



FDG6331L

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Integrated Load Switch

General Description

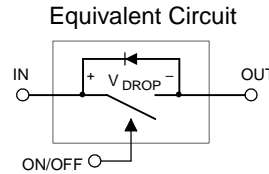
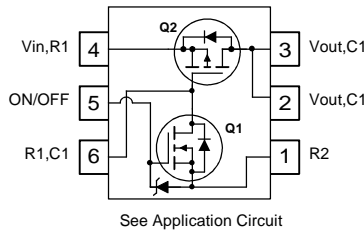
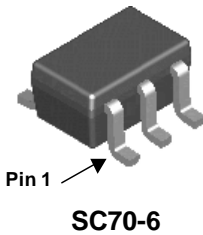
This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 0.8A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) that drives a large P-Channel power MOSFET (Q2) in one tiny SC70-6 package.

Applications

- Power management
- Load switch

Features

- -0.8 A, -8 V. $R_{DS(ON)} = 260\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$
 $R_{DS(ON)} = 330\text{ m}\Omega @ V_{GS} = -2.5\text{ V}$
 $R_{DS(ON)} = 450\text{ m}\Omega @ V_{GS} = -1.8\text{ V}$
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6KV Human body model)
- High performance trench technology for extremely low $R_{DS(ON)}$
- Compact industry standard SC70-6 surface mount package



Absolute Maximum Ratings T_A=25°C unless otherwise noted

| Symbol | Parameter | Ratings | Units |
|-----------------------------------|--|-------------|-------|
| V _{IN} | Gate-Source Voltage (Q2) | ± 8 | V |
| V _{ON/OFF} | Gate-Source Voltage (Q1) | -0.5 to 8 | V |
| I _{Load} | Load Current – Continuous (Note 2) | 0.8 | A |
| | – Pulsed (Note 2) | 2.4 | |
| P _D | Maximum Power Dissipation (Note 1) | 0.3 | W |
| T _J , T _{STG} | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

Thermal Characteristics

| | | | |
|------------------|---|-----|------|
| R _{θJA} | Thermal Resistance, Junction-to-Ambient (Note 1a) | 415 | °C/W |
|------------------|---|-----|------|

Package Marking and Ordering Information

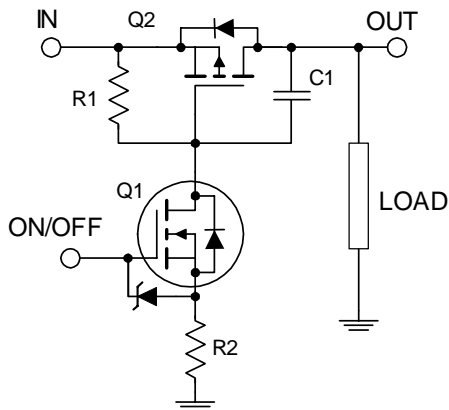
| Device Marking | Device | Reel Size | Tape width | Quantity |
|----------------|----------|-----------|------------|------------|
| .31 | FDG6331L | 7" | 8mm | 3000 units |

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|-----|-----|-------|------------------|
| Off Characteristics | | | | | | |
| BV_{IN} | Vin Breakdown Voltage | $V_{ON/OFF} = 0\text{ V}$, $I_D = -250\ \mu\text{A}$ | 8 | | | V |
| I_{Load} | Zero Gate Voltage Drain Current | $V_{IN} = -6.4\text{ V}$, $V_{ON/OFF} = 0\text{ V}$ | | | -1 | μA |
| I_{FL} | Leakage Current, Forward | $V_{ON/OFF} = 0\text{ V}$, $V_{IN} = 8\text{ V}$ | | | 100 | nA |
| I_{RL} | Leakage Current, Reverse | $V_{ON/OFF} = 0\text{ V}$, $V_{IN} = -8\text{ V}$ | | | -100 | nA |
| On Characteristics (Note 2) | | | | | | |
| $V_{ON/OFF(th)}$ | Gate Threshold Voltage | $V_{IN} = V_{ON/OFF}$, $I_D = -250\ \mu\text{A}$ | 0.4 | 0.9 | 1.5 | V |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance (Q2) | $V_{IN} = 4.5\text{ V}$, $I_D = -0.8\text{ A}$ | | 155 | 260 | $\text{m}\Omega$ |
| | | $V_{IN} = 2.5\text{ V}$, $I_D = -0.7\text{ A}$ | | 193 | 330 | |
| | | $V_{IN} = 1.8\text{ V}$, $I_D = -0.6\text{ A}$ | | 248 | 450 | |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance (Q1) | $V_{IN} = 4.5\text{ V}$, $I_D = 0.4\text{ A}$ | | 310 | 400 | $\text{m}\Omega$ |
| | | $V_{IN} = 2.7\text{ V}$, $I_D = 0.2\text{ A}$ | | 380 | 500 | |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain-Source Diode Forward Current | | | | -0.25 | A |
| V_{SD} | Drain-Source Diode Forward Voltage | $V_{ON/OFF} = 0\text{ V}$, $I_S = -0.25\text{ A}$ (Note 2) | | | -1.2 | V |

Notes:

- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
- Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.

FDG6331L Load Switch Application Circuit**External Component Recommendation:**

For additional in-rush current control, R2 and C1 can be added. For more information, see application note AN1030.

Typical Characteristics

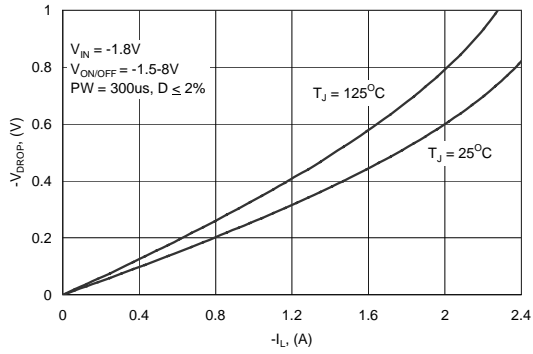


Figure 1. Conduction Voltage Drop Variation with Load Current.

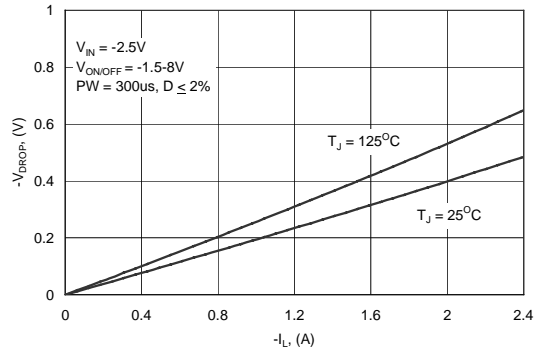


Figure 2. Conduction Voltage Drop Variation with Load Current.

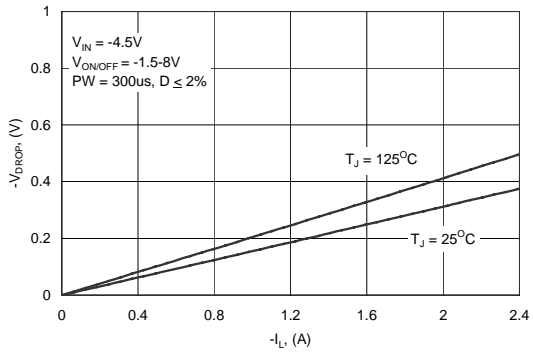


Figure 3. Conduction Voltage Drop Variation with Load Current.

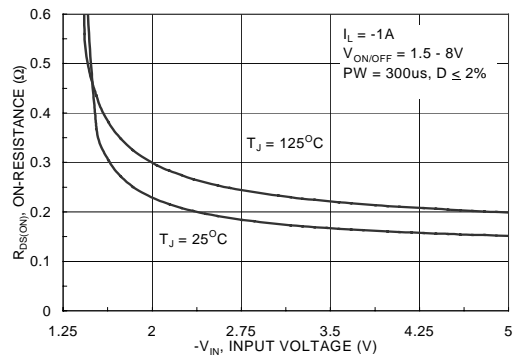
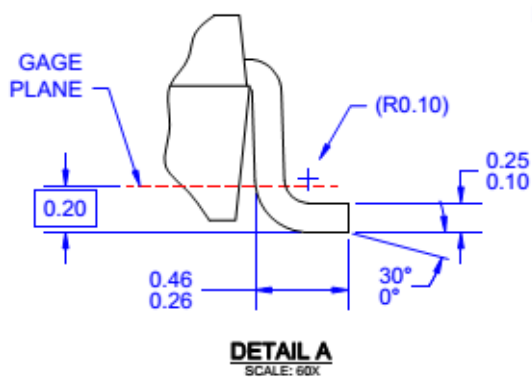
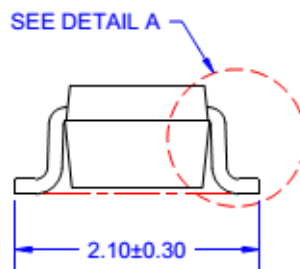
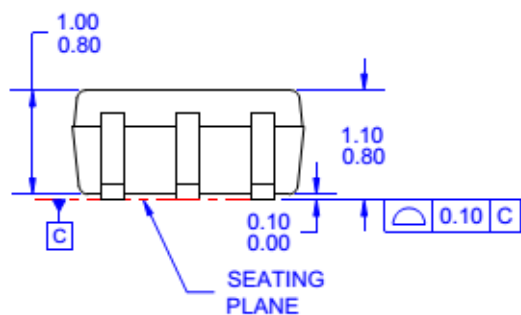
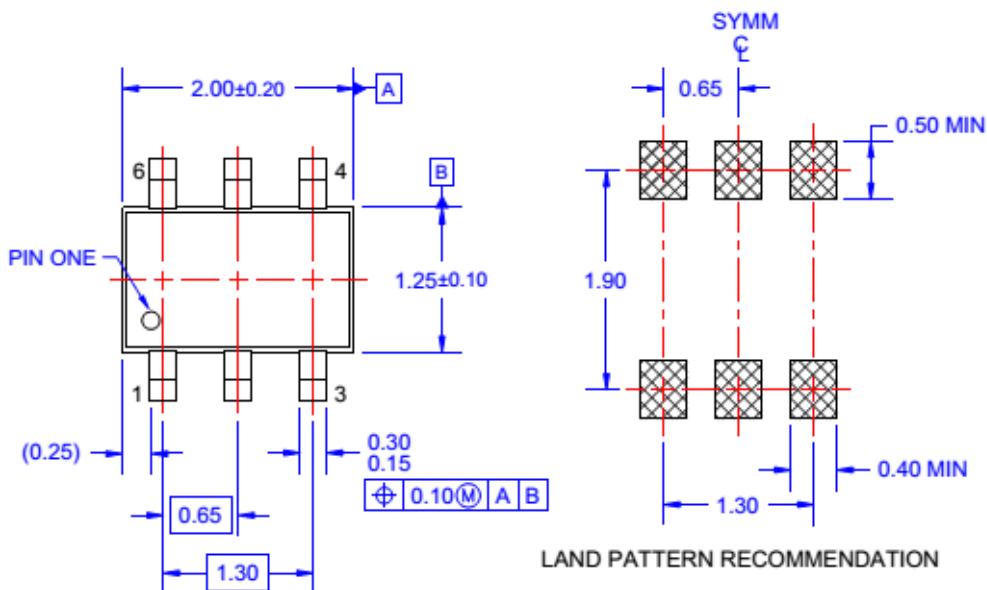


Figure 4. On-Resistance Variation With Input Voltage

Dimensional Outline and Pad Layout



NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO EIAJ SC-88, 1996.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- D) DRAWING FILENAME: MKT-MAA06AREV6

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