SOLID STATE OPTRONICS

SDM4102

1 Form B
60V / 75mΩ
DC MOSFET Output Solid State Relay

Description

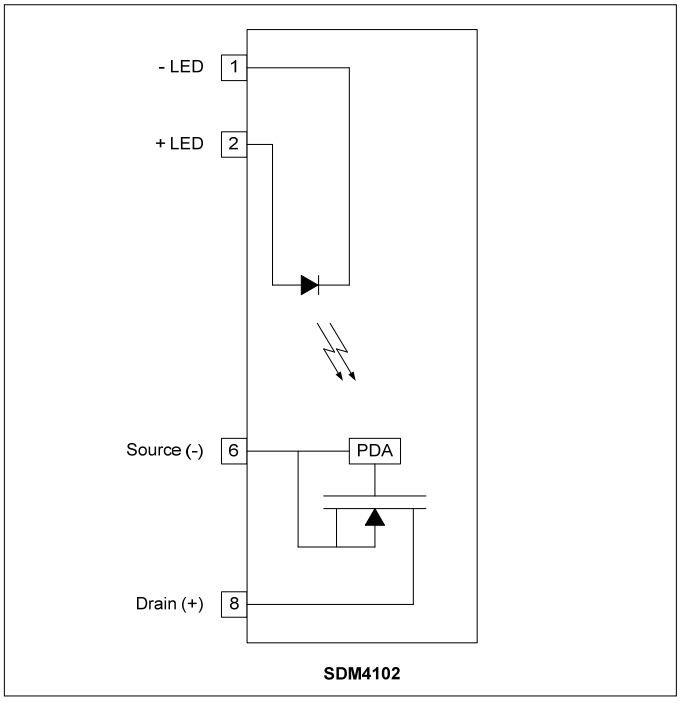
The SDM4102 is a DC, single-pole, single-throw, normally closed solid-state relay in a 4 pin single inline package. The relay consists of an AlGaAs LED, optically coupled to a high performance Photo Diode Array (PDA), which in turn drives one low on-resistance, rugged source-to-source depletion type DMOS transistor. The SDM4102 has an extremely low on resistance of 50mΩ (TYP) and a very high continuous load current rating of up to 3.4A. The combination of low on-resistance, small package outline and high load current capabilities make the SDM4102 a unique, unparalleled solid state relay.

The SDM4102 comes standard in a 4 pin SIP package.

Applications

- Multiplexers
- Meter reading systems
- Data Acquisition
- Medical Equipment
- Battery Monitoring
- Home/Safety Security Systems

Schematic Diagram



SDM4102

Features

- Low On Resistance (75mΩ MAX)
- High Continuous Load Current (3.4A)
- Low Input Control Power Consumption (2mA TYP)
- High Input-to-Output Isolation (3750V MIN)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

UL \ C-UL: File # E201932

Absolute Maximum Ratings

The values indicated are absolute stress ratings. Functional operation of the device is not implied at these or any conditions in excess of those defined in electrical characteristics section of this document. Exposure to absolute Maximum Ratings may cause permanent damage to the device and may adversely affect reliability.

Storage Temperature .....-55 to +125°C
Operating Temperature .....-40 to +85°C
Continuous Input Current.....50mA
Transient Input Current.....500mA
Reverse Input Control Voltage 6V
Input Power Dissipation.....40mW
Total Power Dissipation 1.2W
Solder Temperature – Wave (10sec).....260°C
Solder Temperature – IR Reflow (10sec).....260°C

Ordering Information

Part Number	Description
SDM4102	4 pin SIP, (25/Tube)

NOTE: Suffixes listed above are not included in marking on device for part number identification

Electrical Characteristics, T_A = 25°C (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.2	1.5	V	I_F = 10mA
LED Reverse Voltage	BV_R	6	-	-	V	I_R = 10µA
Input Reverse Current	I_R	-	-	10	µA	V_R = 6V
Turn-On Current	I_F	-	1	-	mA	$I_O = I_{O(MAX)}$
Turn-Off Current	I_{FOFF}	-	2	10	mA	$I_O = I_{O(MAX)}$
Output Specifications						
Blocking Voltage	V_B	60	-	-	V	I_F = 10mA, I_O = 1µA
Continuous Load Current	I_O	-	-	3.4	A	I_F = 0mA
On Resistance	R_{ON}	-	50	75	mΩ	I_F = 0mA, $I_O = I_{O(MAX)}$
Leakage Current	I_{Oleak}	-	0.1	1	µA	I_F = 10mA, V_O = 60V
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	I_F = 0mA
Coupled Specifications						
Turn-On Time	T_{ON}	-	0.1	2	mS	I_F = 0mA, $I_O = I_{O(MAX)}$, V_O = 20V
Turn-Off Time	T_{OFF}	-	2	5	mS	I_F = 10mA, $I_O = I_{O(MAX)}$, V_O = 20V
Coupled Capacitance	$C_{COUPLED}$	-	2	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/µS	dV = 50V
Isolation Specifications						
Isolation Voltage	V_{ISO}	3750	-	-	V_{RMS}	RH ≤ 50%, t=1min
Input-Output Resistance	R_{I-O}	-	10^{12}	-	Ω	V_{I-O} = 500V_{DC}

SDM4102 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

Figure 1: *Typical Turn-On Time Distribution* (N = 100, T_a = 25ºC)

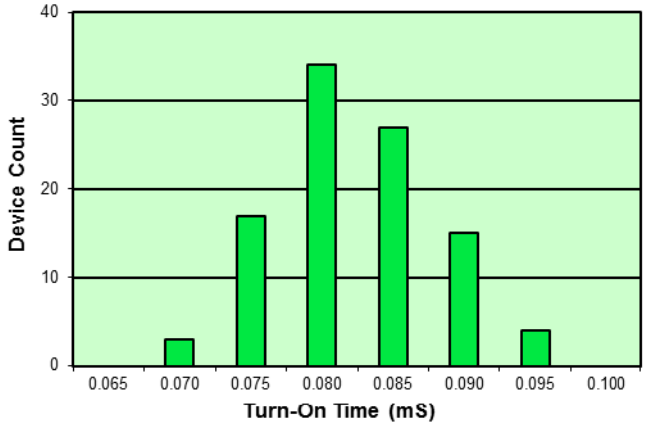


Figure 2: *Typical Turn-Off Time Distribution* (N = 100, T_a = 25ºC)

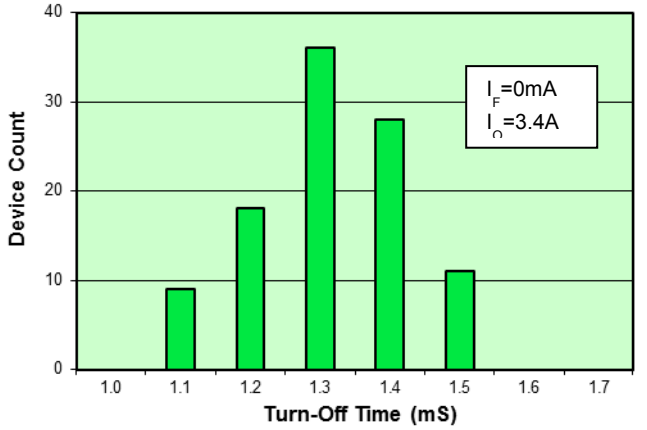


Figure 3: *Typical On-Resistance Distribution* (N = 100, T_a = 25ºC)

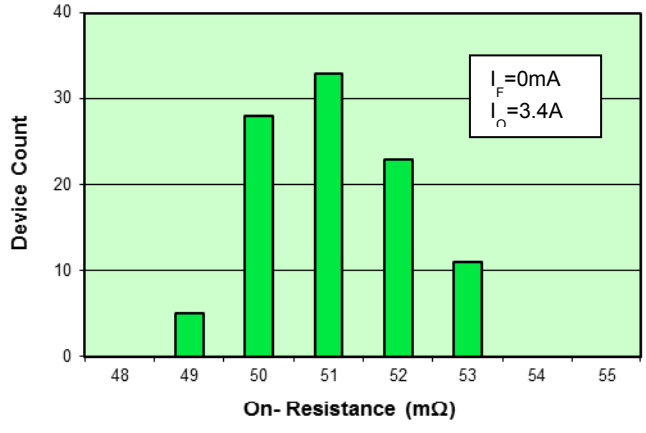


Figure 4: *Typical Output Leakage Current Distribution* (N = 100, T_a = 25ºC)

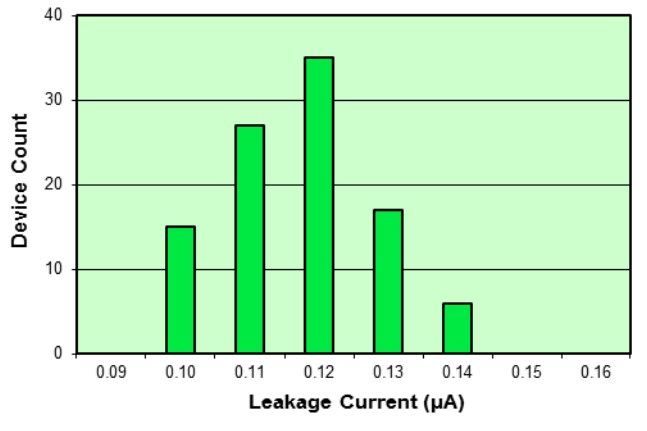


Figure 5: *Typical Blocking Voltage Distribution* (N = 100, Ta = 25ºC)

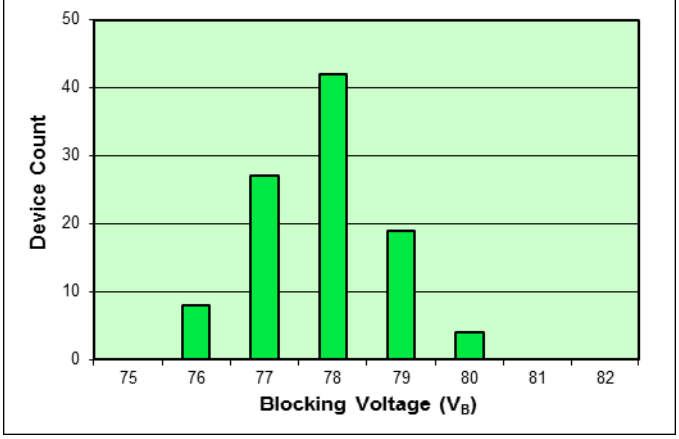
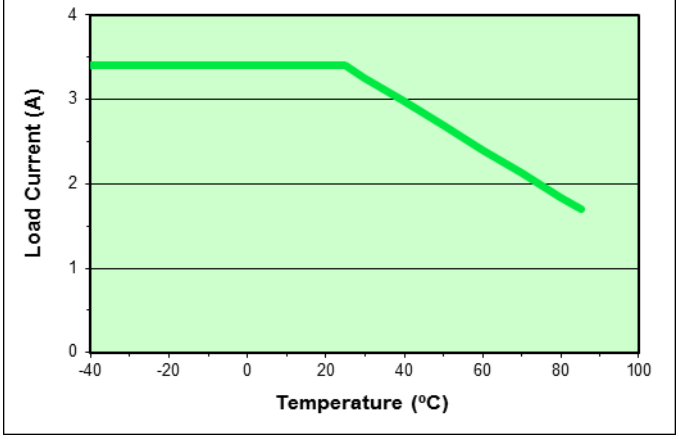


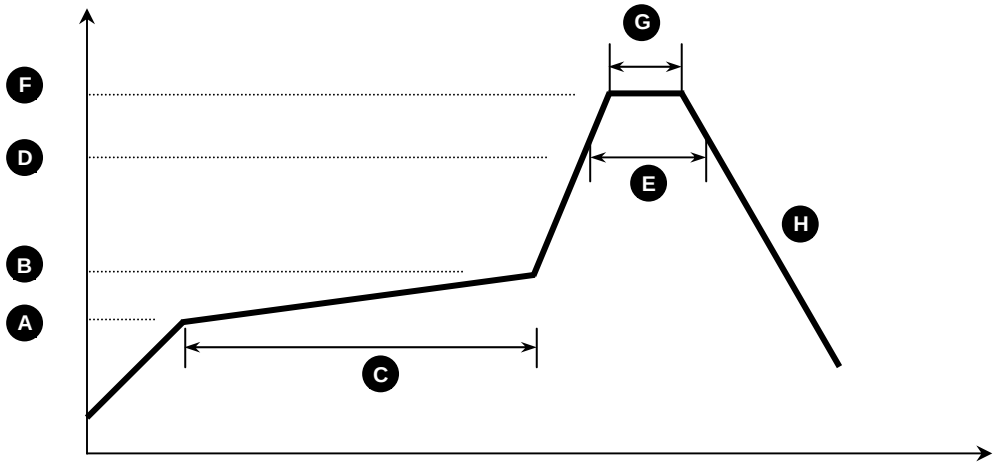
Figure 6: *Maximum Load Current vs. Temperature*



SDM4102 Solder Reflow Temperature Profile Recommendations

(1) *Infrared Reflow:*

Refer to the following figure as an example of an optimal temperature profile for single occurrence infrared reflow. Soldering process should not exceed temperature or time limits expressed herein. Surface temperature of device package should not exceed 250ºC:



Process Step	Description	Parameter
A	Preheat Start Temperature (ºC)	150ºC
B	Preheat Finish Temperature (ºC)	180ºC
C	Preheat Time (s)	90 - 120s
D	Melting Temperature (ºC)	230ºC
E	Time above Melting Temperature (s)	30s
F	Peak Temperature, at Terminal (ºC)	260ºC
G	Dwell Time at Peak Temperature (s)	10s
H	Cool-down (ºC/s)	<6ºC/s

(2) *Wave Solder:*

Maximum Temperature:	260ºC (at terminal)
Maximum Time:	10s
Pre-heating:	100 - 150ºC (30 - 90s)
Single Occurrence	

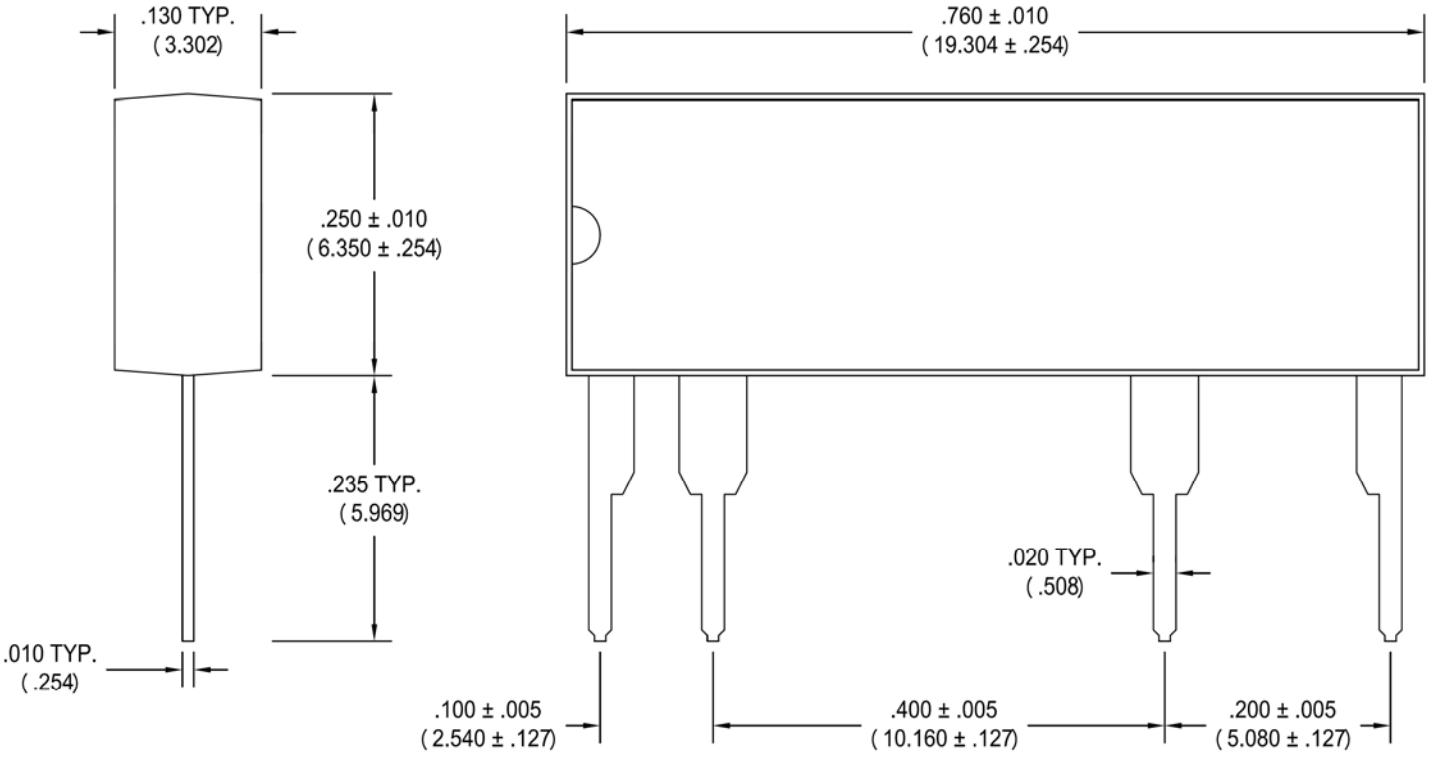
(3) *Hand Solder:*

Maximum Temperature:	350ºC (at tip of soldering iron)
Maximum Time:	3s
Single Occurrence	

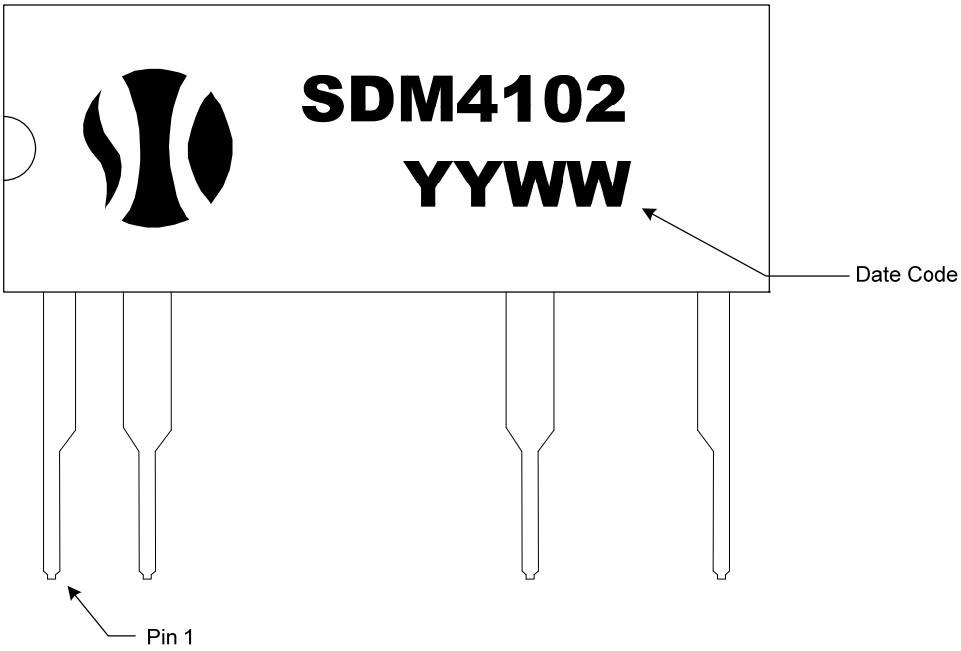
SDM4102 Package Dimensions

4 PIN SIP Package

Note: *All dimensions in inches with millimeters [mm] in parenthesis ()*



SDM4102 Package Marking



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