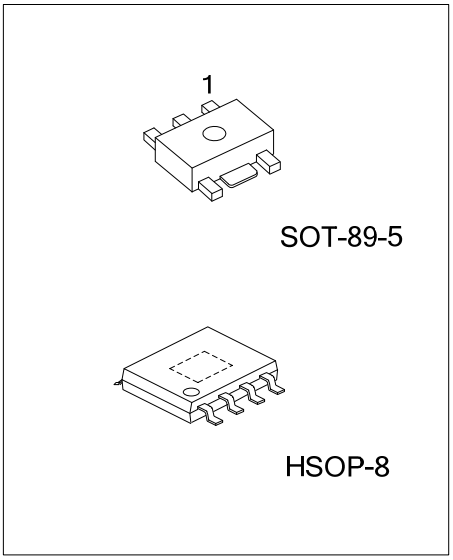
R1MX55

LINEAR INTEGRATED CIRCUIT

VOLTAGE REGULATOR



■ DESCRIPTION

As the UTC linear intergrated LDO, the **R1MX55** shows a high current, high accuracy, low-dropout voltage. The feature are: low dropout voltage, very low ground current. Cause the series have been designed for high current loads, so they are also used in lower current, extremely low dropout-critical systems (in which their tiny dropout voltage and ground current values are important attributes).

The **R1MX55** is stable with ceramic capacitors. It requires a 1μF or greater capacitor for stability.

■ FEATURES

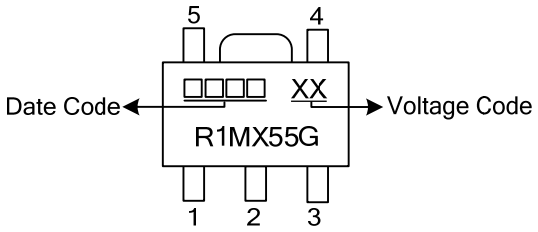
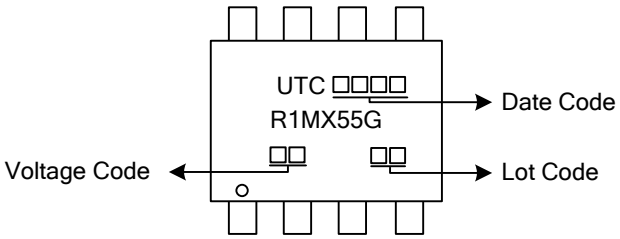
* Available and fixed output versions 1.5V, 1.8V, 2.5V, 3.3V, 5V
* Built-in ON/OFF function
* Over current protection function
* Over heat protection function
* Adjustable DC output voltage

■ ORDERING INFORMATION

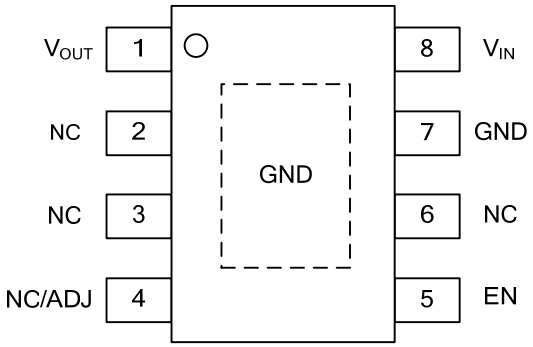
Ordering Number	Package	Packing
R1MX55G-xx-AB5-R	SOT-89-5	Tape Reel
R1MX55G-xx-SH2-R	HSOP-8	Tape Reel

R1MX55G-xx-AB5-R (1)Packing Type (2)Package Type (3)Output Voltage Code (4)Green Package	(1) R: Tape Reel (2) AB5: SOT-89-5, SH2: HSOP-8 (3) xx: refer to Marking Information (4) G: Halogen Free and Lead Free

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89-5	15: 1.5V 18: 1.8V 25: 2.5V	
HSOP-8	33: 3.3V 50: 5.0V AD: ADJ	

■ PIN CONFIGURATION



FOR HSOP-8

■ PIN DESCRIPTIONS

FOR ADJUSTABLE VERSION

PIN NO.	PIN NAME	FUNCTION
SOT89-5 PACKAGE		
1	V_{ADJ}	Output voltage adjustment
2	GND	Ground
3	V_C	ON/OFF control
4	V_{IN}	DC input
5	V_{OUT}	DC output
HSOP-8 PACKAGE		
1	V_{OUT}	DC output
2, 3, 6	NC	No Connection
4	ADJ	Output voltage adjustment
5	EN	Enable pin, Logic Low=Shutdown; Logic High= Enable
7	GND	Ground
8	V_{IN}	DC input

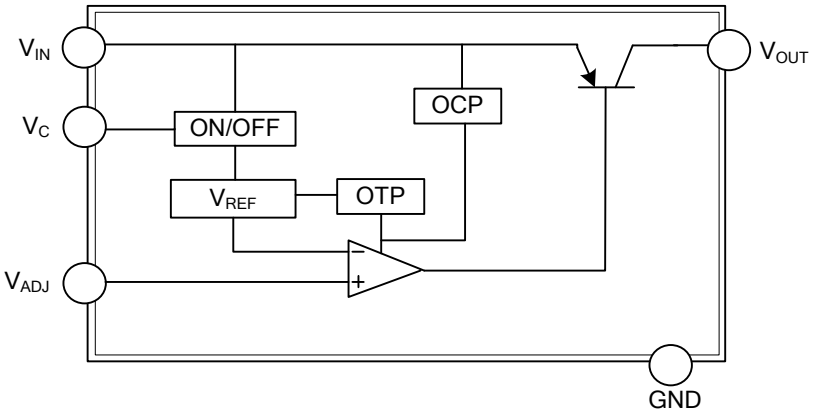
FOR FIXED VERSION

PIN NO	PIN NAME	DESCRIPTION
SOT89-5 PACKAGE		
1	NC	No Connection
2	GND	Ground
3	V_C	ON/OFF control
4	V_{IN}	DC input
5	V_{OUT}	DC output
HSOP-8 PACKAGE		
1	V_{OUT}	DC output
2, 3, 6	NC	No Connection
4	NC	No Connection
5	EN	Enable pin, Logic Low=Shutdown; Logic High= Enable
7	GND	Ground
8	V_{IN}	DC input

■ BLOCK DIAGRAM

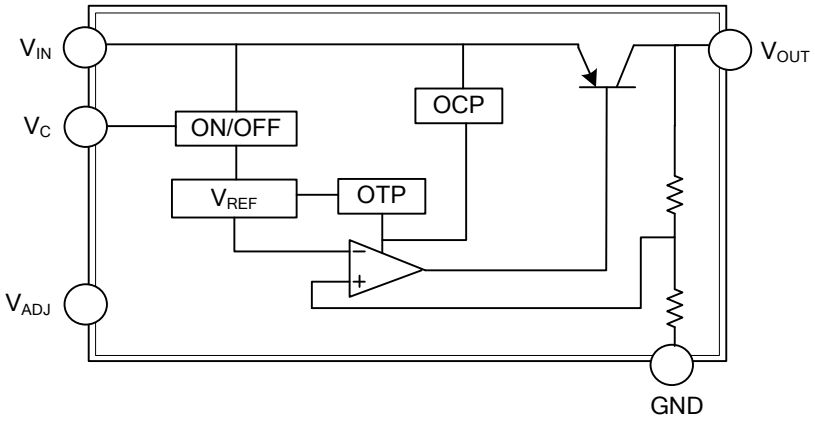
For Adjustable Version

Block For Adjustable Version



For Fixed Version

Block For Fixed Version



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNITS
FOR SOT-89-5			
Input Voltage (Note 2)	V_{IN}	15	V
ON/OFF Control Voltage (Note 2)	V_C	15	V
Output Adiustment pin Voltage (Note 2)	V_{ADJ}	15	V
Output Current	I_{OUT}	500	mA
Power Dissipation	P_D	900	mW
Junction Temperature	T_J	150	°C
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C
FOR HSOP-8			
Input Voltage	V_{IN}	15	V
Enable Voltage	V_C	15	V
Power Dissipation	P_D	1100	mW
Junction Temperature	T_J	+125	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. All are open except GND and applicable terminals.

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

For Fixed Voltage (Unless otherwise specified, V_{IN}=3.0V, I_O=30mA, V_C=1.8V, T_A=25°C (1.5V,1.8V))
(Unless otherwise specified, V_{IN}=$V_{O(TYP.)}$+1.0V, I_O=30mA, V_C=1.8V, T_A=25°C (2.5V,3.3V,5V))

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	1.5V	V_O		1.44	1.5	1.56	V
	1.8V			1.74	1.8	1.86	
	2.5V			2.440	2.5	2.560	
	3.3V			3.234	3.3	3.366	
	5.0V			4.900	5.0	5.100	
Load Regulation		REG_{LOAD}	I_O=5mA~500mA		60	200	mV
Line Regulation	1.5V	REG_{LINE}	V_{IN}=3.0V~7.5V		3.0	20	mV
	1.8V		V_{IN}=3.0V~7.8V				
	2.5V/3.3V		V_{IN}=$V_{O(TYP.)}$+1V to $V_{O(TYP.)}$+6V(MAX9V)				
Temperature coefficient of output voltage		T_CV_O	10kHz<f<100kHz, C_N=0.1μF, I_O=30mA		0.1		mV/°C
Ripple rejection		RR	Refer to Fig below		65		dB
Output noise voltage		$V_{NO(RMS)}$			30		μV
Dropout Voltage		V_{DROP}	I_{OUT}=500mA		400	700	mV
ON-state voltage for control		$V_{C(ON)}$		1.8			V
ON-state current for control		$I_{C(ON)}$	V_C=1.8V		20	70	μA
OFF-state voltage for control		$V_{C(OFF)}$				0.4	V
Quiescent Current		I_Q	I_O=0mA		0.6	1	mA
Output OFF-state dissipation current		I_{QS}	V_C=0.2V			1	μA

Note: In case that the control terminal (3th pin) is non-connection, output voltage should be OFF state.

■ ELECTRICAL CHARACTERISTICS (Cont.)

For SOT-89-5 ADJ (V_{IN}=3.5V, V_{OUT}=2.44V (R_1=R_2=100KΩ), I_{OUT}=30mA, V_C=1.8V)

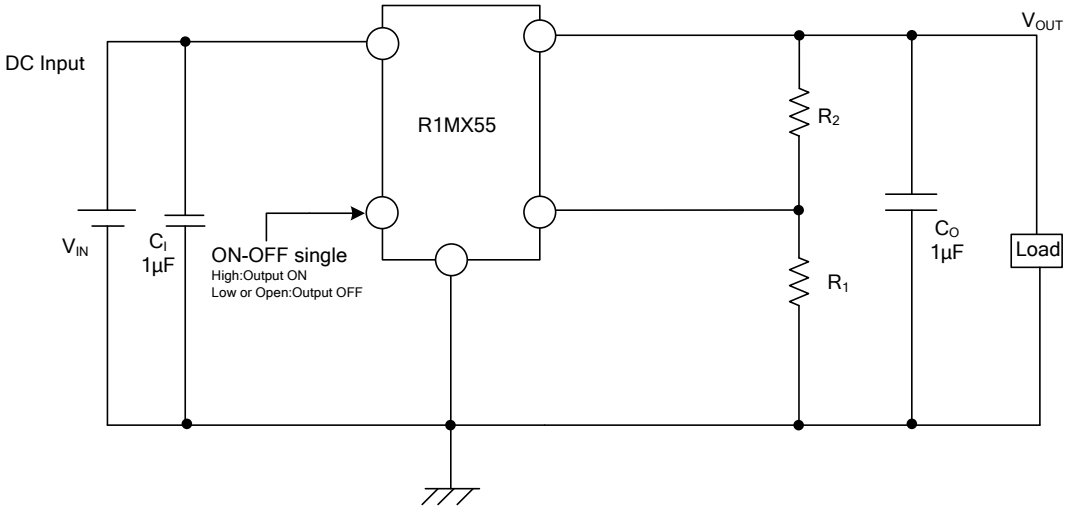
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Voltage	V_{IN}		2.6		9.0	V
Output Voltage	V_{OUT}		1.3		5.0	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5~500mA		10	100	mV
Line Regulation	ΔV_{OUT}	V_{IN}=3.5~8.5V		6	20	mV
Ripple Rejection	RR			55		dB
Dropout Voltage	V_D	I_{OUT}=500mA			0.7	V
Reference Voltage	V_{REF}		1.196	1.22	1.244	V
Temperature Coefficient of Output Voltage	T_CV_{OUT}	T_J=25 ~ 75°C, I_{OUT}=10mA		±0.1		mV/°C
Output Noise Voltage	$V_{NO(RMS)}$	$10H_Z$ < f < $100kH_Z$		100		μV
On-State Voltage for Control	$V_{C(ON)}$	(Note)	1.8			V
On-State Current for Control	$I_{C(ON)}$	V_C=1.8V		20	70	μA
Off-State Voltage for Control	$V_{C(OFF)}$				0.4	V
Quiescent Current	I_Q	I_{OUT}=0A		0.8	1.2	mA
Output Off-State Consumption Current	I_{QS}	V_C=0.2V			1	μA

Note: In case that the control terminal (3th pin) is non-connection, output voltage should be OFF state.

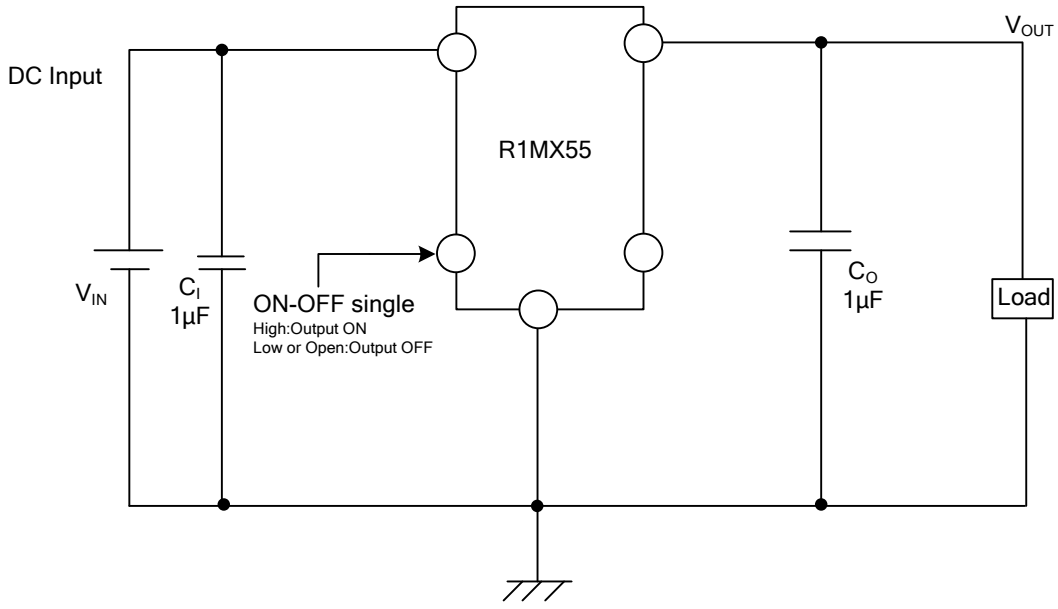
For HSOP-8 ADJ (V_{IN}= V_O +2.5V, V_{OUT}=1.8V, V_{EN}= V_{IN}, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}		2.6		15	V
Output Voltage Accuracy	V_{OUT}		-2		+2	%
Quiescent Current	I_Q	I_{OUT}=0.1mA		0.85		mA
		I_{OUT}=50mA		1.26		
		I_{OUT}=100mA		1.67		
		I_{OUT}=150mA		2.05	5	
Reference Voltage	V_{REF}		-2%	1.2	+2%	V
Line Regulation	REG_{LINE}	V_{OUT}+2.5V<V_{IN}<15V,I_{OUT}=1mA		0.5		%
Load Regulation	REG_{LOAD}	0.1mA<I_{OUT}<150mA		0.5	1	%
Dropout Voltage	V_{DROP}	I_{OUT}=0.1mA		10	100	mV
		I_{OUT}=50mA		40	100	
		I_{OUT}=100mA		70	150	
		I_{OUT}=150mA		100	200	
Maximum Output Current	$I_{O(MAX)}$	V_{IN} =V_{OUT} +2.5V	250			mA
PROTECTION						
Over Temperature Shutdown	OTS			140		°C
Over Temperature Shutdown Hysteresis				30		°C
SHUTDOWN						
Input High Voltage	V_{EN}		2.0			V
Input Low Voltage					0.4	
Shutdown Supply Current	$I_{Q(SHDN)}$	EN=Low, V_{IN}=15V		0.1	10	μA

■ TYPICAL APPLICATION CIRCUIT

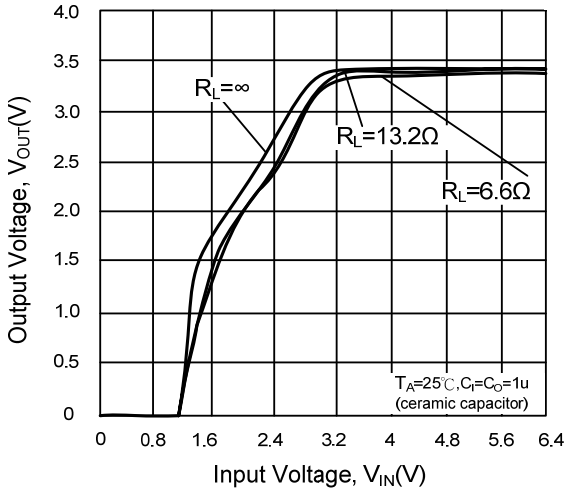


Note: 1. Customers can select the appropriate according to the actual needs of R1, R2; can take R1 = 100kΩ, R2 based on the output voltage needs to select the appropriate resistance.
2. $V_{OUT}=(R1+R2)/R1\times V_{REF}$

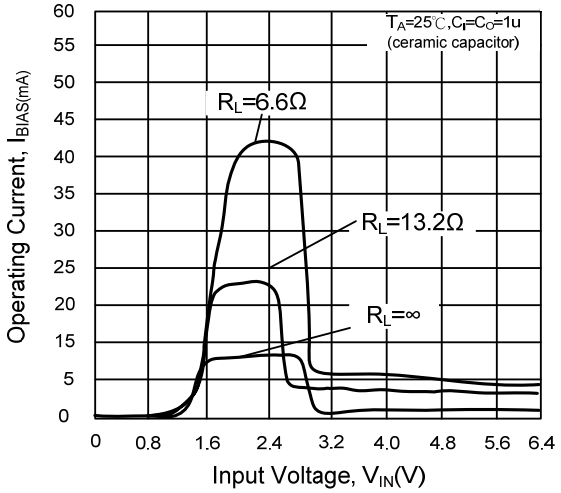


■ TYPICAL CHARACTERISTICS(FOR SOT-89-5)

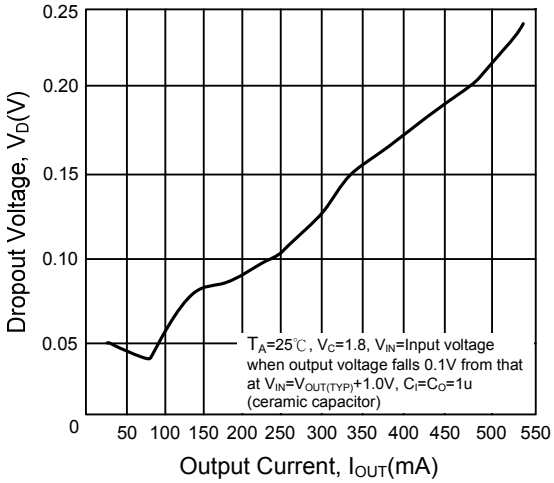
Output Voltage vs.
Input Voltage (Typical Values)



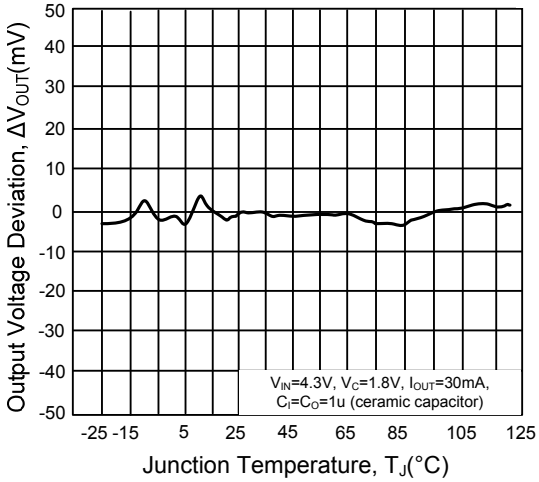
Circuit Operating Current vs.
Input Voltage (Typical Values)



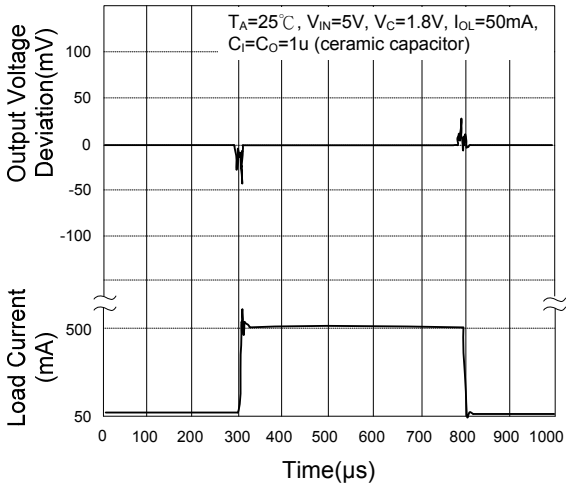
Dropout Voltage vs.
Output Current (Typical Values)



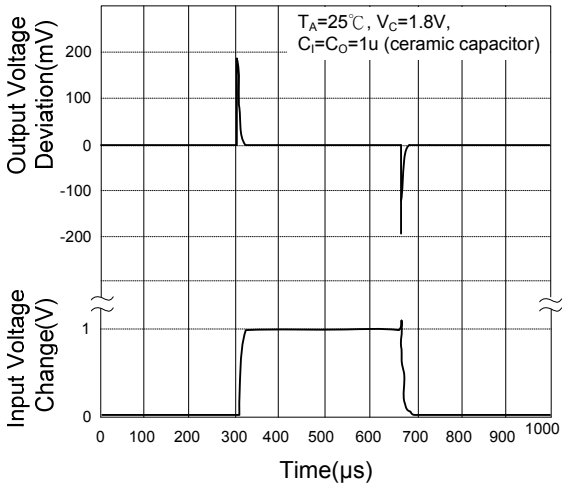
Output Voltage Deviation vs.
Junction Temperature (Typical Values)



Load Transient Response



Line Transient Response



■ TYPICAL CHARACTERISTICS(Cont.)