MC1050

30mAVoltageRegulator

CBC Microelectronics
http://www.cbcv.net

General Description

The MC1050 series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. CMOS technology ensures low voltage drop and low quiescent current. The MC1050 series can deliver 30mA output current and allow an input voltage as high as 30V. They are avail able with several fixed output voltages is 5.0V. The over-temperature protection and over-current protection can ensure the MC1050 series work safe.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

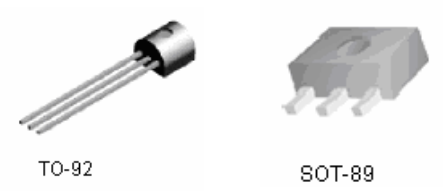


Figure 1: Package Types of MC1050

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 30V)
- High output current : 30mA
- Output voltage accuracy: tolerance ±3%
- TO-92 and SOT-89 package
- Over-temperature protection

Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

Pin Configuration

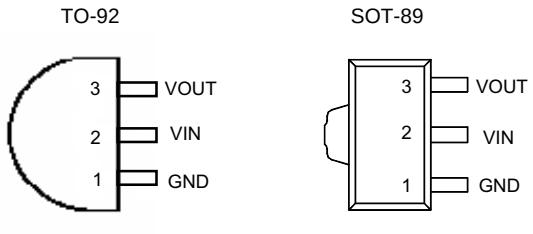
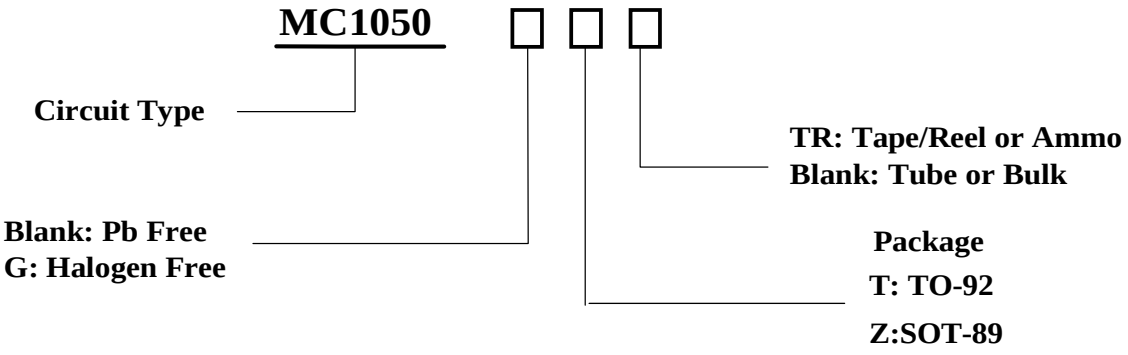


Figure 2: Pin Configuration of MC1050 (Top View)

Order Information



Product No.	Package	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-Free	Pb-free	Halogen-Free	
MC1050	TO-92	MC1050T	MC1050GT	MC1050	MC1050G	Bulk
		MC1050TTR	MC1050GTTR	MC1050	MC1050G	Tape & Reel
	SOT-89	MC1050ZTR	MC1050GZTR	MC1050	MC1050G	Tape & Reel

Block Diagram

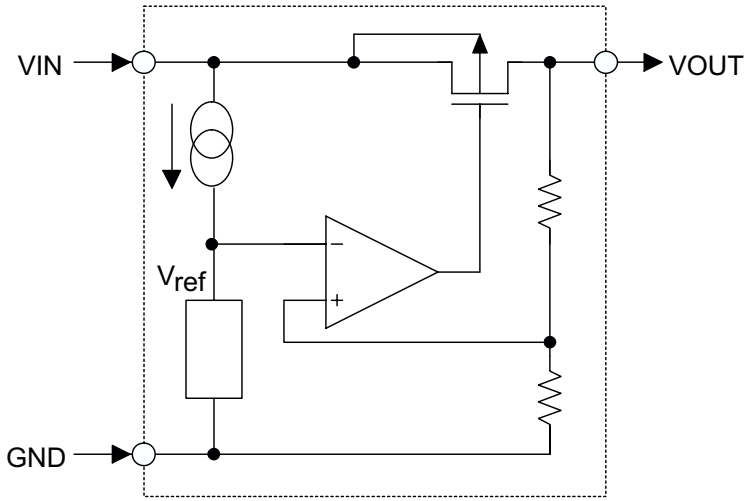


Figure 3: Functional Block Diagram of MC1050

Absolute Maximum Ratings

Parameter	Value	Unit
Supply Voltage	-0.3 to 30	V
Power Consumption (*1)	500	mW
Power Consumption (*2)	300	mW
Storage Temperature	-50 to 125	°C
Operating Temperature	-40 to 85	°C

Note: These are stress ratings only. Stresses exceeding the range specified under ″Absolute Maximum Ratings″ may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.
* applied to SOT89 and TO-92

Electrical Characteristics

MC1050, +5.0V output type Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	7.0V	I_{OUT}=10mA	4.85	5.0	5.15	V
I_{OUT}	Output Current	7.0V	—	—	30	—	mA
ΔV_{OUT}	Load Regulation	7.0V	1mA≤I_{OUT}≤50mA	—	20	30	mV
V_{DIF}	Voltage Drop	—	I_{OUT}=1mA	—	100	—	mV
I_{SS}	Current Consumption	7.0V	No load	—	2.5	5	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	6V≤V_{IN}≤30V I_{OUT}=1mA	—	0.1	—	%/V
V_{IN}	Input Voltage	—	—	—	—	30	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7.0V	I_{OUT}=10mA 0°C<Ta<70°C	—	±0.5	—	mV/°C
OCP	Over-current protection	7.0V	I_{OUT}=10mA	—	—	100	mA
OTP	Over-temperature protection	7.0V	—	—	145	—	°C
OTP hysteresis	—	7.0V	—	—	20	—	°C

Application Circuits

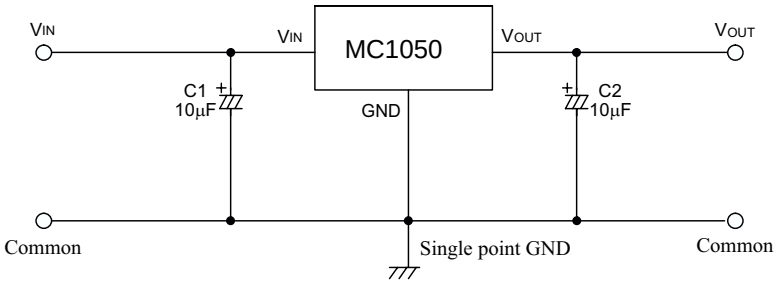


Figure4: Basic circuit

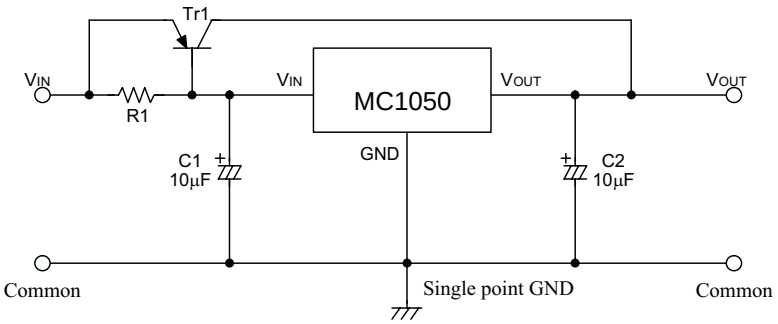


Figure5: High output current positive voltage regulator

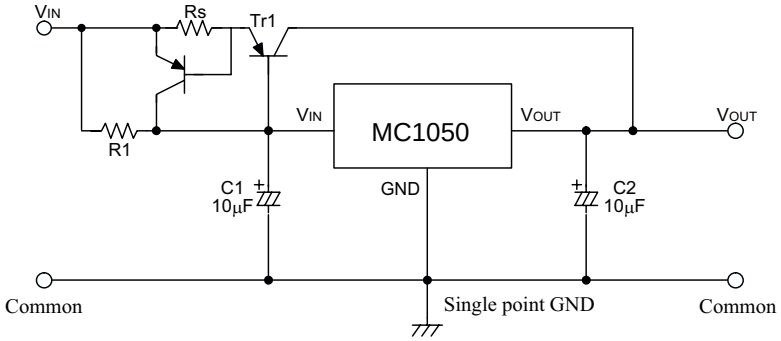
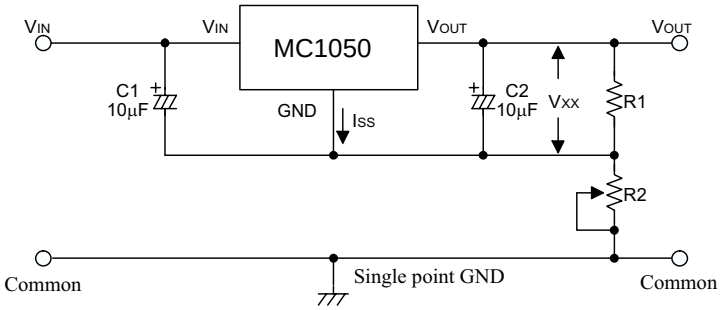
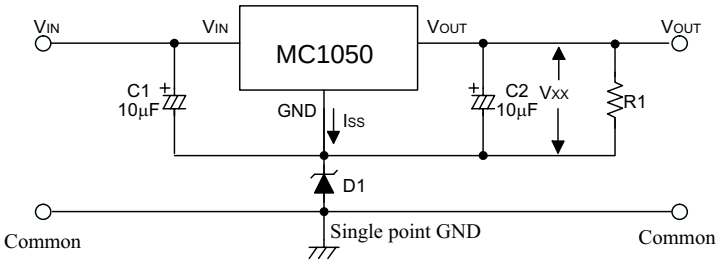


Figure6: Short-Circuit protection for Tr1



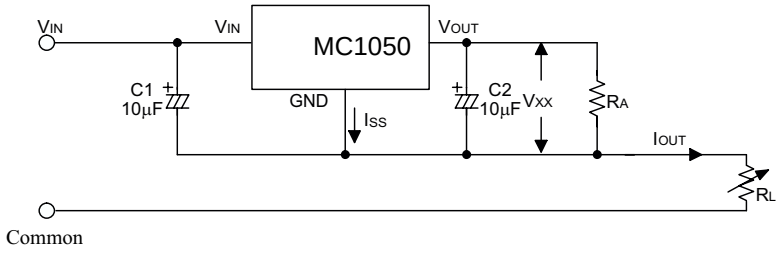
$$V_{OUT} = V_{XX} \left(1 + \frac{R2}{R1}\right) + I_{SS} R2$$

Figure7: Circuit for increasing output voltage



$$V_{OUT} = V_{XX} + V_{D1}$$

Figure8: Circuit for increasing output voltage



$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

Figure9: Constant current regulator

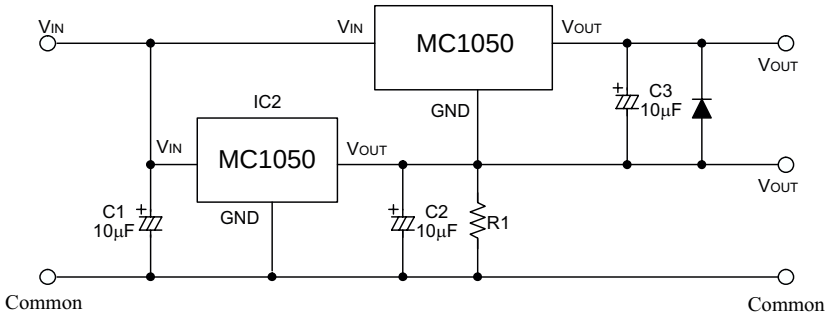
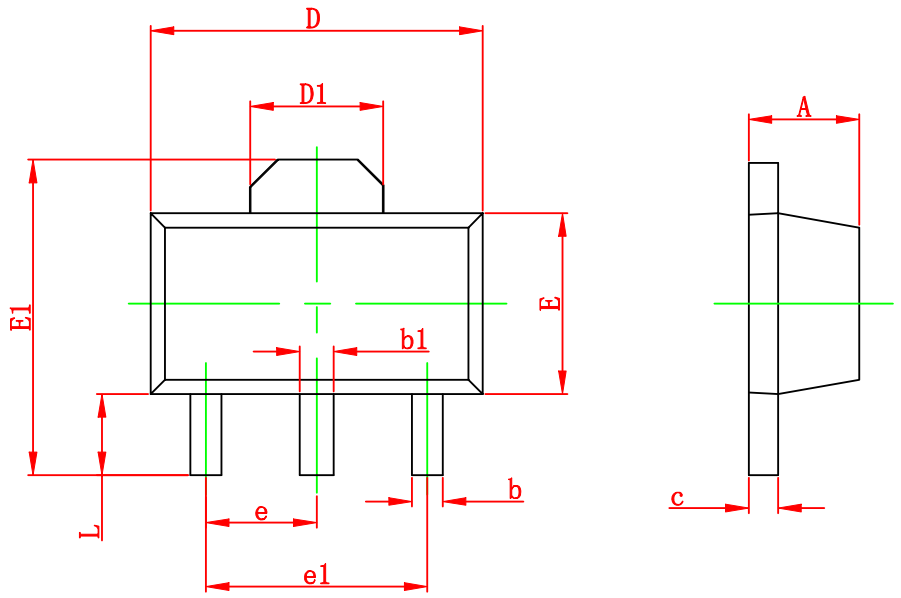


Figure10: Dual supply

Mechanical Dimensions

SOT-8 9 **Unit: mm (inch)**

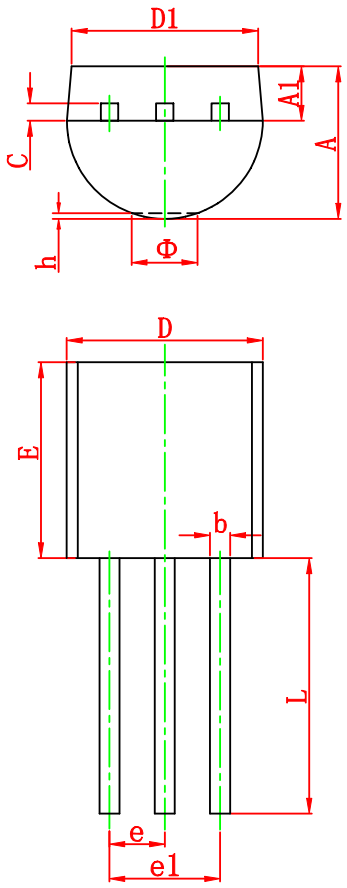


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

MC1050

Mechanical Dimensions

TO-9 2 **Unit: mm (inch)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.400	4.700	0.173	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

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