

# **MIC2039**

## High-Accuracy, High-Side, Adjustable Current-Limit Power Switch

#### Features

- ±5% Current-Limit Accuracy
- Input Supply Range from 2.5V to 5.5V
- Low Quiescent Current: 100 µA Typical (Switch ON)
- 75 mΩ Typical R<sub>DS(ON)</sub> at 5V
- 0.2A to 2.5A Adjustable Output Current
- Kickstart: Momentary Secondary Current-Limit Threshold (120 ms period)
- · Soft-Start Functionality
- Undervoltage Lockout (UVLO)
- Fast 10 µs Short-Circuit Response Time (Non-Kickstart Options)
- Fault Status Output Flag
- · Logic Controlled Enable (Active-High, Active-Low)
- Thermal Shutdown
- Pin Compatible with MIC2009/MIC2019
- 6-Pin 2 mm x 2 mm UDFN and 6-Pin SOT-23
   Packages
- Junction Temperature Range from –40°C to +125°C

#### Applications

- USB Peripherals and USB 2.0/3.0-Compatible
- DTV/STB
- Notebooks and Consumer Electronics
- General Purpose Power Distribution

## Package Types

## **General Description**

The MIC2039 is a high-side MOSFET power distribution switch that provides increased system reliability by using 5% current-limit accuracy.

The MIC2039 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 MIC2039 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 32 ms delay that asserts low during overcurrent or thermal-shutdown conditions.

The MIC2039 features an adjustable output current limit that is resistor-programmable from 0.2A to 2.5A. The MIC2039 also offers a unique kickstart feature that allows momentary high-current surges up to the secondary current limit ( $I_{LIMIT_2nd}$ ) during startup or while operating in steady-state. This is useful for charging loads with high inrush currents, such as capacitors. After an overcurrent condition is established, these switches enter into a constant current-limit mode unless the die temperature exceeds the thermal-shutdown specification.

The MIC2039 is available in 6-pin SOT-23 and 6-pin 2 mm x 2 mm UDFN packages. The MIC2039 has an operating junction temperature range of  $-40^{\circ}$ C to  $+125^{\circ}$ C.



Note 1: UDFN ▲ = Pin 1 identifier.

## **Typical Application Circuit**



## **Functional Block Diagram**



## 1.0 ELECTRICAL CHARACTERISTICS

## Absolute Maximum Ratings †

V <sub>IN</sub> to GND	
V <sub>OUT</sub> to GND	–0.3V to V <sub>IN</sub>
V <sub>ILIMIT</sub> to GND	–0.3V to V <sub>IN</sub> + 0.3V
V <sub>EN</sub> to GND	–0.3V to V <sub>IN</sub>
V <sub>FAULT</sub> to GND	
FAULT/ Current (I <sub>FAULT/</sub> )	
Maximum Power Dissipation (P <sub>D</sub> )	Internally Limited
ESD Rating (HBM) (Note 1)	
ESD Rating (MM) (Note 1)	

## **Operating Ratings ‡**

Supply Voltage (V <sub>IN</sub> )	
V <sub>FN</sub>	–0.3V to V <sub>IN</sub>
V <sub>FAULT</sub> /	
V <sub>ILIMIT</sub> , V <sub>OUT</sub>	–0.3V to V <sub>IN</sub>

**† Notice:** Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

**‡ Notice:** The device is not guaranteed to function outside its operating ratings.

Note 1: Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5 k $\Omega$  in series with 100 pF.

## **ELECTRICAL CHARACTERISTICS**

**Electrical Characteristics:**  $V_{IN} = V_{EN} = 5V$ ,  $C_{IN} = 1 \ \mu\text{F}$ ;  $T_J = +25^{\circ}\text{C}$ , unless noted. **Bold** values indicate  $-40^{\circ}\text{C} \le T_J \le +125^{\circ}\text{C}$ . (Note 1).

Symbol	Symbol Parameters		Тур.	Max.	Units	Conditions			
Power Supply Input									
V <sub>IN</sub>	Input Voltage Range	2.5	_	5.5	V	—			
	Input Supply Undervoltage	2.0	2.25	2.5	V	V <sub>IN</sub> rising			
VUVLO	Lockout Threshold	1.9	2.15	2.4	V	V <sub>IN</sub> falling			
V <sub>UVLOHYS</sub>	Input Supply Undervoltage Lockout Threshold Hysteresis		100	_	mV	V <sub>IN</sub> rising or V <sub>IN</sub> falling			
			0.75	5	μΑ	Switch OFF; Active-High Enable (A): $V_{EN} = 0V$ , $V_{IN} = 5V$ , $I_{OUT} = 0A$			
1	Supply Current	_				Switch OFF; Active-Low Enable (B): V <sub>EN</sub> = 1.5V, V <sub>IN</sub> = 5V, I <sub>OUT</sub> = 0A			
DD			100	300	μΑ	Switch ON; Active-High Enable (A): $V_{EN} = 1.5V$ , $V_{IN} = 5V$ , $I_{OUT} = 0A$			
		_				Switch ON; Active-Low Enable (B): $V_{EN} = 0V$ , $V_{IN} = 5V$ , $I_{OUT} = 0A$			
Power MOSFE	Т								
	Switch On-Resistance	_	100	177	mΩ	V <sub>IN</sub> = 2.5V, I <sub>OUT</sub> = 350 mA			
R <sub>DS(ON)</sub>		—	85	145		V <sub>IN</sub> = 3.3V, I <sub>OUT</sub> = 350 mA			
		_	75	125		V <sub>IN</sub> = 5V, I <sub>OUT</sub> = 350 mA			
I <sub>LKG</sub>	Output Leakage Current		0.22	15	μA	Switch OFF, V <sub>OUT</sub> = 0V			
Current Limit	Γ		1	1	1	Γ			
		0.0E	25	2.65		$\begin{aligned} R_{LIMIT} &= 115\Omega,  V_{IN} = 5V, \\ V_{OUT} &= 0.8V \times V_{IN} \end{aligned}$			
		2.55	2.0	2.05		R <sub>LIMIT</sub> = 115Ω, V <sub>IN</sub> = 2.5V, V <sub>OUT</sub> = 0V			
	Current Limit (Resistor Values	1.90	2.0	2.10					
LIMIT	are Standard 0.1% Values)	0.95	1.0	1.05	A	$R_{LIMIT} = 287\Omega, V_{IN} = 5V, V_{OUT} = 0.8V \times V_{IN}$			
		0.475	0.50	0.525		$R_{\text{LIMIT}} = 576\Omega, V_{\text{IN}} = 5V, \\ V_{\text{OUT}} = 0.8V \times V_{\text{IN}}$			
		0.19	0.20	0.21		$R_{LIMIT} = 1.45 \text{ k}\Omega, \text{ V}_{\text{IN}} = 5\text{V},$ $\text{V}_{\text{OUT}} = 0.8\text{V} \times \text{V}_{\text{IN}}$			
I <sub>LIMIT_2ND</sub>	Secondary Current Limit (Kickstart parts only)	2.2	3.2	6.0	А	V <sub>OUT</sub> = 0V			

Note 1: Specification for packaged product only.

2: See Timing Diagrams.

**3:** For dynamic current loads faster than typically 30 mA/ms. Slower current loads will delay the deactivation of VOUT and the current limitation, allowing FAULT/ to be asserted before these.

## **ELECTRICAL CHARACTERISTICS (CONTINUED)**

**Electrical Characteristics:**  $V_{IN} = V_{EN} = 5V$ ,  $C_{IN} = 1 \ \mu\text{F}$ ;  $T_J = +25^{\circ}\text{C}$ , unless noted. **Bold** values indicate  $-40^{\circ}\text{C} \le T_J \le +125^{\circ}\text{C}$ . (Note 1).

Symbol	Symbol Parameters		Тур.	Max.	Units	Conditions			
I/O									
		_	_	0.5		Logic-Low			
V <sub>EN</sub>	Enable Voltage	1.5	—	_		Logic-High			
I <sub>EN</sub>	Enable Input Current	_	1	_	μA	$0V \le V_{EN} \le 5V$			
R <sub>FAULT/</sub>	FAULT/ Output Resistance	_	_	25	Ω	I <sub>OUT</sub> = 10 mA			
I <sub>FAULT/_OFF</sub>	FAULT/ Off Current	_	_	10	μA	V <sub>FAULT/</sub> = V <sub>IN</sub>			
Thermal Prote	ection								
T <sub>SD</sub>	Thermal Shutdown Threshold	_	157		°C	T <sub>J</sub> rising			
T <sub>SDHYS</sub>	Thermal Shutdown Hysteresis	_	15	_	°C	_			
Timing Specif	ications (AC Parameters)								
t <sub>RISE</sub>	Output Turn-On Rise Time (Note 2)	_	700	_	μs	R <sub>LOAD</sub> = 10Ω; C <sub>OUT</sub> = 1 μF			
t <sub>FALL</sub>	Output Turn-Off Fall Time (Note 2)	_	32	_	μs	V <sub>EN</sub> = OFF; R <sub>LOAD</sub> = 10Ω; C <sub>OUT</sub> = 1 μF			
t <sub>ON_DLY</sub>	Output Turn-On Delay (Note 2)	_	700		μs	R <sub>LOAD</sub> = 10Ω; C <sub>OUT</sub> = 1 μF			
t <sub>OFF_DLY</sub>	Output Turn-Off Delay (Note 2)	_	5	_	μs	R <sub>LOAD</sub> = 10Ω; C <sub>OUT</sub> = 1 μF			
t <sub>SC_RESP</sub>	Short Circuit Response Time (Note 2, Note 3)	_	10	_	μs	V <sub>OUT</sub> = 0V (short-circuit)			
t <sub>FAULT/</sub>	Overcurrent Fault Response Delay Time (Note 2, Note 3)	16	32	49	ms	Non-kickstart parts.			
<sup>t</sup> KICKSTART	Overcurrent Fault Response Delay During Kickstart (Note 2)	64	120	200	ms	Kickstart parts only.			

**Note 1:** Specification for packaged product only.

2: See Timing Diagrams.

**3:** For dynamic current loads faster than typically 30 mA/ms. Slower current loads will delay the deactivation of VOUT and the current limitation, allowing FAULT/ to be asserted before these.

## **TEMPERATURE SPECIFICATIONS**

Parameters	Sym.	Min.	Тур.	Max.	Units	Conditions		
Temperature Ranges								
Junction Operating Temperature Range	ТJ	-40	_	+125	°C	Note 1		
Storage Temperature Range	Τ <sub>S</sub>	-65	—	+150	°C	—		
Lead Temperature	_	—	—	+260	°C	Soldering, 10s		
Package Thermal Resistances								
Thermal Resistance SOT-23-6	$\theta_{JA}$	-	177.2	_	°C/W	—		
Thermal Resistance 6-pin 2 mm x 2 mm UDFN	$\theta_{JA}$	_	90	_	°C/W	—		

**Note 1:** The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction to air (i.e., T<sub>A</sub>, T<sub>J</sub>, θ<sub>JA</sub>). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum +125°C rating. Sustained junction temperatures above +125°C can impact the device reliability.

#### 2.0 **TYPICAL PERFORMANCE CURVES**

Note: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.



FIGURE 2-1: Temperature.



FIGURE 2-2: Temperature.



Temperature.



FIGURE 2-4:

R<sub>DS(ON)</sub> vs. Temperature.



FIGURE 2-5:

R<sub>DS(ON)</sub> vs. Temperature.



FIGURE 2-6:

R<sub>DS(ON)</sub> vs. Output Current.



FIGURE 2-7: FAULT/ Response Time vs. Temperature.



FIGURE 2-8: FAULT/ Response Time vs. Temperature.



FIGURE 2-9: Output Current.



*FIGURE 2-10:* Output Leakage Current vs. Temperature.



**FIGURE 2-11:** V<sub>IN</sub> - V<sub>OUT</sub> vs. Output Current.



FIGURE 2-12: Current Limit Set Resistor vs. Output Current.







Soft-Start Turn-Off.



**FIGURE 2-15:** 





FIGURE 2-17: Turn-On Into Short-Circuit.



**FIGURE 2-18:** Turn-On Into Short (Kickstart).



FIGURE 2-19: C

Current-Limit Response.



FIGURE 2-20: Output Recovery from Short-Circuit.



FIGURE 2-21: Output Recovery from Short-Circuit (Kickstart).



FIGURE 2-22: 85 ms Stepped Load Pulse (Kickstart).



FIGURE 2-23: 160 ms Stepped Load Pulse (Kickstart).



FIGURE 2-24: Output Thermal Shutdown and Recovery.



**FIGURE 2-25:** Output Thermal Shutdown and Recovery (Kickstart).





(Kickstart).



**FIGURE 2-28:** Turn-On into 12% Overload - 500 mA I<sub>LIMIT</sub>.



**FIGURE 2-29:** Turn-On into 25% Overload - 1A I<sub>LIMIT</sub>.



**FIGURE 2-30:** Turn-On into Minimal Overload - 1.5A I<sub>LIMIT</sub>.

## 3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 3-1.

-					
Pin Number SOT-23-6L	Pin Number UDFN	Pin Name	Description		
1	6	V <sub>IN</sub>	Input: Power switch and logic supply input.		
2	5	GND	Ground: Input and output return pin.		
3	4	EN	Enable (Input): Logic compatible, enable control input that allows turn-on/off of the switch. Do not leave the EN pin floating.		
4	3	FAULT/	Fault Status Flag (Output): Active-low, open-drain output. A logic-low state indicates an overcurrent or thermal shutdown condition. An overcurrent condition must last longer than $t_{FAULT/}$ in order to assert FAULT/. A pull-up resistor (10 k $\Omega$ recommended) to an external supply is required.		
5	2	I <sub>LIMIT</sub>	Current Limit Set: Current limit adjust setting. Connect a resistor from this pin to GND to set the current limit, but do not leave the $I_{\text{LIMIT}}$ pin floating.		
6	1	V <sub>OUT</sub>	Switch Output: Power switch output.		
_	EP	ePad	Exposed Pad: Exposed pad on bottom side of package. Connect to electrical ground for optimum thermal dissipation.		

#### TABLE 3-1: PIN FUNCTION TABLE

## 4.0 FUNCTIONAL DESCRIPTION

The MIC2039 is a high-side MOSFET power distribution switch that provides increased system reliability by using 5% current-limit accuracy. The MIC2039 is internally current-limited and has thermal shutdown, which protects the device and system.

The MIC2039 has a soft-start circuit that minimizes inrush current by slowing the turn-on time. Additionally, the MIC2039 has an optional kickstart feature, which momentarily overrides the normal current-limiting function to allow higher inrush and/or transient currents.

#### 4.1 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.

#### 4.2 Kickstart Inrush Overcurrent Filter

The MIC2039EYxx and MIC2039FYxx are equipped with a secondary current-limit that allows high inrush current transients to pass for a set period before the primary current-limit circuitry becomes active. The FAULT/ status flag does not assert during the kickstart period (typically 120 ms), which eliminates any false (FAULT/) assertions. The kickstart function is active during initial startup or while operating in steady state.

#### 4.3 Input Capacitor

A 1  $\mu$ F to 100  $\mu$ F ceramic input capacitor is recommended for most applications. Place the input capacitor on the same side of the board and next to the MIC2039 to minimize the voltage ringing during transient and short-circuit conditions. Using two vias for each end of the capacitor to connect to the power and ground plane is also recommended.

An X7R or X5R dielectric ceramic capacitors is recommended because of their temperature performance. X7R-type capacitors change capacitance by 15% over their operating temperature range and are the most stable type of ceramic capacitors. Z5U and Y5V dielectric capacitors change value by as much as 50% and 60%, respectively, over their operating temperature ranges. To use a ceramic chip capacitor with Y5V dielectric, the value must be much higher than an X7R ceramic or a tantalum capacitor to ensure the same capacitance value over the operating temperature range.

## 4.4 Output Capacitor

The output capacitor type and placement criteria are the same as the input capacitor.

The exact amount of capacitance depends upon the specific application. For example, USB applications will typically use 150  $\mu$ F, whereas local consumers, such as microcontrollers, may require as little as 1  $\mu$ F.

Care must be taken when choosing the output capacitance for inductive loads. Without sufficient capacitance or clamping devices, sudden disconnects or shorts on VOUT can result in stresses beyond the device's absolute maximum ratings, even for short cables, which will damage the device.

## 4.5 Enable

The MIC2039 offers either an active-high or active-low enable input (EN) that allows ON/OFF control of the switch output. The current through the device reduces to near zero when the device is shut down, with only microamperes of leakage current. The EN input can be directly tied to  $V_{\rm IN}$  or driven by a voltage that is equal to or less than  $V_{\rm IN}$ . Do not leave this pin floating.

Care should be taken to ensure that the EN pin does not exceed V<sub>IN</sub> by more than 500 mV at any time. This includes at power-up and during load transients. Whenever possible, it is recommended to tie EN to V<sub>IN</sub> through a pull-up resistor and use an open-drain or open-collector device to change the state.

## 4.6 Adjustable Current-Limit

The MIC2039 current-limit is adjustable from 0.2A to 2.5A by connecting a resistor from the  $I_{LIMIT}$  pin to GND. The following equation determines the resistor:

#### **EQUATION 4-1:**

	$R_{LIMIT} \cong \frac{289}{I_{LIMIT}}$
Where:	
I <sub>LIMIT</sub>	Typical current-limit from Electrical Characteristics table.

If the output current exceeds the set current-limit, the MIC2039 switch enters constant current-limit mode. The maximum allowable current-limit can be less than the full specified and/or expected current if the MIC2039 is not mounted on a circuit board with sufficiently low thermal resistance. Table 4-1 shows resistor values (1%) for select current-limit settings.

#### TABLE 4-1: RESISTOR SELECTION FOR ADJUSTABLE CURRENT-LIMIT

I <sub>LIMIT</sub>	0.2A	0.5A	1.0A	2.0A	2.5A
R <sub>LIMIT</sub>	1.45 kΩ	576Ω	287Ω	145Ω	115Ω

## 4.7 Thermal Design

To help reduce the thermal resistance, the ePad (underneath the IC) should be soldered to the PCB ground. The placement of thermal vias either underneath or near the ePad is highly recommended. Thermal design requires the following application-specific parameters:

- Maximum ambient temperature (T<sub>A</sub>)
- Output current (I<sub>OUT</sub>)
- Input voltage (V<sub>IN</sub>)
- Current Limit (I<sub>LIMIT</sub>)

When the MIC2039 is in constant current-limit mode, it may exceed the overtemperature threshold. If this occurs, the overtemperature condition will shut down the MIC2039 switch and the fault status flag will go active (assert low). After the switch cools down, it will turn on again. The user can maximize the MIC2039 power dissipation by either lowering the thermal resistance on the exposed pad (only the DFN package has an exposed pad) on the printed circuit board, or by limiting the maximum allowable ambient temperature.

#### 4.8 Thermal Measurements

It is always wise to measure the IC's case temperature to make sure that it is within its operating limits. Although this might seem like an elementary task, it is very easy to get false results. The most common mistake is to use the standard thermal couple that comes with the thermal voltage meter. This thermal couple wire gauge is large, typically 22 gauge, and behaves like a heatsink, resulting in a lower case measurement.

There are two suggested methods for measuring the IC case temperature: a thermal couple or an infrared thermometer. If a thermal couple is used, it must be constructed of 36 gauge wire or higher to minimize the wire heatsinking effect. In addition, the thermal couple tip must be covered in either thermal grease or thermal glue to make sure that the thermal couple junction is making good contact to the case of the IC. Thermal couple 5SC TT-K-36-36 from Omega is adequate for most applications.

To avoid using messy thermal couple grease or glue, an infrared thermometer is recommended. Most infrared thermometers' spot size is too large for an accurate reading on small form factor ICs. However, an IR thermometer from Optris has a 1 mm spot size, which makes it ideal for the 2 mm x 2 mm UDFN package. Also, get the optional stand. The stand makes it easy to hold the beam on the IC for long periods of time.

## 5.0 TIMING DIAGRAMS













Overcurrent Fault Flag Delay (Kickstart).

## 6.0 PACKAGING INFORMATION

## 6.1 Package Marking Information



Legend	: XXX Y YY WW NNN @3 * •, ▲, ▼ mark).	Product code or customer-specific information Year code (last digit of calendar year) Year code (last 2 digits of calendar year) Week code (week of January 1 is week '01') Alphanumeric traceability code Pb-free JEDEC <sup>®</sup> designator for Matte Tin (Sn) This package is Pb-free. The Pb-free JEDEC designator (e3) can be found on the outer packaging for this package. Pin one index is identified by a dot, delta up, or delta down (triangle
Note:	In the even be carried characters the corpora Underbar (	t the full Microchip part number cannot be marked on one line, it will over to the next line, thus limiting the number of available for customer-specific information. Package may or may not include ate logo. _) and/or Overbar ( <sup>-</sup> ) symbol may not be to scale.

## 6-Lead UDFN 2 mm x 2 mm Package Outline and Recommended Land Pattern

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-1156-HSA Rev A Sheet 2 of 2



Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

Thermal Via Diameter

Contact Pad to Center Pad (X6)

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

G

V

0.29

0.33

Microchip Technology Drawing C04-3156-HSA Rev A



#### 6-Lead SOT-23 Package Outline and Recommended Land Pattern

NOTES:

## APPENDIX A: REVISION HISTORY

## **Revision A (March 2018)**

- Converted Micrel document MIC2039 to Microchip data sheet DS20005540A.
- Minor text changes throughout.
- Value for C1 corrected in Typical Application Circuit.

## Revision B (May 2022)

• Updated package marking drawing in Section 6.1, Package Marking Information.

NOTES:

## **PRODUCT IDENTIFICATION SYSTEM**

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

	v	v	VV	XX	Exa	mple	s:	
Device:	Enable	Temperature	Package	Media Type	a)	MIC	2039AYM6-T5:	High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-High Enable, –40°C to +125°C Temp. Range, SOT-23-6L
Enable:	A =	Active-High	it Power Switch		b)	MIC	2039BYM6-TR:	Package, 500/Reel High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-Low
	в = Е = F =	Active-Low Active-High wi Active-Low wit	ith Kickstart th Kickstart					Enable, -40°C to +125°C Temp. Range, SOT-23-6L Package, 3,000/Reel
Temperature: Package:	Y = M6 =	-40°C to +125 SOT-23-6L	5°C		c)	MIC:	2039AYMT-TR:	High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-High Enable, -40°C to +125°C
	MT =	6-Lead 2 mm	x 2 mm UDFN (	Note 1)	d)	MIC	2030BVMT T5.	Temp. Range, 6-Lead UDFN Package, 5,000/Reel
Media Type:	T5 = TR = TR = FN is a G	500/Reel 3,000/Reel (M 5,000/Reel (M REEN RoHS-c	6 only) T only) compliant pack	age. Lead finish is	u)	WIC.	203901111-13.	Adjustable Current-Limit Power Switch, Active-Low Enable, –40°C to +125°C Temp. Range, 6-Lead UDFN
NiP	dAu. Mold	compound is H	lalogen Free.		e)	MIC	2039EYM6-T5:	Package, 500/Reel High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-High Enable with Kickstart, -40°C to +125°C Temp. Range, SOT-23-6L Package, 500/ Reel
					f)	MIC	2039FYM6-TR:	High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-Low Enable with Kickstart, -40°C to +125°C Temp. Range, SOT-23-6L Package, 3,000/ Reel
					g)	MIC	2039EYMT-TR:	High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-High Enable with Kickstart, -40°C to +125°C Temp. Range, 6-Lead UDFN Package, 5,000/Reel
					h)	MIC:	2039FYMT-T5:	High-Accuracy, High-Side, Adjustable Current-Limit Power Switch, Active-Low Enable with Kickstart, -40°C to +125°C Temp. Range, 6-Lead UDFN Package, 500/ Reel
					Note	ə 1:	Tape and Reel id catalog part num used for ordering the device packa Sales Office for p Tape and Reel op	entifier only appears in the ber description. This identifier is purposes and is not printed on ge. Check with your Microchip vackage availability with the otion.

NOTES:

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