

General Description

The QM01N65L is the highest performance N-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The QM01N65L meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- 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 | 650 | V |
| V_{GS} | Gate-Source Voltage | ± 30 | V |
| $I_D@T_A=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 0.2 | A |
| $I_D@T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 0.15 | A |
| I_{DM} | Pulsed Drain Current ² | 1 | A |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation ⁴ | 0.89 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|---|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient (Steady State) ¹ | --- | 140 | $^\circ C/W$ |

Product Summary

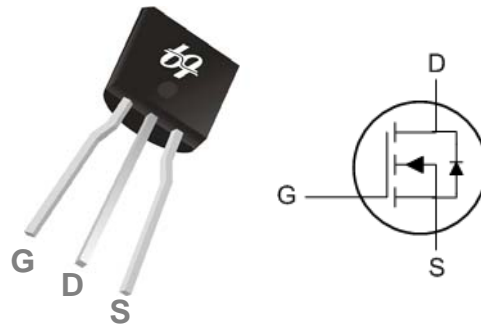


| BVDSS | RDSON | ID |
|-------|-------------|------|
| 650V | 12 Ω | 0.2A |

Applications

- High efficient switched mode power supplies
- Electronic lamp ballast
- LCD TV/ Monitor
- Adapter

TO-92 Pin Configuration



Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|--|--|------|------|-----------|----------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 650 | --- | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BV_{DSS} Temperature Coefficient | Reference to 25°C , $I_D=1\text{mA}$ | --- | 0.63 | --- | V/ $^\circ\text{C}$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=0.15A$ | --- | 10.5 | 12 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 2 | --- | 5 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -7.4 | --- | mV/ $^\circ\text{C}$ |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=520V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 2 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 30V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| gfs | Forward Transconductance | $V_{DS}=5V, I_D=0.15A$ | --- | 0.31 | --- | S |
| R_g | Gate Resistance | $V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$ | --- | 4.9 | 9.8 | Ω |
| Q_g | Total Gate Charge (10V) | $V_{DS}=520V, V_{GS}=10V, I_D=1A$ | --- | 6.03 | 8.4 | nC |
| Q_{gs} | Gate-Source Charge | | --- | 1.95 | 2.7 | |
| Q_{gd} | Gate-Drain Charge | | --- | 2.3 | 3.2 | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}=300V, V_{GS}=10V, R_G=10\Omega, I_D=1A$ | --- | 4.4 | 8.8 | ns |
| T_r | Rise Time | | --- | 18.4 | 33 | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 7.2 | 14.4 | |
| T_f | Fall Time | | --- | 22.4 | 45 | |
| C_{iss} | Input Capacitance | $V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$ | --- | 175 | 245 | pF |
| C_{oss} | Output Capacitance | | --- | 17.8 | 25 | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 4.3 | 6 | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|--|--|------|------|------|------|
| I_S | Continuous Source Current ^{1,6} | $V_G=V_D=0V$, Force Current | --- | --- | 0.2 | A |
| I_{SM} | Pulsed Source Current ^{2,6} | | --- | --- | 1 | A |
| V_{SD} | Diode Forward Voltage ² | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$ | --- | --- | 1 | V |
| t_{rr} | Reverse Recovery Time | $I_F=1A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$ | --- | 181 | --- | nS |
| Q_{rr} | Reverse Recovery Charge | | --- | 336 | --- | nC |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 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

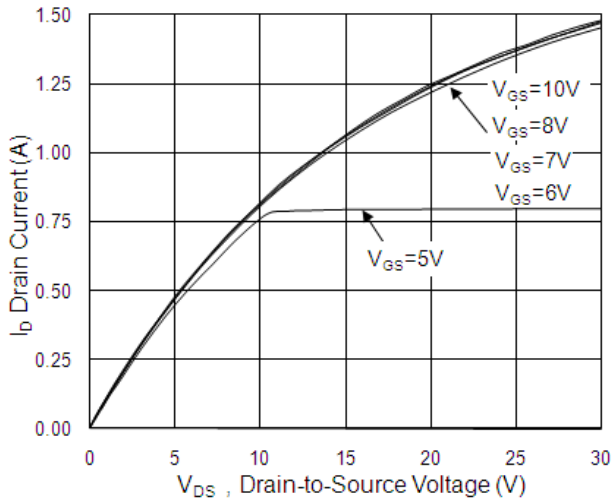


Fig.1 Typical Output Characteristics

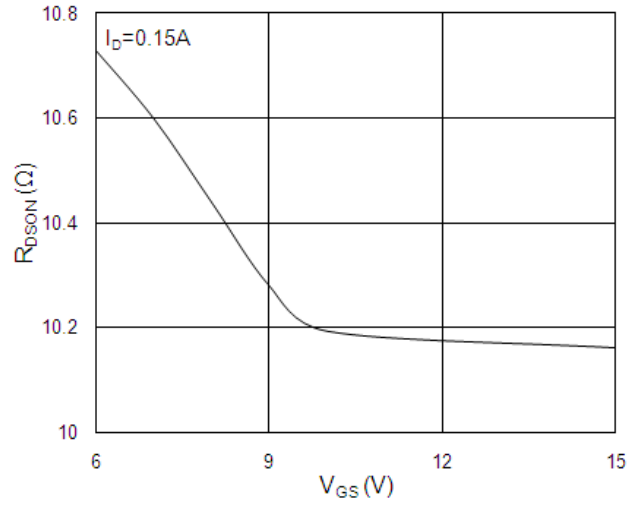


Fig.2 On-Resistance vs. G-S Voltage

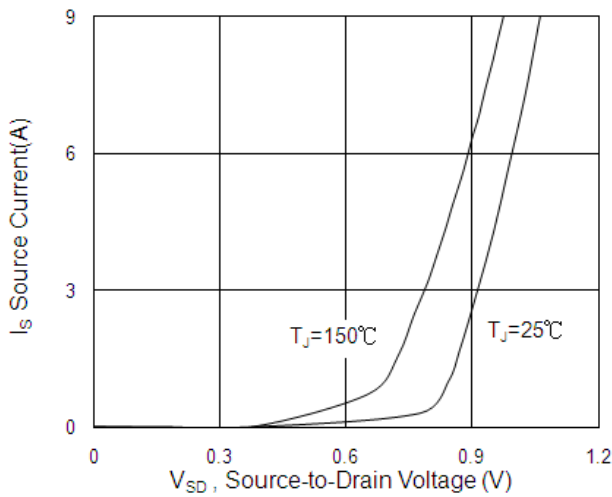


Fig.3 Forward Characteristics of Reverse

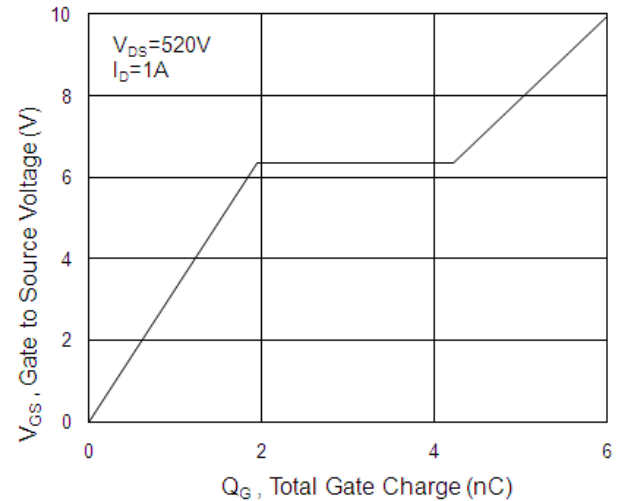


Fig.4 Gate-Charge Characteristics

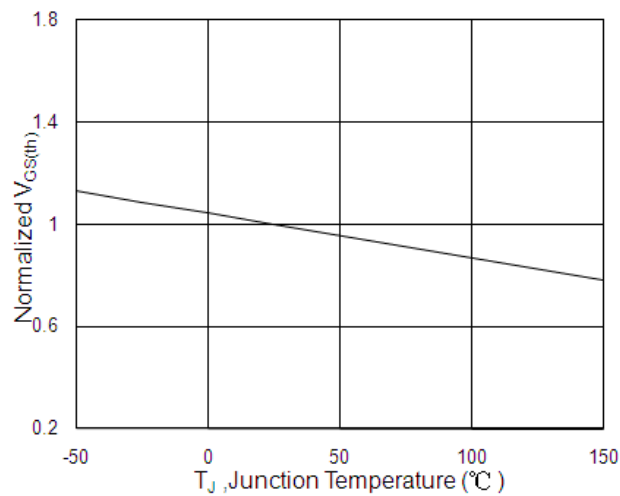


Fig.5 $V_{GS(th)}$ vs. T_J

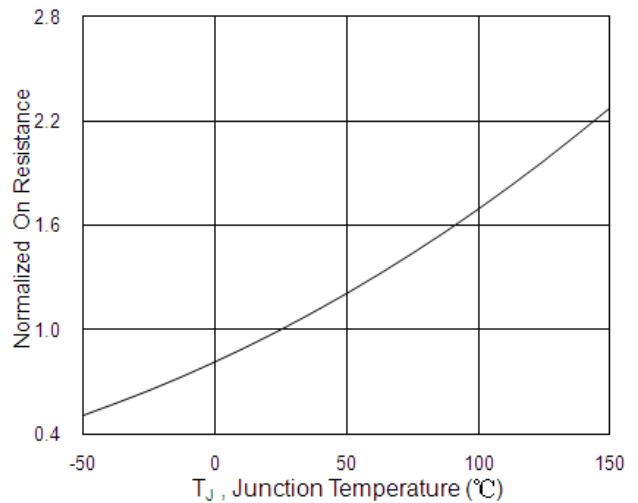


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

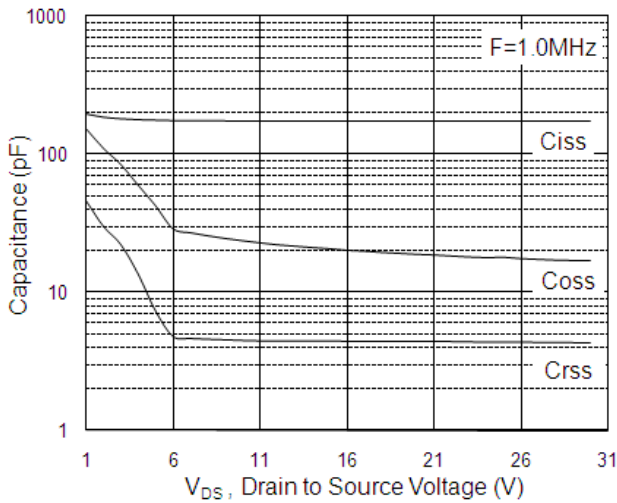


Fig.7 Capacitance

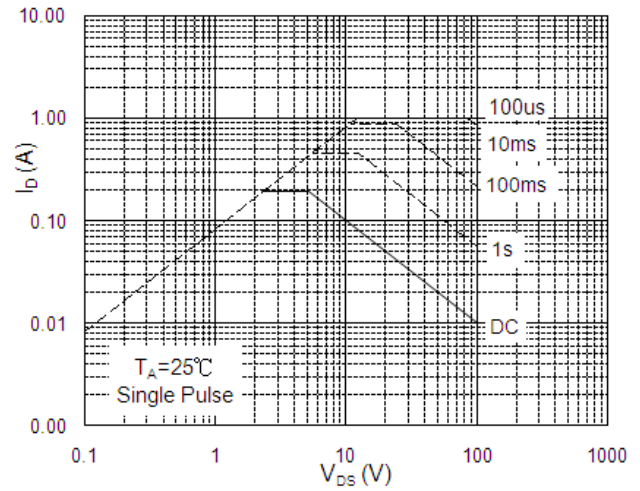


Fig.8 Safe Operating Area

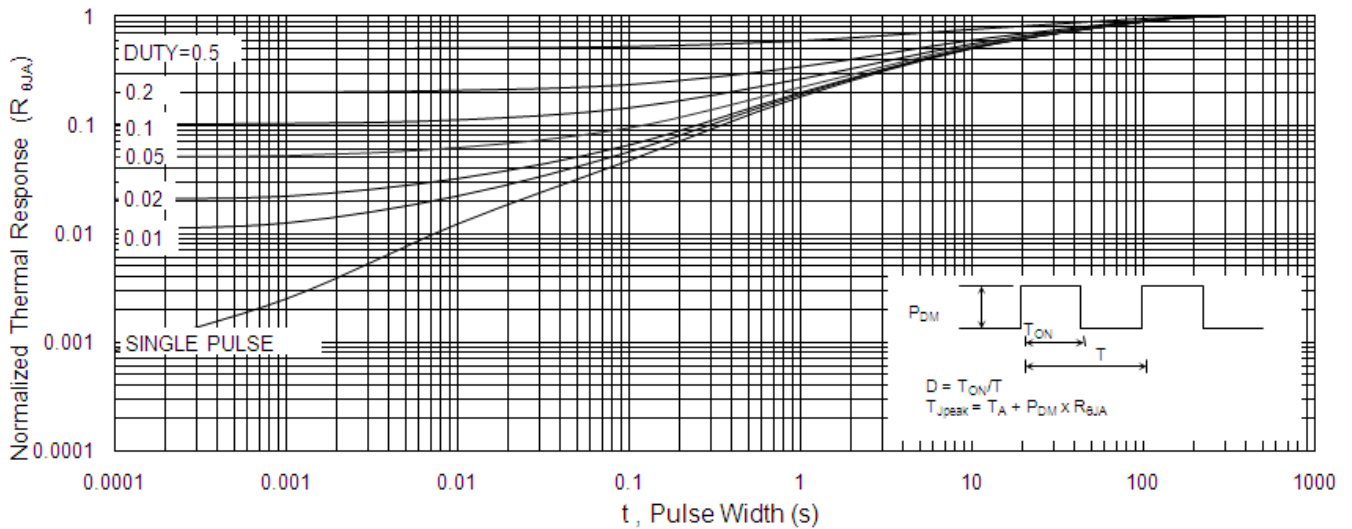


Fig.9 Normalized Maximum Transient Thermal Impedance



Fig.10 Switching Time Waveform

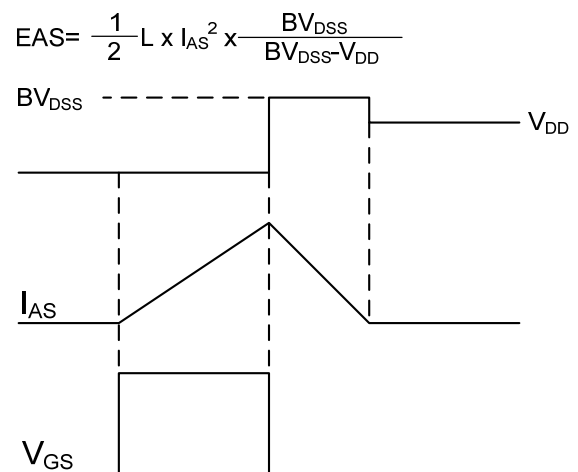


Fig.11 Unclamped Inductive Switching Waveform