 96 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 61 | 85 | |

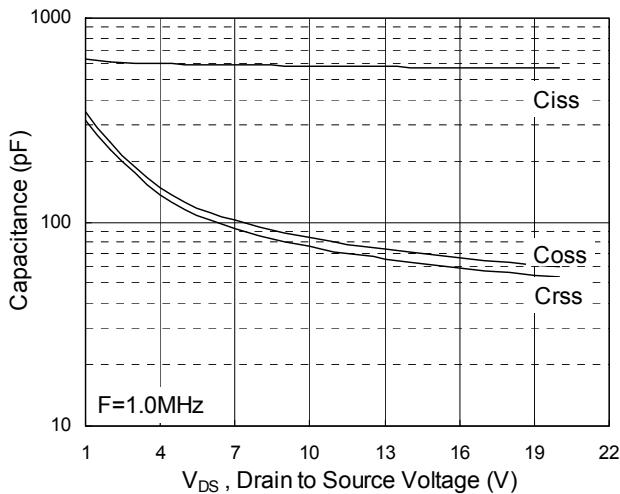
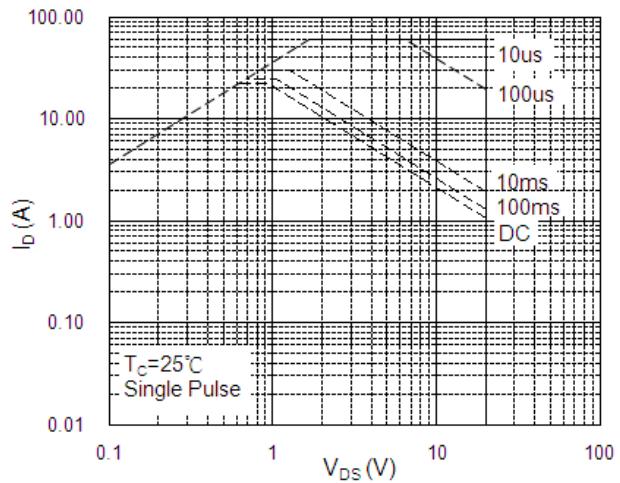
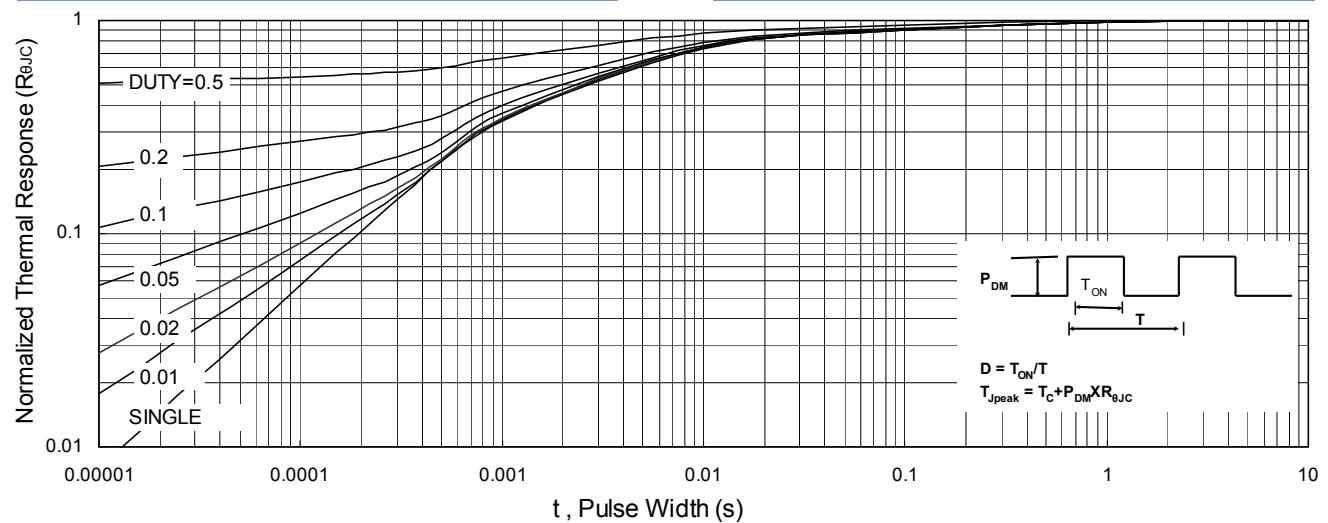
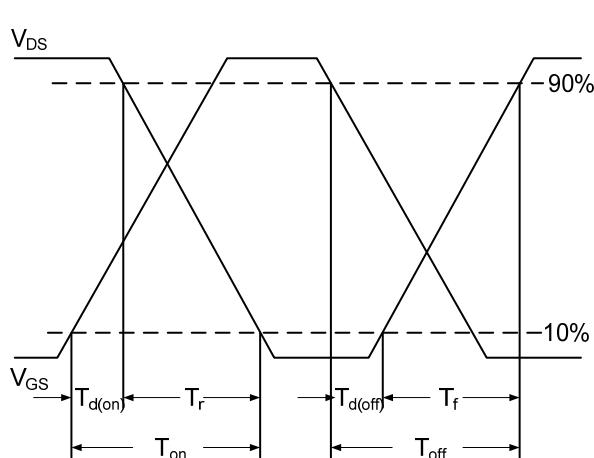
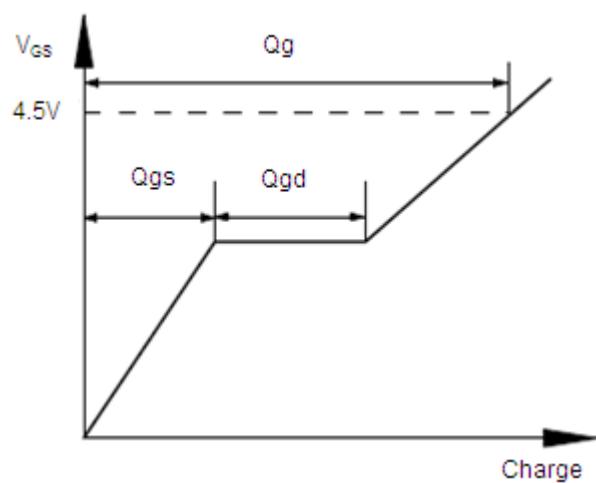
Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,4} | V _G =V _D =0V, Force Current | --- | --- | 22 | A |
| I _{SM} | Pulsed Source Current ^{2,4} | | --- | --- | 60 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =15A, dI/dt=100A/μs, T _J =25°C | --- | 4.8 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 0.78 | --- | nC |

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 power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs. Gate-Source

Fig.3 Forward Characteristics Of Reverse

Fig.4 Gate-Charge Characteristics

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

Fig.6 Normalized $R_{DS(on)}$ vs. T_J


Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform