MIC2033
Evaluation Board

High-Accuracy, High-Side, Fixed Current Limit Power Switch

General Description

The MIC2033 is a high-side MOSFET power distribution switch providing increased system reliability using 5% current limit accuracy.

The MIC2033 has an operating input voltage range from 2.5V to 5.5V, is internally current limited, and has thermal shutdown to protect the device and system. The MIC2033 is offered with either active-high or active-low logic level enable input controls. It has an open drain fault status output flag with a built-in 32ms delay that asserts low during overcurrent or thermal shutdown conditions.

The MIC2033 is available with several different fixed current limit options: 0.5A, 0.8A, 1A, and 1.2A. A capacitor-adjustable soft-start circuit minimizes inrush current in applications using high capacitive loads.

The MIC2033 is offered in both 6-pin SOT-23 and 6-pin 2mm x 2mm thin DFN packages. It has an operating junction temperature range of –40°C to +125°C.

Requirements

The MIC2033 evaluation board requires a single power supply to provide V_{IN}. The V_{IN} power supply must be able to deliver a minimum of 2.5V and more than 1.5A capability. The output load can either be active or passive.

Precautions

The evaluation board does not have reverse polarity protection. Applying a negative voltage to the V_{IN} terminal can damage the device. In addition, the maximum V_{IN} operating voltage of the MIC2033 evaluation board is 5.5V. Exceeding 5.5V on V_{IN} can permanently damage the device.

Getting Started

1. **Connect an external supply to the V_{IN} terminal**.

   Apply the desired input voltage to the V_{IN} and ground terminals of the evaluation board, paying careful attention to polarity and supply voltage. The user can place an ammeter between the input supply and the V_{IN} terminal to the evaluation board. Make sure that the supply voltage is monitored at the V_{IN} terminal. The ammeter and/or power lead resistance can reduce the voltage supplied to the input.

2. **Connect the load to the V_{OUT} and ground terminals.**

   The load can be either passive (resistive) or active (as in an electronic load). The user can place an ammeter between the load and the V_{OUT} terminal. Make sure that the output voltage is monitored at the V_{OUT} terminal.

3. **Enable the switch**

   The MIC2033-12AYxx evaluation boards are configured for default enable using a 10kΩ pull-up resistor from the ENABLE pin to VIN. To disable the switch, place a jumper short across the jumper pins at TP2. The MIC2033-05BYxx evaluation boards are configured for default disable. To enable the switch, place a jumper short across the jumper pins at TP2.

4. **Fault detection**

   The MIC2033 is equipped with an error flag, FAULT/. TP3 is provided to monitor the FAULT/ pin.

Ordering Information

Part Number	Description
MIC2033-05BYM6 EV	Evaluation board featuring the MIC2033-05BYM6 500mA Switch
MIC2033-12AYM6 EV	Evaluation board featuring the MIC2033-12AYM6 1.2A Switch
MIC2033-05BYMT EV	Evaluation board featuring the MIC2033-05BYMT 500mA Switch
MIC2033-12AYMT EV	Evaluation board featuring the MIC2033-12AYMT 1.2A Switch

Application Information

Soft-Start

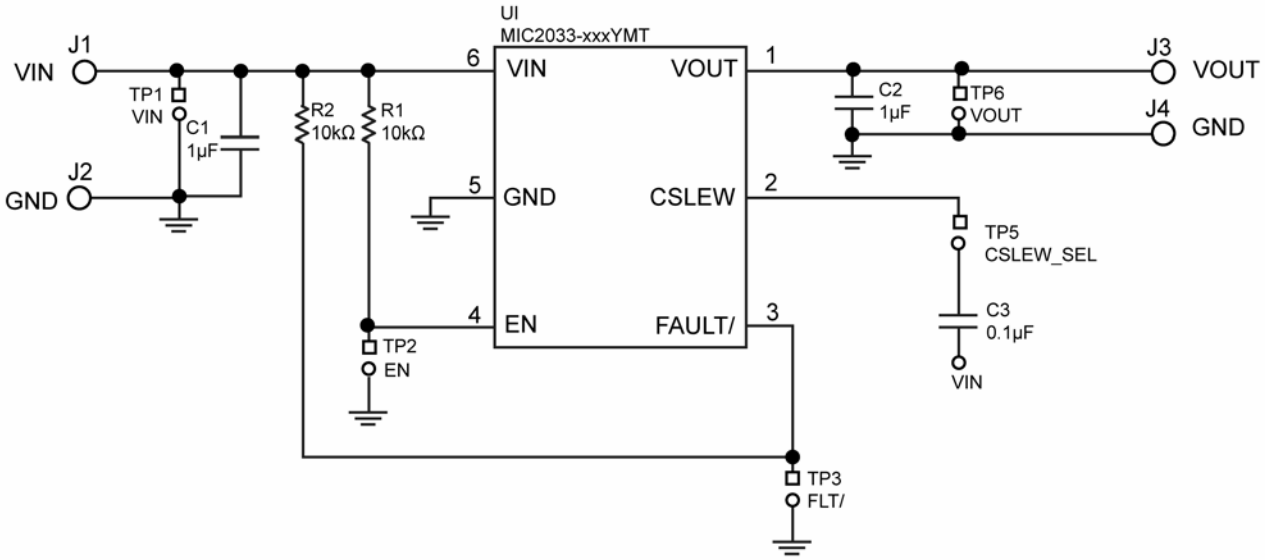
Soft-start reduces the power supply input surge current at startup by controlling the output voltage rise time. The input surge appears while the output capacitor is charged up. A slower output rise time draws a lower input surge current.

During soft-start, an internal current sink discharges the external capacitor at CSLEW to ground to control the ramp of the output voltage. The output voltage rise time depends on the value of C_{CSLEW}, the input voltage, output voltage, and the current limit. Micrel recommends that the value of the CSLEW external capacitor be in the range of 0.1µF to 1µF. For the MIC2033 evaluation board, CSLEW = C3 = 0.1µF.

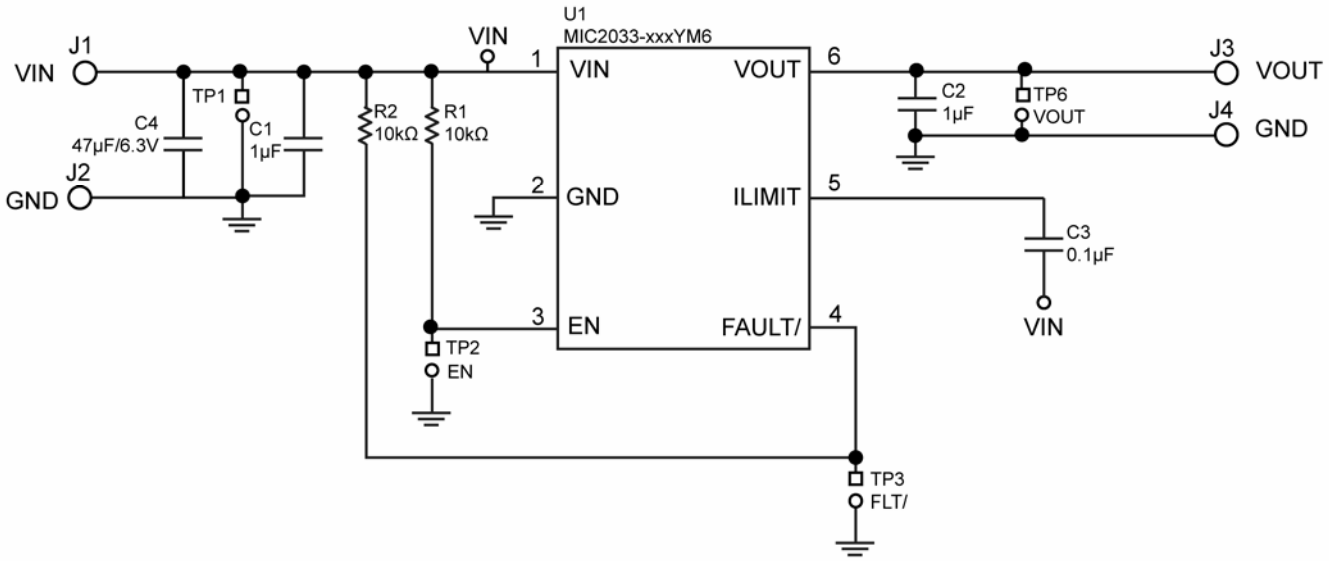
Output Voltage

The MIC2033 evaluation board is available with either a 0.5A or 1.2A fixed current limit. If the output current exceeds the current limit, the MIC2033 switch enters constant current limit mode. The maximum allowable current limit can be less than the full specified and/or expected current if the MIC2033 is not mounted on a circuit board with sufficiently low thermal resistance. The MIC2033 responds to short circuits within 10µs to limit the output current. It also provides an output fault flag that asserts (low) for an overcurrent condition that lasts longer than the overcurrent fault response delay time ($t_{FAULT/}$), which is typically 32ms.

MIC2033-xxxYMx Evaluation Board Schematics



MIC2033-xxxYMT Evaluation Board



MIC2033-xxxYM6 Evaluation Board

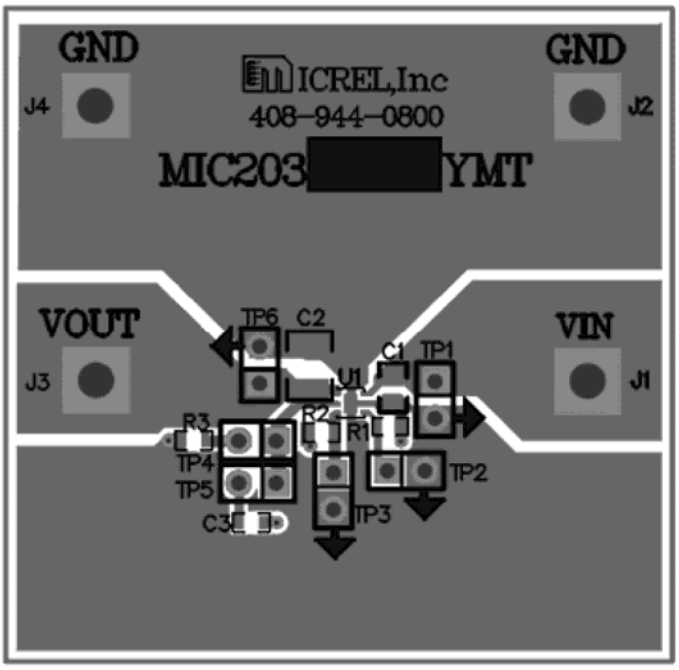
Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1, C2	C1608X5R0J105K	TDK[1]	1.0µF/6.3V ceramic capacitor, X5R, 0603	2
	06036D105KAT2A	AVX[2]		
C3	06033C104KAT2A	TDK	0.1µF/25V ceramic capacitor, X7R, 0603	1
	C1608X7R1E104K	AVX		
R1, R2	CRCW060310K0FKEA	Vishay/Dale[3]	10.0kΩ, film resistor, 0603, 1%	2
U1	**MIC2033-xxxYMx**	**Micrel[4]**	**High-accuracy, high-side, fixed current limit power switch**	**1**

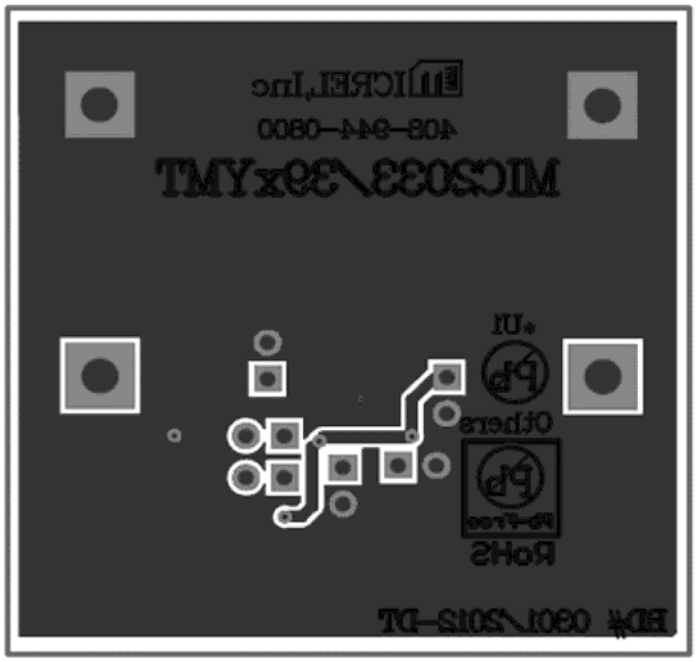
Notes:

1. TDK: www.tdk.com.
2. AVX: www.avx.com.
3. Vishay: www.vishay.com.
4. **Micrel, Inc.: www.micrel.com.**

Evaluation Board PCB Layout

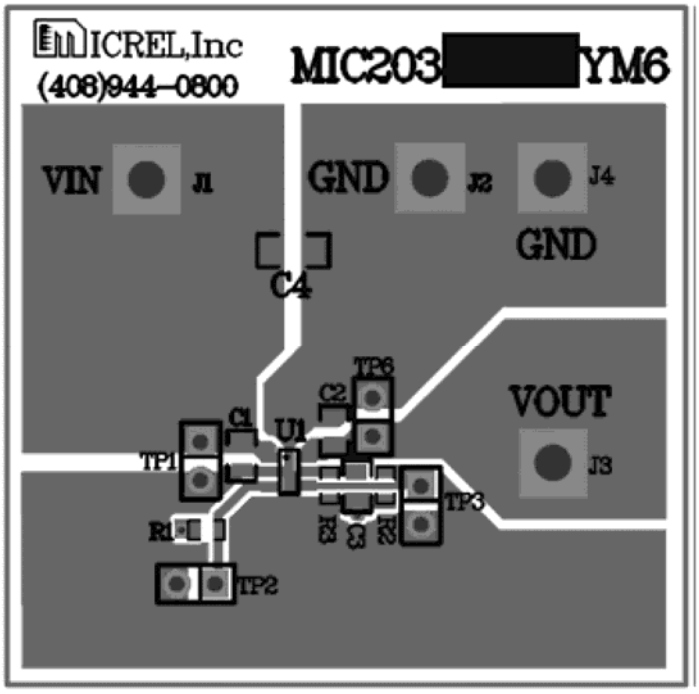


MIC2033-xxxYMT Evaluation Board – Top Layer

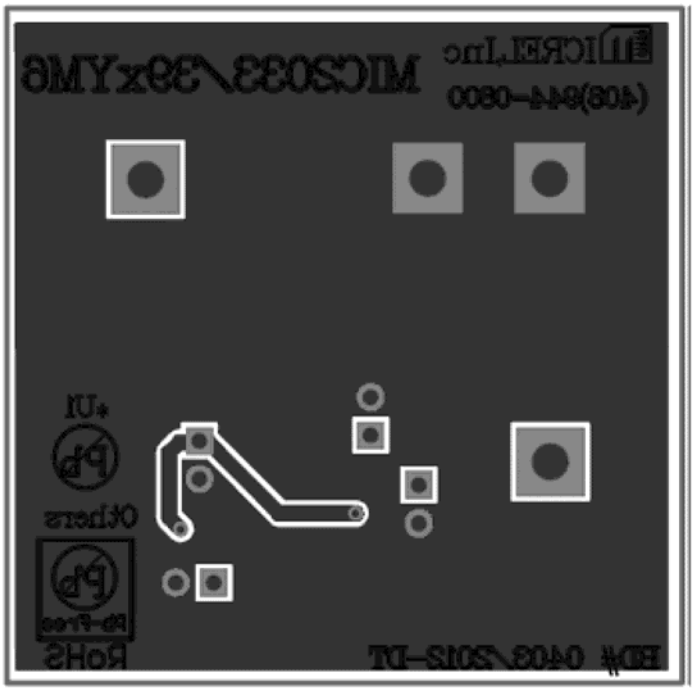


MIC2033-xxxYMT Evaluation Board – Bottom Layer

Evaluation Board PCB Layout (Continued)



MIC2033-xxxYM6 Evaluation Board – Top Layer



MIC2033-xxxYM6 Evaluation Board – Bottom Layer

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