

FDR8521L

P-Channel MOSFET With Gate Driver For Load Switch Application

General Description

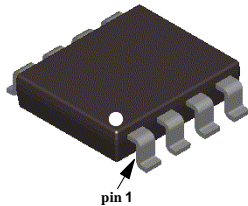
This device is designed for configuration as a load switch and is particularly suited for power management in portable battery powered electronic equipment. Designed to operate from 3V to 20V input and supply up to 2.9A, the device features a small N-Channel MOSFET (Q1) together with a large P-Channel Power MOSFET (Q2) in a single SO-8 package.

Applications

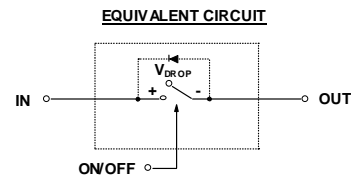
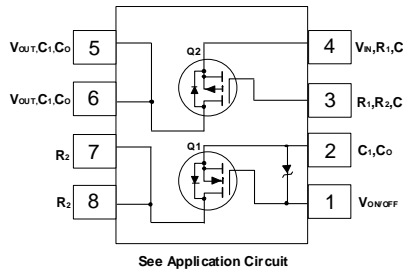
- Power management
- Load switch

Features

- $V_{\text{DROP}} = 0.07 \text{ V} @ V_{\text{IN}} = 12 \text{ V}, I_{\text{L}} = 1 \text{ A}, R_{\text{(ON)}} = 0.07 \Omega$
 $V_{\text{DROP}} = 0.115 \text{ V} @ V_{\text{IN}} = 5 \text{ V}, I_{\text{L}} = 1 \text{ A}, R_{\text{(ON)}} = 0.115 \Omega.$
- $V_{\text{DROP}} = 0.2 \text{ V} @ V_{\text{IN}} = 12 \text{ V}, I_{\text{L}} = 2.9 \text{ A}, R_{\text{(ON)}} = 0.07 \Omega$
 $V_{\text{DROP}} = 0.2 \text{ V} @ V_{\text{IN}} = 5 \text{ V}, I_{\text{L}} = 1.8 \text{ A}, R_{\text{(ON)}} = 0.115 \Omega.$
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6kV Human Body Model).
- High density cell design for extremely low on-resistance.



SuperSOT™-8



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V _{IN}	Input Voltage Range (Note 1)	3 - 20	V
V _{ON/OFF}	On/Off Voltage Range	2.5 - 8	V
I _D	Load Current - Continuous (Note 2)	2.9	A
		8	
P _D	Maximum Power Dissipation (Note 2)	0.8	W
T _J , T _{stg}	Operating and Storage Temperature Range	-55 to +150	°C
ESD	Electrostatic Discharge Rating MIL-STD-883D Human-Body-Model (100pf/1500 Ohm)	6	kV

Thermal Characteristics

R _{θJA}	Thermal Resistance, Junction-to-Ambient (Note 2)	156	°C/W
R _{θJC}	Thermal Resistance, Junction-to-Case (Note 2)	40	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
8521L	FDR8521L	13"	12mm	3000 units

Electrical Characteristics T_A=25°C unless otherwise noted

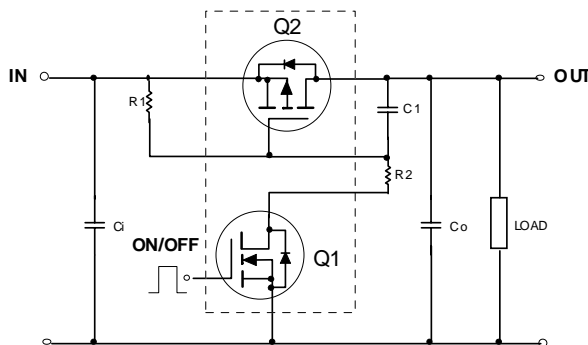
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF Characteristics						
I _{FL}	Forward Leakage Current	V _{IN} = 20 V, V _{ON/OFF} = 250 μA			1	μA
ON Characteristics (Note 3)						
V _{DROP}	Conduction Voltage	V _{IN} = 12 V, V _{ON/OFF} = 3.3 V, I _L = 1 A V _{IN} = 5 V, V _{ON/OFF} = 3.3 V, I _L = 1 A V _{IN} = 12 V, V _{ON/OFF} = 3.3 V, I _L = 2.9 A V _{IN} = 5 V, V _{ON/OFF} = 3.3 V, I _L = 1.8 A		0.053 0.085	0.070 0.115 0.200 0.200	V
R _(ON)	Q ₂ - Static On-Resistance	V _{GS} = -12 V, I _D = 2.9 A V _{GS} = -5 V, I _D = 1.8 A		0.054 0.090	0.070 0.115	Ω
I _L	Load Current	V _{DROP} = 0.2 V, V _{IN} = 12 V, V _{ON/OFF} = 3.3 V V _{DROP} = 0.2 V, V _{IN} = 5 V, V _{ON/OFF} = 3.3 V	2.9 1.8			A

Notes:

1. Range of V_{IN} can be up to 25V, but R₁ and R₂ must be scaled such that V_{GS} of Q₂ does not exceed -20V.
2. R_{θJA} 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_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.
3. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%.

FDR8521L Load Switch Application

APPLICATION CIRCUIT



External Component Recommendation:

- For applications where Co ≤ 1μF.
- For slew rate control, select R2 in the range of 470 - 10kΩ .
- For additional in-rush current control, C1 ≤ 1000pF can be added.
- Select R1 so that the R1/R2 ratio ranges from 10 - 100. R1 is required to turn Q2 off.

Typical Characteristics (continued)

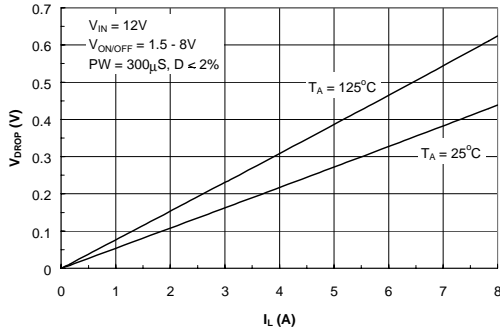


Figure 1. Conduction Voltage Drop Variation with Load Current.

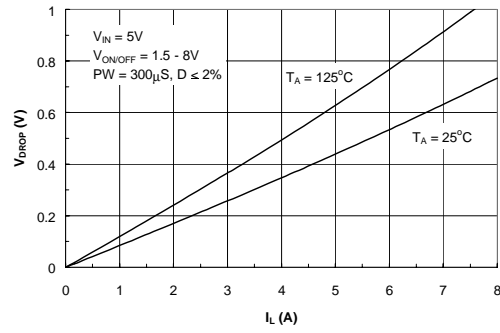


Figure 2. Conduction Voltage Drop Variation with Load Current.

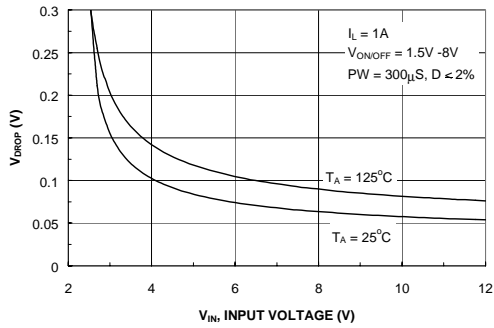


Figure 3. On-Resistance Variation with Input Voltage.

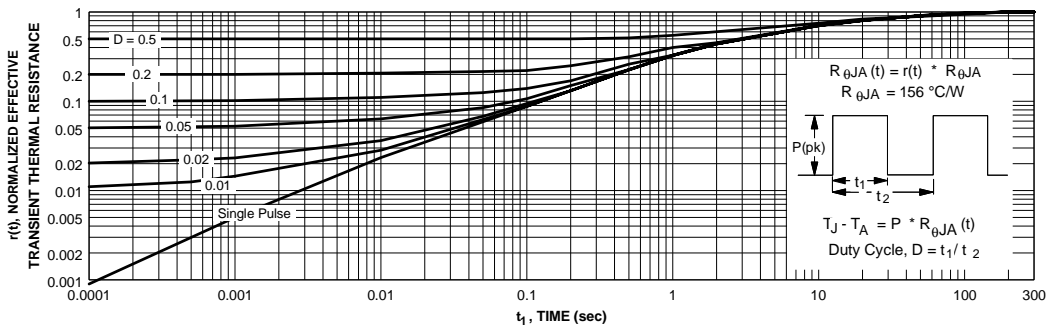


Figure 4. Transient Thermal Response Curve.

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

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE ^x ™	FAST ^r ™	QFET™	VCX™
Bottomless™	GlobalOptoisolator™	QS™	
CoolFET™	GTO™	QT Optoelectronics™	
CROSSVOLT™	HiSeC™	Quiet Series™	
DOME™	ISOPLANAR™	SuperSOT™-3	
E ² CMOS™	MICROWIRE™	SuperSOT™-6	
EnSigna™	OPTOLOGIC™	SuperSOT™-8	
FACT™	OPTOPLANAR™	SyncFET™	
FACT Quiet Series™	POP™	TinyLogic™	
FAST®	PowerTrench®	UHC™	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.