

Integrated Load Switch

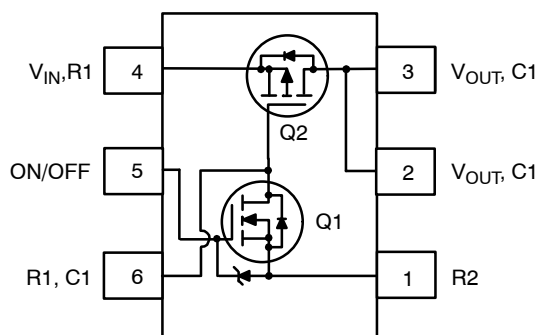
FDC6329L

Description

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

Features

- $V_{DROPP} = 0.20\text{ V @ } V_{IN} = 5\text{ V, } I_L = 2.8\text{ A, } R_{(on)} = 0.07\ \Omega$
- $V_{DROPP} = 0.20\text{ V @ } V_{IN} = 2.5\text{ V, } I_L = 1.9\text{ A, } R_{(on)} = 0.105\ \Omega$
- Control MOSFET (Q1) Includes Zener Protection for ESD Ruggedness (> 6 kV Human Body Model)
- High Performance Trench Technology for Extremely Low On-Resistance
- SUPERSOT-6 Package Design Using Copper Lead Frame for Superior Thermal and Electrical Capabilities
- This is a Pb-Free and Halide Free Device



See Application Circuit (Figure 3)

Figure 1.

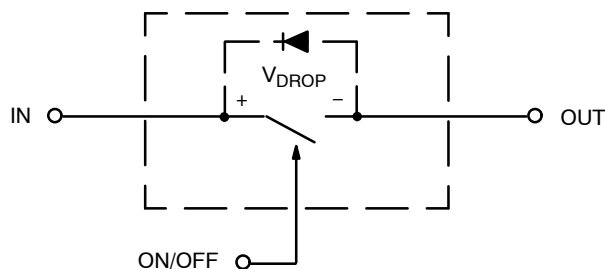


Figure 2. Equivalent Circuit



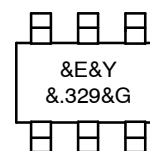
ON Semiconductor®

www.onsemi.com



TSOT-23-6
CASE 419BL

MARKING DIAGRAM



- &E = Designates Space
- &Y = Binary Calendar Year Coding Scheme
- &. = Pin One Dot
- 329 = Specific Device Code
- &G = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------|------------------------|-----------------------|
| FDC6329L | TSOT-23-6 (Pb-Free) | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

FDC6329L

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Value | Unit |
|----------------|--|------------|------------------|
| V_{IN} | Input Voltage Range (Note 1) | 2.5–8 | V |
| $V_{ON/OFF}$ | On/Off Voltage Range | 1.5–8 | V |
| I_L | Load Current – Continuous (Note 2) | 2.5 | A |
| | Load Current – Pulsed | 10 | |
| P_D | Maximum Power Dissipation (Note 2) | 0.7 | W |
| T_J, T_{STG} | Operating and Storage Temperature Range | –55 to 150 | $^\circ\text{C}$ |
| ESD | Electrostatic Discharge Rating MIL–STD–883D Human Body Model (100 pF / 1500 Ω) | 6 | kV |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Value | Unit |
|-----------------|--|-------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction–to–Ambient (Note 2) | 180 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction–to–Case (Note 2) | 60 | $^\circ\text{C}/\text{W}$ |

ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|--------|-----------|-----------------|-----|-----|-----|------|
|--------|-----------|-----------------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | | |
|----------|-------------------------|--|---|---|---|---------------|
| I_{FL} | Forward Leakage Current | $V_{IN} = 8\text{ V}, V_{ON/OFF} = 0\text{ V}$ | – | – | 1 | μA |
|----------|-------------------------|--|---|---|---|---------------|

ON CHARACTERISTICS (Note 3)

| | | | | | | |
|--------------|---------------------------------------|---|-----|-------|-------|----------|
| V_{DROP} | Conduction Voltage | $V_{IN} = 5\text{ V}, V_{ON/OFF} = 3.3\text{ V}, I_L = 2.8\text{ A}$ | – | 0.12 | 0.2 | V |
| | | $V_{IN} = 2.5\text{ V}, V_{ON/OFF} = 3.3\text{ V}, I_L = 1.9\text{ A}$ | – | 0.14 | 0.2 | |
| $R_{DS(on)}$ | Q ₂ – Static On–Resistance | $V_{GS} = -5\text{ V}, I_D = -2.5\text{ A}$ | – | 0.047 | 0.07 | Ω |
| | | $V_{GS} = -2.5\text{ V}, I_D = -2.0\text{ A}$ | – | 0.073 | 0.105 | |
| I_L | Load Current | $V_{DROP} = 0.2\text{ V}, V_{IN} = 5\text{ V}, V_{ON/OFF} = 3.3\text{ V}$ | 2.8 | – | – | A |
| | | $V_{DROP} = 0.2\text{ V}, V_{IN} = 2.5\text{ V}, V_{ON/OFF} = 3.3\text{ V}$ | 1.9 | – | – | |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTES:

- Range of V_{IN} can be up to 8 V, but R_1 and R_2 must be scaled such that V_{GS} of Q₂ does not exceed –8 V.
- $R_{\theta JA}$ 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 $R_{\theta CA}$ is determined by the user’s board design.
- Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

FDC6329L

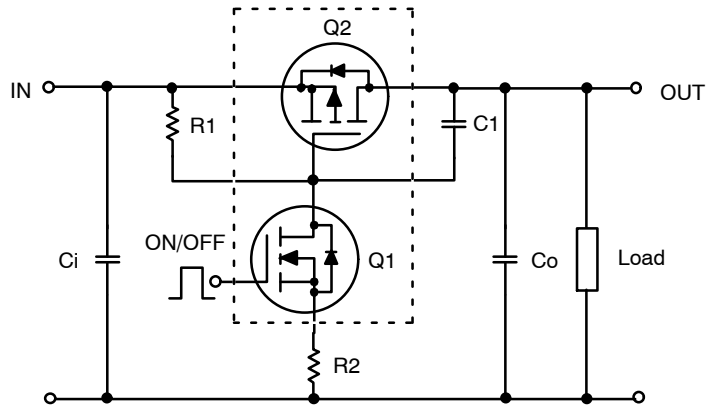


Figure 3. FDC6329L Load Switch Application

External Component Recommendation:

For applications where $C_o \leq 1 \mu\text{F}$.

For slew rate control, select R2 in the range of 1k – 4.7 k Ω .

For additional in-rush current control, $C_1 \leq 1000 \text{ pF}$ can be added.

Select R1 so that the R1/R2 ratio ranges from 10 – 100. R1 is required to turn Q2 off.

TYPICAL CHARACTERISTICS

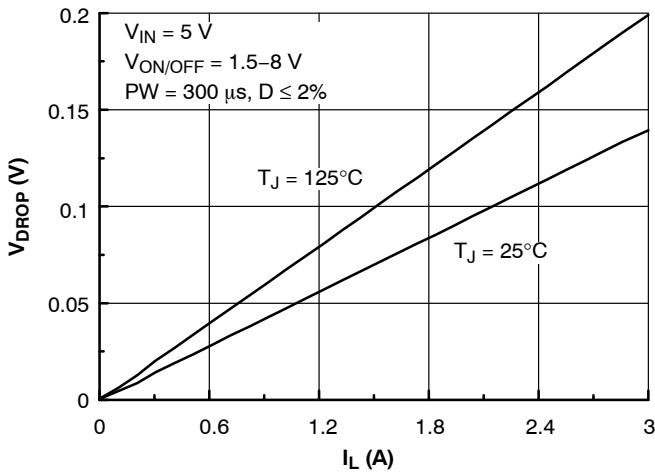


Figure 4. Conduction Voltage Drop Variation with Load Current

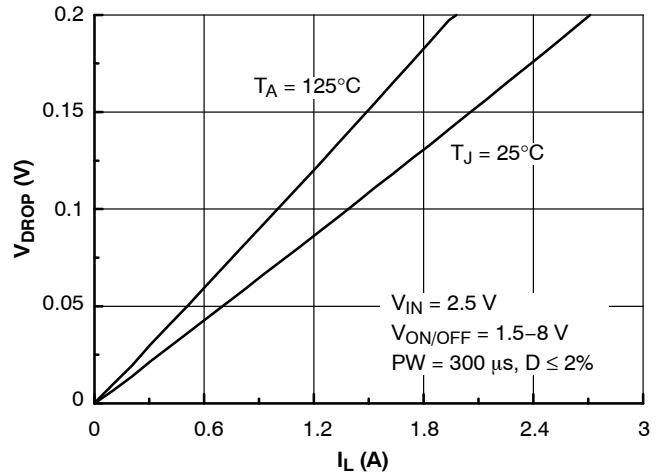


Figure 5. Conduction Voltage Drop Variation with Load Current

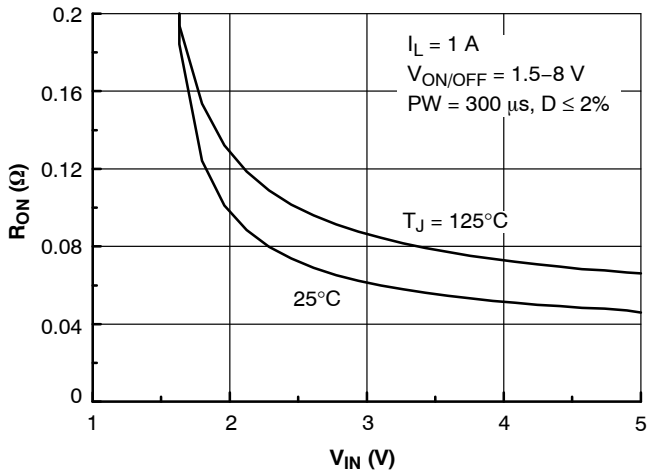


Figure 6. On-Resistance Variation with Input Voltage

TYPICAL CHARACTERISTICS (continued)

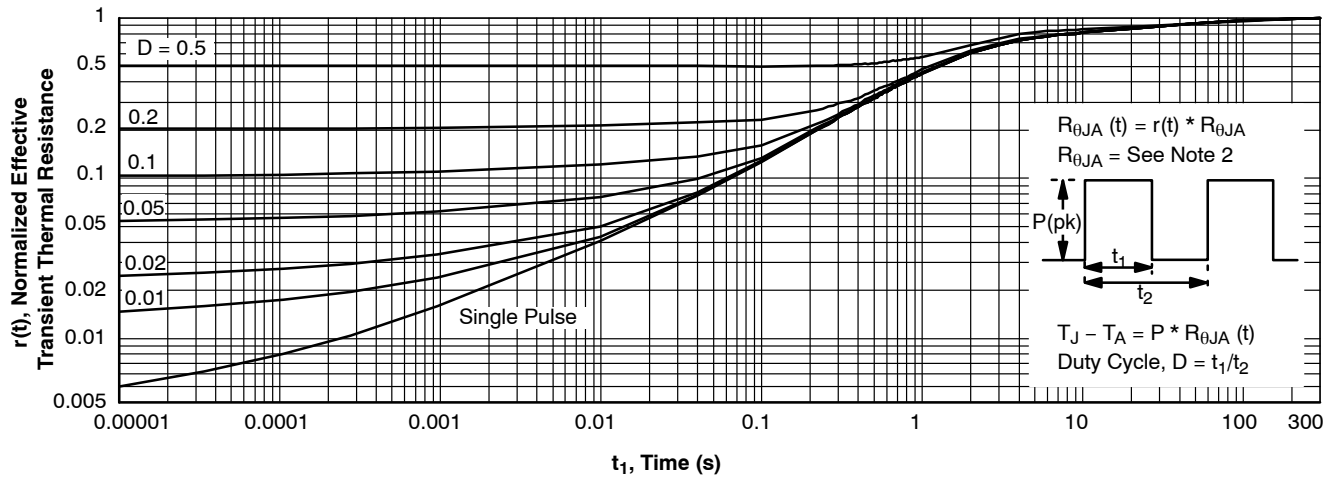


Figure 7. Transient Thermal Response Curve

NOTE: Thermal characterization performed on the conditions described in Note 2.
 Transient thermal response will change depending on the circuit board design.

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 2:1

TSOT23 6-Lead CASE 419BL ISSUE A

DATE 31 AUG 2020



TOP VIEW



FRONT VIEW



DETAIL A



SIDE VIEW

SYMM
⌀



LAND PATTERN
RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25MM PER END. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
4. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

| DIM | MILLIMETERS | | |
|-----|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0.00 | 0.05 | 0.10 |
| A2 | 0.70 | 0.85 | 1.00 |
| A3 | 0.25 BSC | | |
| b | 0.25 | 0.38 | 0.50 |
| c | 0.10 | 0.18 | 0.26 |
| D | 2.80 | 2.95 | 3.10 |
| d | 0.30 REF | | |
| E | 2.50 | 2.75 | 3.00 |
| E1 | 1.30 | 1.50 | 1.70 |
| e | 0.95 BSC | | |
| e1 | 1.90 BSC | | |
| L1 | 0.60 REF | | |
| L2 | 0.20 | 0.40 | 0.60 |
| ⌀ | 0° | -- | 10° |

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

| | | |
|------------------|---------------|--|
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