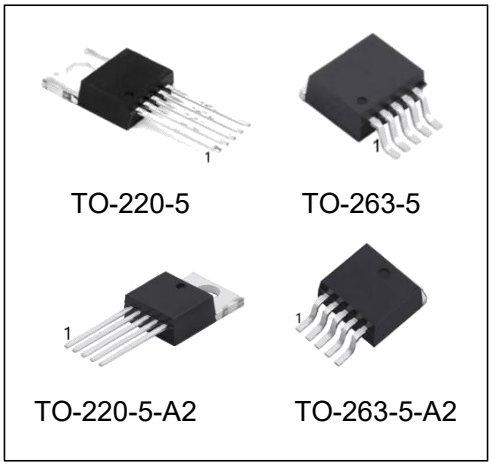
High-Current Low-Dropout Regulator

Features

- High Current Capability of 5A
- Low-Dropout Voltage of 350mV at Full Load
- Low Ground Current
- Accurate 1% Guaranteed Tolerance
- Extremely Fast Transient Response
- Reverse-Battery and"Load Dump"Protection
- Zero-Current Shutdown Mode
- Adjustable Version



Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
MIC29502WT	TO-220-5/TO-220-5-A2	MIC29502W	TUBE	1000pcs/box
MIC29502WS/TR	TO-263-5/TO-263-5-A2	MIC29502W	REEL	500pcs/reel

General Description

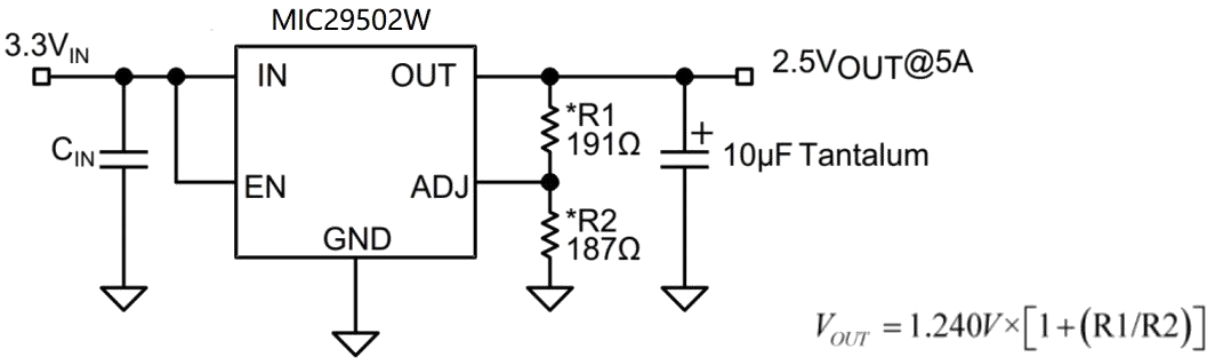
The MIC29502W is a high current, high accuracy and low-dropout voltage regulator.This regulator features 350mV to 425mV (full load) dropout voltage and very low ground current. Designed for high current load, the device also finds applications in lower current, extremely low dropout-critical systems, where its tiny dropout voltage and ground current value are important attributes.

The MIC29502W is fully protected against over-current fault, reversed input polarity, reversed lead insertion,over-temperature operation, and positive and negative transient voltage spikes.

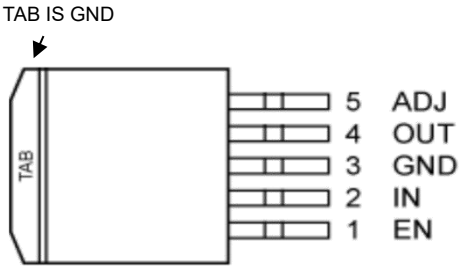
On the MIC29502W, the ENABLE pin may be tied to V_{IN} if it is not required for ON/OFF control.

The MIC29502W is available in TO263-5 and TO220-5 package.

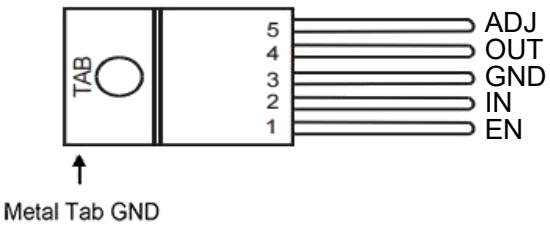
Typical Application



Pin Configuration



TO-263-5



TO-220-5

Absolute Maximum Ratings

Parameter Name	Symbol	Value	Unit
Power Dissipation	P_D	Internally Limited	
Input Supply Voltage(*1)	V_{IN}	-20~+50	V
Lead Temperature (soldering, 10 seconds)	T_{LEAD}	245	°C
Operating Junction Temperature	T_{OPR}	-40~+125	°C
Storage Temperature Range	T_{STG}	-55~+150	°C
Thermal Resistance(JC)	θ_{Jc}	2	°C/W

Note: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

Recommended Operating Conditions

Parameter Name	Symbol	Value	Unit
Maximum Operating Input Voltage	V_{IN}	26	V

Electrical Characteristics

All measurements at T_j= 25°C unless otherwise noted. **Bold** values are guaranteed across the operating temperature range.Adjustable versions is programmed to 5.0V.

Parameter Name	Test Conditions		Min.	Typ.	Max.	Units
Output Voltage	Io=10mA		-1		1	%
	10mA≤Io≤I_{FL}, (V_{OUT}+1V)≤V_{IN}≤26V(*2)		**-2**		**2**	%
Line Regulation	Io=10mA,(V_{OUT}+1V) ≤V_{IN}≤26V			0.06	0.5	%
Load Regulation	V_{IN}=V_{OUT}+5V, 10mA≤I_{OUT}≤$I_{FULLLOAD}$(*2,3)			0.2	1	%
$\frac{\Delta V_O}{\Delta T}$	Output Voltage (*3) Temperature Coefficient			20	100	ppm/°C
Dropout Voltage	I_O=100mA I_O=1.5A I_O=5A	△V_{OUT}=-1%(*4)		80 250 370	175 600	mV
Ground Current	I_O=1.5A, I_O=5A	V_{IN}=V_{OUT}+1V(*5)		10 45	35	mA
Ground Pin Current at Dropout	V_{IN}=0.5V less than specified V_{OUT} I_{OUT}=10mA			1.7		mA
Current Limit	V_{OUT}=0V(*6)			7.5	10	A
Output Noise Voltage(10Hz to 100kHz) I_L-100mA	C_L=10μF C_L=33μF			400 260		μV(rms)

Reference					
Reference Voltage		1.228 **1.215**	1.240	1.252 **1.265**	V V
Reference Voltage	(*7)	1.203		1.265	V
Adjust Pin Bias Current			40	80 **120**	nA
Reference Voltage Temperature Coefficient	(*8)		20		ppm/°C
Adjust Pin Bias Current Temperature Coefficient			0.1		nA/°C
Enable Input					
Input Logie Voltage Low (OFF) High (ON)			 2.4	0.8	V
Enable Pin Input Current	V_{EN}=26V		100	600 **750**	μA
	V_{EN}=0.8V			1 **2**	μA
Regulator Output Current in Shutdown	(*9)		10	 **500**	μA

*1:Maximum positive supply voltage of 50V must be of limited duration(<100msec) and duty cycle (≤1%).The maximum continuous supply voltage is 26V.

*2: Full Load current (I_{FL}) is defined as 5A.

*3: Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.

*4:Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with V_{OUT} + 1V applied to V_{IN}.

*5:Ground pin current is the regulator quiescent current. The total current drawn from the source is the sum of the load current plus the ground pin current.

*6:V_{IN} = V_{OUT} (nominal) +1V. For example, use V_{IN}= 4.3V for a 3.3V regulator or use 6V for a 5V regulator. Employ pulse-testing procedures to minimize temperature rise.

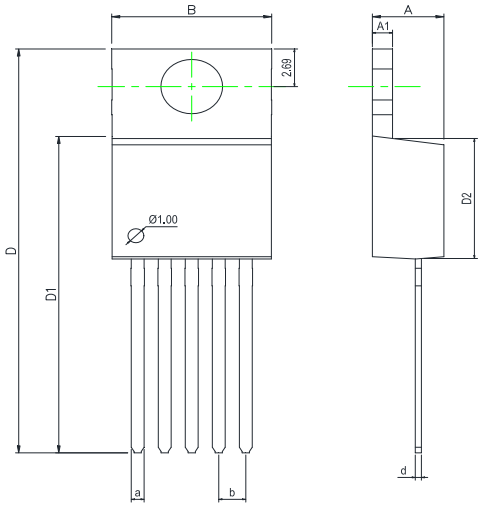
*7: V_{REF} ≤ V_{OUT}≤ (V_{IN}-1 V), 2.3V≤V_{IN}≤ 26V, 10mA <I_L≤I_{FL},T_J≤$T_{JMAX.}$

*8:Thermal regulation is defined as the change in output voltage at a time T after a change in power dissipation is applied,excluding load or line regulation effects. Specifications are for a 200mA load pulse at V_{IN}=20V (a 4W pulse) for T=10ms.

*9:V_{EN}≤ 0.8V and V_{IN}≤ 26V,V_{OUT}=0.

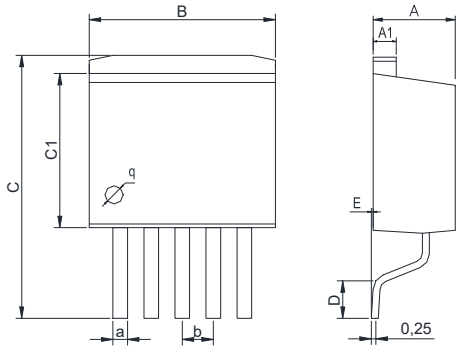
Physical Dimensions

TO-220-5



Dimensions In Millimeters(TO-220-5)									
Symbol:	A	A1	B	D	D1	D2	a	d	b
Min:	4.52	1.25	10	28.2	22.4	8.69	0.71	0.33	1.70BSC
Max:	4.62	1.29	10.3	28.9	22.6	8.79	0.97	0.42	

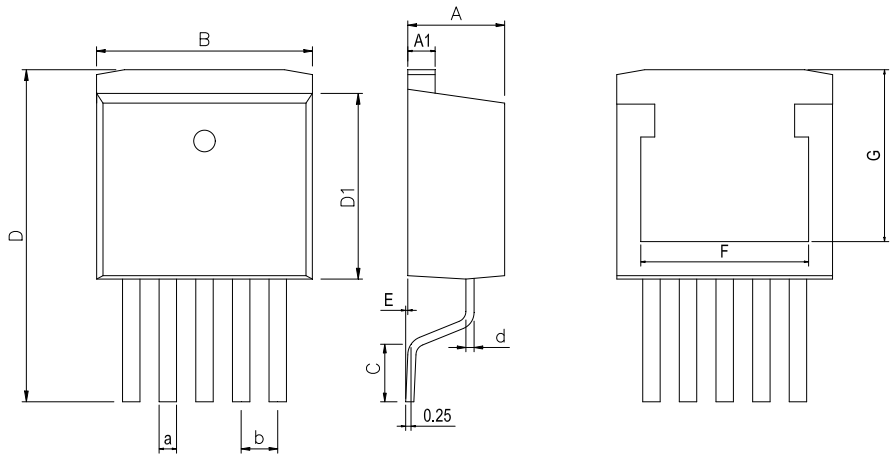
TO-263-5



Dimensions In Millimeters(TO-263-5)									
Symbol:	A	A1	B	C	C1	D	E	a	b
Min:	4.45	1.22	10	13.7	8.40	1.90	0	0.71	1.70BSC
Max:	4.62	1.32	10.4	14.6	8.90	2.10	0.20	0.97	

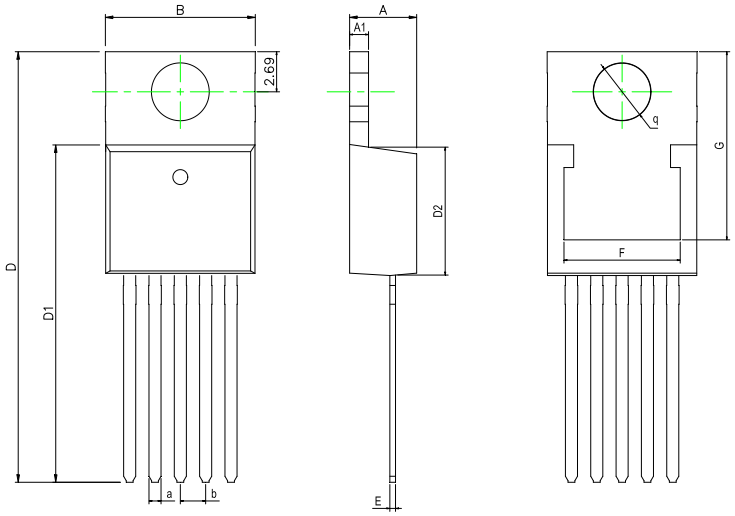
Physical Dimensions

TO-263-5$_{(A2)}$



Dimensions In Millimeters(TO-263-5)											
Symbol:	A	A1	B	C	D	D1	E	F	G	a	b
Min:	4.40	1.22	9.8	2.10	14.7	8.50	0	7.70	7.87	0.71	1.70
Max:	4.60	1.32	10.4	2.60	15.6	9.10	0.305	7.90	8.07	0.97	BSC

TO-220-5$_{(A2)}$



Dimensions In Millimeters(TO-220-5)												
Symbol:	A	A1	B	D	D1	D2	E	F	G	a	b	q
Min:	4.40	1.22	9.8	28.5	22.4	8.50	0.33	7.70	12.55	0.71	1.70	3.80
Max:	4.60	1.32	10.4	28.9	22.7	9.10	0.43	7.90	12.65	0.97	BSC	TYP

Revision History

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2017-11	New	1-7
V1.1	2024-11	Document Reformatting	1-8

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