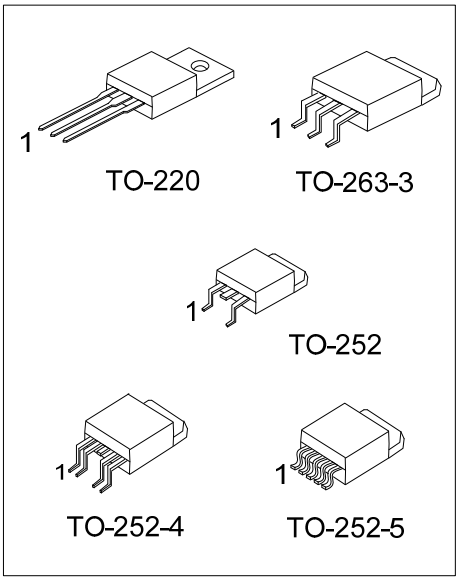
M29150A/B

LINEAR INTEGRATED CIRCUIT

1.5A, VERY LOW DROP VOLTAGE REGULATORS



■ DESCRIPTION

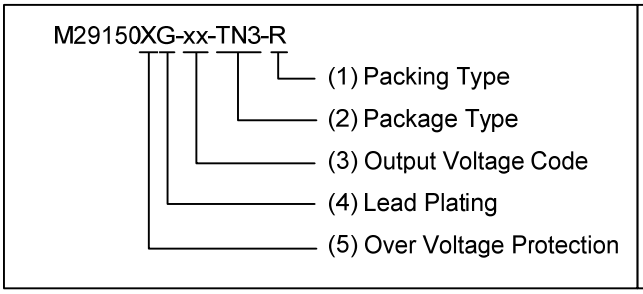
As the UTC linear integrated LDO, the UTC **M29150A/B** shows a high current, high accuracy, low-dropout voltage. The features are: 400mV dropout voltage, very low ground current. Cause the series have been designed for high current loads, so they are also used in lower current, extremely low dropout-critical systems (in which their tiny dropout voltage and ground current values are important attributes).

■ FEATURES

* Very low dropout voltage : typ. 0.4 @ I_{OUT}=1.5A
* Output current guaranteed 1.5A
* Fixed and adjustable output voltage
* Thermal limit and Internal current
* Logic controlled electronic shutdown available
* Over voltage protection

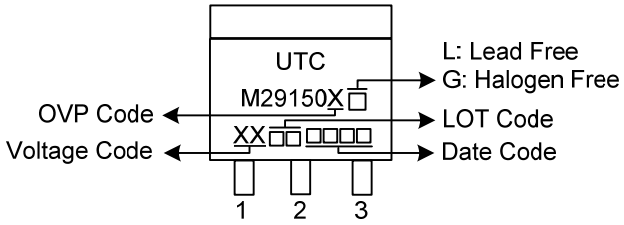
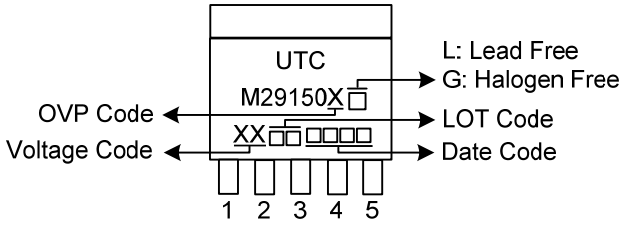
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
M29150AL-xx-TA3-T	M29150AG-xx-TA3-T	TO-220	Tube
M29150AL-xx-TN3-R	M29150AG-xx-TN3-R	TO-252	Tape Reel
M29150AL-xx-TN4-R	M29150AG-xx-TN4-R	TO-252-4	Tape Reel
M29150AL-xx-TN5-R	M29150AG-xx-TN5-R	TO-252-5	Tape Reel
M29150AL-xx-TQ3-T	M29150AG-xx-TQ3-T	TO-263-3	Tube
M29150AL-xx-TQ3-R	M29150AG-xx-TQ3-R	TO-263-3	Tape Reel
M29150BL-xx-TA3-T	M29150BG-xx-TA3-T	TO-220	Tube
M29150BL-xx-TN3-R	M29150BG-xx-TN3-R	TO-252	Tape Reel
M29150BL-xx-TN4-R	M29150BG-xx-TN4-R	TO-252-4	Tape Reel
M29150BL-xx-TN5-R	M29150BG-xx-TN5-R	TO-252-5	Tape Reel
M29150BL-xx-TQ3-T	M29150BG-xx-TQ3-T	TO-263-3	Tube
M29150BL-xx-TQ3-R	M29150BG-xx-TQ3-R	TO-263-3	Tape Reel

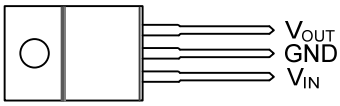


(1) R: Tape Reel
(2) TA3: TO-220, TN3: TO-252, TN4: TO-252-4, TN5: TO-252-5, TQ3: TO-263-3
(3) xx: Refer to ELECTRICAL CHARACTERISTICS
(4) G: Halogen Free and Lead Free, L: Lead Free
(5) X: Refer to Marking Information

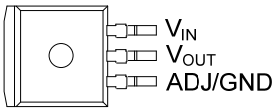
■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220 TO-263-3	50: 5.0V 60: 6.0V AD: ADJ	
TO-252 TO-252-4 TO-252-5		

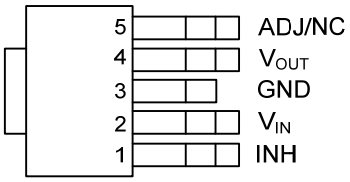
■ PIN CONFIGURATION



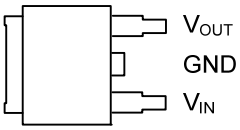
TO-220



TO-263-3



TO-252-4 / TO-252-5



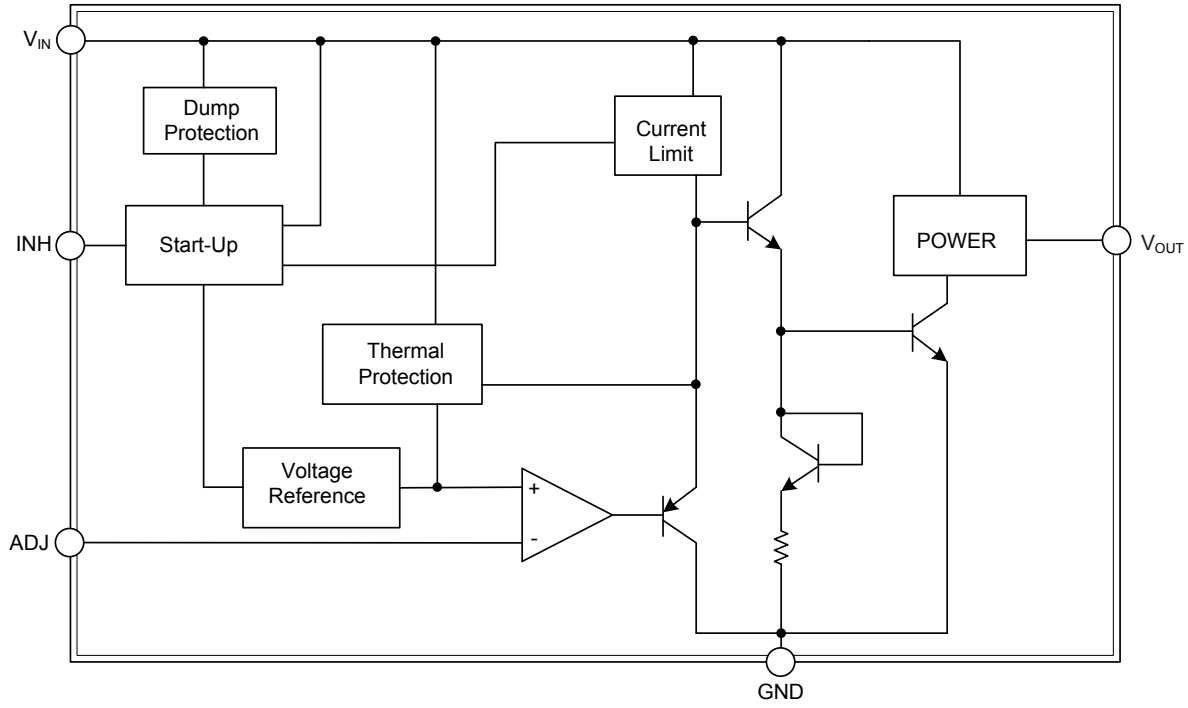
TO-252

■ PIN DESCRIPTIONS

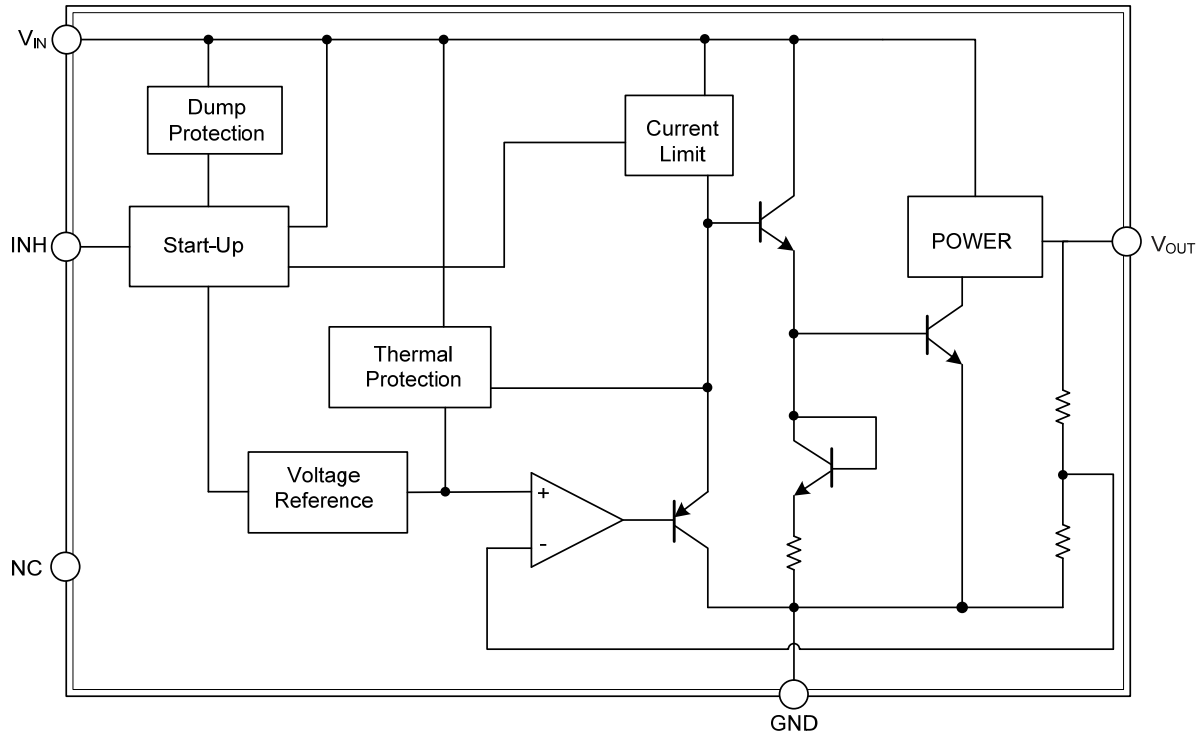
PIN NO.			PIN NAME	PIN FUNCTION
TO-220 TO-252	TO-252-4 TO-252-5	TO-263		
1	2	3	V_{IN}	Input voltage
2	3	-	GND	GND
3	4	2	V_{OUT}	Output Voltage
-	1	-	INH	Inhibit Function Input
-	5	1	ADJ/NC	Adjustable Version Input /Not connected for fixed version

■ BLOCK DIAGRAM

Adjutable Version



Fixed Version



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNITS
DC Input Voltage		V_{IN}	30	V
DC Output Voltage		V_{OUT}	-0.3 ~ +20	V
Inhibit Input Voltage		V_{INH}	-0.3 ~ +20	V
Over Voltage Protection	M29150A	OVP	14	V
	M29150B		35	V
Output current		I_{OUT}	Internally Limited	mA
Power Dissipation		P_D	Internally Limited	mW
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-40 ~ +85	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	65	°C/W
	TO-252/TO-252-4 TO-252-5		100	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	5	°C/W
	TO-252/TO-252-4 TO-252-5		8	°C/W

■ ELECTRICAL CHARACTERISTICS

(I_{OUT}=10mA, T_J=25°C, V_{INH}=2V (Note 2), C_I=0.33μF, C_O=10μF, unless otherwise specified)

M29150-5.0V (V_{IN}=7.0V)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=6V~10.5V , I_{OUT}=10mA~1.5A	M29150A	4.9	5.0	5.1	V
		V_{IN}=6V~10.5V, I_{OUT}=10mA~1.5A V_{IN}=30V, I_{OUT}=10mA~100mA	M29150B	4.95	5.0	5.05	V
Load Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	I_{OUT}=10mA~1.5A			0.2	1.0	%
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	V_{IN}=6V ~ 13V	M29150A		0.06	0.5	%
		V_{IN}=6V ~ 30V	M29150B				
Supply Voltage Rejection	SVR	f=120Hz, V_{IN}=7±1V, I_{OUT}=0.75A (Note 1)		49	64		dB
Dropout Voltage	V_D	I_{OUT}=250mA (Note 3)			0.1		V
		I_{OUT}=0.75A (Note 3)			0.2		V
		I_{OUT}=1.5A (Note 3)			0.4	0.7	V
Quiescent Current	I_Q	I_{OUT}=0.75A			15	40	mA
		I_{OUT}=1.5A			30	80	mA
		V_{IN}=13V,V_{INH}=GND	M29150A		0.13	0.18	mA
		V_{IN}=30V,V_{INH}=GND	M29150B				
Short Circuit Current	I_{SC}	V_{IN}-V_{OUT}=5.5V			2.2		A
Control Input Logic Low	V_{IL}	OFF MODE (Note 2)				0.8	V
Control Input Logic High	V_{IH}	ON MODE (Note 2)		2			V
Control Input Current	I_{INH}	V_{INH}=13V			5	10	μA
Output Noise Voltage	e_N	B_P=10Hz~100KHz, I_{OUT}=100mA			200		μV_{RMS}
Thermal Shutdown	T_{SHDN}				150		°C

■ ELECTRICAL CHARACTERISTICS (Cont.)

M29150-6.0V (V_{IN}=8.0V)

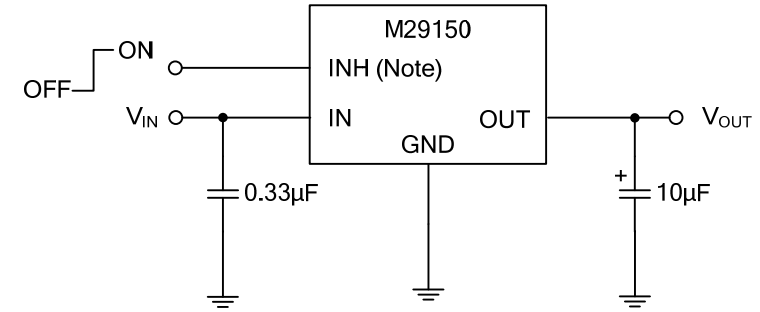
PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=7V~10.5V , I_{OUT}=10mA~1.5A	M29150A	5.88	6.0	6.12	V
		V_{IN}=7V~10.5V, I_{OUT}=10mA~1.5A V_{IN}=30V, I_{OUT}=10mA~100mA	M29150B	5.94	6.0	6.06	V
Load Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	I_{OUT}=10mA~1.5A			0.2	1.0	%
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	V_{IN}=7V ~ 13V	M29150A		0.06	0.5	%
		V_{IN}=7V ~ 30V	M29150B				
Supply Voltage Rejection	SVR	f=120Hz, V_{IN}=8±1V, I_{OUT}=0.75A (Note 1)		49	64		dB
Dropout Voltage	V_D	I_{OUT}=250mA (Note 3)			0.1		V
		I_{OUT}=0.75A (Note 3)			0.2		V
		I_{OUT}=1.5A (Note 3)			0.4	0.7	V
Quiescent Current	I_Q	I_{OUT}=0.75A			15	40	mA
		I_{OUT}=1.5A			30	80	mA
		V_{IN}=13V,V_{INH}=GND	M29150A		0.13	0.18	mA
		V_{IN}=30V,V_{INH}=GND	M29150B				
Short Circuit Current	I_{SC}	V_{IN}-V_{OUT}=5.5V			2.2		A
Control Input Logic Low	V_{IL}	OFF MODE (Note 2)				0.8	V
Control Input Logic High	V_{IH}	ON MODE (Note 2)		2			V
Control Input Current	I_{INH}	V_{INH}=13V			5	10	μA
Output Noise Voltage	e_N	B_P=10Hz~100KHz, I_{OUT}=100mA			200		μV_{RMS}
Thermal Shutdown	T_{SHDN}				150		°C

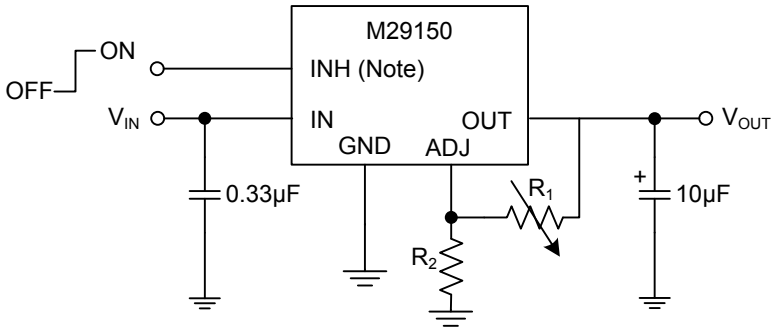
M29150-ADJ (V_{IN}=3.23V)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Minimum Operating Input Voltage	V_{IN}	I_{OUT}=10mA~1.5A		2.5			V
Load Regulation	ΔV_{OUT}	I_{OUT}=10mA~1.5A			0.2	1.0	%
Line Regulation	ΔV_{OUT}	V_{IN}=2.5V~13V, I_{OUT}=10mA	M29150A		0.06	0.5	%
		V_{IN}=2.5V~30V, I_{OUT}=10mA	M29150B				
Reference Voltage	V_{REF}	I_{OUT}=10mA~1.5A, V_{IN}=2.5~4.5V (Note 4)		-1%	1.23	+1%	V
				-2%		+2%	
Supply Voltage Rejection	SVR	f=120Hz, V_{IN}=3.23±1V, I_{OUT}=0.75A (Note 1)		45	75		dB
Quiescent Current	I_Q	I_{OUT}=0.75A			15	40	mA
		I_{OUT}=1.5A			30	80	mA
		V_{IN}=13V,V_{INH}=GND	M29150A		0.13	0.18	mA
		V_{IN}=30V,V_{INH}=GND	M29150B				
Adjust Pin Current	I_{ADJ}	(Note 1)				1	μA
Short Circuit Current	I_{SC}	V_{IN}-V_{OUT}=5.5V			2.2		A
Control Input Logic Low	V_{IL}	OFF MODE (Note 2)				0.8	V
Control Input Logic High	V_{IH}	ON MODE (Note 2)		2			V
Control Input Current	I_{INH}	V_{INH}=13V			5	10	μA
Output Noise Voltage	e_N	B_P=10Hz ~100KHz, I_{OUT}=100mA			50		μV_{RMS}
Thermal Shutdown	T_{SHDN}				150		°C

Notes: 1. Guaranteed by design.
2. Only for version with Inhibit function.
3. Dropout voltage is defined as the input-to-output differential when the output voltage drops to 98% of its nominal value with V_{OUT} +1V applied to V_{IN}.
4. Reference voltage is measured between output and GND pin, with ADJ PIN tied to V_{OUT}

■ TYPICAL APPLICATION CIRCUITS

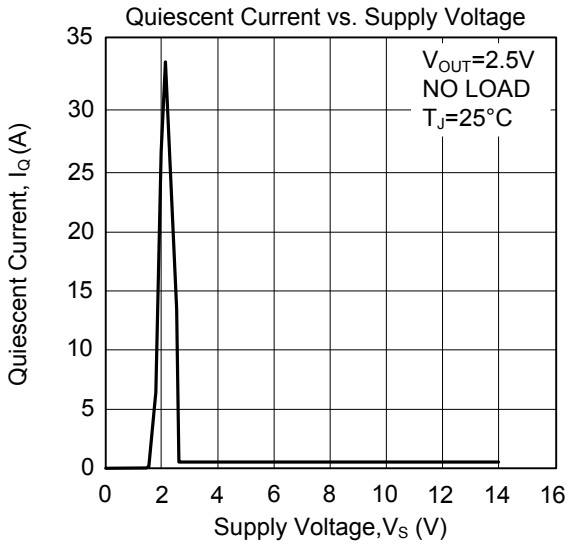


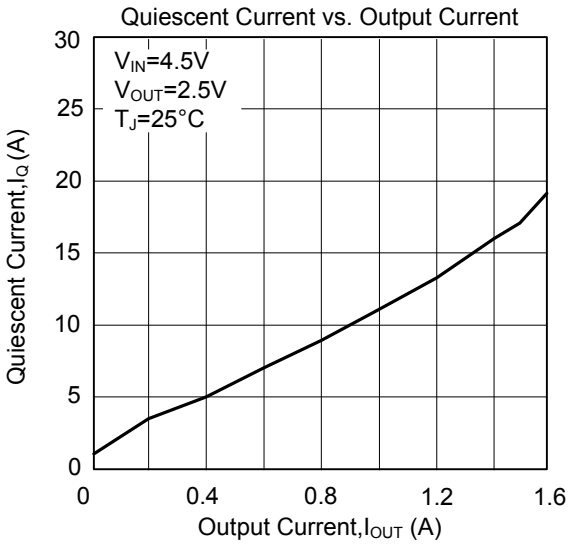


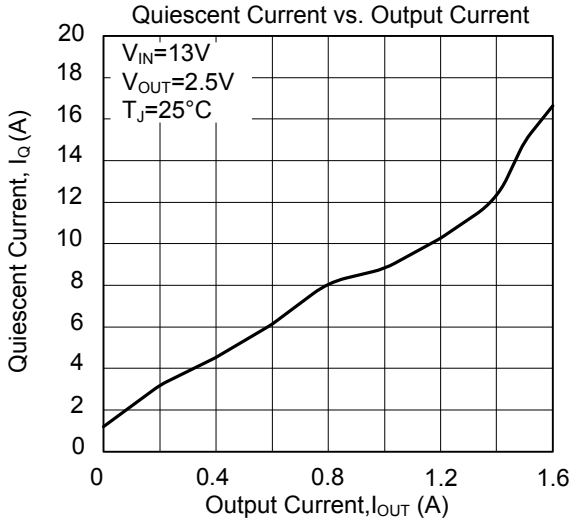
$V_{OUT}=V_{REF}\ (1+R_1/R_2)$

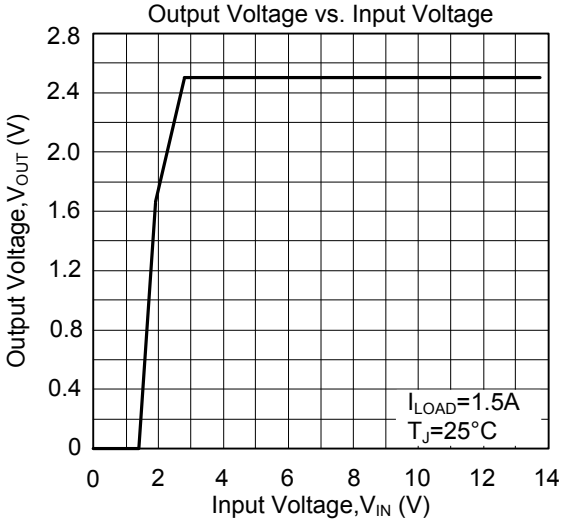
Note: Only for version with inhibit function.

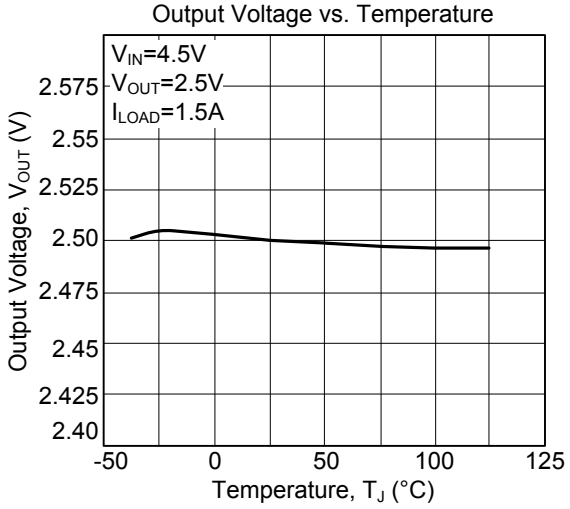
■ TYPICAL CHARACTERISTICS

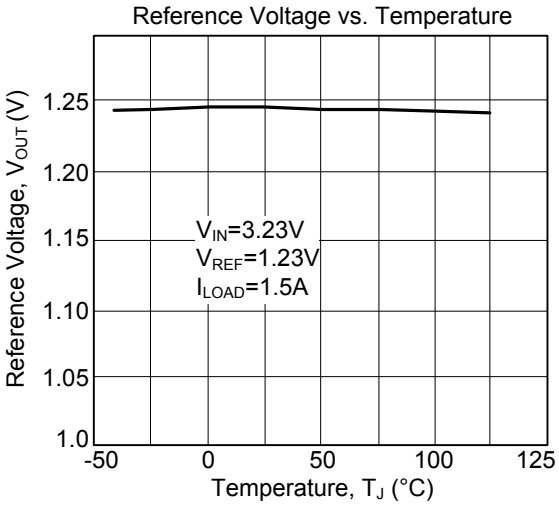






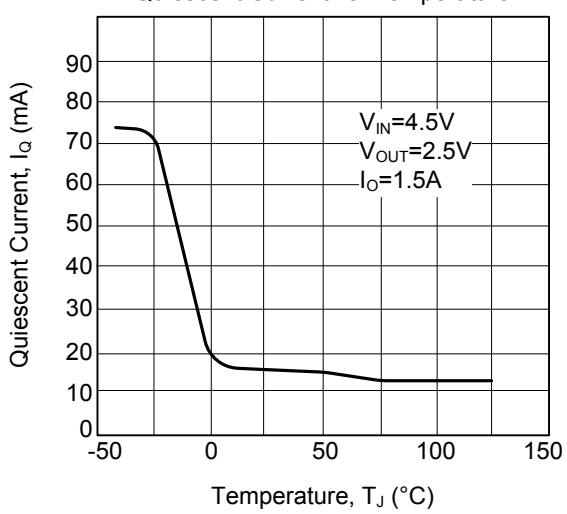




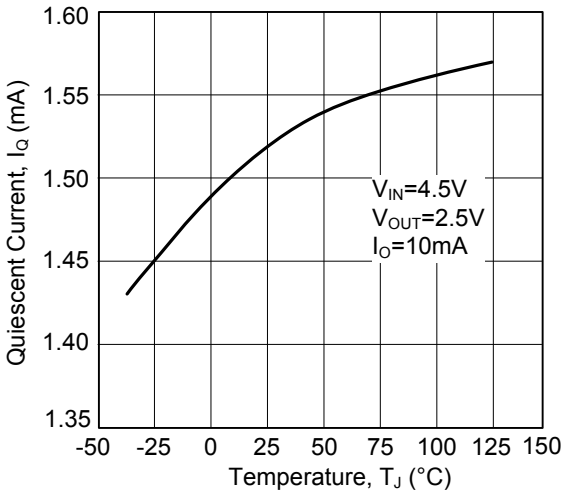


■ TYPICAL CHARACTERISTICS (Cont.)

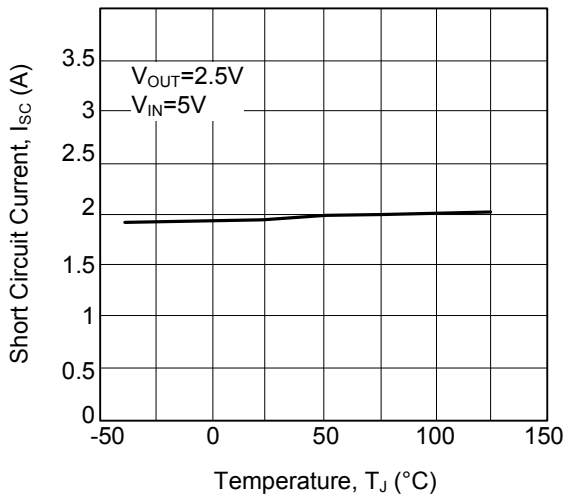
Quiescent Current vs. Temperature



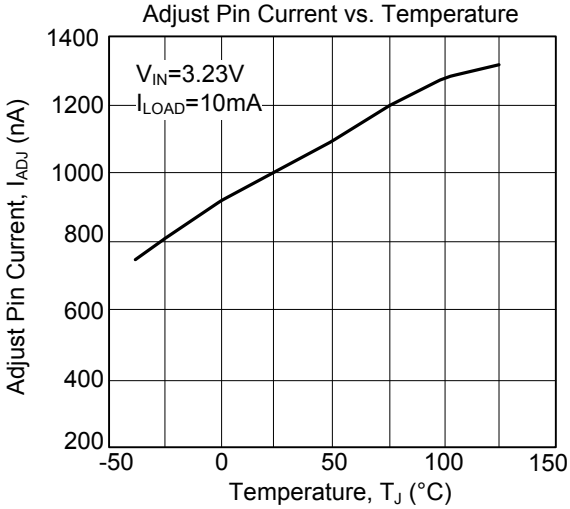
Quiescent Current vs. Temperature



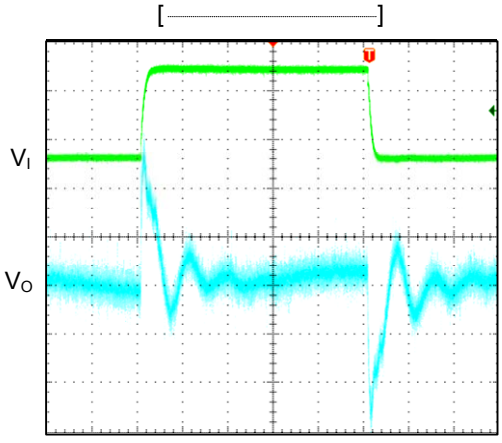
Short Circuit Current vs. Temperature



Adjust Pin Current vs. Temperature

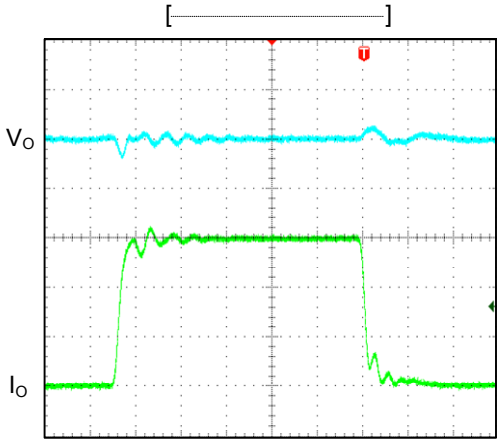


Line Transient



V_I=3.5~5.5V,I_O=10mA,V_O=2.5V,C_O=10μF

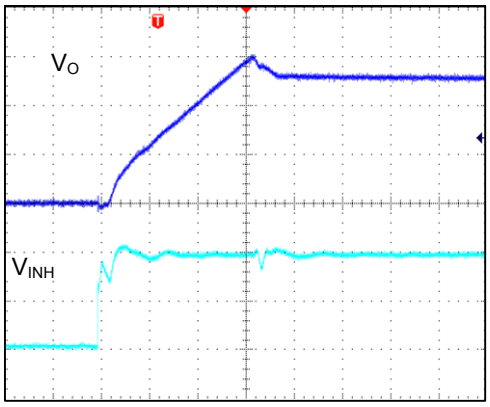
Load Transient



V_I=5V,I_O=10mA~1.5A,V_O=2.5V,C_O=10μF

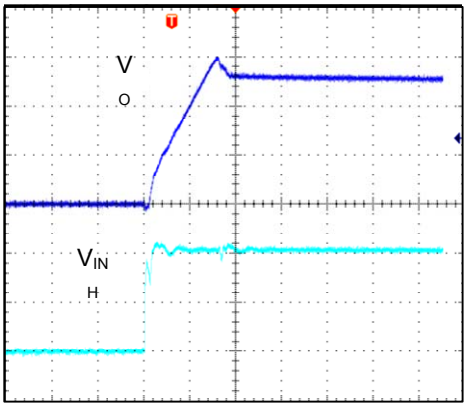
■ TYPICAL CHARACTERISTICS (Cont.)

Start-up Time 10mA



C_O=10μF,I_O=10mA,V_{INH}=2V,V_O=5V,V_I=7V

Start-up Time 1.5A



C_O=10μF,I_O=1.5A,V_{INH}=2V,V_O=5V,V_I=7V