

Integrated Load Switch

FDC6326L

Description

This device is particularly suited for compact power management in portable electronic equipment where 3 V to 20 V input and 1.8 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

- $V_{DRO} = 0.20 \text{ V @ } V_{IN} = 12 \text{ V, } I_L = 1.5 \text{ A, } R_{DS(on)} = 0.125 \Omega$
- $V_{DRO} = 0.20 \text{ V @ } V_{IN} = 5 \text{ V, } I_L = 1 \text{ A, } R_{DS(on)} = 0.20 \Omega$
- SUPERSOT-6 Package Design Using Copper Lead Frame for Superior Thermal and Electrical Capabilities
- This is a Pb-Free and Halide Free Device

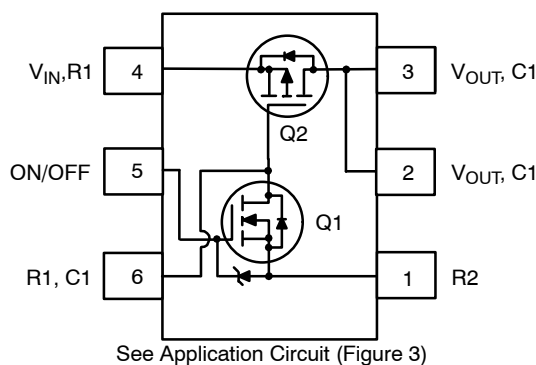


Figure 1.

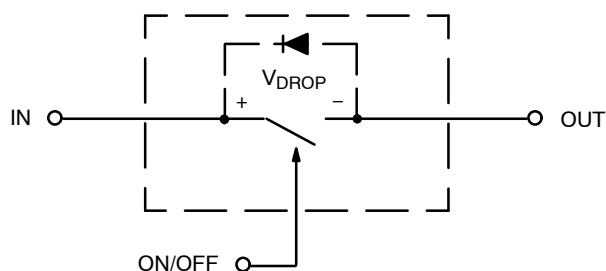


Figure 2. Equivalent Circuit



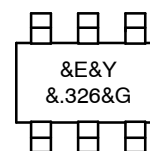
ON Semiconductor®

www.onsemi.com



TSOT-23-6
CASE 419BL

MARKING DIAGRAM



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

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------|------------------------|-----------------------|
| FDC6326L | 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.

FDC6326L

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

| Symbol | Parameter | Value | Unit |
|----------------|--------------------------------------------------------------------------------------|------------|------------------|
| V_{IN} | Input Voltage Range | 3–20 | V |
| $V_{ON/OFF}$ | On/Off Voltage Range | 2.5–8 | V |
| I_L | Load Current – Continuous (Note 1) | 1.8 | A |
| | Load Current – Pulsed (Note 1, Note 3) | 5 | |
| 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 | $V_{IN} = 20\text{ V}, V_{ON/OFF} = 0\text{ V}$ | – | – | 1 | μA |
|----------|-------------------------|-------------------------------------------------|---|---|---|---------------|

ON CHARACTERISTICS (Note 3)

| | | | | | | |
|--------------|------------------------------|------------------------------------------------------------------------------|---|-------|-------|----------|
| V_{DROP} | Conduction Voltage Drop | $V_{IN} = 12\text{ V}, V_{ON/OFF} = 3.3\text{ V}, I_L = 1.5\text{ A}$ | – | 0.15 | 0.2 | V |
| | | $V_{IN} = 5\text{ V}, V_{ON/OFF} = 3.3\text{ V}, I_L = 1\text{ A}$ | – | 0.14 | 0.2 | |
| $R_{DS(on)}$ | Q_2 – Static On–Resistance | $V_{GS} = -12\text{ V}, I_D = -1.9\text{ A}$ | – | 0.095 | 0.125 | Ω |
| | | $V_{GS} = -5\text{ V}, I_D = -1.5\text{ A}$ | – | 0.14 | 0.2 | |
| I_L | Load Current | $V_{DROP} = 0.125\text{ V}, V_{IN} = 12\text{ V}, V_{ON/OFF} = 3.3\text{ V}$ | 1 | – | – | A |
| | | $V_{DROP} = 0.20\text{ V}, V_{IN} = 5\text{ V}, V_{ON/OFF} = 3.3\text{ V}$ | 1 | – | – | |

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:

- $V_{IN} = 20\text{ V}, V_{ON/OFF} = 8\text{ V}, T_A = 25^\circ\text{C}$
- $R_{\theta JA}$ 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 $\leq 2.0\%$.

FDC6326L

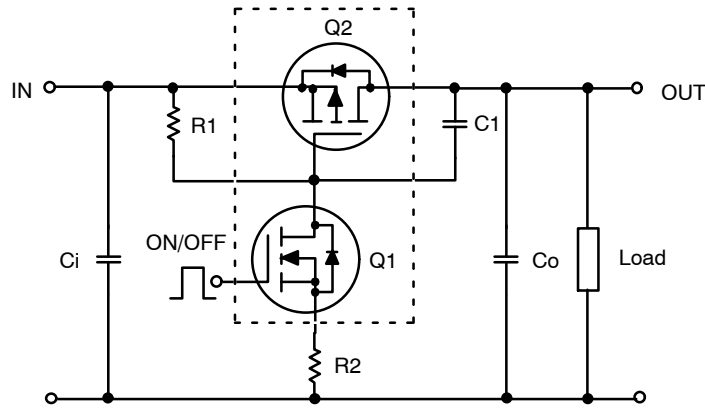


Figure 3. FDC6326L Load Switch Application

External Component Recommendation:

First select R2, 100–1 k Ω , for Slew Rate control.

C1 \leq 1000 pF can be added in addition to R2 for further In-rush current control.

Then select R1 such that R1/R2 ratio maintains between 10–100. R1 is required to turn Q2 off.

For SPICE simulation, users can download a "FDC6326L.MOD" Spice model from ON Semiconductor Web Site at www.onsemi.com

TYPICAL CHARACTERISTICS

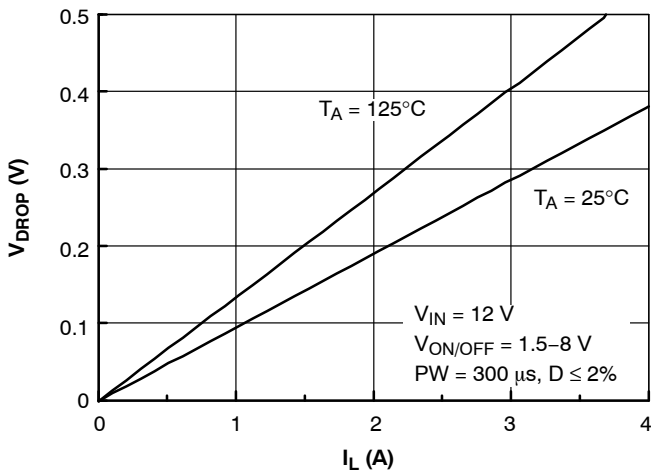


Figure 4. Conduction Voltage Drop Variation with Load Current

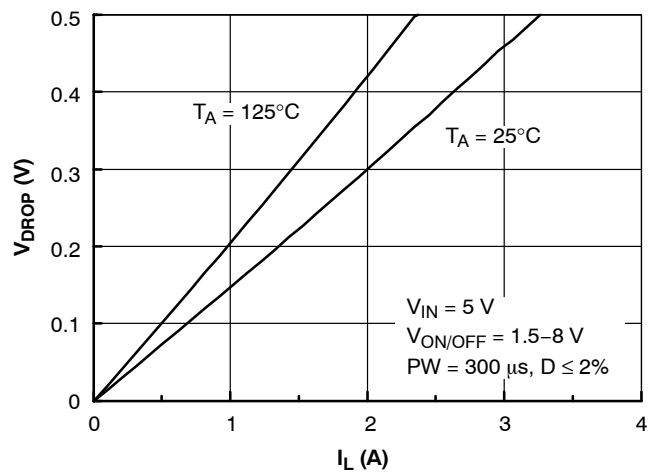


Figure 5. Conduction Voltage Drop Variation with Load Current

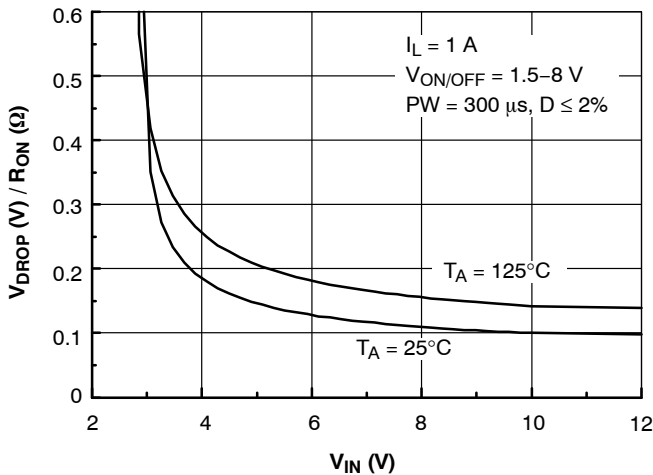


Figure 6. On-Resistance Variation with Input Voltage

TYPICAL CHARACTERISTICS (continued)

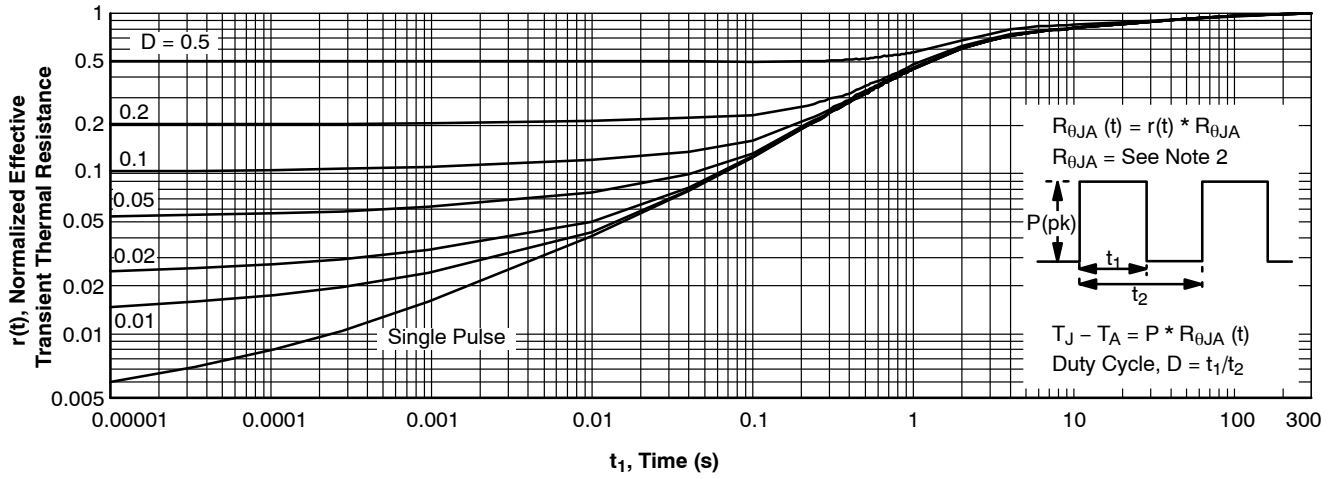


Figure 7. Transient Thermal Response Curve

NOTE: Thermal characterization performed on the conditions described in Note 2.

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



1
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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