描述

MX74700T与外部N沟道MOSFET配合工作，可作为理想二极管整流器并利用20mV正向压降实现低损耗反向保护。3.2V至100V的宽电源输入范围可实现对众多常用直流总线电压（例如：12V、24V和48V汽车电池系统）的控制。该器件可耐受低至-100V的负电源电压，并提供负载保护。

该器件通过控制MOSFET的栅极将正向压降调节至20mV。可在电流反向时支持平稳关机，并确保零直流反向电流。该器件能够快速响应反向电流。

MX74700控制器可提供适用于外部N沟道MOSFET的电荷泵栅极驱动器。当使能引脚处于低电平时，控制器关闭，消耗大约1μA的电流。

特性

- 3.2V至100V输入范围（3.9V启动）
- -100V反向电压额定值
- 适用于外部N沟道MOSFET的电荷泵
- 20mV阳极至阴极正向压降调节
- 使能引脚特性
- 1.1μA关断电流（EN=低电平）
- 300μA工作静态电流（EN=高电平）
- 2.3A峰值栅极关断电流
- 快速响应反向电流阻断
- 采用SOT23-6封装

应用

- 工业工厂自动化-PLC
- 企业电源
- 用于冗余电源的有源ORing

基本信息

订购须知

产品编号	描述
MX74700T	SOT23-6
MPQ	3000pcs

封装耗散额定值

封装	RθJA(°C/W)
SOT23-6	108.1

绝对最大额定值

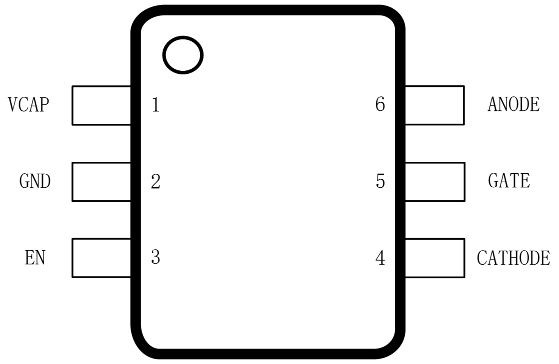
参数	范围
ANODE to GND	-100 to 100V
EN to GND,$V_{(ANODE)}$＞0V	-0.3 to 100V
EN to GND,$V_{(ANODE)}\le$0V	$V_{(ANODE)}$ to (100+$V_{(ANODE)}$)
GATE to ANODE	-0.3 to 15V
VCAP to ANODE	-0.3 to 15V
CATHODE to ANODE	-5 to 75V
结温,T_J	-40 to 150°C
贮藏温度，Tstg	-40 to 150°C
ESD	±2000V

超出绝对最大额定值的应力可能会对设备造成永久性损坏，这些仅是应力额定值，不意味着设备在这些或任何其他超出“推荐条件”下指示的功能操作。长时间暴露在绝对最大额定值条件下可能会影响设备可靠性。

推荐操作条件

参数	范围
ANODE to GND	-90 to 90V
CATHODE to GND	90V(MAX)
EN to GND	-90 to 90V
ANODE to CATHODE	-70V(MIN)
GATE to ANODE	15V(MIN)
结温,TJ	-40 to 150°C

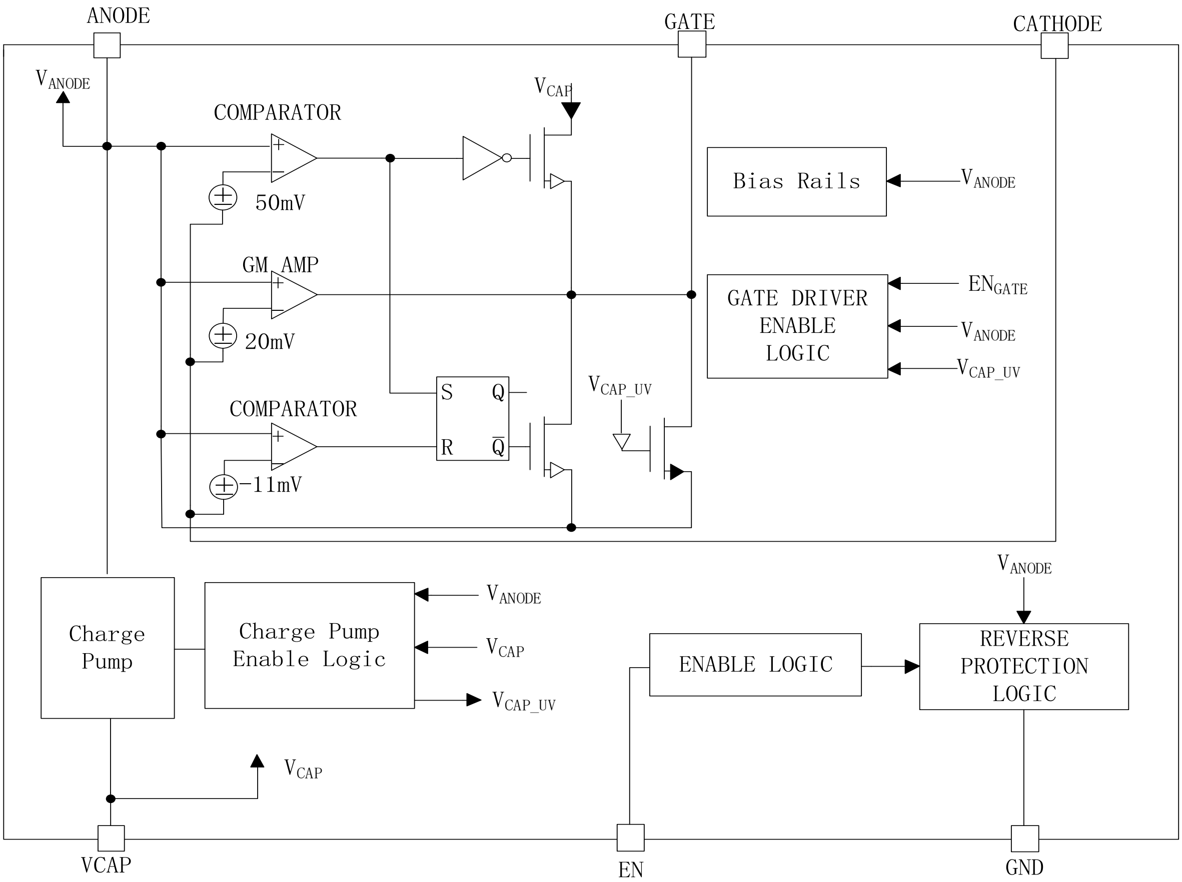
Terminal assignments



MX74700

Pin		Description
Name	No.	
VCAP	1	Charge pump output. Connect to external charge pump capacitor
GND	2	Ground pin
EN	3	Enable pin. Can be connected to ANODE for always ON operation
CATHODE	4	Cathode of the diode. Connect to the drain of the external N-channel MOSFET
GATE	5	Gate drive output. Connect to gate of the external N-channel MOSFET
ANODE	6	Anode of the diode and input power. Connect to the source of the external N-channel MOSFET

Block diagram



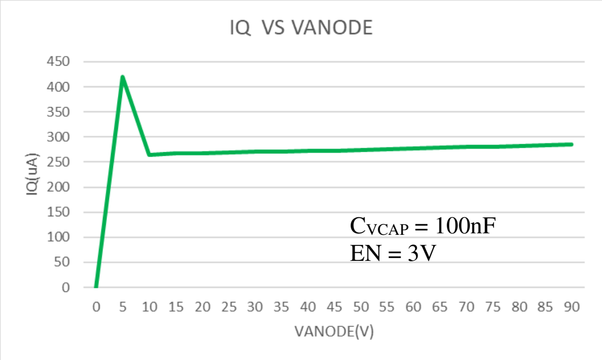
Electrical characteristics

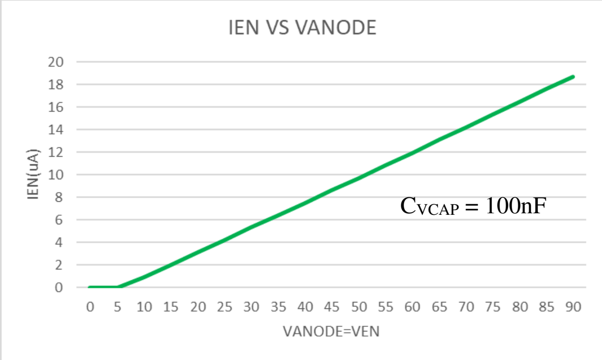
T_J =25°C, $V_{(ANODE)}$ =12V, $C_{(VCAP)}$ =1μF, $V_{(EN)}$ =3V (unless otherwise noted).

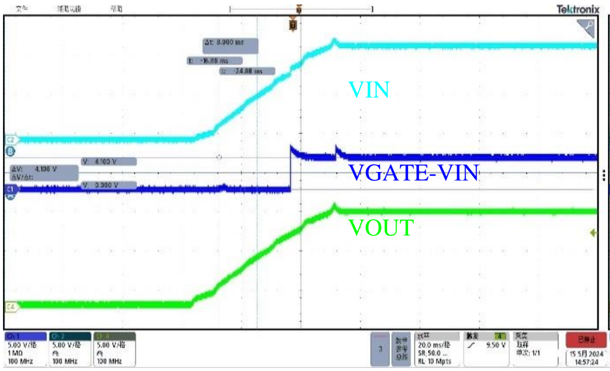
Symbol	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{ANODE} SUPPLY VOLTAGE						
$V_{(ANODE)}$	Operating input voltage		4		90	V
$V_{(ANODE\ POR)}$	V_{ANODE} POR Rising threshold				3.9	V
	V_{ANODE} POR Falling threshold		2.2		3.1	V
$V_{(ANODE\ POR(Hys))}$	V_{ANODE} POR Hysteresis		0.2	0.32	0.67	V
$I_{(SHDN)}$	Shutdown Supply Current	$V_{(EN)}$=0V		1.1	1.5	μA
$I_{(Q)}$	Operating Quiescent Current			300	350	μA
ENABLE INPUT						
$V_{(EN\_IL)}$	Enable input low threshold		0.5	0.9	1.22	V
$V_{(EN\_IH)}$	Enable input high threshold		1.2	2	2.5	V
$V_{(EN\_Hys)}$	Enable Hysteresis		0.52		1.35	V
$I_{(EN)}$	Enable sink current	$V_{(EN)}$=12V		1.3	5	μA
V_{ANODE} to $V_{CATHODE}$						
$V_{(AK\ REG)}$	Regulated Forward $V_{(AK)}$ Threshold		13	20	29	mV
$V_{(AK)}$	$V_{(AK)}$ threshold for full conduction mode		34	50	57	mV
$V_{(AK\ REV)}$	$V_{(AK)}$ threshold for reverse current blocking		-17	-11	-2	mV
Gm	Regulation Error AMP Transconductance		1200	1800	3100	μA /V
GATE DEIVER						
$I_{(GATE)}$	Peak source current	$V_{(ANODE)}$–$V_{(CATHODE)}$=100mV, $V_{(GATE)}$–$V_{(ANODE)}$=5V	3	11		mA
	Peak sink current	$V_{(ANODE)}$–$V_{(CATHODE)}$= –20mV, $V_{(GATE)}$–$V_{(ANODE)}$=5V		2370		mA
	Regulation max sink current	$V_{(ANODE)}$–$V_{(CATHODE)}$=0V, $V_{(GATE)}$–$V_{(ANODE)}$=5V	6	26		μA
R_{DSON}	discharge switch R_{DSON}	$V_{(ANODE)}$–$V_{(CATHODE)}$= –20mV, $V_{(GATE)}$–$V_{(ANODE)}$=100mV	0.4		2	Ω
CHANGE PUMP						
$I_{(VCAP)}$	Charge Pump source current (Charge pump on)	$V_{(VCAP)}$–$V_{(ANODE)}$=7V	162	300	600	μA
	Charge Pump sink current (Charge pump off)	$V_{(VCAP)}$–$V_{(ANODE)}$=14V		5	10	μA
$V_{(VCAP)}$ –$V_{(ANODE)}$	Charge pump voltage at $V_{(ANODE)}$ =3.2 V	$I_{(VCAP)}$≤30μA	8			V
	Charge pump turn on voltage		10.8	12.1	12.9	V
	Charge pump turn off voltage		11.6	13	13.9	V
	Charge Pump Enable comparator Hysteresis		0.54	2	2.3	V
$V_{(VCAP\ UVLO)}$	$V_{(VCAP)}$ – $V_{(ANODE)}$ UV release at rising edge	$V_{(ANODE)}$–$V_{(CATHODE)}$=100mV	5.8	6.6	7.7	V
	$V_{(VCAP)}$ – $V_{(ANODE)}$ UV threshold at falling edge	$V_{(ANODE)}$–$V_{(CATHODE)}$=100mV	5.1	5.6	6	V
CATHODE						
$I_{(CATHODE)}$	CATHODE sink current	$V_{(ANODE)}$=12V, $V_{(ANODE)}$–$V_{(CATHODE)}$= –100mV		25	35	μA
		$V_{(ANODE)}$= –12V, $V_{(CATHODE)}$=12V		0.2	2	μA
Switching						
EN_{TDLY}	Enable (low to high) to Gate Turn On delay	$V_{(VCAP)}$>$V_{(VCAP\ UVLOR)}$		75	110	μs
$t_{Reverse\ delay}$	Reverse voltage detection to Gate Turn Off delay	$V_{(ANODE)}$–$V_{(CATHODE)}$=100mV to –100mV		0.45	0.75	μs
$t_{Forward\ recovery}$	Forward voltage detection to Gate Turn On delay	$V_{(ANODE)}$–$V_{(CATHODE)}$= –100mV to 700mV		1.4	2.6	μs

Characteristic plots

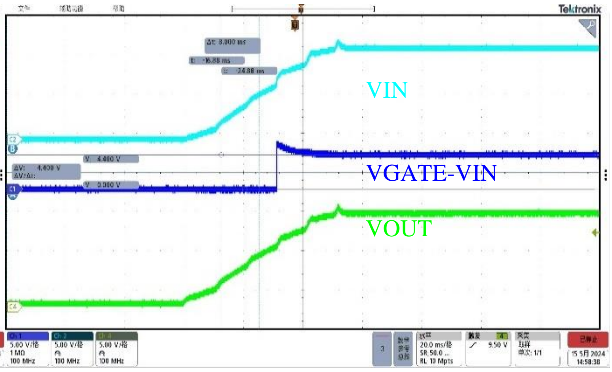
T_J =25°C, $V_{(ANODE)}$ =12V, $C_{(VCAP)}$ =1µF, $V_{(EN)}$ =3V (unless otherwise noted).



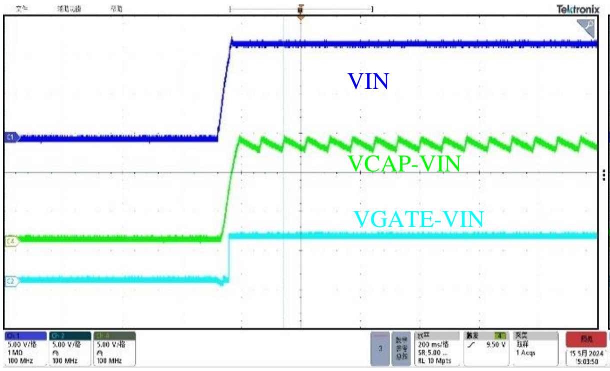




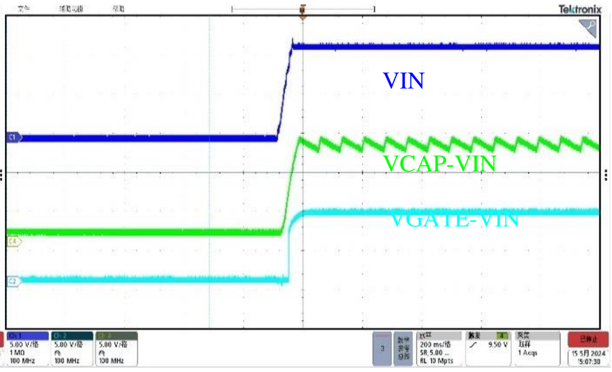
Startup with 3A Load



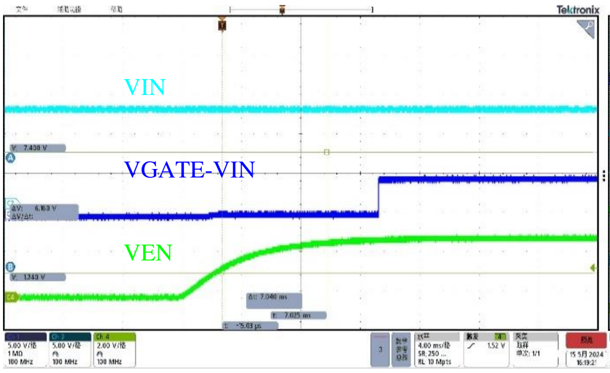
Startup with 5.8A Load



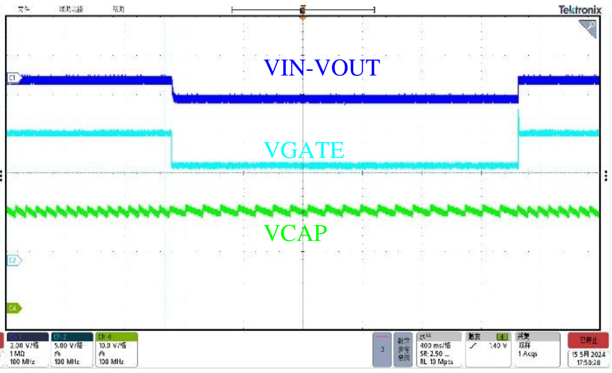
VCAP-VIN During Startup at 3A Load



VCAP-VIN During Startup at 5.8A Load

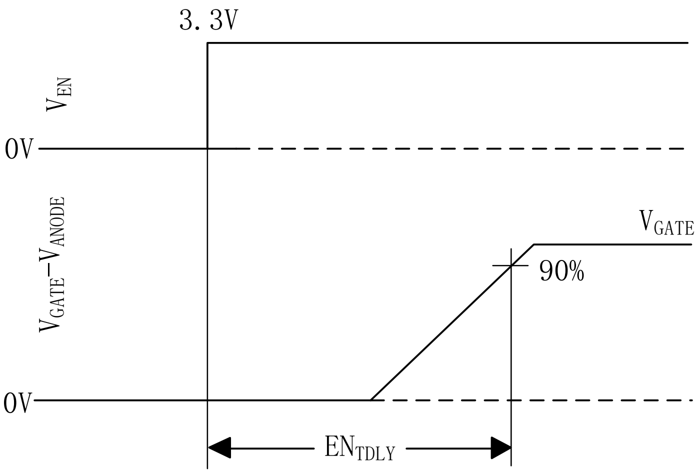


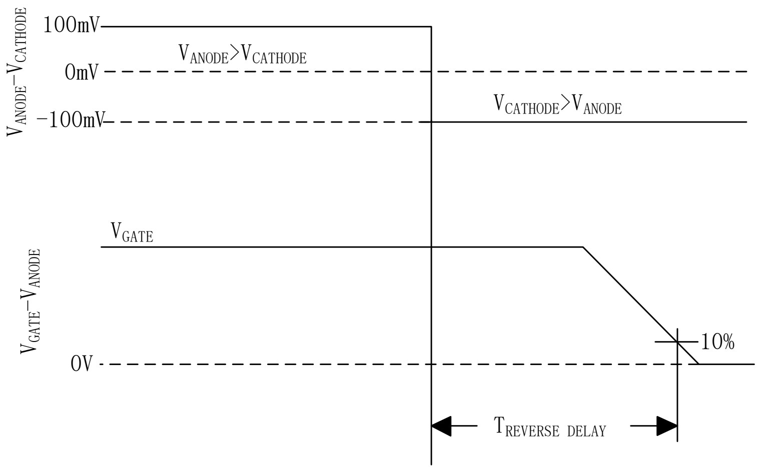
Startup with EN at 3A Load

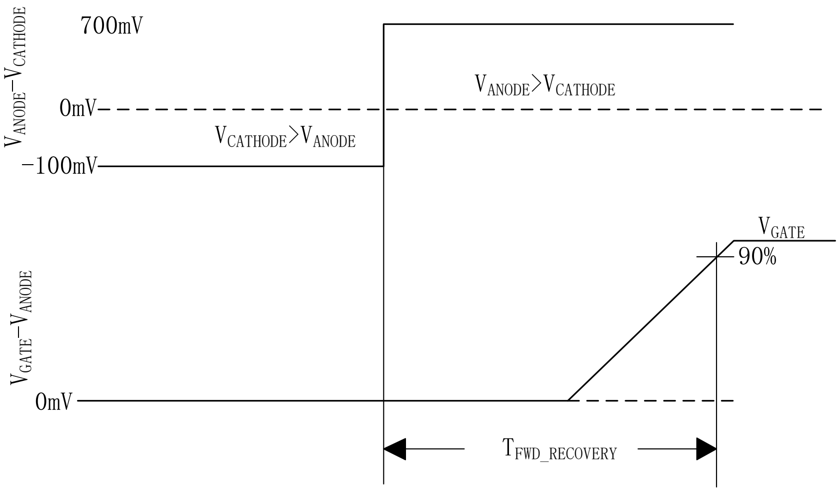


Entry and exit reverse current protection

Parameter Measurement Information







Detailed description

Overview

The MX74700 ideal diode controller has all the features necessary to implement an efficient and fast reverse polarity protection circuit or be used in an ORing configuration while minimizing the number of external components. This easy to use ideal diode controller is paired with an external N-channel MOSFET to replace other reverse polarity schemes such as a P-channel MOSFET or a Schottky diode. An internal charge pump is used to drive the external N-Channel MOSFET to a maximum gate drive voltage of approximately 15V. The voltage drop across the MOSFET is continuously monitored between the ANODE and CATHODE pins, and the GATE to ANODE voltage is adjusted as needed to regulate the forward voltage drop at 20mV. This closed loop regulation scheme enables graceful turn off of the MOSFET during a reverse current event and ensures zero DC reverse current flow. A fast reverse current condition is detected when the voltage across ANODE and CATHODE pins reduces below –11mV , resulting in the GATE pin being internally connected to the ANODE pin turning off the external N-channel MOSFET, and using the body diode to block any of the reverse current. An enable pin, EN is available to place the MX74700 in shutdown mode disabling the N-Channel MOSFET and minimizing the quiescent current.

Input Voltage

The ANODE pin is used to power the MX74700's internal circuitry, typically drawing 80μA when enabled and 1μA when disabled. If the ANODE pin voltage is greater than the POR Rising threshold, then MX74700 operates in either shutdown mode or conduction mode in accordance with the EN pin voltage. The voltage from ANODE to GND is designed to vary from -100V to 100V, allowing the MX74700 to withstand negative voltage transients

Charge Pump

The charge pump supplies the voltage necessary to drive the external N-channel MOSFET. An external charge pump capacitor is placed between VCAP and ANODE pins to provide energy to turn on the external MOSFET. In order for the charge pump to supply current to the external capacitor the EN pin voltage must be above the specified input high threshold, V(EN_IH). When enabled the charge pump sources a charging current of 300μA typical. If EN pins is pulled low, then the charge pump remains disabled. To ensure that the external MOSFET can be driven above its specified threshold voltage, the VCAP to ANODE voltage must be above the undervoltage lockout threshold, typically 6.6V, before the internal gate driver is enabled. Use the following equation to calculate the initial gate driver enable delay.

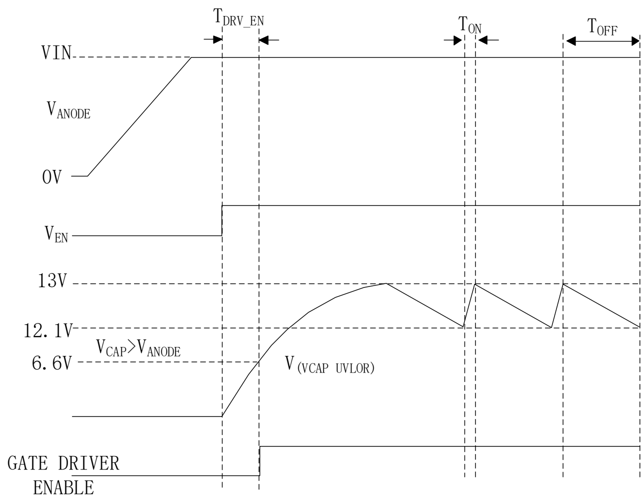
$$T_{(DRV\_EN)} = 75\mu s + C_{(VCAP)} \times \frac{V_{(VCAP\_UVLOR)}}{300\mu A}$$

where

• $C_{(VCAP)}$ is the charge pump capacitance connected across ANODE and VCAP pins

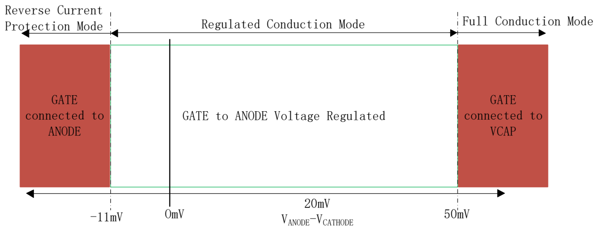
• $V_{(VCAP\_UVLOR)}$=6.6V(typical)

To remove any chatter on the gate drive approximately 900mV of hysteresis is added to the VCAP undervoltage lockout. The charge pump remains enabled until the VCAP to ANODE voltage reaches 13V, typically, at which point the charge pump is disabled decreasing the current draw on the ANODE pin. The charge pump remains disabled until the VCAP to ANODE voltage is below to 12.1V typically at which point the charge pump is enabled. The voltage between VCAP and ANODE continue to charge and discharge between 12.1V and 13V as shown in the following figure. By enabling and disabling the charge pump, the operating quiescent current of the MX74700 is reduced. When the charge pump is disabled it sinks 5μA typical.



Gate Driver

The gate driver is used to control the external N-Channel MOSFET by setting the GATE to ANODE voltage to the corresponding mode of operation. There are three defined modes of operation that the gate driver operates under forward regulation, full conduction mode and reverse current protection, according to the ANODE to CATHODE voltage. Forward regulation mode, full conduction mode and reverse current protection mode are described in more detail in the Device Functional Mods sections. As shown in the following figure depicts how the modes of operation vary according to the ANODE to CATHODE voltage of the MX74700. The threshold between forward regulation mode and conduction mode is when the ANODE to CATHODE voltage is 50mV. The threshold between forward regulation mode and reverse current protection mode is when the ANODE to CATHODE voltage is –11mV.



Before the gate driver is enabled following three conditions must be achieved:

• The EN pin voltage must be greater than the specified input high voltage.

• The VCAP to ANODE voltage must be greater than the undervoltage lockout voltage.

• The ANODE voltage must be greater than VANODE POR Rising threshold.

If the above conditions are not achieved, then the GATE pin is internally connected to the ANODE pin, assuring that the external MOSFET is disabled. Once these conditions are achieved the gate driver operates in the correct mode depending on the ANODE to CATHODE voltage.

Enable

The MX74700 has an enable pin, EN. The enable pin allows for the gate driver to be either enabled or disabled by an external signal. If the EN pin voltage is greater than the rising threshold, the gate driver and charge pump operates as described in Gate Driver and Charge Pump sections. If the enable pin voltage is less than the input low threshold, the charge pump and gate driver are disabled placing the MX74700 in shutdown mode. The EN pin can withstand a voltage as large as 100V and as low as –100V. This allows for the EN pin to be connected directly to the ANODE pin if enable functionality is not needed. In conditions where EN is left floating, the internal sink current of 3uA pulls EN pin low and disables the device.

Device Functional Modes

Shutdown Mode

The MX74700 enters shutdown mode when the EN pin voltage is below the specified input low threshold $V_{(EN\_IL)}$. Both the gate driver and the charge pump are disabled in shutdown mode. During shutdown mode the MX74700 enters low I_Q operation with the ANODE pin only sinking 1μA. When the MX74700 is in shutdown mode, forward current flow through the external MOSFET is not interrupted but is conducted through the MOSFET's body diode.

Conduction Mode

Conduction mode occurs when the gate driver is enabled. There are three regions of operating during conduction mode based on the ANODE to CATHODE voltage of the MX74700. Each of the three modes is described in the Regulated Conduction Mode, Full Conduction Mode and Reverse Current Protection Mode sections.

Regulated Conduction Mode

For the MX74700 to operate in regulated conduction mode, the gate driver must be enabled as described in the Gate Driver section and the current from source to drain of the external MOSFET must be within the range to result in an ANODE to CATHODE voltage drop of –11mV to 50mV. During forward regulation mode the ANODE to CATHODE voltage is regulated to 20mV by adjusting the GATE to ANODE voltage. This closed loop regulation scheme enables graceful turn off of the MOSFET at very light loads and ensures zero DC reverse current flow.

Full Conduction Mode

For the MX74700 to operate in full conduction mode the gate driver must be enabled as described in the Gate Driver section and the current from source to drain of the external MOSFET must be large enough to result in an ANODE to CATHODE voltage drop of greater than 50mV typical. If these conditions are achieved the GATE pin is internally connected to the VCAP pin resulting in the GATE to ANODE voltage being approximately the same as the VCAP to ANODE voltage. By connecting VCAP to GATE the external MOSFET's $R_{DS(ON)}$ is minimized reducing the power loss of the external MOSFET when forward currents are large.

Rever Current Protection Mode

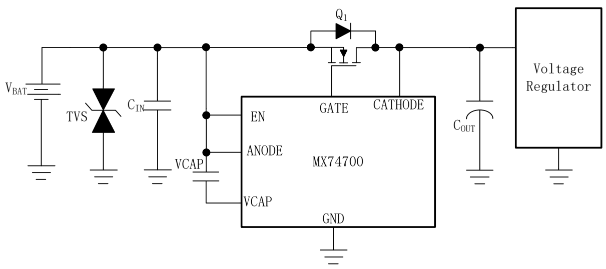
For the MX74700 to operate in reverse current protection mode, the gate driver must be enabled as described in the Gate Driver section and the current of the external MOSFET must be flowing from the drain to the source. When the ANODE to CATHODE voltage is typically less than –11mV, reverse current protection mode is entered and the GATE pin is internally connected to the ANODE pin. The connection of the GATE to ANODE pin disables the external MOSFET. The body diode of the MOSFET blocks any reverse current from flowing from the drain to source.

Application and Implementation

Application Information

The MX74700 is used with N-Channel MOSFET controller in a typical reverse polarity protection application. The schematic for the 12V battery protection application is shown in follow figure where the MX74700 is used in series with a battery to drive the MOSFET Q1. The TVS is not required for the MX74700 to operate, but they are used to clamp the positive and negative voltage surges. The output capacitor C_{OUT} is recommended to protect the immediate output voltage collapse as a result of line disturbance.

Typical Application



Design Requirements

MOSFET Selection

The important MOSFET electrical parameters are the maximum continuous drain current ID, the maximum drain to source voltage $V_{DS(MAX)}$, the maximum source current through body diode and the drain to source On resistance R_{DSON}.

The maximum continuous drain current, I_D, rating must exceed the maximum continuous load current. The maximum drain-to-source voltage, $V_{DS(MAX)}$, must be high enough to withstand the highest differential voltage seen in the application. This would include any anticipated fault conditions. It is recommended to use MOSFETs with voltage rating up to 100V maximum with the MX74700 because anode-cathode maximum voltage is 100V. The maximum V_{GS} MX74700 can drive is 13V, so a MOSFET with 15V minimum V_{GS} should be selected. If a MOSFET with < 15V V_{GS} rating is selected, a zener diode can be used to clamp V_{GS} to safe level. During startup, inrush current flows through the body diode to charge the bulk hold-up capacitors at the output. The maximum source current through the body diode must be higher than the inrush current that can be seen in the application.

To reduce the MOSFET conduction losses, lowest possible $R_{DS(ON)}$ is preferred, but selecting a MOSFET based on low $R_{DS(ON)}$ may not be beneficial always. Higher $R_{DS(ON)}$ will provide increased voltage information to MX74700's reverse comparator at a lower reverse current. Reverse current detection is better with increased $R_{DS(ON)}$.

It is recommended to operate the MOSFET in regulated conduction mode during nominal load conditions and select $R_{DS(ON)}$ such that at nominal operating current, forward voltage drop V_{DS} is close to 20mV regulation point and not more than 50mV.

As a guideline, it is suggested to choose $(20mV / I_{Load(Nominal)}) \leq R_{DS(ON)} \leq (50mV / I_{Load(Nominal)})$.

MOSFET manufacturers usually specify $R_{DS(ON)}$ at 4.5V V_{GS} and 10V V_{GS}. $R_{DS(ON)}$ increases drastically below 4.5V V_{GS} and $R_{DS(ON)}$ is highest when V_{GS} is close to MOSFET V_{th}. For stable regulation at light load conditions, it is recommended to operate the MOSFET close to 4.5V V_{GS}, that is, much higher than MOSFET gate threshold voltage. It is recommended to choose MOSFET gate threshold voltage V_{th} of 2V to 2.5V maximum. Choosing a lower V_{th} MOSFET also reduces the turn ON time.

Based on the design requirements, preferred MOSFET ratings are:

- 100V $V_{DS(MAX)}$ and ±20V $V_{GS(MAX)}$
- $R_{DS(ON)}$ at 3A nominal current: $(20mV / 3A) \leq R_{DS(ON)} \leq (50mV / 3A) = 6.67m\Omega \leq R_{DS(ON)} \leq 16.67m\Omega$
- MOSFET gate threshold voltage V_{th}: 2V maximum

DMT6007LFG MOSFET from Diodes Inc. is selected to meet this 12V reverse battery protection design requirements and it is rated at:

- 100V $V_{DS(MAX)}$ and ±20V $V_{GS(MAX)}$
- $R_{DS(ON)}$ 6.5mΩ typical and 8.5mΩ maximum rated at 4.5V V_{GS}
- MOSFET V_{th}: 2V maximum

Thermal resistance of the MOSFET should be considered against the expected maximum power dissipation in the MOSFET to ensure that the junction temperature (T_J) is well controlled.

Charge Pump VCAP, input and output capacitance

Minimum required capacitance for charge pump VCAP and input/output capacitance are:

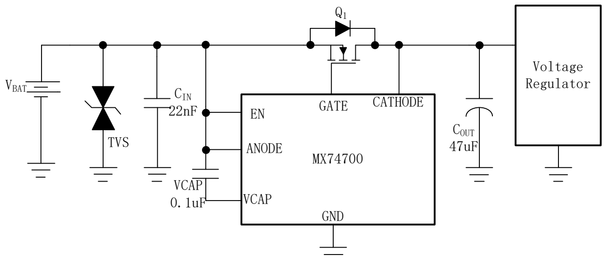
- VCAP: Minimum 0.1μF is required; recommended value of $VCAP(\mu F) \geq 10 \times C_{ISS(MOSFET)}(\mu F)$
- C_{IN}: minimum 22nF of input capacitance
- C_{OUT}: minimum 100nF of output capacitance

Selection of TVS Diodes for 12V Battery Protection Application

TVS diodes are used for protection against transients. In the 12V battery protection application circuit shown below, a bi-directional TVS diode is used to protect from positive and negative transient voltages that occur during normal operation.

There are two important specifications are breakdown voltage and clamping voltage of the TVS. Breakdown voltage is the voltage at which the TVS diode goes into avalanche similar to a zener diode and is specified at a low current value typical 1mA and the breakdown voltage should be higher than worst case steady state voltages seen in the system. The breakdown voltage of the TVS+ should be higher than 24V jump start voltage and 35V suppressed load dump voltage and less than the maximum ratings of MX74700 (100V). The breakdown voltage of TVS- should be beyond than maximum reverse battery voltage –16V, so that the TVS- is not damaged due to long time exposure to reverse connected battery.

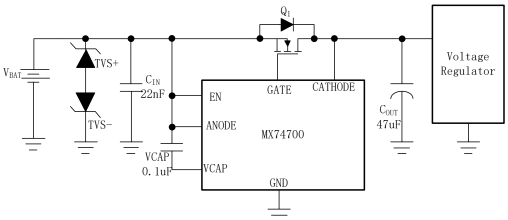
Clamping voltage is the voltage the TVS diode clamps in high current pulse situations and this voltage is much higher than the breakdown voltage. TVS diodes are meant to clamp transient pulses and should not interfere with steady state operation.



The next criterion is that the absolute maximum rating of Anode to Cathode reverse voltage of the MX74700(–100V) and the maximum V_{DS} rating MOSFET are not exceeded. In the design example, 100V rated MOSFET is chosen and maximum limit on the cathode to anode voltage is 100V.

Selection of TVS Diodes and MOSFET for 24V Battery Protection Applications

A typical 24V battery protection application circuit uses two unidirectional TVS diodes to prevent positive and negative transient voltages as shown below.



The breakdown voltage of the TVS+ should be higher than 48V jump start voltage, less than the absolute maximum ratings of anode and enable pin of MX74700 (100V) and should withstand 100V suppressed load dump. The breakdown voltage of TVS- should be lower than maximum reverse battery voltage –32V, so that the TVS- is not damaged due to long time exposure to reverse connected battery.

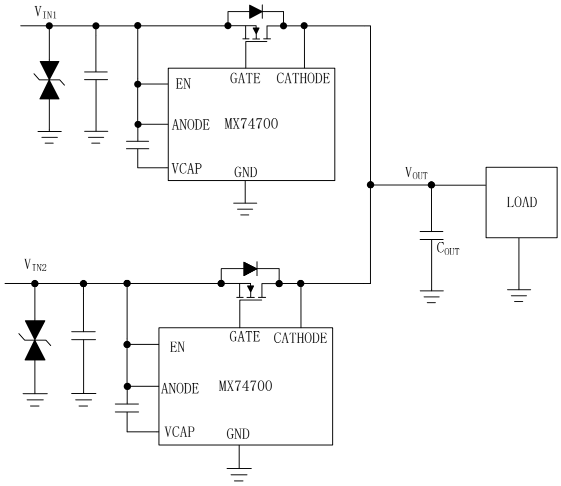
Single bi-directional TVS cannot be used for 24V battery protection because breakdown voltage for TVS+ ≥ 100V, maximum clamping voltage is ≤ 68V and the clamping voltage cannot be less than the breakdown voltage. Two un-directional TVS connected back-back needs to be used at the input.

For 24V battery protection, a 100V rated MOSFET is recommended to be used along with TVS+ and TVS- connected back-back at the input.

ORing Application Configuration

Basic redundant power architecture comprises of two or more voltage or power supply sources driving a single load. In its simplest form, the ORing solution for redundant power supplies consists of Schottky ORing diodes that protect the system against an input power supply fault condition. A diode ORing device provides effective and low cost solution with few components. However, the diodes forward voltage drops affects the efficiency of the system permanently, since each diode in an ORing application spends most of its time in forward conduction mode. These power losses increase the requirements for thermal management and allocated board space.

MX74700 ICs combined with external N-channel MOSFETs can be used for ORing solution, as shown in the following figure The forward diode drop is reduced as the external N-Channel MOSFET is turned ON during normal operation. MX74700 quickly detects the reverse current, pulls down the MOSFET gate fast, leaving the body diode of the MOSFET to block the reverse current flow. An effective ORing solution needs to be extremely fast to limit the reverse current amount and duration. The MX74700 devices in ORing configuration constantly sense the voltage difference between Anode and Cathode pins, which are the voltage levels at the power sources (V_{IN1}, V_{IN2}) and the common load point respectively. The source to drain voltage V_{DS} for each MOSFET is monitored by the Anode and Cathode pins of the MX74700. A fast comparator shuts down the Gate Drive through a fast Pull-Down within 0.45µs (typical) as soon as $V_{(IN)} – V_{(OUT)}$ falls below –11mV. It turns on the Gate with 11mA gate charge current once the differential forward voltage $V_{(IN)} – V_{(OUT)}$ exceeds 50mV.



ORing V_{IN1} toV_{IN2} Switch Over to ORing V_{IN2} to V_{IN1} Switch over how the smooth switch over between two power supply rails vin1 at 12V and V_{IN2} at 15V. ORing -V_{IN2} Failure and Switch Over to V_{IN1} and ORing -V_{IN2} Failure and Switch Over to V_{IN1} illustrate the performance when V_{IN2} fails. MX74700 controlling V_{IN2} power rail turns off quickly, so that the output remains uninterrupted and V_{IN1} is protected from V_{IN2} failure.

Power Supply Recommendations

The MX74700 Ideal Diode Controller designed for the supply voltage range of 3.2V ≤ VANODE ≤ 100V. If the input supply is located more than a few inches from the device, an input ceramic bypass capacitor higher than 22nF is recommended. To prevent MX74700 and surrounding components from damage under the conditions of a direct output short circuit, it is necessary to use a power supply having over load and short circuit protection.

Layout

Layout Guidelines

• Connect ANODE, GATE and CATHODE pins of MX74700 close to the MOSFET's SOURCE, GATE and DRAIN pins.

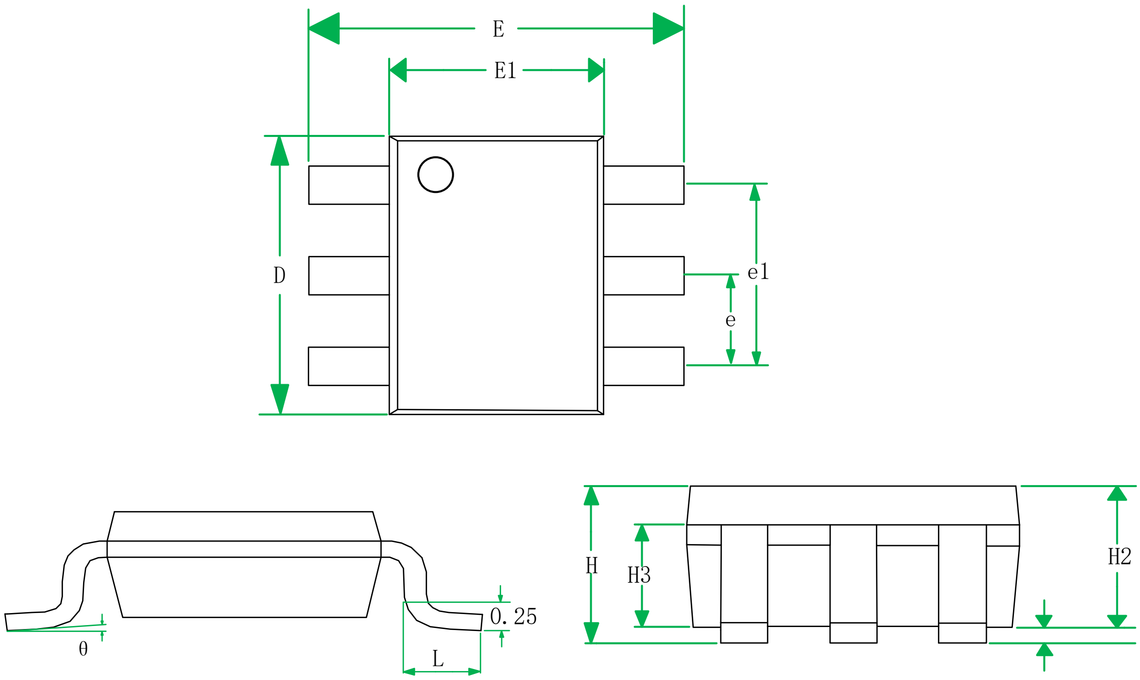
• The high current path of for this solution is through the MOSFET, therefore it is important to use thick traces for source and drain of the MOSFET to minimize resistive losses.

• The charge pump capacitor across VCAP and ANODE pins must be kept away from the MOSFET to lower the thermal effects on the capacitance value.

• The Gate pin of the MX74700 must be connected to the MOSFET gate with short trace. Avoid excessively thin and long trace to the Gate Drive.

• Keep the GATE pin close to the MOSFET to avoid increase in MOSFET turn-off delay due to trace resistance.

Package information



SOT23-6 for MX74700

SYMBOL	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
H			1.45			0.057
H1	0.04		0.15	0.0016		0.0059
H2	1.00	1.10	1.20	0.039	0.043	0.047
H3	0.55	0.65	0.75	0.022	0.026	0.029
D	2.72	2.92	3.12	0.107	0.115	0.123
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.40	1.60	1.80	0.055	0.063	0.071
e	0.95BSC			0.037BSC		
e1	1.90BSC			0.074BSC		
L	0.30		0.60	0.012		0.024
θ	0		8°	0		8°

Restrictions on Product Use

◆ MAXIN micro is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing MAXIN products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such MAXIN products could cause loss of human life, bodily injury or damage to property.

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Version update record:

V10 The original version （preliminary）