RoHS

COMPLIANT HALOGEN

FREE





Load Switch with Level-Shift

PRODUCT SUMMARY			
V _{DS2} (V)	$R_{DS(on)}(\Omega)$	I _D (A)	
1.8 to 8	0.215 at V _{IN} = 4.5 V	± 1.2	
	0.300 at V _{IN} = 2.5 V	± 1.0	
	0.440 at V _{IN} = 1.8 V	± 0.7	

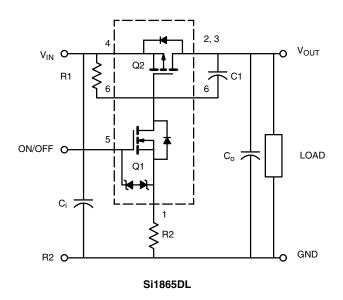
DESCRIPTION

The Si1865DL includes a p- and p-channel MOSFET in a single SC70-6 package. The low on-resistance p-channel TrenchFET is tailored for use as a load switch. The n-channel, with an external resistor, can be used as a level-shift to drive the p-channel load-switch. The n-channel MOSFET has internal ESD protection and can be driven by logic signals as low as 1.5 V. The Si1865DL operates on supply lines from 1.8 V to 8 V, and can drive loads up to 1.2 A.

FEATURES

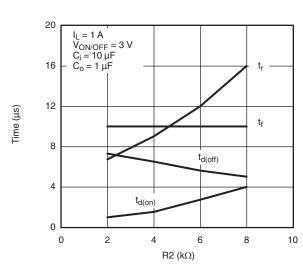
- Halogen-free According to IEC 61249-2-21 Definition
- 215 m Ω Low R_{DS(on)} TrenchFET[®]
- 1.8 V to 8 V Input
- 1.5 V to 8 V Logic Level Control
- Low Profile, Small Footprint SC70-6 Package
- 2000 V ESD Protection On Input Switch, V_{ON/OFF}
- Adjustable Slew-Rate
- 1.8 V Rated
- Compliant to RoHS Directive 2002/95/EC

APPLICATION CIRCUITS



COMPONENTS			
R1	Pull-Up Resistor	Typical 10 k Ω to 1 m Ω^*	
R2	Optional Slew-Rate Control	Typical 0 k Ω to 100 k Ω *	
C1	Optional Slew-Rate Control	Typical 1000 pF	

^{*} Minimum R1 value should be least 10 x R2 to ensure Q1 turn-on.



Note: For R2 switching variations with other V_{IN}/R1 combinations see Typical Characteristics

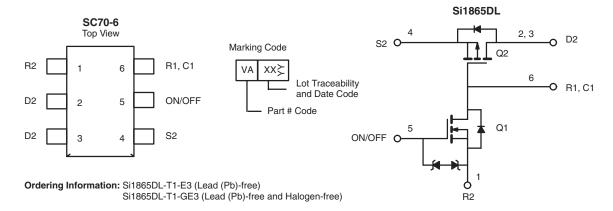
Switching Variation R2 at V_{IN} = 2.5 V, R1 = 20 k Ω

The Si1865DL is ideally suited for high-side load switching in portable applications. The integrated n-channel level-shift devices saves space by reducing external components. The slew rate is set externally so that rise-times can be tailored to different load types.

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FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted						
Parameter		Symbol	Limit	Unit		
Input Voltage		V _{IN}	8	V		
ON/OFF Voltage		V _{ON/OFF}	8	V		
Load Current	Continuous ^{a, b}	- IL	± 1.2	А		
Load Current	Pulsed ^{b, c}		± 3			
Continuous Intrinsic Diode Conduction ^a		I _S	- 0.4			
Maximum Power Dissipation ^a		P _D	0.4	W		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C		
ESD Rating, MIL-STD-833D Human Body Model (100 pF, 1500 Ω)		ESD	2	kV		

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient (continuous current) ^a	R _{thJA}	260	320	°C/W	
Maximum Junction-to-Foot (Q2)	R _{thJC}	180	220		

SPECIFICATIONS T _J = 25 °C unless otherwise noted							
Parameter	Symbol	Test Conditions		Тур.	Max.	Unit	
OFF Characteristics							
Reverse Leakage Current	V_{IN}	$V_{IN} = 8 \text{ V}, V_{ON/OFF} = 0 \text{ V}$			1	μΑ	
Diode Forward Voltage	ΙQ	I _S = - 0.4 A		0.85	1.1	V	
ON Characteristics							
Input Volatge	V _{IN}		1.8		8	V	
		$V_{ON/OFF} = 1.5$, $V_{IN} = 4.5$ V, $I_D = 1.2$ A		0.180	0.215		
On-Resistance (P-Channel) at 1 A	R _{DS(on)}	$V_{ON/OFF} = 1.5$, $V_{IN} = 2.5$ V, $I_D = 1.0$ A		0.250	0.300	Ω	
On-mesistance (i -onannei) at i A		$V_{ON/OFF} = 1.5$, $V_{IN} = 1.8$ V, $I_D = 0.7$ A		0.367	0.440	32	
		$V_{IN-OUT} \le 0.2 \text{ V}, V_{IN} = 5 \text{ V}, V_{ON/OFF} = 1.5 \text{ A}$	1				
On-State (P-Channel) Drain-Current	I _{D(on)}	$V_{IN-OUT} \le 0.3 \text{ V}, V_{IN} = 3 \text{ V}, V_{ON/OFF} = 1.5 \text{ A}$	1			Α	

Notes:

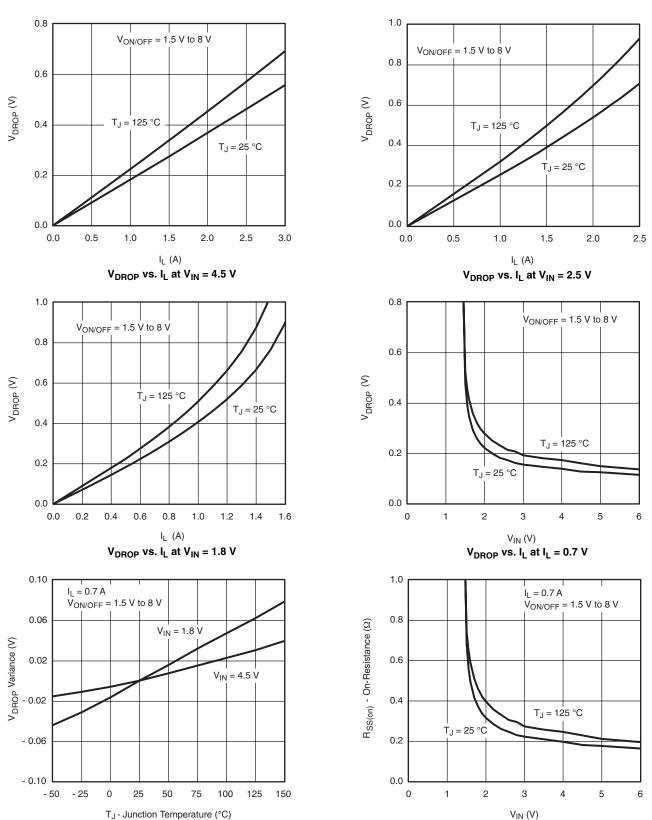
- a) Surface mounted on FR4 board.
- b) $V_{IN}=8$ V, $V_{ON/OFF}=8$ V, $T_A=25$ °C. c) Pulse test; pulse width \leq 300 μ s, duty cycle \leq 2 %.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.





TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

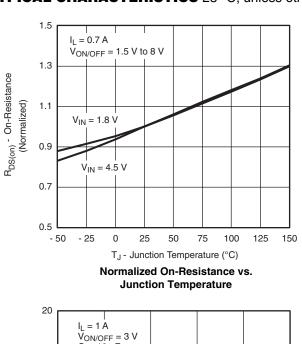


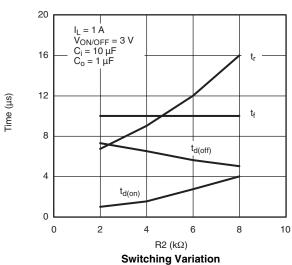
V_{DROP} Variance vs. Junction Temperature

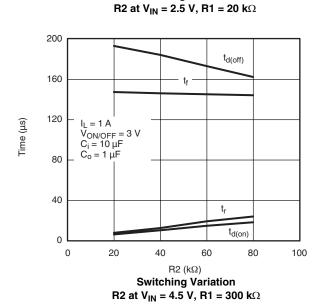
On-Resistance vs. Input Voltage

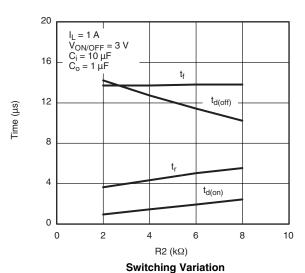
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

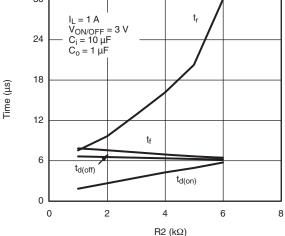




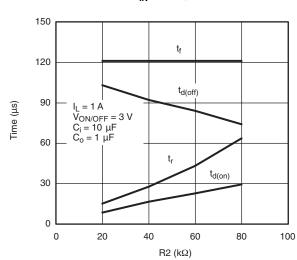




R2 at $V_{IN} = 1.8 \text{ V}$, R1 = 20 k Ω 30 I_L = 1 A $V_{ON/OFF} = 3 V$ $C_i = 10 \mu F$ 24 $C_0 = 1 \mu F$



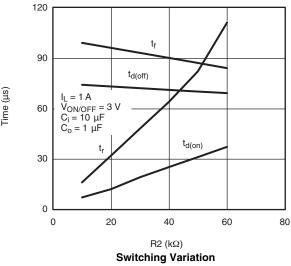
Switching Variation R2 at V_{IN} = 1.8 V, R1 = 20 k Ω



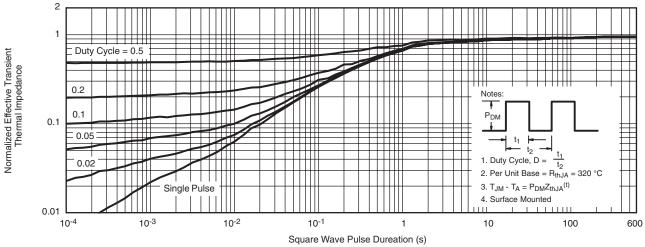
Switching Variation R2 at V_{IN} = 2.5 V, R1 = 300 k Ω



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Switching Variation R2 at V_{IN} = 1.8 V, R1 = 300 k Ω



Normalized Thermal Transient Impedance, Junction-to-Ambient

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