

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

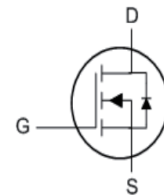
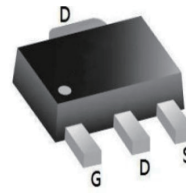
Product Summary

| BVDSS | RDSON | ID |
|-------|-------|------|
| 30V | 20mΩ | 7.0A |

Description

The 3400Q is the high cell density trenched N ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications. The 3400Q meets the RoHS and Green Product requirement with full function reliability approved.

SOT89-3L Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-------------------------|--|------------|-------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ±12 | V |
| $I_{D@T_A=25^{\circ}C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 7.0 | A |
| $I_{D@T_A=70^{\circ}C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 4.5 | A |
| I_{DM} | Pulsed Drain Current ² | 25.4 | A |
| $P_{D@T_A=25^{\circ}C}$ | Total Power Dissipation ³ | 2.5 | 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 | --- | 92 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | --- | °C/W |

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

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|--|---|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=30V, V_{GS}=0V,$ | - | - | 1 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 12V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.5 | 0.9 | 1.4 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note ² | $V_{GS}=10V, I_D=4.2A$ | - | 20 | 28 | m Ω |
| | | $V_{GS}=4.5V, I_D=4A$ | - | 25 | 34 | |
| | | $V_{GS}=2.5V, I_D=1A$ | - | 35 | 50 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V, f=1.0MHz$ | - | 602 | - | pF |
| C_{oss} | Output Capacitance | | - | 56 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 42 | - | pF |
| Q_g | Total Gate Charge | $V_{DS}=15V, I_D=4A, V_{GS}=4.5V$ | - | 4.8 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 1.2 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 1.7 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}=15V, I_D=4A, R_{GEN}=3\Omega,$ $V_{GS}=4.5V$ | - | 12 | - | ns |
| t_r | Turn-on Rise Time | | - | 52 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 17 | - | ns |
| t_f | Turn-off Fall Time | | - | 10 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 7.0 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 25.2 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=5.8A$ | - | - | 1.2 | V |

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Electrical and Thermal Characteristics (Curves)

Figure 1: Output Characteristics

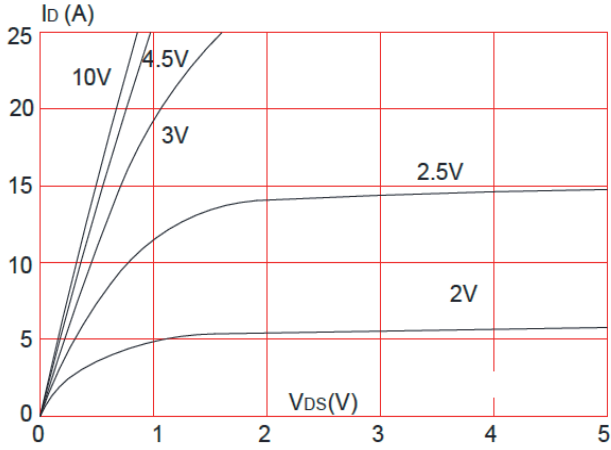


Figure 2: Typical Transfer Characteristics

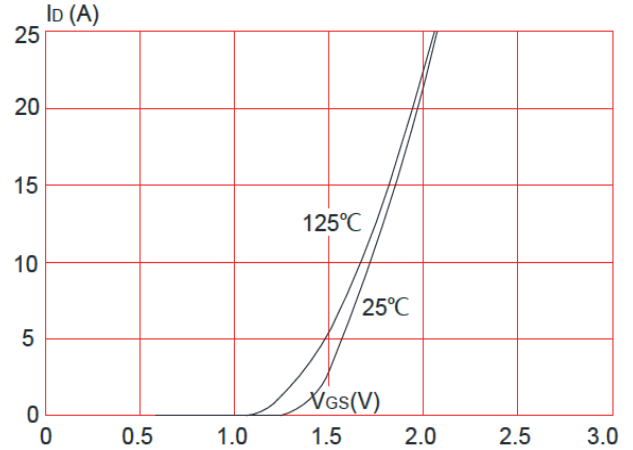


Figure 3: On-resistance vs. Drain Current

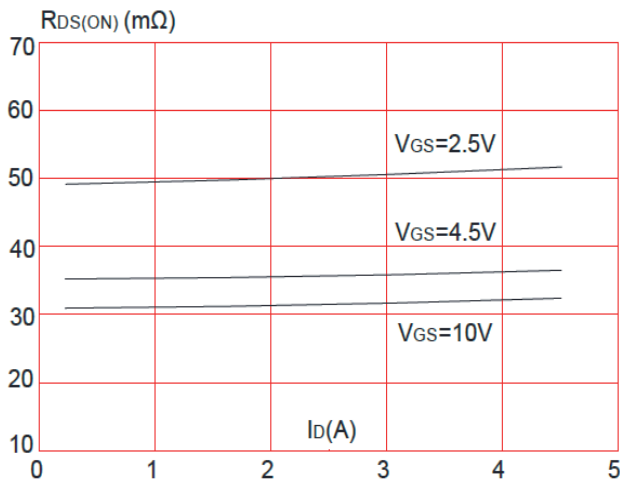


Figure 4: Body Diode Characteristics

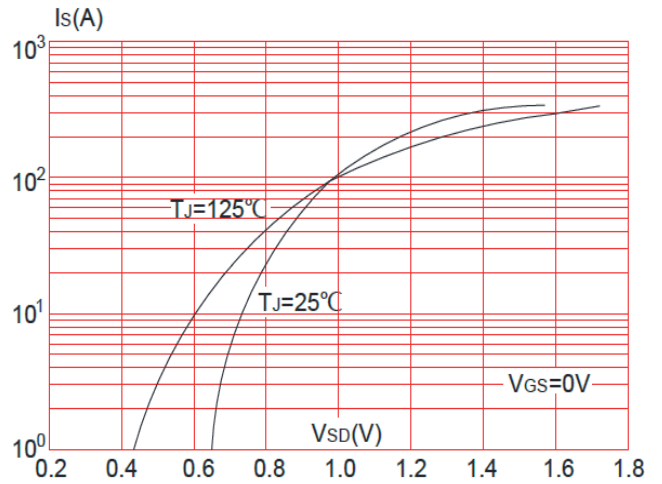


Figure 5: Gate Charge Characteristics

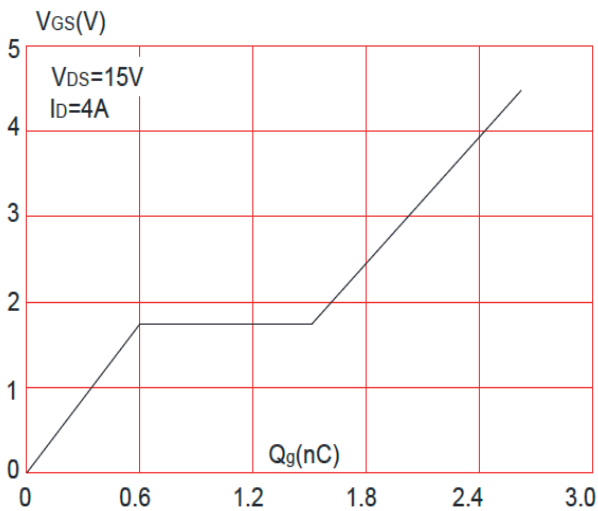
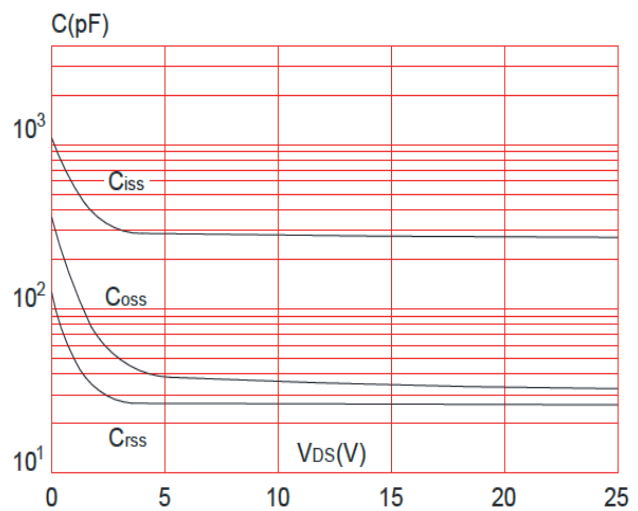


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

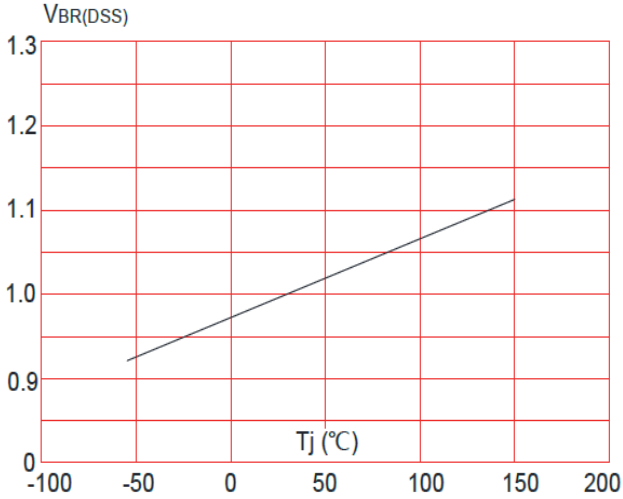


Figure 8: Normalized on Resistance vs. Junction Temperature

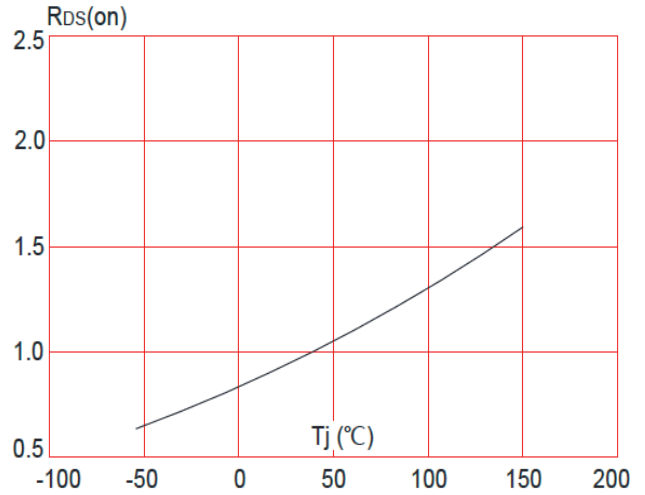


Figure 9: Maximum Safe Operating Area

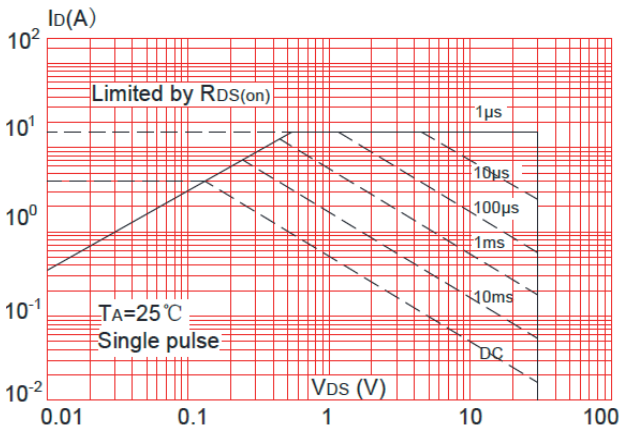


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

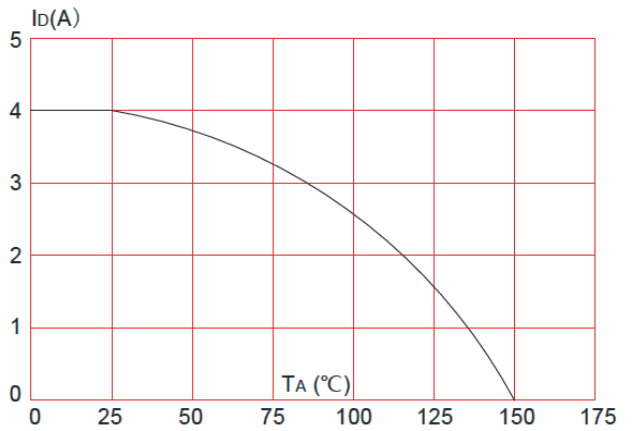
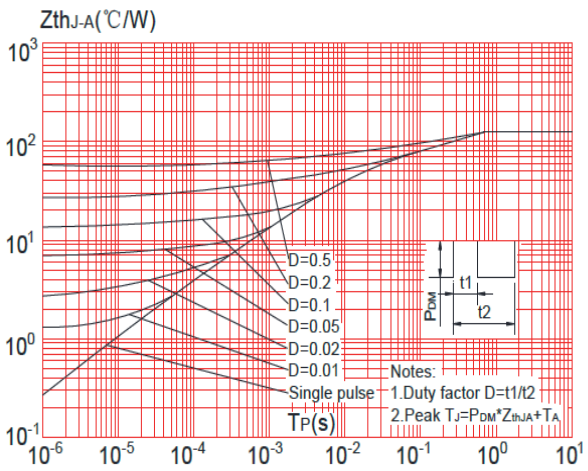
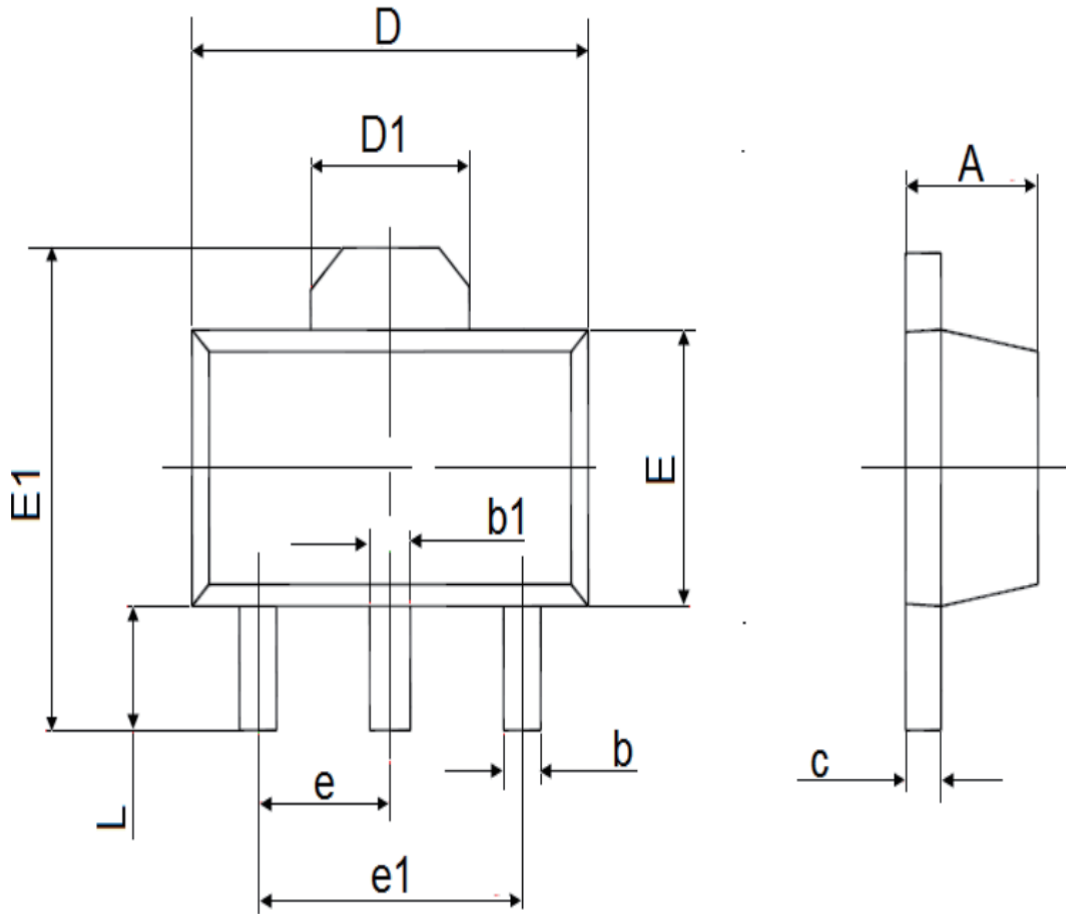


Figure 11: Maximum Effective Transient Thermal Impedance Junction to Ambient



SOT-89-3L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.320 | 0.520 | 0.013 | 0.020 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 0.440 | 0.014 | 0.017 |
| D | 4.400 | 4.600 | 0.173 | 0.181 |
| D1 | 1.550 REF. | | 0.061 REF. | |
| E | 2.300 | 2.600 | 0.091 | 0.102 |
| E1 | 3.940 | 4.250 | 0.155 | 0.167 |
| e | 1.500 TYP. | | 0.060 TYP. | |
| e1 | 3.000 TYP. | | 0.118 TYP. | |
| L | 0.900 | 1.200 | 0.035 | 0.047 |