



Description

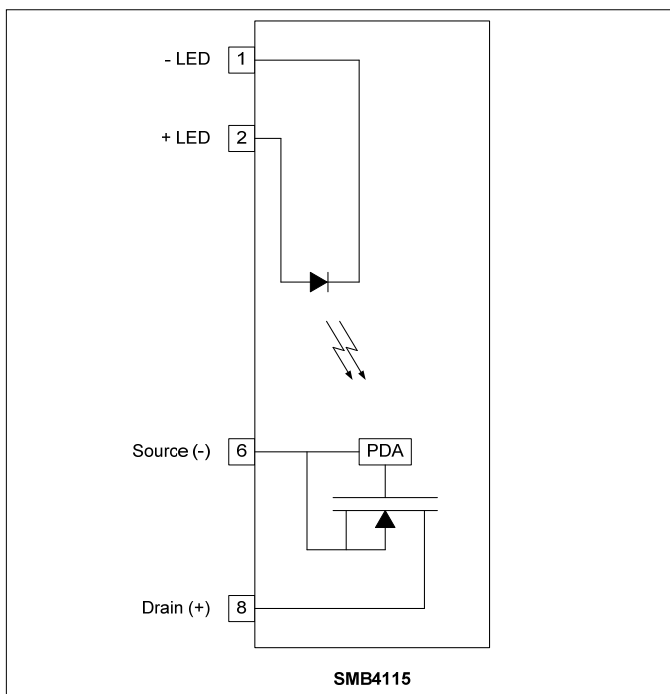
The SMB4115 is a DC, single-pole, single-throw, normally closed solid-state relay in a 4 pin single inline package. The relay consists of an AlGaAs LED, optically coupled to a high performance Photo Diode Array (PDA), which in turn drives one low on-resistance, rugged source-to-source depletion type DMOS transistor. The SMB4115 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 SMB4115 a unique, unparallelled solid state relay.

The SMB4115 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



Features

- Low On Resistance (75mΩ MAX)
- High Continuous Load Current (3.4A)
- Low Input Control Power Consumption (2mA TYP)
- High Input-to-Output Isolation (up to 5kV MIN)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

UL/C-UL: File # E90096
VDE: File # 40035191 (EN 60747-5-2)

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	5V
Input Power Dissipation	40mW
Total Power Dissipation	1.2W
Solder Temperature – Wave (10sec).....	260°C
Solder Temperature – IR Reflow (10sec).....	260°C

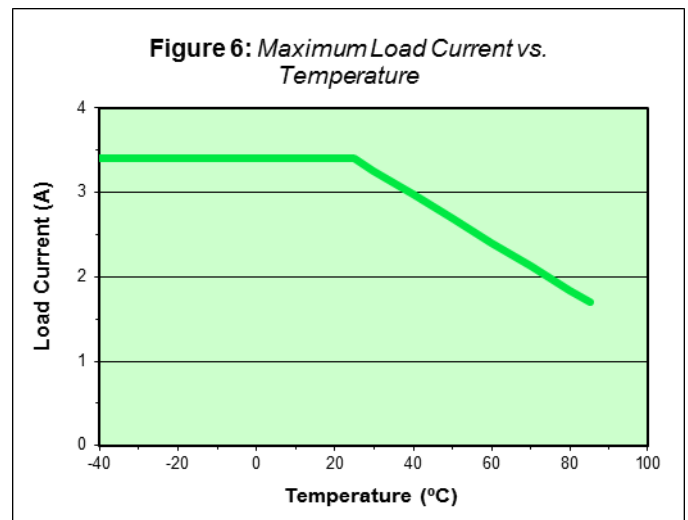
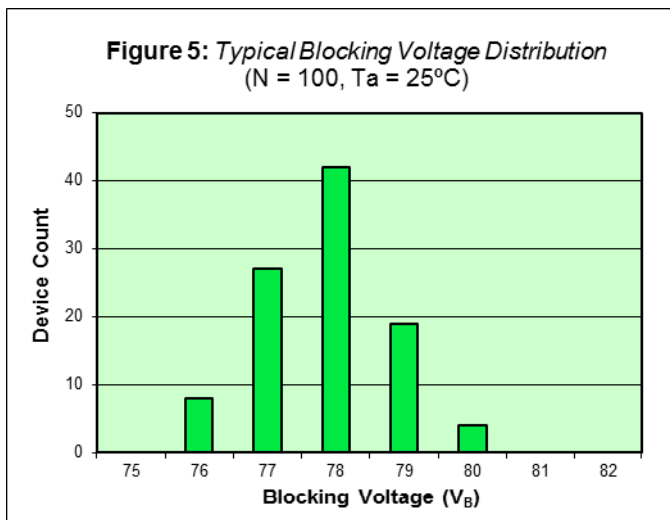
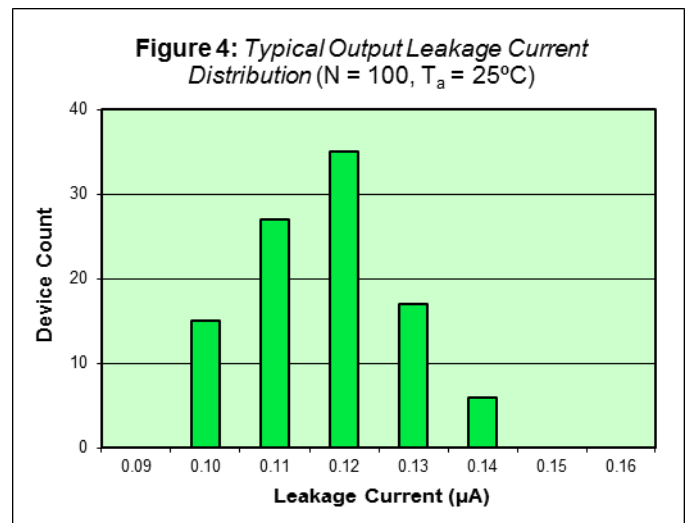
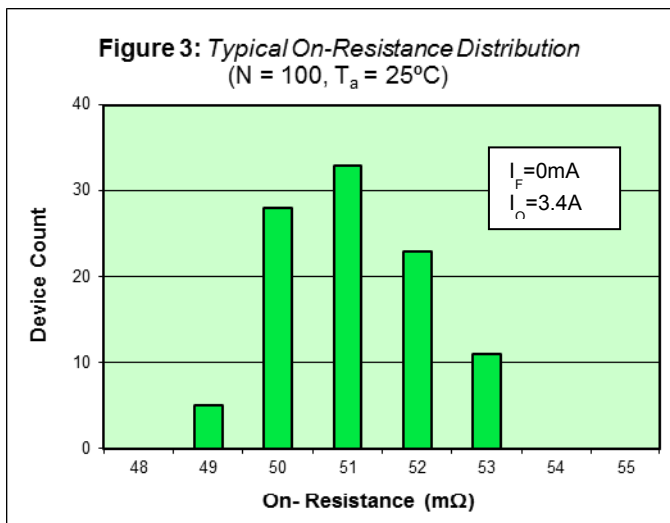
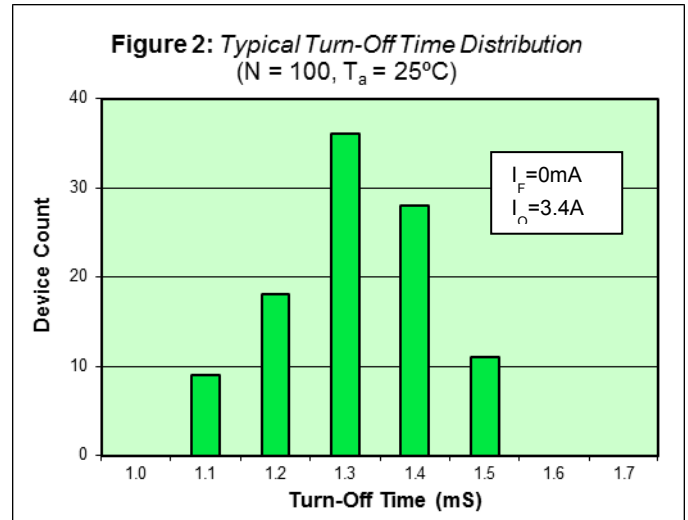
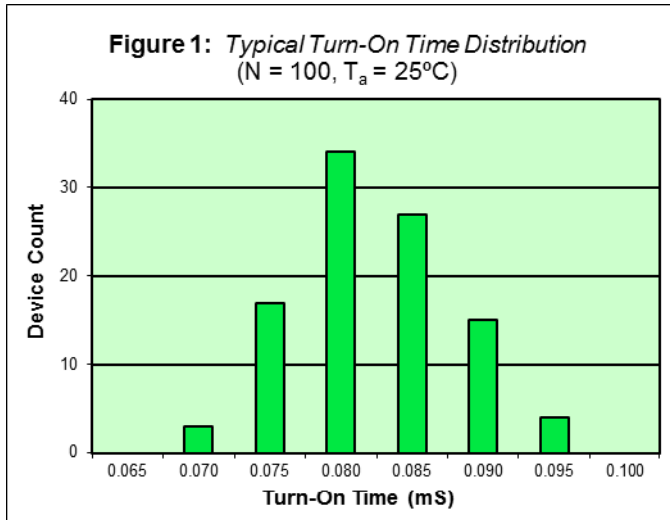
Ordering Information

Part Number	Description
SMB4115	4 pin SIP, (25/Tube)
SMB4115-H	4 pin SIP, V _{ISO} = 5kV, (25/Tube)

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

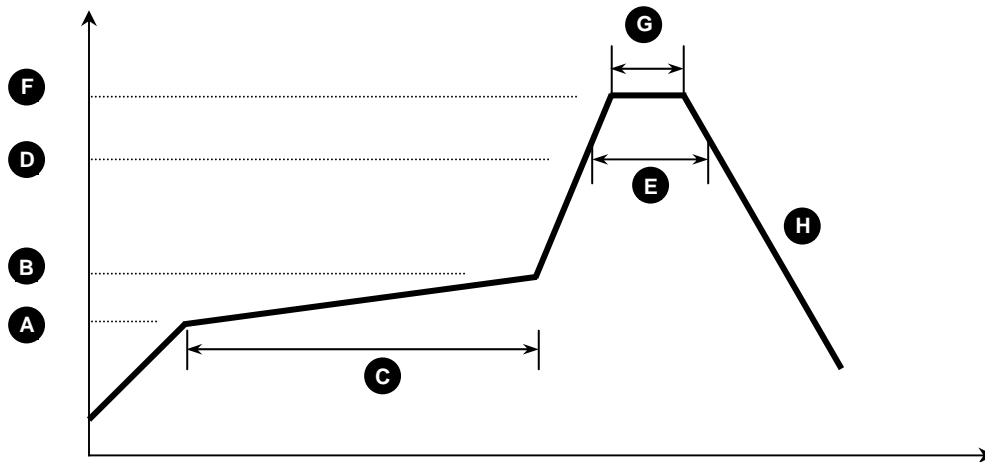
Electrical Characteristics, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.4	1.8	V	$I_F = 10\text{mA}$
LED Reverse Voltage	BV_R	5	-	-	V	$I_R = 10\mu\text{A}$
Input Reverse Current	I_R	-	-	10	μA	$V_R = 6\text{V}$
Turn-On Current	I_F	-	1	-	mA	$I_O = I_{O(\text{MAX})}$
Turn-Off Current	I_{FOFF}	-	2	10	mA	$I_O = I_{O(\text{MAX})}$
Output Specifications						
Blocking Voltage	V_B	60	-	-	V	$I_F = 10\text{mA}, I_O = 1\mu\text{A}$
Continuous Load Current	I_O	-	-	3.4	A	$I_F = 0\text{mA}$
On Resistance	R_{ON}	-	50	75	mΩ	$I_F = 0\text{mA}, I_O = I_{O(\text{MAX})}$
Leakage Current	I_{leak}	-	0.1	1	μA	$I_F = 10\text{mA}, V_O = 60\text{V}$
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	$I_F = 0\text{mA}$
Coupled Specifications						
Turn-On Time	T_{ON}	-	0.1	2	mS	$I_F = 0\text{mA}, I_O = I_{O(\text{MAX})}, V_O = 20\text{V}$
Turn-Off Time	T_{OFF}	-	2	5	mS	$I_F = 10\text{mA}, I_O = I_{O(\text{MAX})}, V_O = 20\text{V}$
Coupled Capacitance	C_{COUPLED}	-	2	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/ μS	dV = 50V
Isolation Specifications						
Isolation Voltage (-H) Option	V_{ISO}	3,750 5,000	- -	- -	V_{RMS}	$\text{RH} \leq 50\%, t=1\text{min}$
Input-Output Resistance	$R_{\text{I-O}}$	-	10^{12}	-	Ω	$V_{\text{I-O}} = 500V_{\text{DC}}$

SMB4115 Performance & Characteristics Plots, $T_A = 25^\circ\text{C}$ (unless otherwise specified)


SMB4115 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 250°C:



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

(2) Wave Solder:

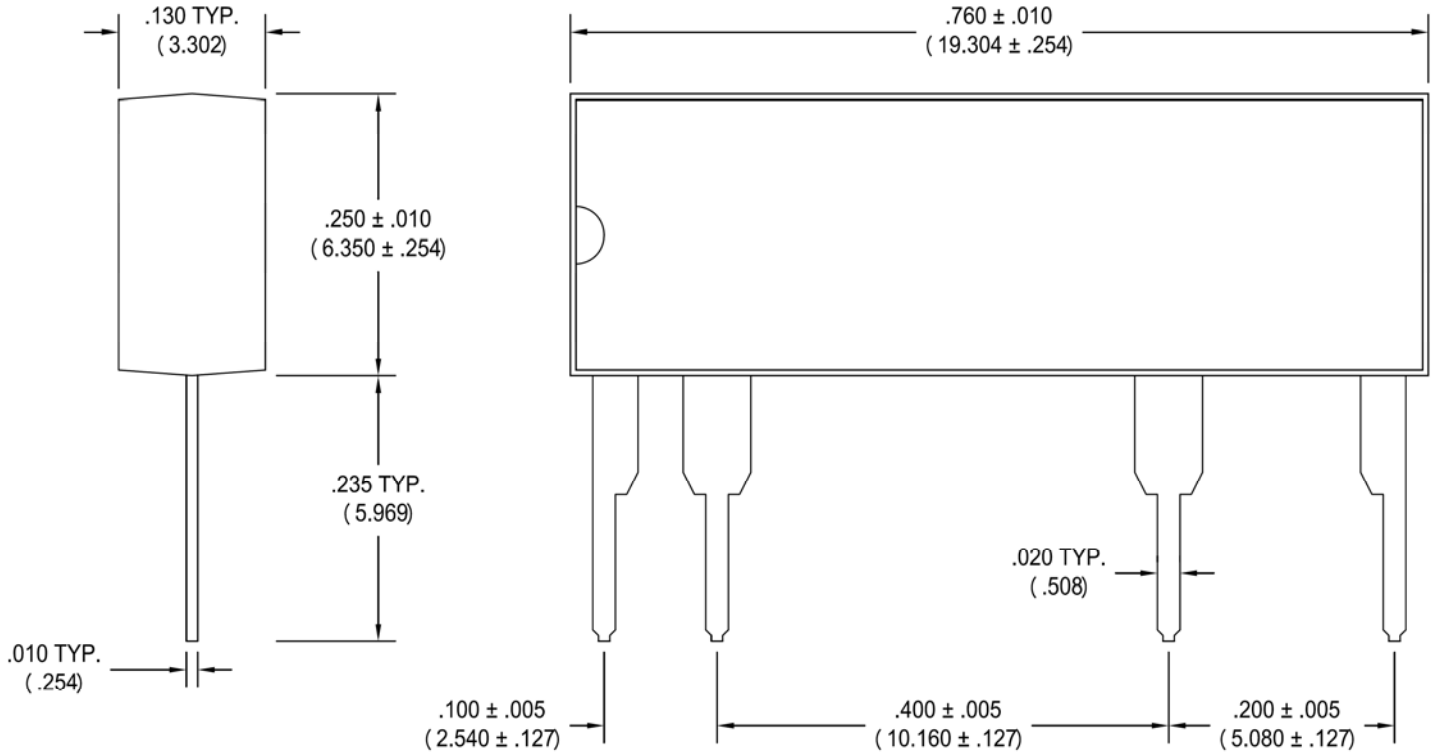
Maximum Temperature: 260°C (at terminal)
 Maximum Time: 10s
 Pre-heating: 100 - 150°C (30 - 90s)
 Single Occurrence

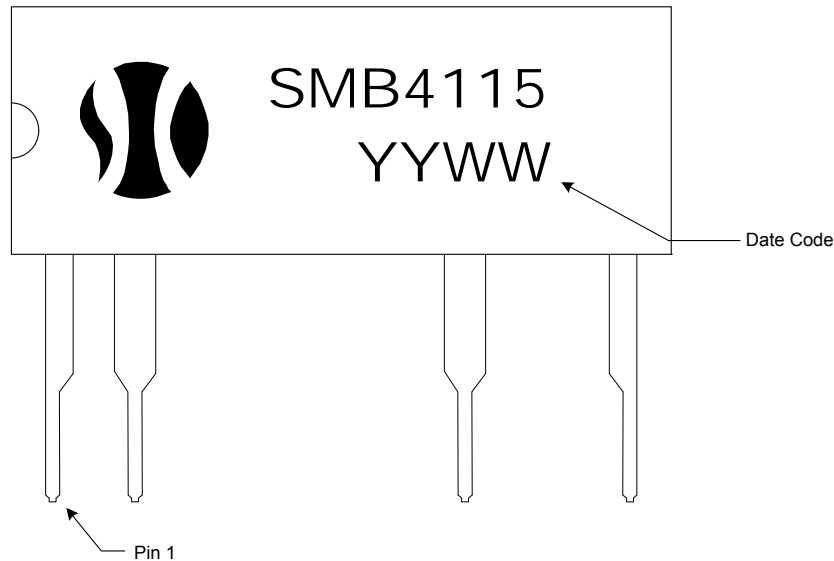
(3) Hand Solder:

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

SMB4115 Package Dimensions

4 PIN SIP Package

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


SMB4115 Package Marking

SMB4115 Package Weights

Device	Single Unit	Full Tube (25pcs)	Full Pouch (10 tubes)
SMB4115(-H)	0.88	35	370

Note: All weights above are in GRAMS, and include packaging materials where applicable

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