



## 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).

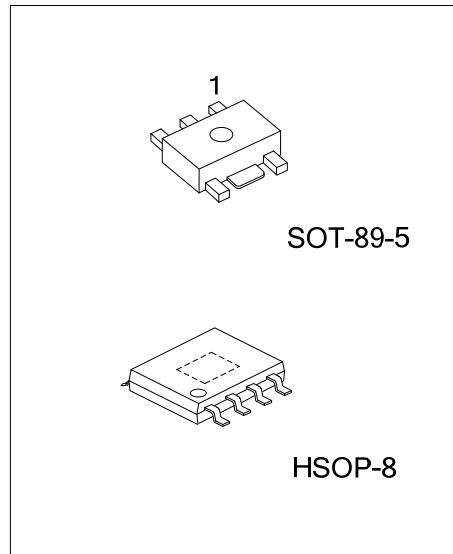
The **R1MX55** is stable with ceramic capacitors. It requires a 1 $\mu$ F or greater capacitor for stability.

#### 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

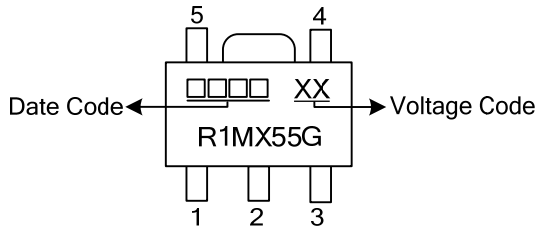
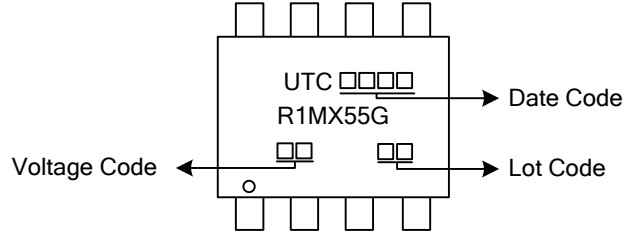
#### ORDERING INFORMATION

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

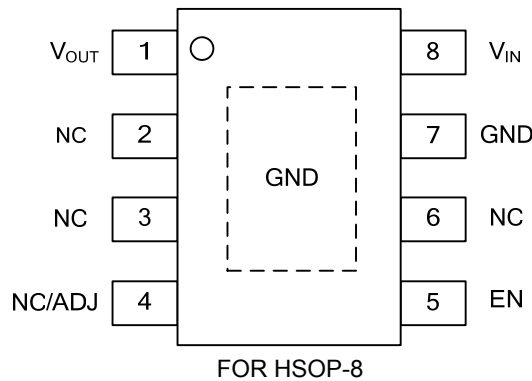


<p>R1MX55G-xx-AB5-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Output Voltage Code</p> <p>(4) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AB5: SOT-89-5, SH2: HSOP-8</p> <p>(3) xx: refer to Marking Information</p> <p>(4) G: Halogen Free and Lead Free</p>
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###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

PACKAGE	VOLTAGE CODE	MARKING
SOT-89-5	15: 1.5V 18: 1.8V 25: 2.5V	 <p>The diagram shows a SOT-89-5 package with pins 1, 2, 3, 4, and 5. The marking 'R1MX55G' is centered. To the left of the part number are three boxes representing the Date Code. To the right are two boxes representing the Voltage Code.</p>
HSOP-8	33: 3.3V 50: 5.0V AD: ADJ	 <p>The diagram shows an HSOP-8 package with pins 1 through 8. The marking 'R1MX55G' is centered. Above it are four boxes representing the Date Code (UTC). Below it are two boxes representing the Lot Code. A small circle is located at the bottom left of the package.</p>

## ■ PIN CONFIGURATION



## ■ PIN DESCRIPTIONS

### FOR ADJUSTABLE VERSION

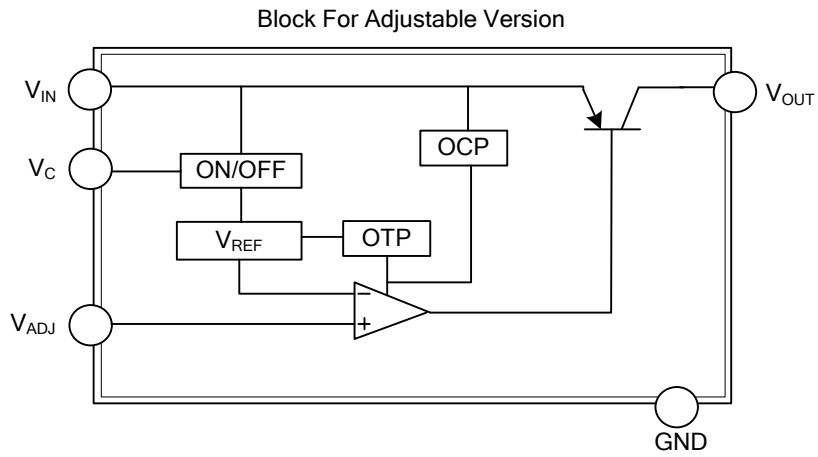
PIN NO.	PIN NAME	FUNCTION
<b>SOT89-5 PACKAGE</b>		
1	$V_{ADJ}$	Output voltage adjustment
2	GND	Ground
3	$V_C$	ON/OFF control
4	$V_{IN}$	DC input
5	$V_{OUT}$	DC output
<b>HSOP-8 PACKAGE</b>		
1	$V_{OUT}$	DC output
2, 3, 6	NC	No Connection
4	ADJ	Output voltage adjustment
5	EN	Enable pin, Logic Low=Shutdown;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

### FOR FIXED VERSION

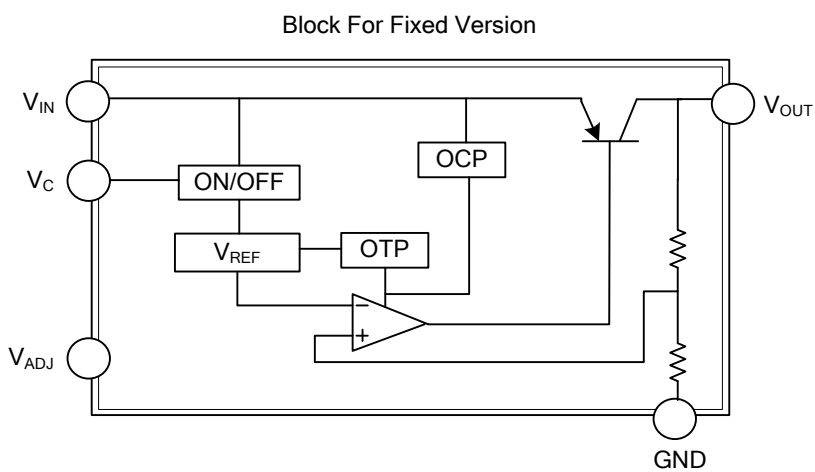
PIN NO	PIN NAME	DESCRIPTION
<b>SOT89-5 PACKAGE</b>		
1	NC	No Connection
2	GND	Ground
3	$V_C$	ON/OFF control
4	$V_{IN}$	DC input
5	$V_{OUT}$	DC output
<b>HSOP-8 PACKAGE</b>		
1	$V_{OUT}$	DC output
2, 3, 6	NC	No Connection
4	NC	No Connection
5	EN	Enable pin, Logic Low=Shutdown; Logic High= Enable
7	GND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

## ■ BLOCK DIAGRAM

For Adjustable Version



For Fixed Version



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNITS
<b>FOR SOT-89-5</b>			
Input Voltage (Note 2)	$V_{IN}$	15	V
ON/OFF Control Voltage (Note 2)	$V_C$	15	V
Output Adjustment 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
<b>FOR HSOP-8</b>			
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 ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

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

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

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 ( $V_{IN}=3.5V$ ,  $V_{OUT}=2.44V$  ( $R_1=R_2=100K\Omega$ ),  $I_{OUT}=30mA$ ,  $V_C=1.8V$ )

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	$\Delta V_{OUT}$	$I_{OUT}=5\sim 500mA$		10	100	mV
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=3.5\sim 8.5V$		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	$T_C V_{OUT}$	$T_J=25 \sim 75^\circ C$ , $I_{OUT}=10mA$		$\pm 0.1$		mV/ $^\circ C$
Output Noise Voltage	$V_{NO(RMS)}$	$10Hz < f < 100kHz$		100		$\mu V$
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	$\mu A$
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	$\mu A$

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

For HSOP-8 ADJ ( $V_{IN}=V_O+2.5V$ ,  $V_{OUT}=1.8V$ ,  $V_{EN}=V_{IN}$ ,  $T_A=25^\circ C$ , 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

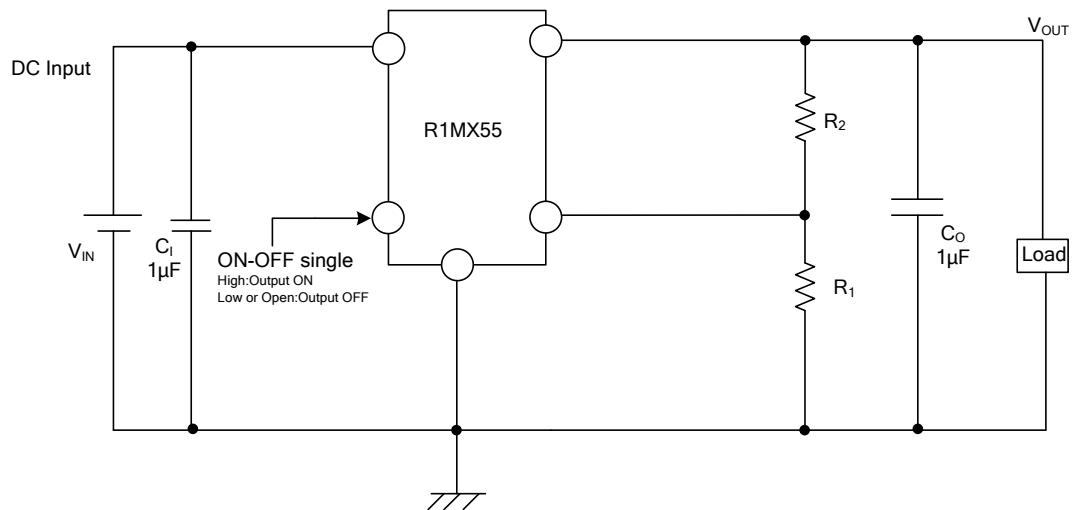
**PROTECTION**

Over Temperature Shutdown	OTS			140		$^\circ C$
Over Temperature Shutdown Hysteresis				30		$^\circ C$

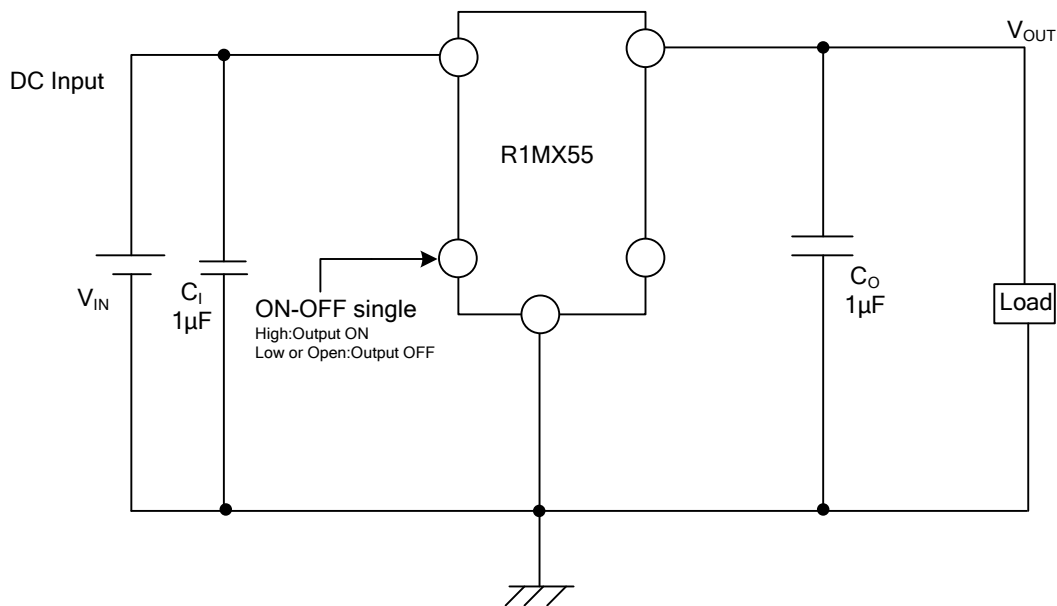
**SHUTDOWN**

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	$\mu A$

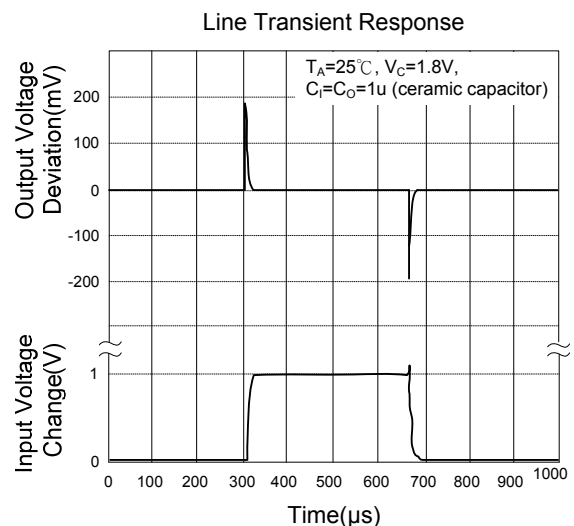
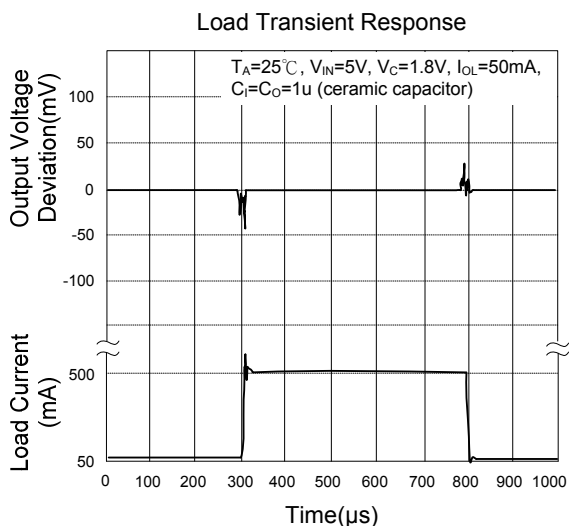
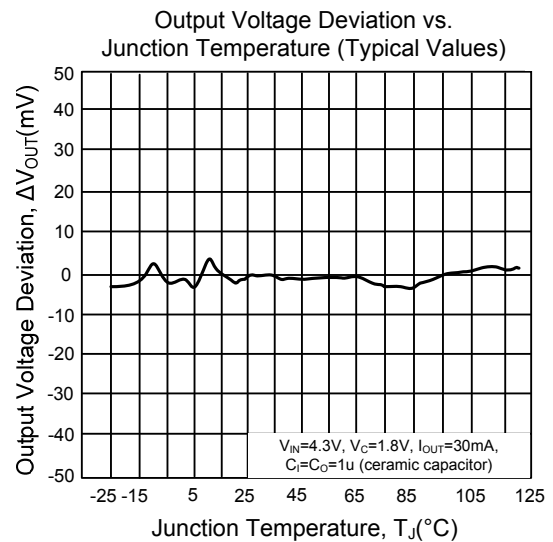
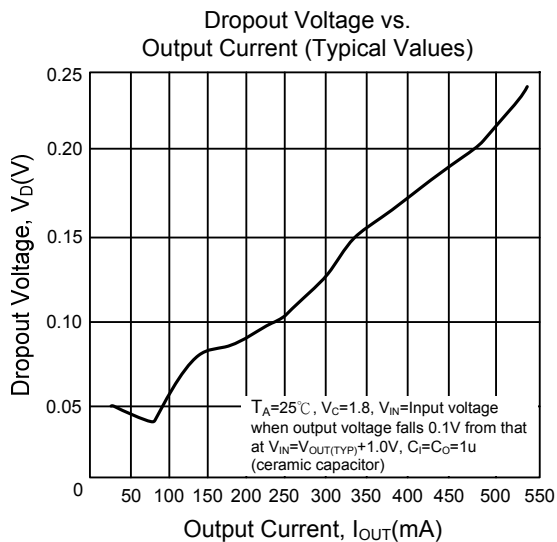
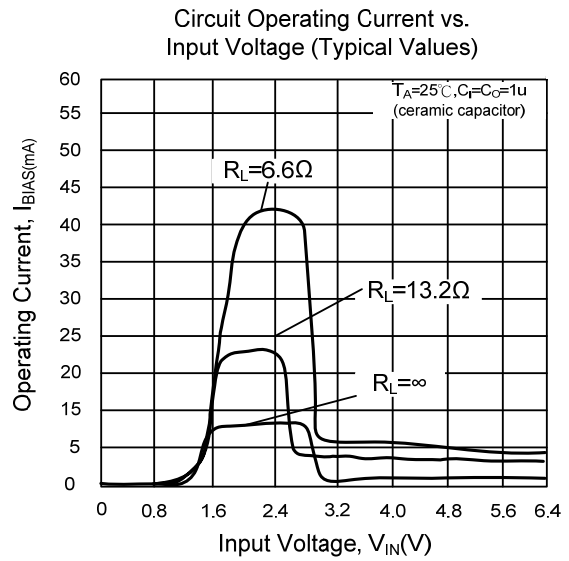
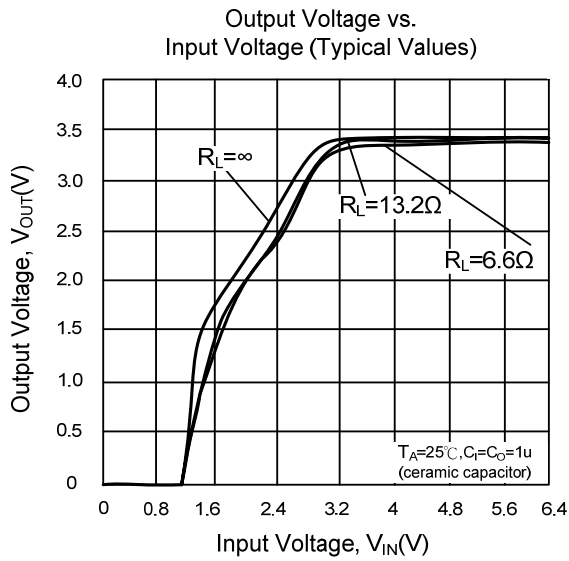
## ■ TYPICAL APPLICATION CIRCUIT



- Note: 1. Customers can select the appropriate according to the actual needs of  $R_1$ ,  $R_2$ ; can take  $R_1 = 100\text{k}\Omega$ ,  $R_2$  based on the output voltage needs to select the appropriate resistance.  
 2.  $V_{OUT} = (R_1 + R_2) / R_1 \times V_{REF}$

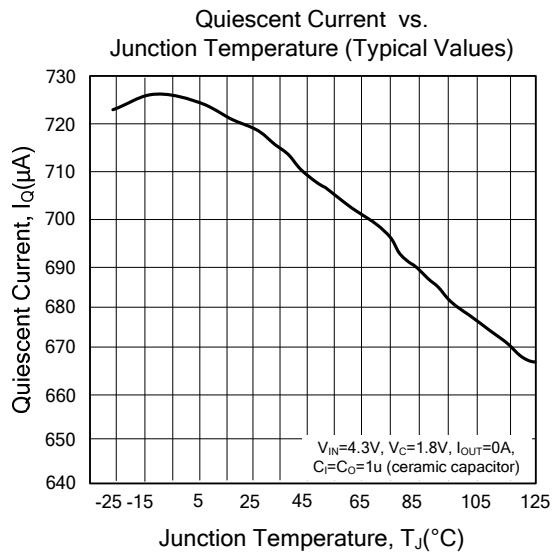


■ TYPICAL CHARACTERISTICS(FOR SOT-89-5)





## ■ TYPICAL CHARACTERISTICS(Cont.)



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