



ON Semiconductor®

FDG6324L Integrated Load Switch

General Description

This device is intended to be configured as a load switch and is particularly suited for compact computer peripheral switching applications where 3V to 20V input and 0.6A output current capability are needed. This device features a small N-Channel MOSFET (Q1) together with a large P-Channel Power MOSFET (Q2) in a single SC70-6 package.

Features

- $V_{\text{DROP}}=0.2\text{V}$ @ $V_{\text{IN}}=12\text{V}$, $I_{\text{L}}=0.36\text{A}$. $R_{(\text{ON})} = 0.55\Omega$. $V_{\text{DROP}}=0.2\text{V}$ @ $V_{\text{IN}}=5\text{V}$, $I_{\text{L}}=0.27\text{A}$. $R_{(\text{ON})} = 0.75\Omega$.
- Very small package outline (SC70-6).
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (> 6KV Human Body Model).
- High density cell design for extremely low on-resistance.



SC70-6



SOT-23



SuperSOT™-6



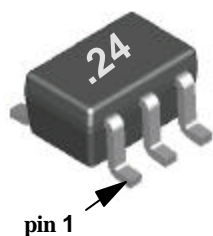
SuperSOT™-8



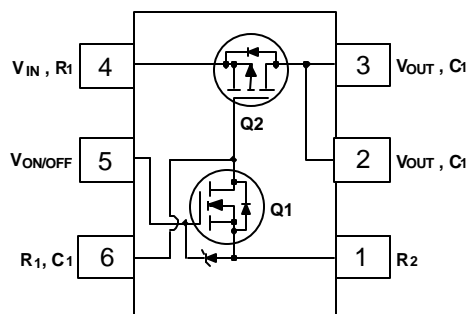
SO-8



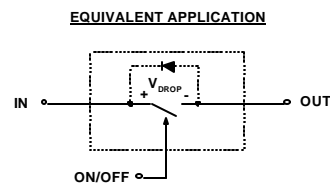
SOT-223



SC70-6



See Application Circuit



Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	FDG6324L	Units
V_{IN}	Input Voltage Range	3 - 20	V
$V_{\text{ON/OFF}}$	On/Off Voltage Range	2.5 - 8	V
I_{L}	Load Current - Continuous (Note 1)	0.6	A
	- Pulsed (Note 1 & 3)	1.8	
P_{D}	Maximum Power Dissipation (Note 2)	0.3	W
$T_{\text{J}}, T_{\text{STG}}$	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
ESD	Electrostatic Discharge Rating Human Body Model (100pf/1500Ohm)	6	kV

THERMAL CHARACTERISTICS

Symbol	Parameter	FDG6324L	Units
$R_{\theta\text{JA}}$	Thermal Resistance, Junction-to-Ambient (Note 2)	415	$^\circ\text{C/W}$

Electrical Characteristics (T_A = 25°C unless otherwise noted)

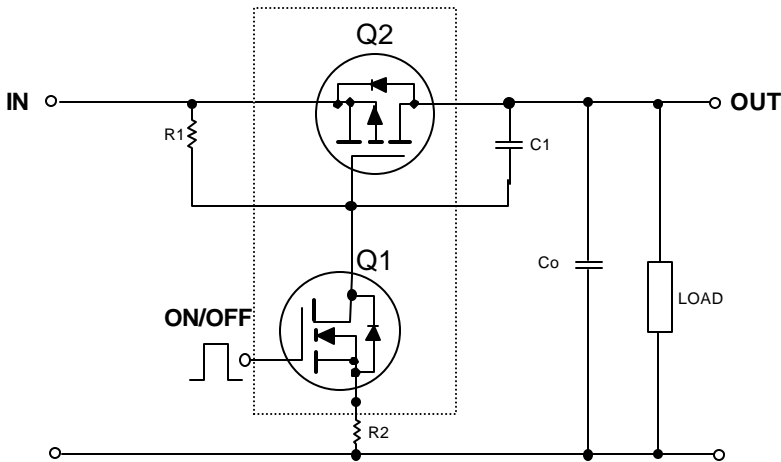
Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
I _{FL}	Forward Leakage Current	V _{IN} = 20 V, V _{ON/OFF} = 0 V			1	μA
ON CHARACTERISTICS (Note 3)						
V _{DROP}	Conduction Voltage Drop	V _{IN} = 12 V, V _{ON/OFF} = 3.3 V, I _L = 0.36 A		0.14	0.2	V
		V _{IN} = 5 V, V _{ON/OFF} = 3.3 V, I _L = 0.27 A		0.16	0.2	
R _(ON)	Q ₂ - Static On-Resistance	V _{GS} = -12 V, I _D = -0.6 A		0.37	0.55	Ω
		V _{GS} = -5 V, I _D = -0.5 A		0.58	0.75	
I _L	Load Current	V _{DROP} = 0.2 V, V _{IN} = 12 V, V _{ON/OFF} = 3.3 V	0.36			A
		V _{DROP} = 0.2 V, V _{IN} = 5 V, V _{ON/OFF} = 3.3 V	0.27			

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_{θCA} is determined by the user's board design. Thermal ratings based on minimum mounting pad.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

FDG6324L Load Switch Application

APPLICATION CIRCUIT



External Component Recommendation

For Co ≤ 1μF applications:

R1 is required to turn Q2 off.

R2 and C1 are optional for slew rate control.

First select R2, 100 -1KΩ, for slew rate control.

Then select R1 such that the ratio R1/R2 is maintained between 10-100.

SPICE model (FDG6324L.MOD) available at www.onsemi.com.

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

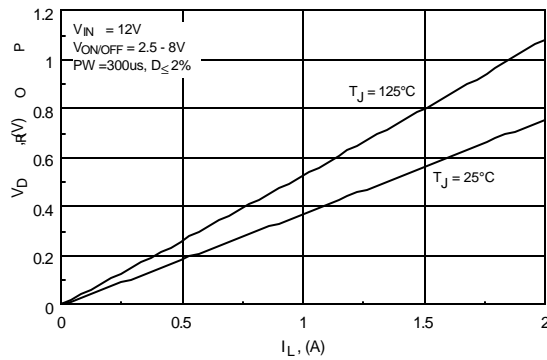


Figure 1. Conduction Voltage Drop Variation with Load Current.

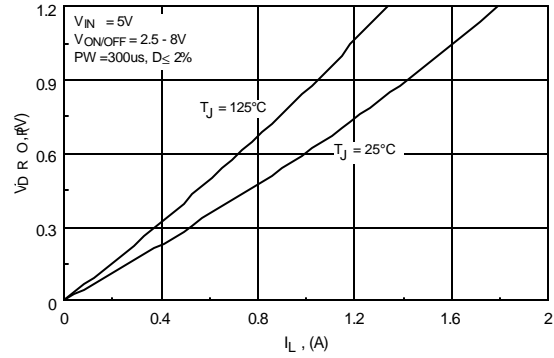


Figure 2. Conduction Voltage Drop Variation with Load Current.

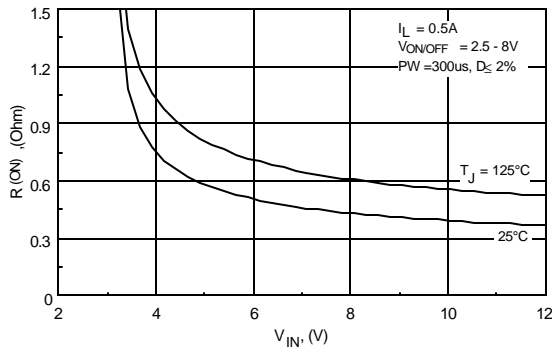


Figure 3. On-Resistance Variation with Input Voltage.

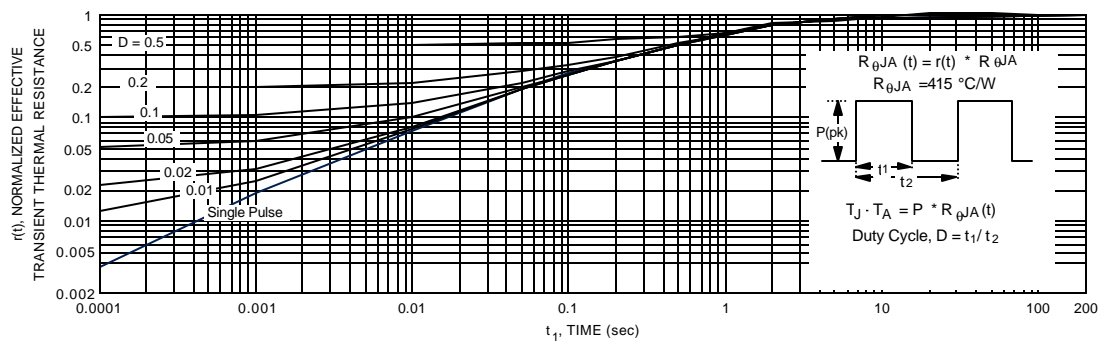


Figure 4. Transient Thermal Response Curve.

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

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local
Sales Representative