



SGM48000/1/2

High Speed, Dual Power MOSFET Drivers

GENERAL DESCRIPTION

The SGM48000/1/2 ICs are matched dual-drivers. Unique circuit design provides very high speed drivers capable of delivering peak currents of 2A into highly capacitive loads. Improved speed and drive capability are enhanced by matched rise and fall delay times. These matched delays maintain the integrity of input-to-output pulse-widths to reduce timing errors and clock skew problems. Dynamic switching losses are minimized with non-overlapped drive techniques.

The SGM48000/1/2 are available in Green SOIC-8 and TDFN-2×2-8L packages. They operate over an ambient temperature range of -40°C to +125°C.

FEATURES

- **Improved Response Times**
- **Matched Rise and Fall Times**
- **Reduced Clock Skew between Dual Channels**
- **Low Output Impedance**
- **Output is at LOW under UVLO Protection**
- **High Noise Immunity**
- **Improved Clocking Rate**
- **Low Supply Current**
- **Wide Operating Voltage Range**
- **-40°C to +125°C Operating Temperature Range**
- **Available in Green SOIC-8 and TDFN-2×2-8L Packages**

APPLICATIONS

Clock/Line Drivers
CCD Drivers
Ultra-Sound Transducer Drivers
Power MOSFET Drivers
Switch Mode Power Supplies
Class D Switching Amplifiers
Ultrasonic and RF Generators
Pulsed Circuits

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDER NUMBER	PACKAGE MARKING	PACKING OPTION
SGM48000	SOIC-8	-40°C to +125°C	SGM48000XS8G/TR	SGM 48000XS8 XXXXX	Tape and Reel, 2500
	TDFN-2×2-8L	-40°C to +125°C	SGM48000XTDE8G/TR	SYA XXXX	Tape and Reel, 3000
SGM48001	SOIC-8	-40°C to +125°C	SGM48001XS8G/TR	SGM 48001XS8 XXXXX	Tape and Reel, 2500
	TDFN-2×2-8L	-40°C to +125°C	SGM48001XTDE8G/TR	SV8 XXXX	Tape and Reel, 3000
SGM48002	SOIC-8	-40°C to +125°C	SGM48002XS8G/TR	SGM 48002XS8 XXXXX	Tape and Reel, 2500
	TDFN-2×2-8L	-40°C to +125°C	SGM48002XTDE8G/TR	SV9 XXXX	Tape and Reel, 3000

NOTE: XXXX = Date Code. XXXXX = Date Code and Vendor Code.

Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

VCC to GND	-0.3V to 28V
INA, INB to GND	-0.3V to V _{CC} + 0.3V
Combined Peak Output Current	4A
Junction Temperature	+150°C
Package Thermal Resistance	
SOIC-8, θ_{JA}	132°C/W
TDFN-2×2-8L, θ_{JA}	118°C/W
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10sec)	+260°C
ESD Susceptibility	
HBM	6000V
MM	200V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range	4.5V to 26.5V
Operating Temperature Range	-40°C to +125°C

OVERSTRESS CAUTION

Stresses beyond those listed may cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational section of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

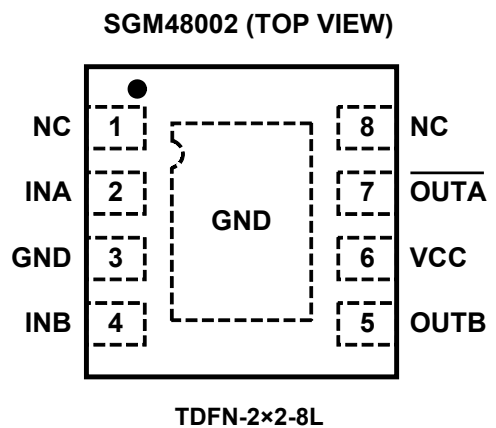
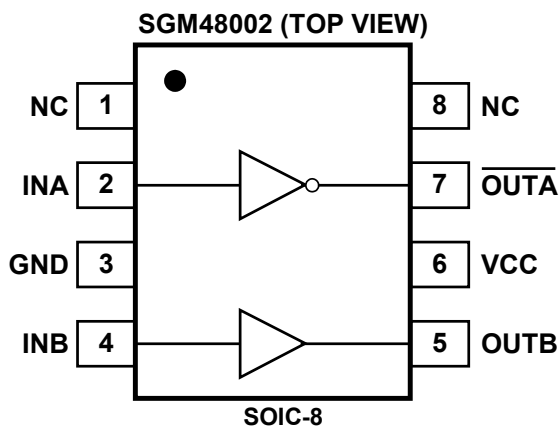
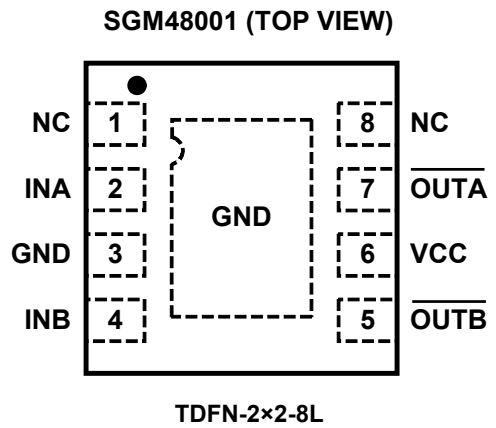
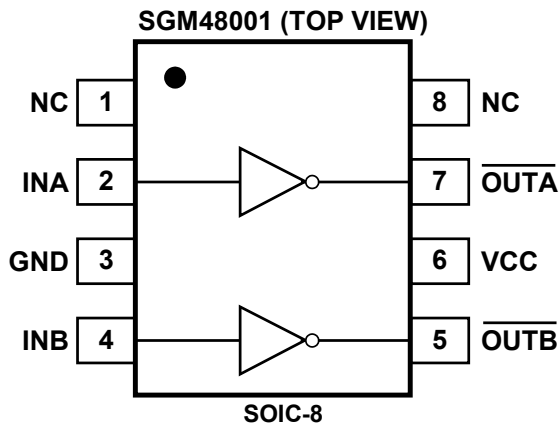
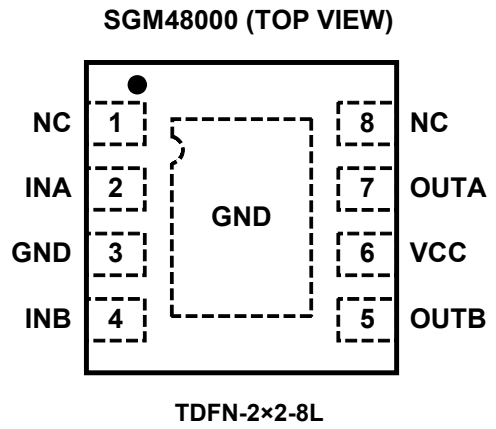
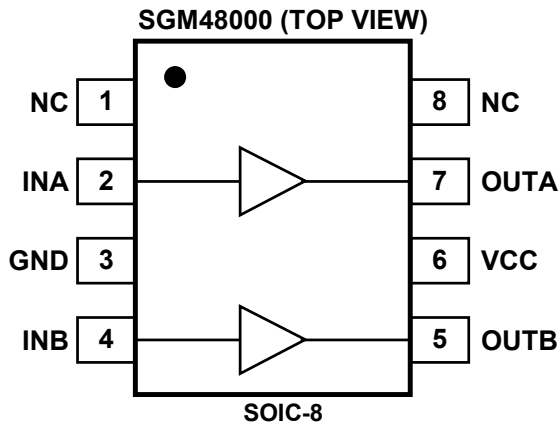
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time.

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN		NAME	FUNCTION
TDFN-2×2-8L	SOIC-8		
1, 8	1, 8	NC	No Connection.
2	2	INA	Input for Channel A. Non-inverting input in SGM48000, inverting input in SGM48001, and inverting input in SGM48002. $\overline{OUTA}/\overline{OUTA}$ is held LOW if INA is unbiased or floating.
3	3	GND	Ground. All signals referenced to this pin.
4	4	INB	Input for Channel B. Non-inverting input in SGM48000, inverting input in SGM48001, and non-inverting input in SGM48002. $\overline{OUTB}/\overline{OUTB}$ is held LOW if INB is unbiased or floating.
5	5	$\overline{OUTB}/\overline{OUTB}$	Output of Channel B.
6	6	VCC	Supply Input.
7	7	$\overline{OUTA}/\overline{OUTA}$	Output of Channel A.
Exposed Pad	—	GND	Exposed pad should be soldered to PCB board and connected to GND.

FUNCTION TABLE

INA	INB	SGM48000		SGM48001		SGM48002	
		OUTA	OUTB	\overline{OUTA}	\overline{OUTB}	\overline{OUTA}	OUTB
L	L	L	L	H	H	H	L
L	H	L	H	H	L	H	H
H	L	H	L	L	H	L	L
H	H	H	H	L	L	L	H
Floating	Floating	L	L	L	L	L	L

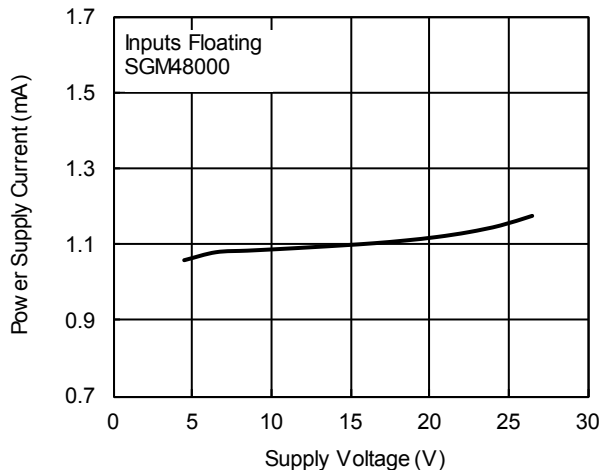
ELECTRICAL CHARACTERISTICS(V_{CC} = 24V, T_A = 25°C, unless otherwise noted.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT					
Input Signal High Threshold (V _{IH})	T _A = -40°C to +125°C	1.6			V
Input Signal Low Threshold (V _{IL})	T _A = -40°C to +125°C			0.7	V
Input Signal Hysteresis (V _{HYS})	T _A = -40°C to +125°C		0.3		V
Input Signal High Current (I _{IH})	Inverting Input Current, V _{INX} = 24V		6	8	μA
	Non-Inverting Input Current, V _{INX} = 24V		108	145	
Input Signal Low Current (I _{IL})	Inverting Input Current, V _{INX} = 0V		102	125	μA
	Non-Inverting Input Current, V _{INX} = 0V		0.1	1	
OUTPUT					
Pull-Up Resistance (R _{OH})	Source Current = 100mA		2.3	3.1	Ω
Pull-Down Resistance (R _{OL})	Sink Current = -100mA		1.6	2.2	Ω
Peak Output Current (I _{PK})	Source Current, f = 1kHz, C _L = 0.1μF		2		A
	Sink Current, f = 1kHz, C _L = 0.1μF		-2		
Continuous Output Current (I _{DC})	Source/Sink Current		±200		mA
POWER SUPPLY					
Power Supply Current (I _{CC})	Inputs Floating, SGM48000		1.14	1.54	mA
	Inputs Floating, SGM48001		1.29	1.72	
	Inputs Floating, SGM48002		1.19	1.60	
Operating Voltage Range (V _{CC})		4.5		26.5	V
Under-Voltage Lockout ON Threshold			3.6	4	V
Under-Voltage Lockout Hysteresis			0.5		V
SWITCHING CHARACTERISTICS					
Rise Time (t _R)	C _L = 1000pF		12		ns
Fall Time (t _F)	C _L = 1000pF		13		ns
Turn-On Delay Time (t _{D1})	See Figure 1, Figure 2		21		ns
Turn-Off Delay Time (t _{D2})	See Figure 1, Figure 2		23		ns
OVER-TEMPERATURE PROTECTION					
Thermal Shutdown Threshold			150		°C
Thermal Shutdown Threshold Hysteresis			15		°C

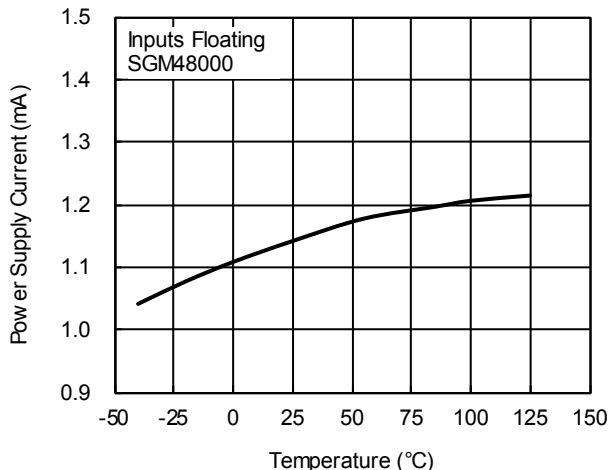
TYPICAL PERFORMANCE CHARACTERISTICS

T_A = +25°C, V_{CC} = 24V, C_{IN} = 4.7μF, C_L = 1nF, unless otherwise noted.

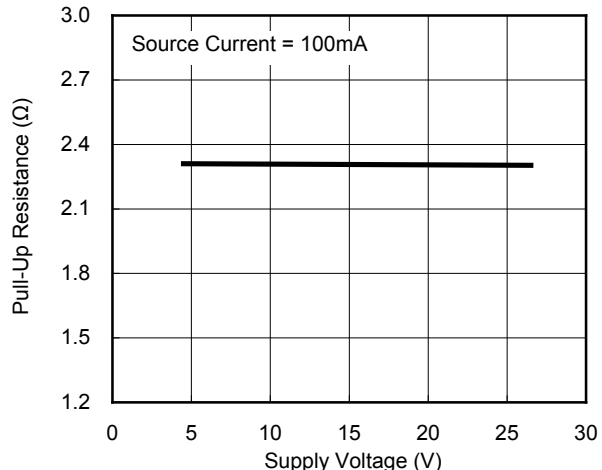
Power Supply Current vs. Supply Voltage



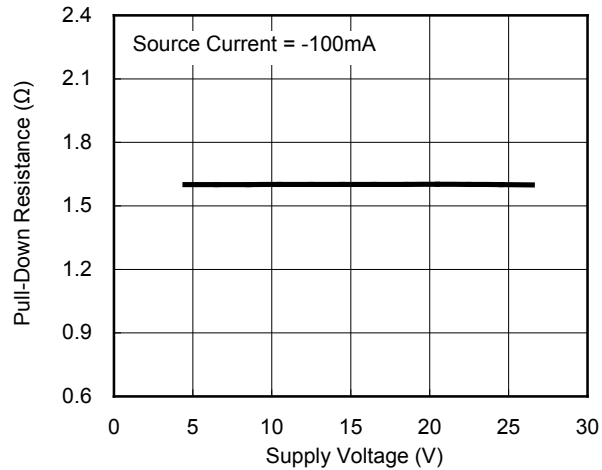
Power Supply Current vs. Temperature



Pull-Up Resistance vs. Supply Voltage

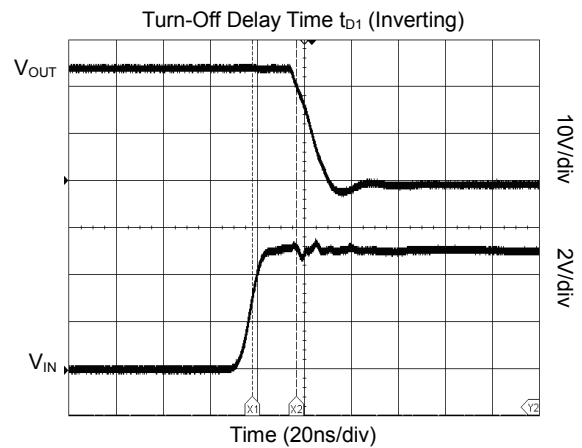
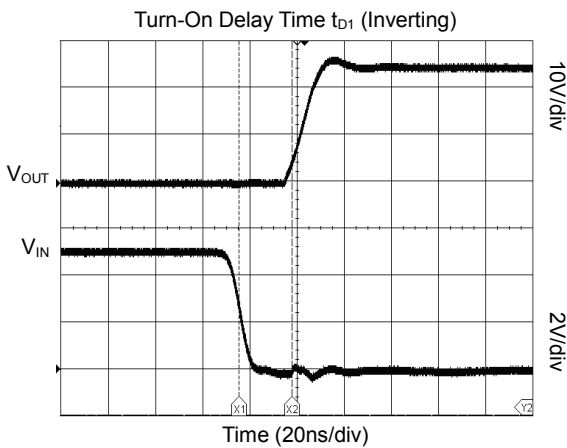
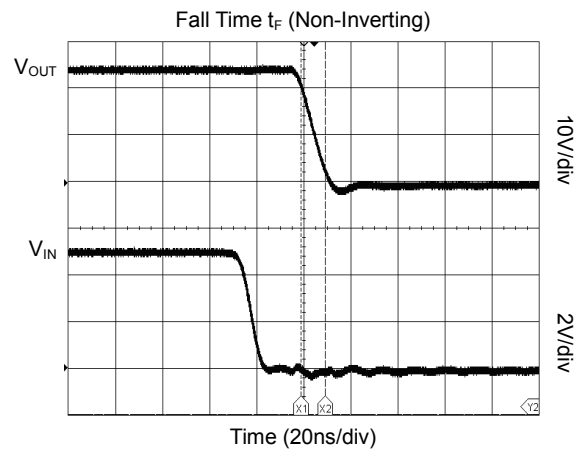
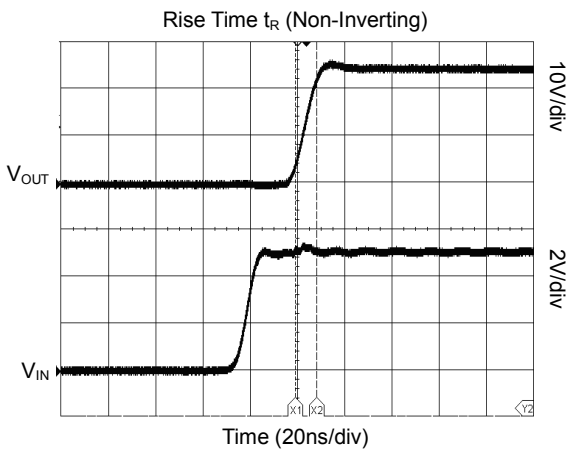
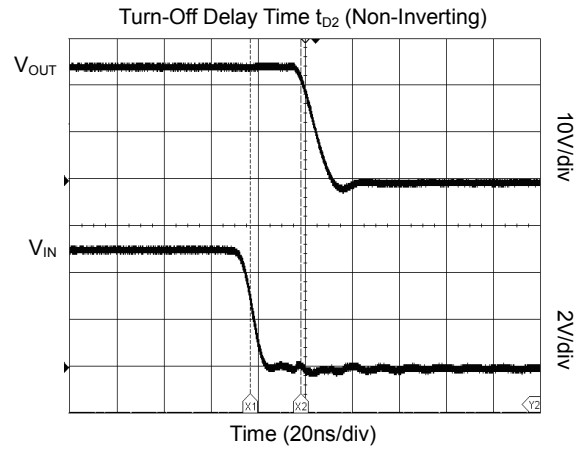
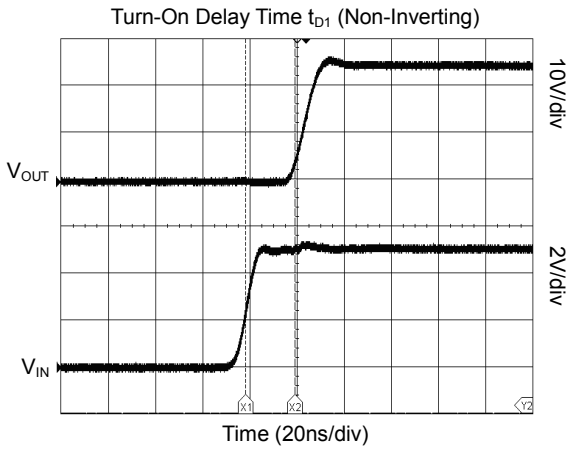


Pull-Down Resistance vs. Supply Voltage



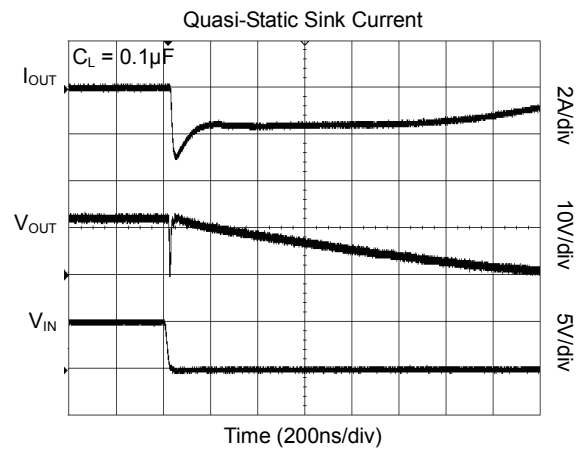
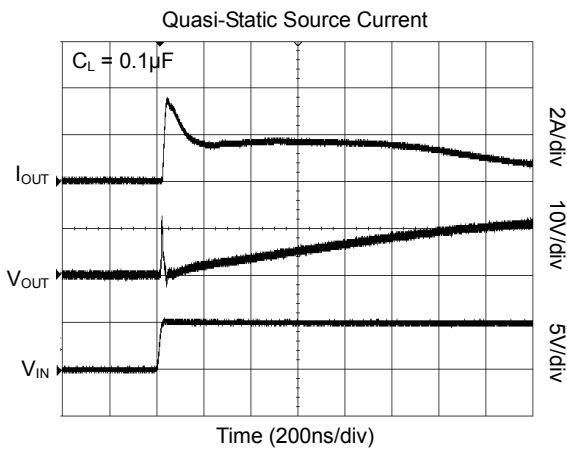
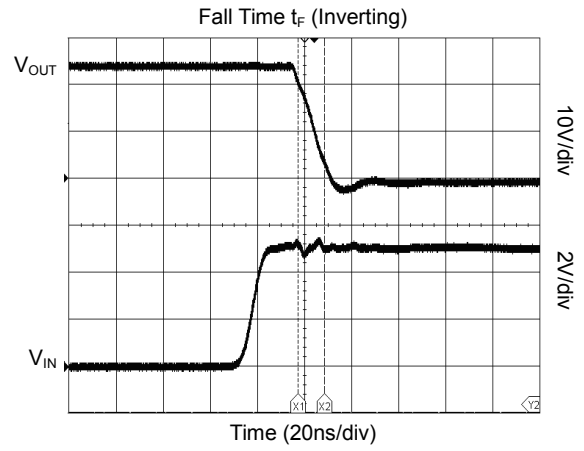
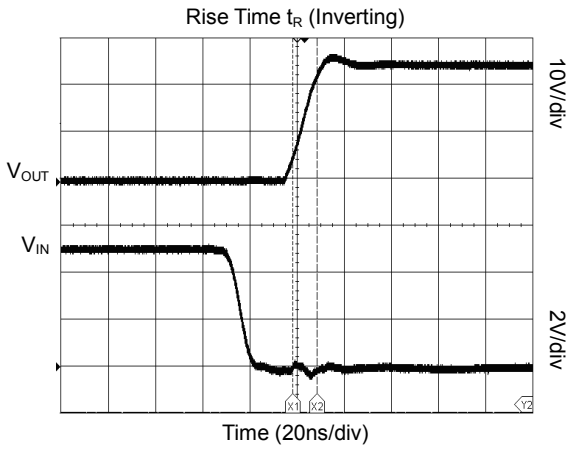
TYPICAL PERFORMANCE CHARACTERISTICS

T_A = +25°C, V_{CC} = 24V, C_{IN} = 4.7μF, C_L = 1nF, unless otherwise noted.



TYPICAL PERFORMANCE CHARACTERISTICS

T_A = +25°C, V_{CC} = 24V, C_{IN} = 4.7μF, C_L = 1nF, unless otherwise noted.



TIMING TABLE

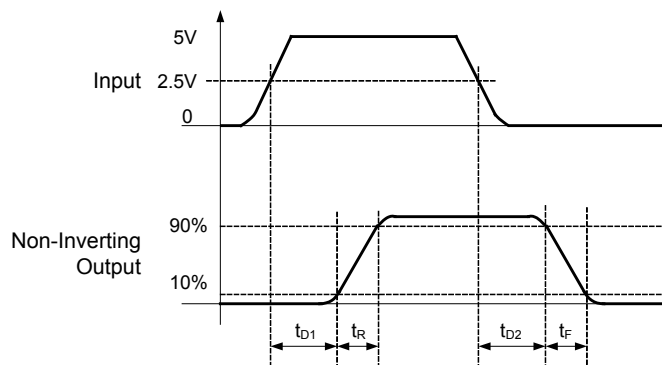


Figure 1. Non-Inverting Input Driver Operation

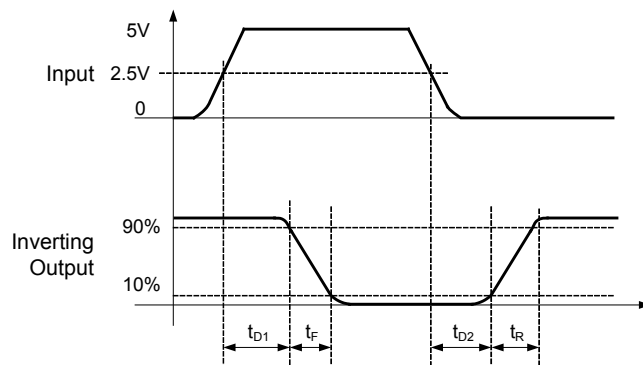


Figure 2. Inverting Input Driver Operation

TEST CIRCUIT

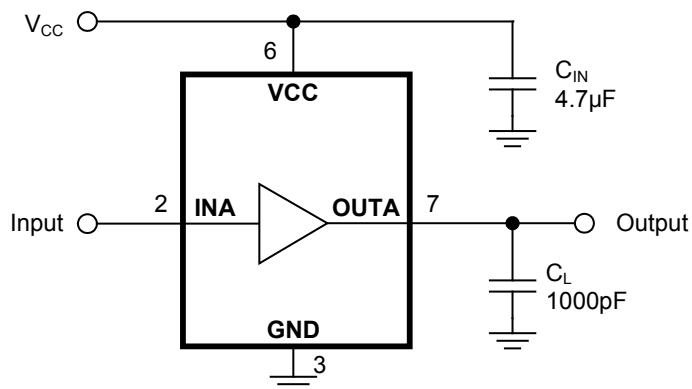


Figure 3. Standard Test Configuration

FUNCTIONAL BLOCK DIAGRAMS

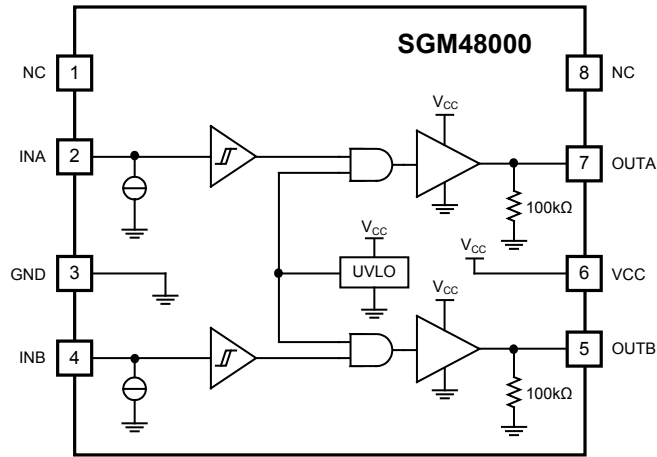


Figure 4. SGM48000 Block Diagram

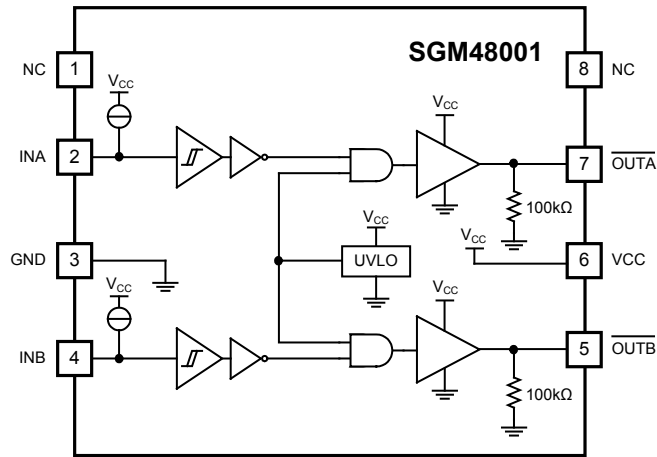


Figure 5. SGM48001 Block Diagram

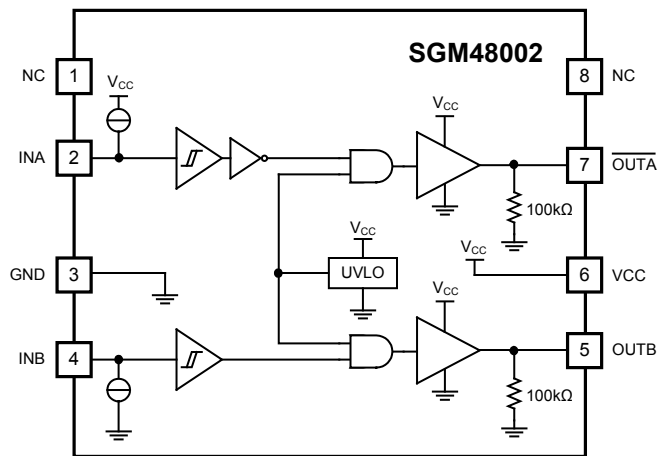
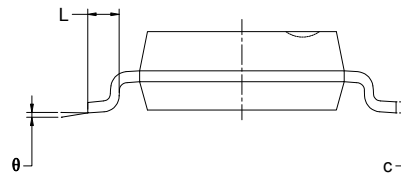
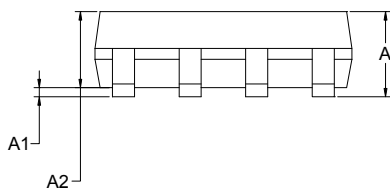
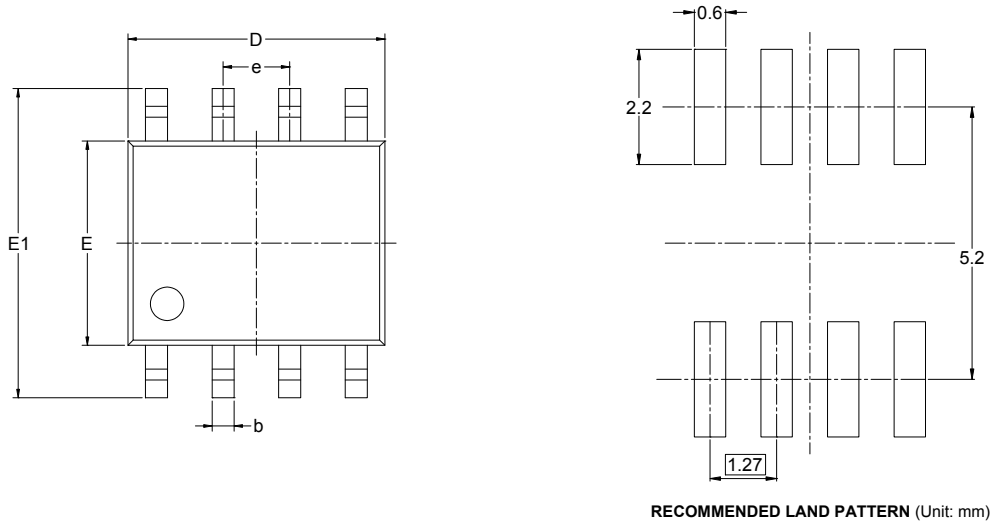


Figure 6. SGM48002 Block Diagram

PACKAGE OUTLINE DIMENSIONS

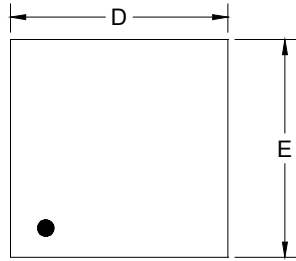
SOIC-8



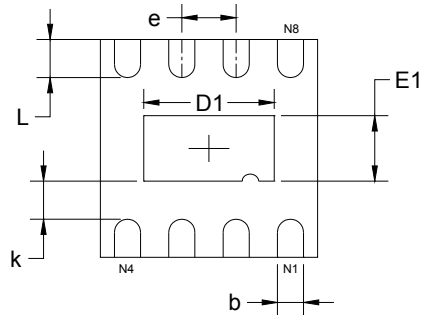
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

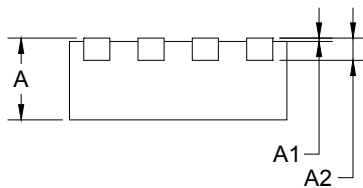
TDFN-2x2-8L



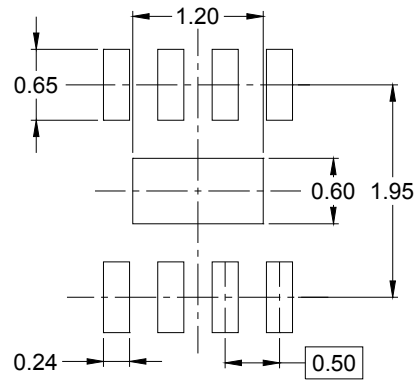
TOP VIEW



BOTTOM VIEW



SIDE VIEW

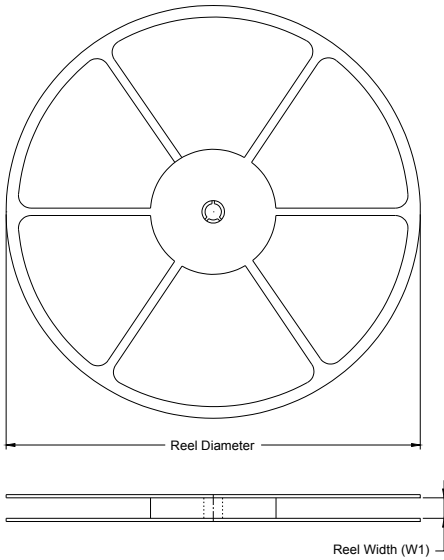


RECOMMENDED LAND PATTERN (Unit: mm)

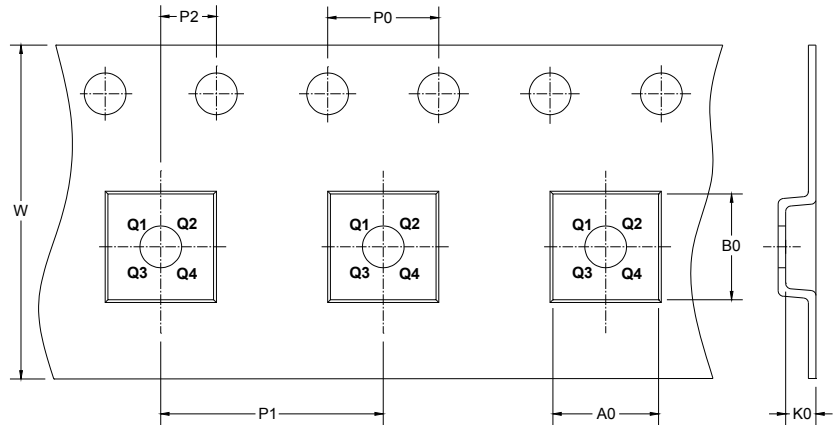
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E	1.900	2.100	0.075	0.083
E1	0.500	0.700	0.020	0.028
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.250	0.450	0.010	0.018

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



➔ DIRECTION OF FEED

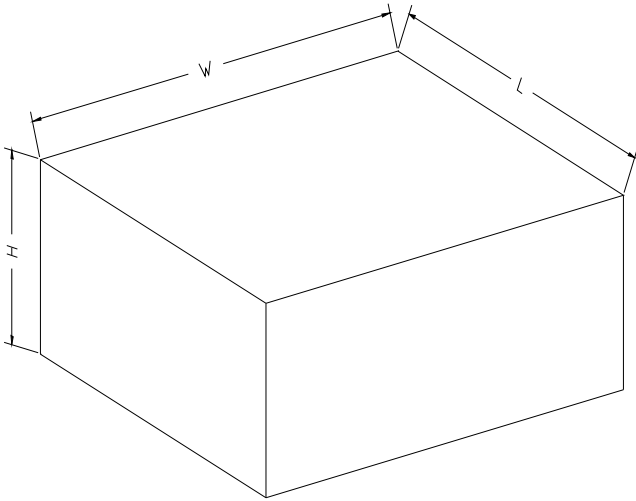
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOIC-8	13"	12.4	6.4	5.4	2.1	4.0	8.0	2.0	12.0	Q1
TDFN-2×2-8L	7"	9.5	2.30	2.30	1.10	4.00	4.00	2.00	8.00	Q1

D00001

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18
13"	386	280	370	5

D30002