



ON Semiconductor®

<http://onsemi.com>

LB11668MC

Monolithic Digital IC For Fan Motor Two-Phase Half-Wave Driver

Overview

The LB11668MC is a two-phase uni-polar brushless motor driver for fan motor.

Functions

- Two-phase half-wave drive.
- RD (lock detection) outputs incorporated.
- FG (rotation detection) outputs incorporated.
- Thermal shutdown circuit incorporated.
- Lock protection and automatic return function incorporated.
- Output protection zener diode incorporated.
- Hall input amplifier incorporated.

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum inflow current	$I_{IN\ max}$		100	mA
Output current	$I_{OUT\ ave}$		400	mA
	$I_{OUT\ peak}$		800	mA
Output withstand voltage	$V_{OUT\ max}$		Internal	V
RD output current	$I_{RD\ max}$		10	mA
RD output withstand voltage	$V_{RD\ max}$		28	V
Allowable dissipation	$P_d\ max$	Mounted on a board *	750	mW
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

* Specified board : 114.3mm × 76.1mm × 1.5mm, glass epoxy board.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

LB11668MC

Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Inflow current range	I_{IN1}		5 to 25	mA
Common-mode input voltage range	VCOM		0.2 to $V_{IN} - 2.3$	V

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 24\text{V}$, $R_1 = 1\text{k}\Omega$, unless otherwise specified.

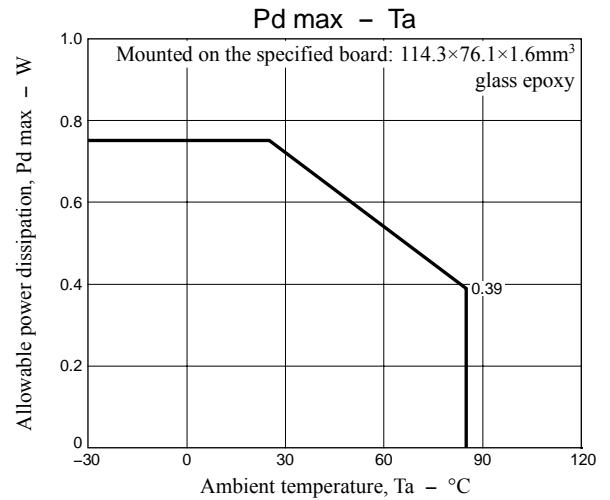
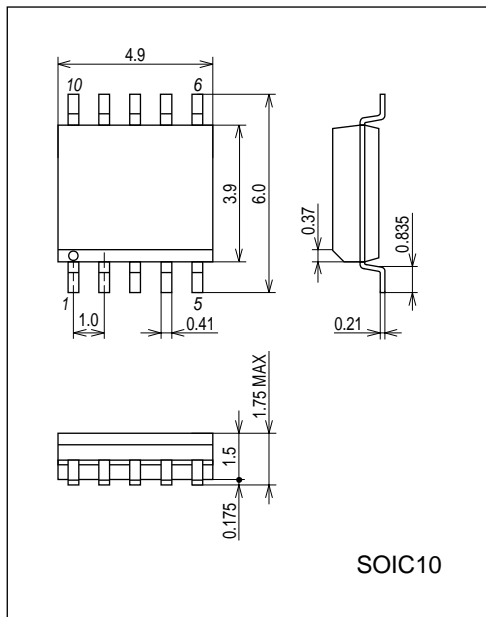
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
V_{IN} voltage	V_{IN}	$I_{IN} = 6\text{mA}$	6.9	7.2	7.6	V
CT capacitor charging current	I_{CT1}	$CT = 0\text{V}$	0.8	1.2	2.0	μA
Capacitor discharging current	I_{CT2}	$CT = 6.0\text{V}$	0.12	0.24	0.4	μA
Capacitor charging/ discharging current ratio	R_{CT}	$R_{CT} = I_{CT1} / I_{CT2}$	4.0	5.0	7.0	
CT charging voltage	V_{CTH}	V_{CT}/V_{IN}	66	70	74	%
CT discharging voltage	V_{CTL}	V_{CT}/V_{IN}	36	40	44	%
Output limit withstand voltage	V_{OLM}	$I_O = 10\text{mA}$	50	53	56	V
Output saturation voltage	V_{OL1}	$I_O = 200\text{mA}$		0.85	1.1	V
Hall input sensitivity	V_{HN}	Including offset and hysteresis		8	18	mV
RD output saturation voltage	V_{RD}	$I_{RD} = 5\text{mA}$		0.2	0.5	V
RD output leak current	I_{RD}	$V_{RD} = 14\text{V}$		0.1	10	μA
Thermal protection function operating temperature	VTH	Design target value *	150	180	210	$^\circ\text{C}$

* "Design" is a design target and is not measured.

Package Dimensions

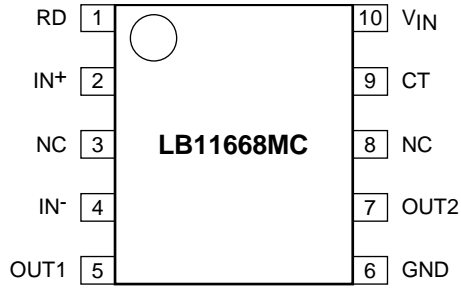
unit : mm (typ)

3426A



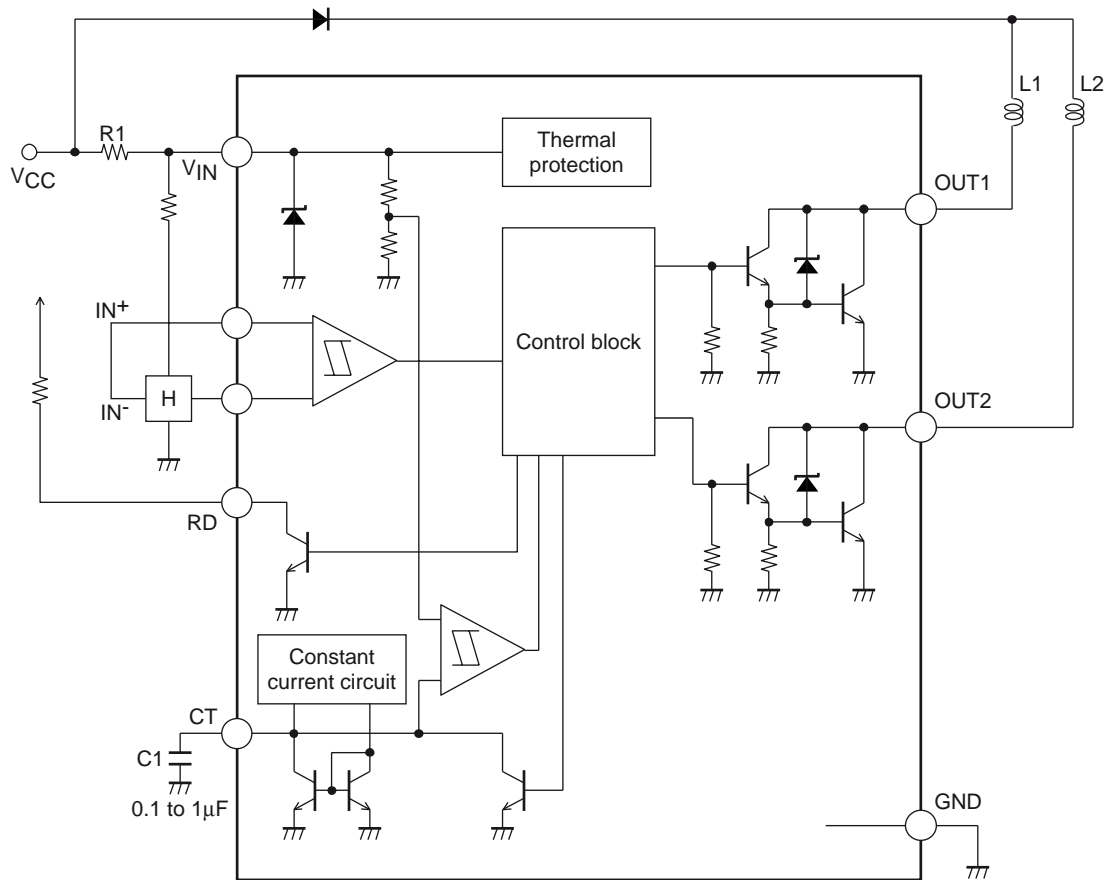
LB11668MC

Pin Assignment



Top view

Block Diagram

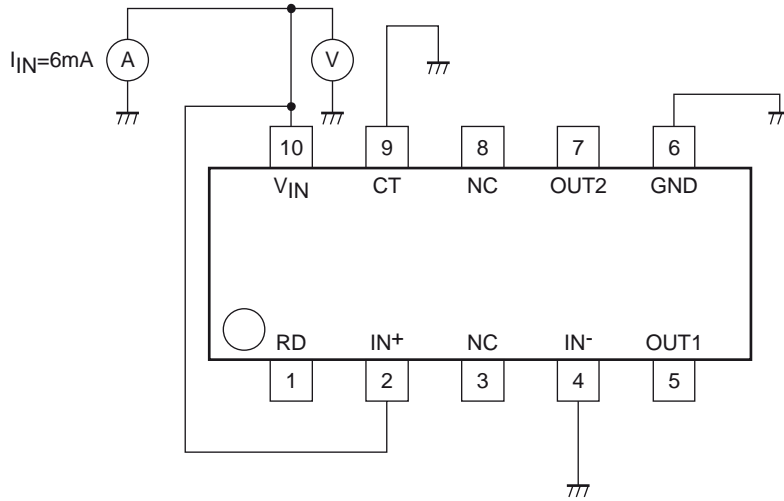


Truth table

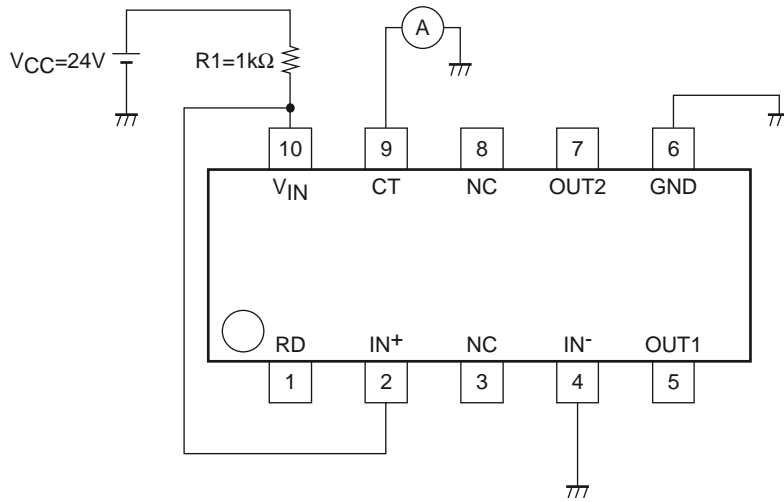
IN ⁻	IN ⁺	CT	OUT1	OUT2	RD	Mode
H	L	L	L	H	L	Rotation
L	H		H	L		
-	-	H	OFF	OFF	H	Lock protection

LB11668MC

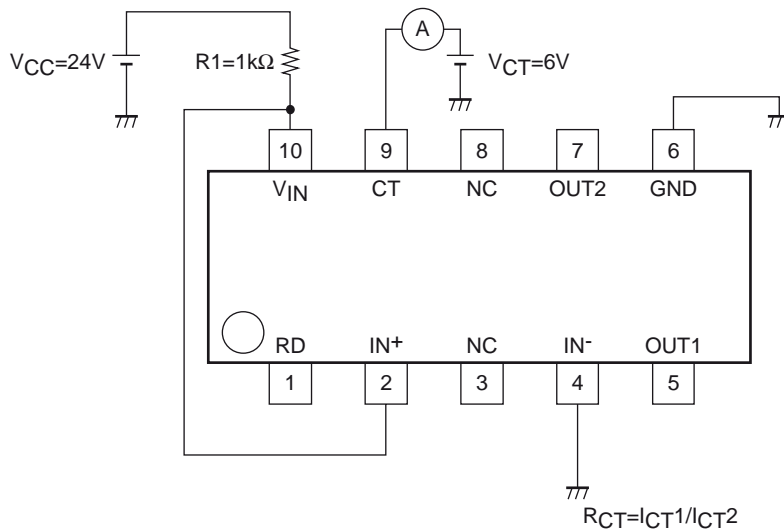
V_{IN1}



I_{CT1}

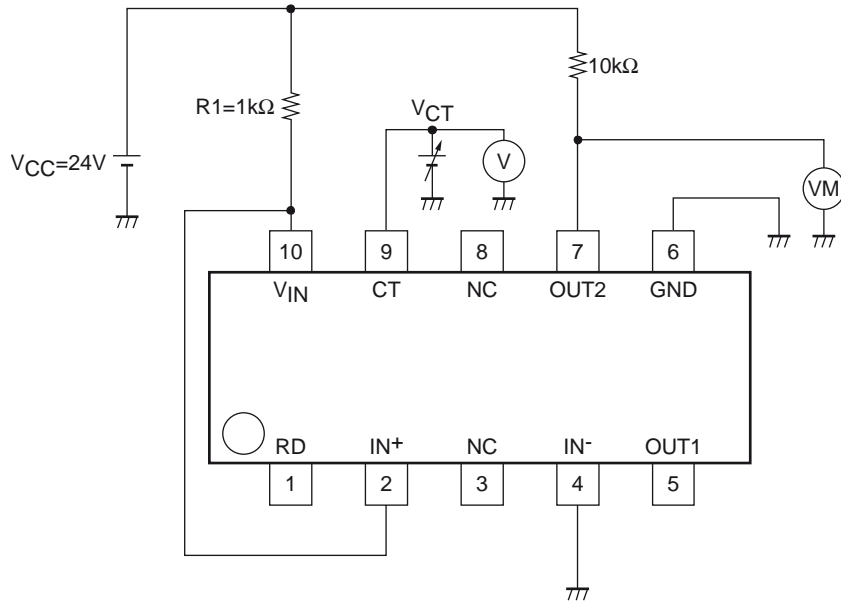


I_{CT2}

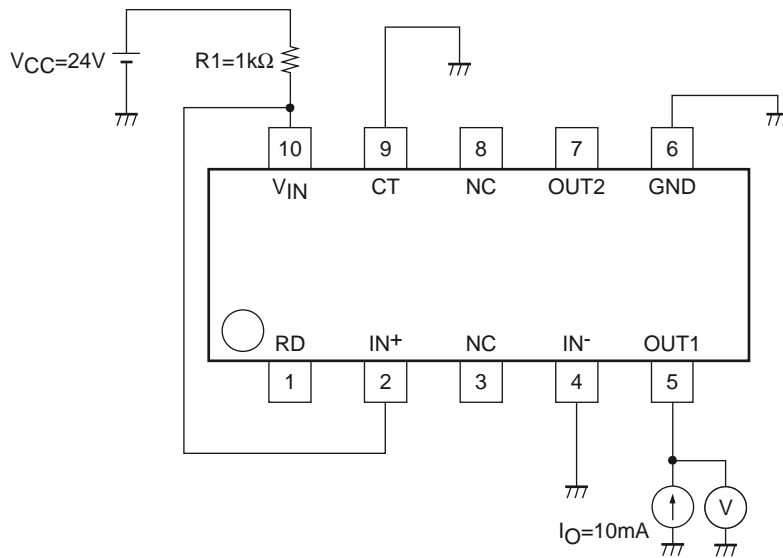


LB11668MC

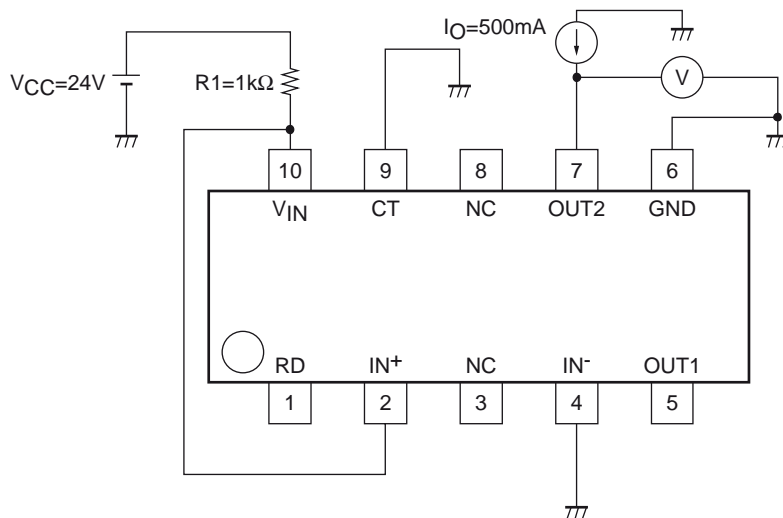
V_{CTH} , V_{CTL}



V_{OLM}

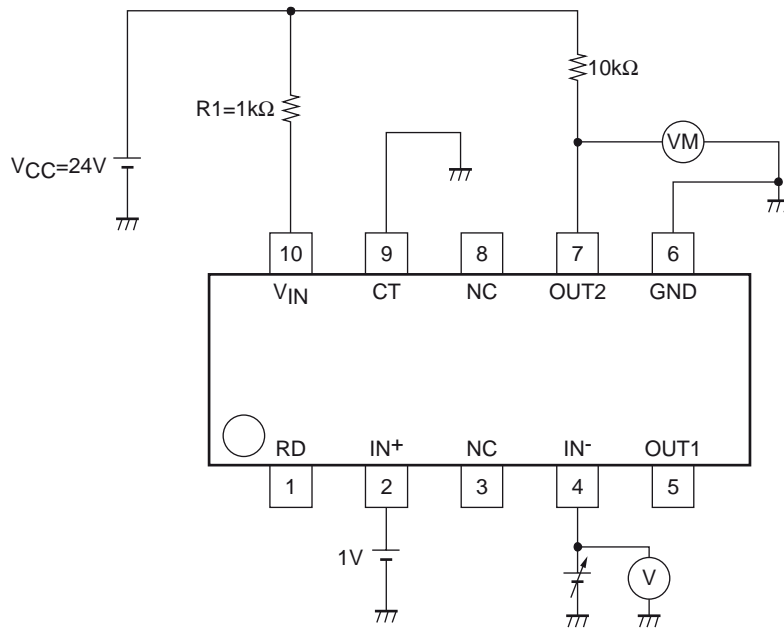


V_{OL1}

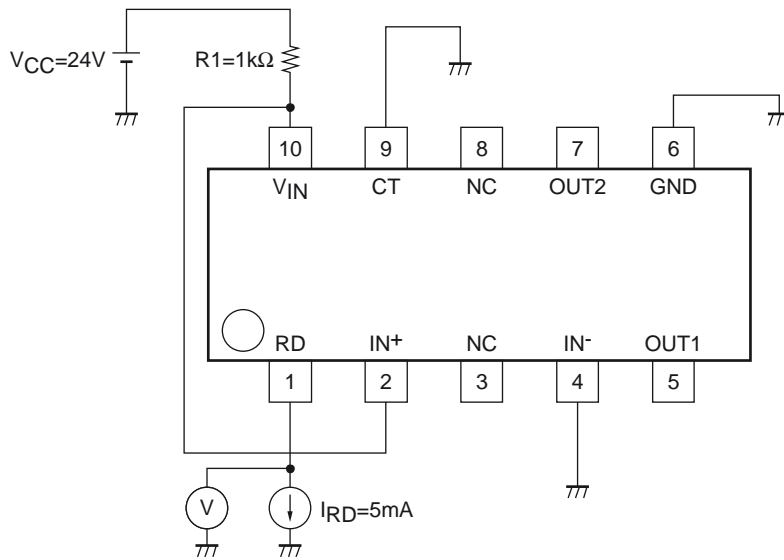


LB11668MC

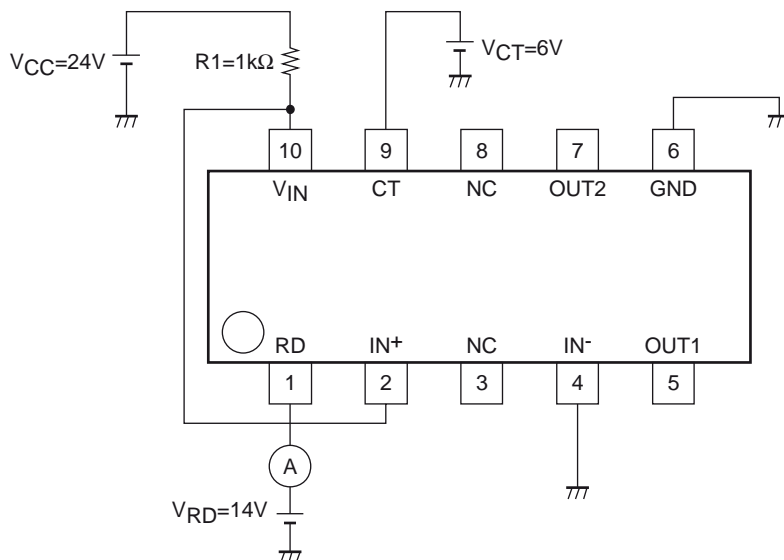
V_{HN}



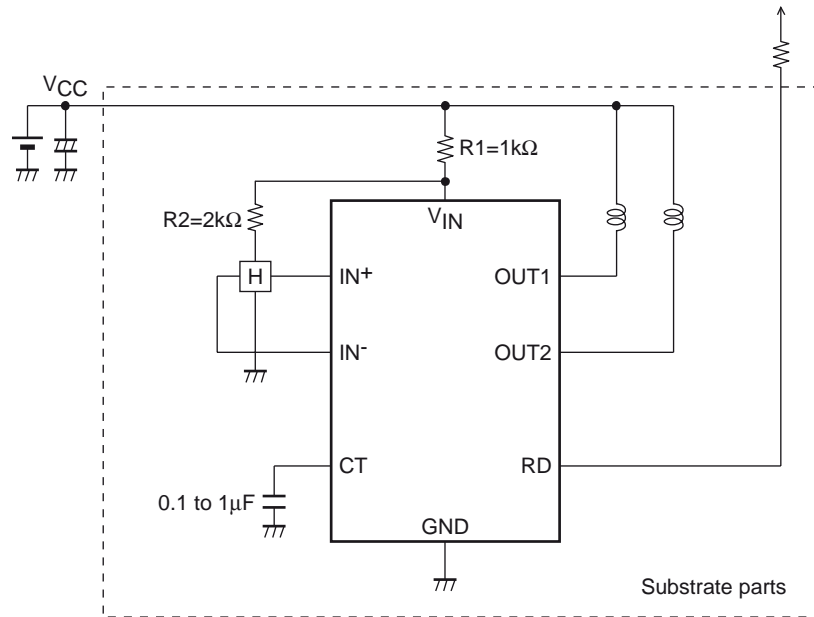
V_{RD}



V_{RL}



Application Circuit Example 24V power supply



Notice

- Take care not to cause interference due to wiring of IN⁻ and OUT1.
- In an application of connecting the CT pin to GND, lock protection and restart function are not effective.
- With reverse power - GND connection in the above application figure, the current restricted by the coil resistance flows from GND → OUT → coil → power supply. IC breakage does not occur if the current value is 500mA or less. If necessary, insert Di between V_{CC} and coil.

ON Semiconductor and the ON logo are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.