



78RXX

LINEAR INTEGRATED CIRCUIT

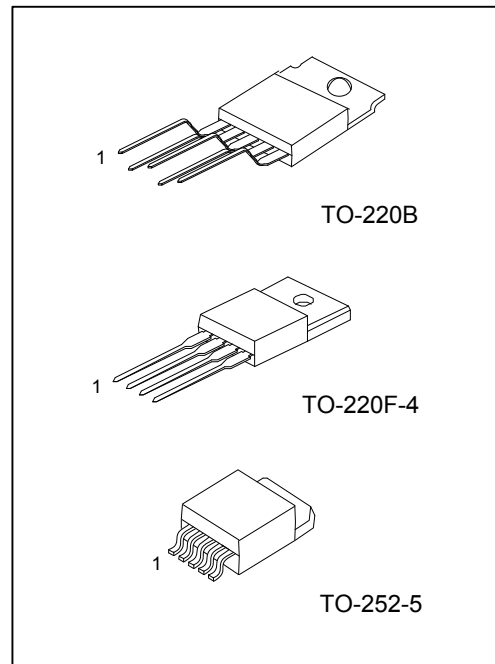
LOW DROPOUT VOLTAGE REGULATOR

DESCRIPTION

As the UTC linear integrated LDO, the UTC **78RXX** shows a high current, high accuracy, and specially low-dropout voltage. The features are: maximum 500mV 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

- * $I_{OUT}=1A$; $V_{OUT}=3.3V,5V,9V$ (typ)
- * With ADJ version
- * Internal overcurrent protection, internal thermal shutdown
- * Internal overvoltage protection, internal short-circuit protection
- * Output disable function



ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
78RXXL-TB5-T	78RXXG-TB5-T	TO-220B	Tube
78RXXL-TF4-T	78RXXG-TF4-T	TO-220F-4	Tube
78RXXL-TN5-R	78RXXG-TN5-R	TO-252-5	Tape Reel

Note: xx: output voltage, refer to Marking Information

<p>78RXXL-TB5-T</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Plating</p> <p>(4) Voltage Code</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) TB5: TO-220B, TF4: TO-220F-4, TN5: TO-252-5</p> <p>(3) G: Halogen Free, L: Lead Free</p> <p>(4) xx: refer to Marking Information</p>
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MARKING INFORMATION

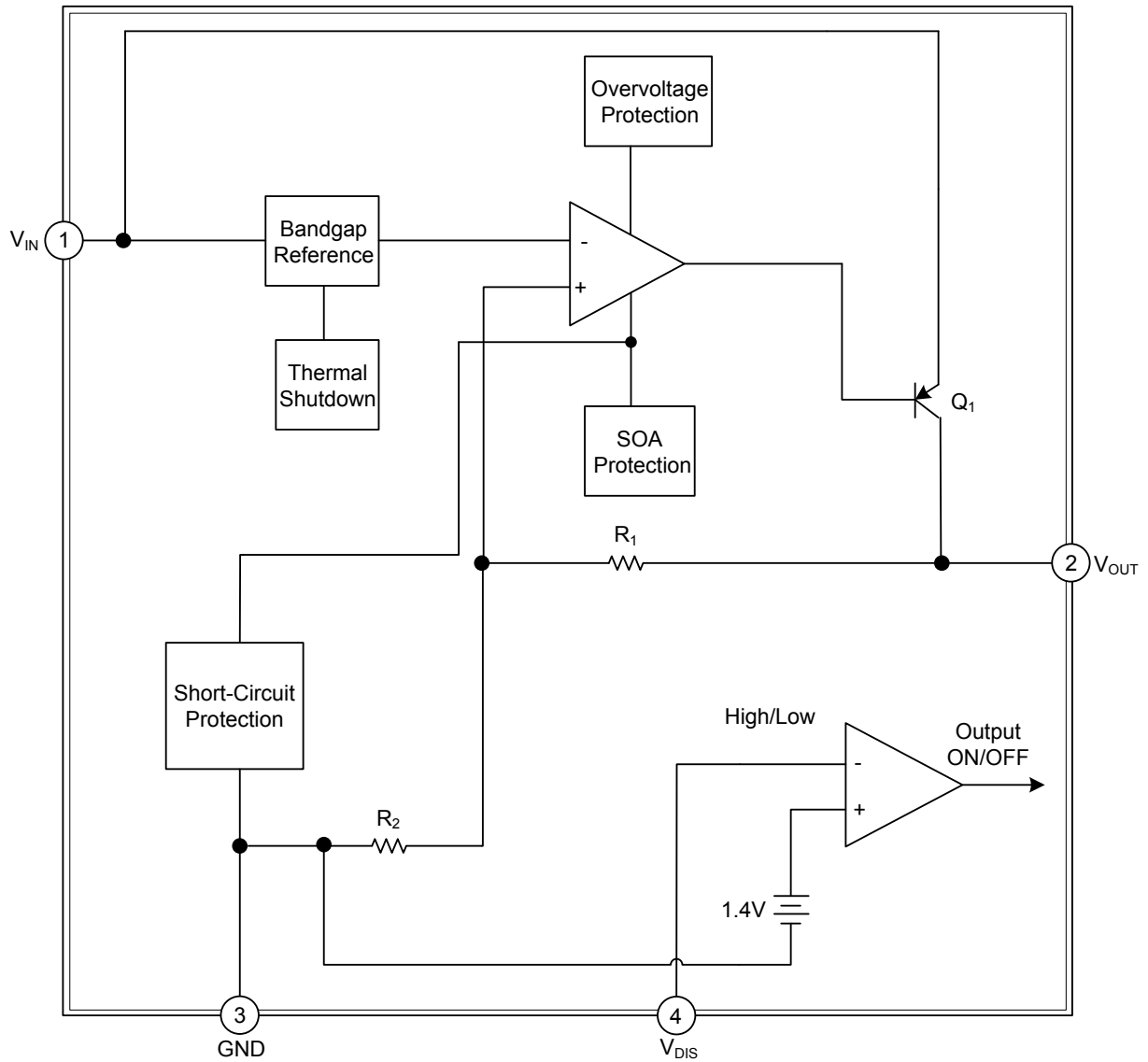
PACKAGE	VOLTAGE CODE	MARKING
TO-220F-4	33: 3.3V 05: 5.0V 09: 9.0V	<p>The diagram shows a rectangular marking area on a component. At the top, it says 'UTC'. Below that, '78RXX' is printed. To the right of '78RXX' is a small square. Below '78RXX' are four small squares. Arrows point from these squares to labels: 'Voltage Code' points to the first square, 'LOT Code' points to the second square, 'L: Lead Free' points to the third square, and 'G: Halogen Free' points to the fourth square. Below the four squares are two more small squares, with an arrow pointing to 'Date Code'.</p>
TO-220B	33: 3.3V 05: 5.0V 09: 9.0V AD: ADJ	
TO-252-5	05: 5.0V	

PIN DESCRIPTIONS

PIN NO.	PIN NAME	PIN FUNCTION
1	V_{IN}	Input voltage pin
2	V_{OUT}	Output voltage pin
3	GND	GND
4	V_{DIS}	Disable signal input pin
5	ADJ	Adjustable input pin

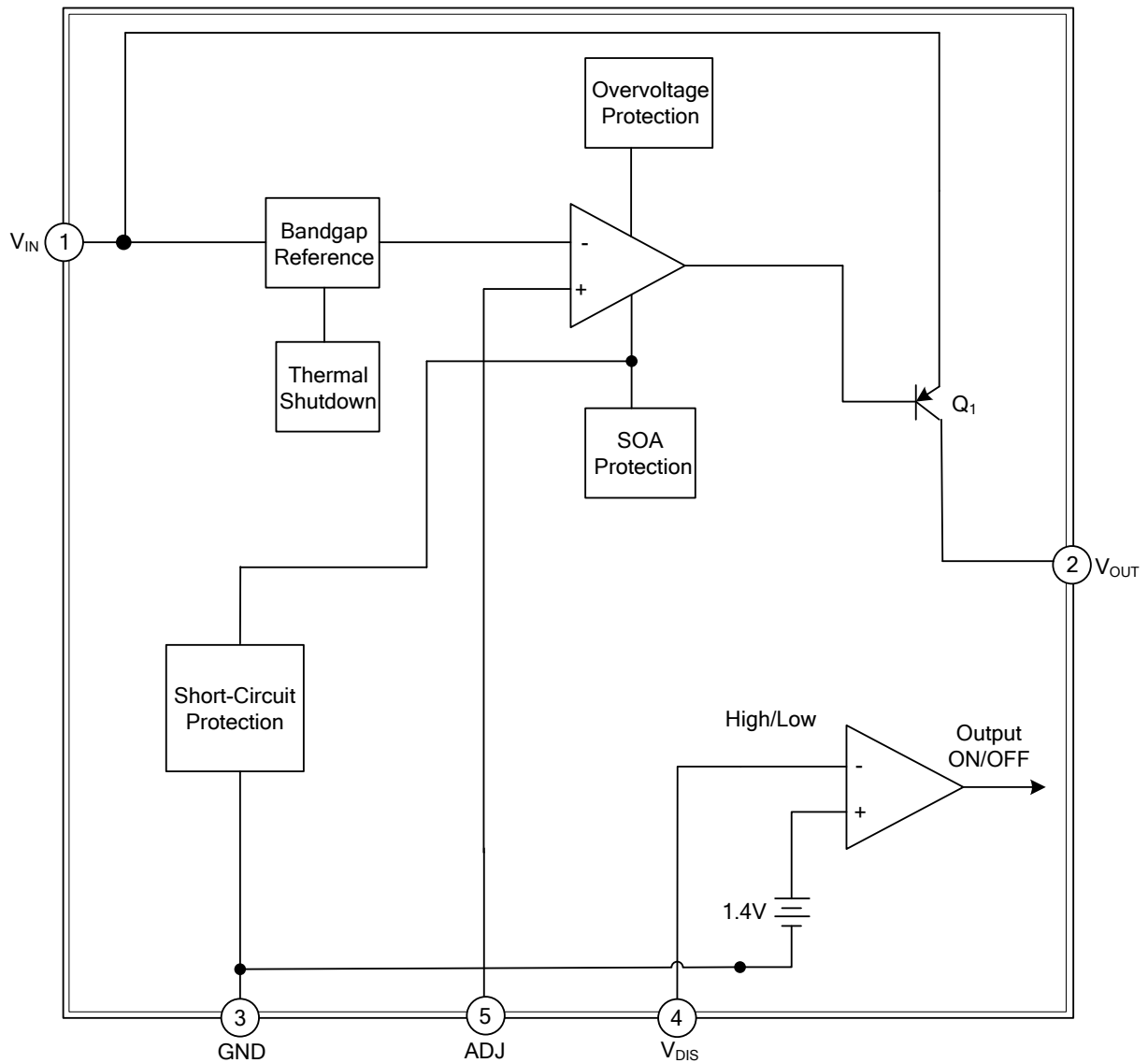
■ BLOCK DIAGRAM

Fixed Output Voltage Versions



■ BLOCK DIAGRAM

Adjustable Output Voltage Versions



■ ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified.)

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	35	V
Disable Voltage		V_{DIS}	35	V
Output Current		I_{OUT}	1.0	A
Power Dissipation	TO-220B/TO-220F-4	P_D	1.5	W
	TO-252-5		1	W
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-20 ~ +80	°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	RATING	UNIT
Junction to Ambient	TO-220B	θ_{JA}	62.5	°C/W
	TO-220F-4		62.5	°C/W
	TO-252-5		110	°C/W
Junction to Case	TO-220B	θ_{JC}	1.67	°C/W
	TO-220F-4		3.68	°C/W
	TO-252-5		2.5	°C/W

■ ELECTRICAL CHARACTERISTICS ($I_{OUT}=0.5A$, $T_A = 25^\circ C$, unless otherwise specified)

For 78R33 ($V_{IN}=5V$)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage		V_{OUT}	$V_{IN} = 5V$	3.22	3.3	3.38	V
Dropout Voltage		V_D	$I_{OUT} = 1A$			0.5	V
Load Regulation		ΔV_{OUT}	$5mA < I_{OUT} < 1A$		0.1	2.0	%
Line Regulation		ΔV_{OUT}	$4V < V_{IN} < 10V$		0.5	2.5	%
Quiescent Current		I_Q	$I_{OUT} = 0A$			10	mA
Ripple Rejection		RR	(Note)	45	55		dB
Disable Voltage	High	V_{DISH}	Output Active	2.0			V
	Low	V_{DISL}	Output Disabled			0.8	V
Disable Bias Current	High	I_{DISH}	$V_{DIS} = 2.7V$			0.02	mA
	Low	I_{DISL}	$V_{DIS} = 0.4V$			-0.4	mA

For 78R05 ($V_{IN}=7V$)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage		V_{OUT}	$V_{IN} = 7V$	4.88	5	5.12	V
Dropout Voltage		V_D	$I_{OUT} = 1A$			0.5	V
Load Regulation		ΔV_{OUT}	$5mA < I_{OUT} < 1A$		0.1	2.0	%
Line Regulation		ΔV_{OUT}	$6V < V_{IN} < 12V$		0.5	2.5	%
Quiescent Current		I_Q	$I_{OUT} = 0A$			10	mA
Ripple Rejection		RR	(Note)	45	55		dB
Disable Voltage	High	V_{DISH}	Output Active	2.0			V
	Low	V_{DISL}	Output Disabled			0.8	V
Disable Bias Current	High	I_{DISH}	$V_{DIS} = 2.7V$			0.02	mA
	Low	I_{DISL}	$V_{DIS} = 0.4V$			-0.4	mA

■ ELECTRICAL CHARACTERISTICS(Cont.)

For 78R09 ($V_{IN}=11V$)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage		V_{OUT}	$V_{IN} = 11V$	8.78	9	9.22	V
Dropout Voltage		V_D	$I_{OUT} = 1A$			0.5	V
Load Regulation		ΔV_{OUT}	$5mA < I_{OUT} < 1A$		0.1	2.0	%
Line Regulation		ΔV_{OUT}	$10V < V_{IN} < 25V$		0.5	2.5	%
Quiescent Current		I_Q	$I_{OUT} = 0 A$			10	mA
Ripple Rejection		RR	(Note)	45	55		Db
Disable Voltage	High	V_{DISH}	Output Active	2.0			V
	Low	V_{DISL}	Output Disabled			0.8	V
Disable Bias Current	High	I_{DISH}	$V_{DIS} = 2.7V$			0.02	mA
	Low	I_{DISL}	$V_{DIS} = 0.4V$			-0.4	mA

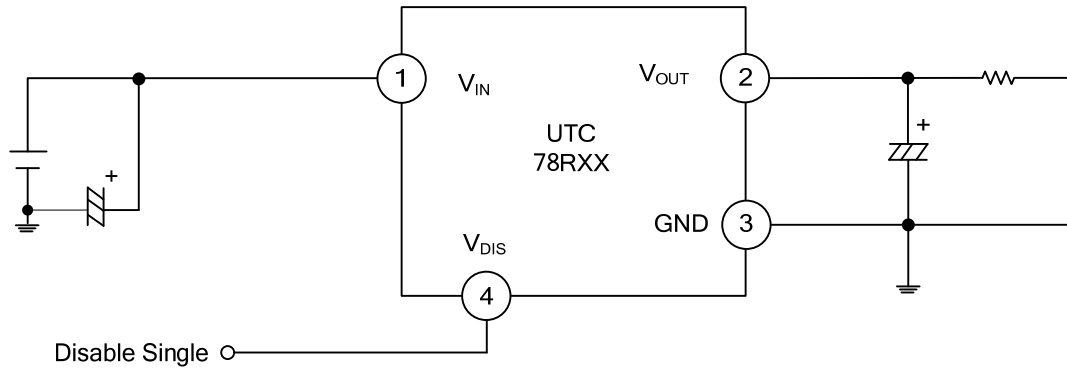
For 78RAD-ADJ

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage		V_{OUT}		1.22	1.25	1.28	V
Dropout Voltage		V_D	$I_{OUT} = 1A$			0.5	V
Load Regulation		ΔV_{OUT}	$5mA < I_{OUT} < 1A$		0.1	2.0	%
Line Regulation		ΔV_{OUT}	$V_o+1V < V_{IN} < V_o+7V$		0.5	2.5	%
Quiescent Current		I_Q	$I_{OUT} = 0 A$			10	mA
Ripple Rejection		RR	(Note)	45	55		dB
Disable Voltage	High	V_{DISH}	Output Active	2.0			V
	Low	V_{DISL}	Output Disabled			0.8	V
Disable Bias Current	High	I_{DISH}	$V_{DIS} = 2.7V$			0.02	mA
	Low	I_{DISL}	$V_{DIS} = 0.4V$			-0.4	mA

Note: These guaranteed parameters, are not 100% tested in production.

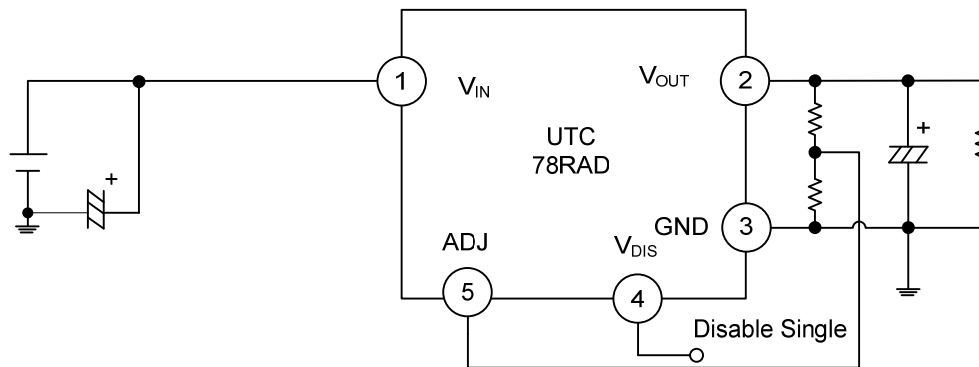
■ TYPICAL APPLICATION CIRCUIT

Fixed Output Voltage Versions



- * C_1 is required if regulator is located an appreciable distance from power supply filter. [$C_1 > 0.33\mu\text{F}$ (Electrolytic)]
- * C_o improves stability and transient response. [$C_o > 47\mu\text{F}$ (Electrolytic)]

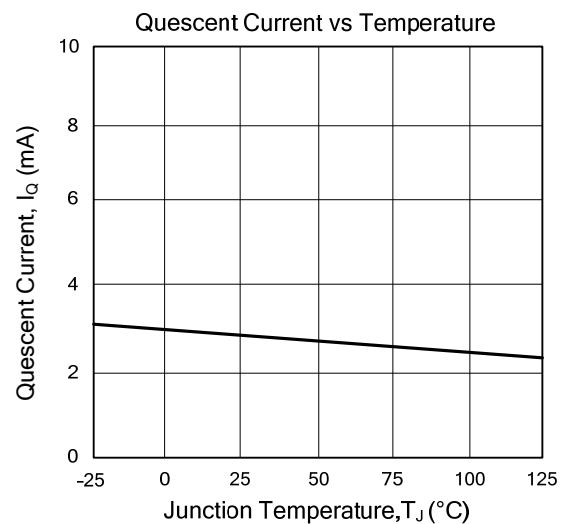
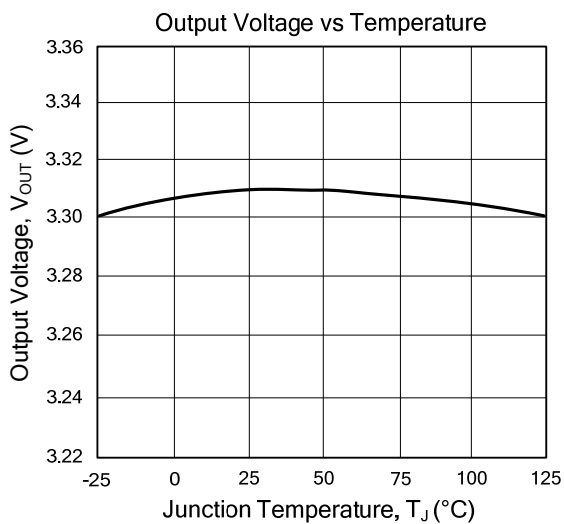
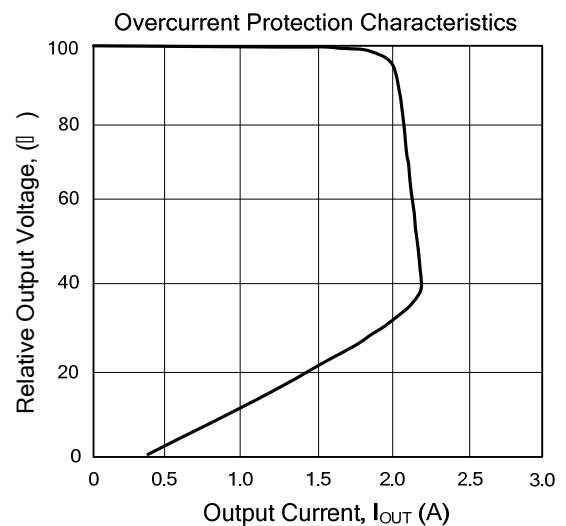
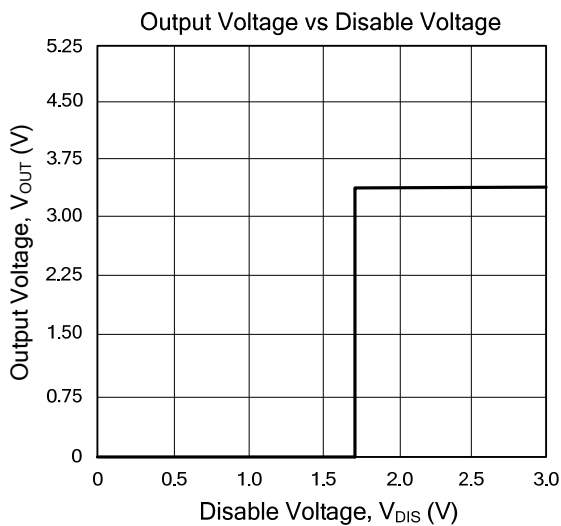
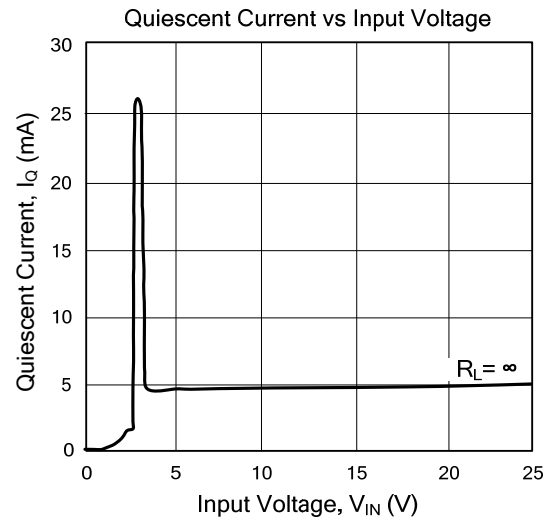
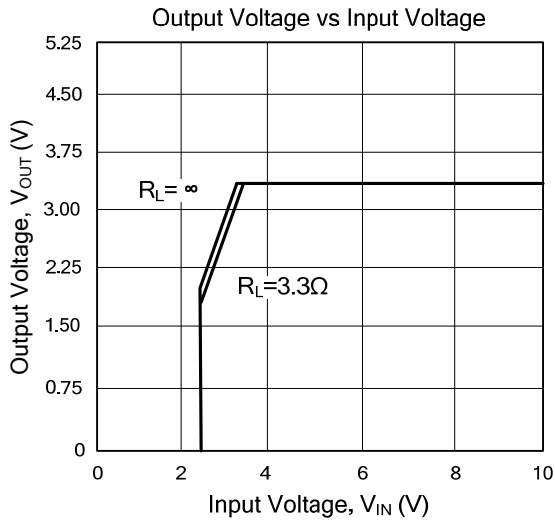
Adjustable Output Voltage Version



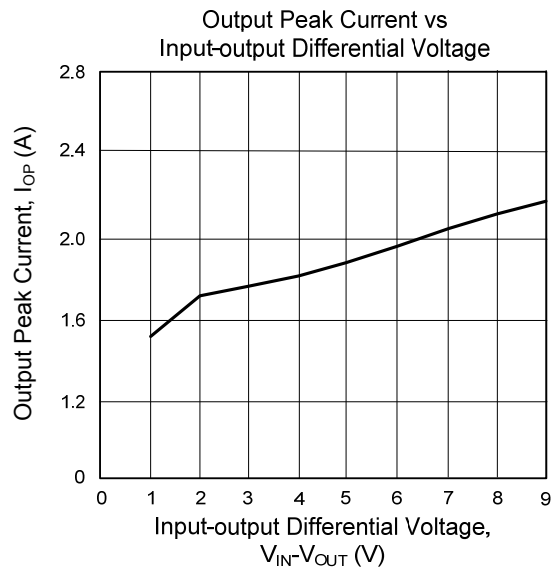
- * C_1 is required if regulator is located an appreciable distance from power supply filter. [$C_1 > 0.33\mu\text{F}$ (Electrolytic)]
- * C_o improves stability and transient response. [$C_o > 47\mu\text{F}$ (Electrolytic)]

■ TYPICAL CHARACTERISTICS

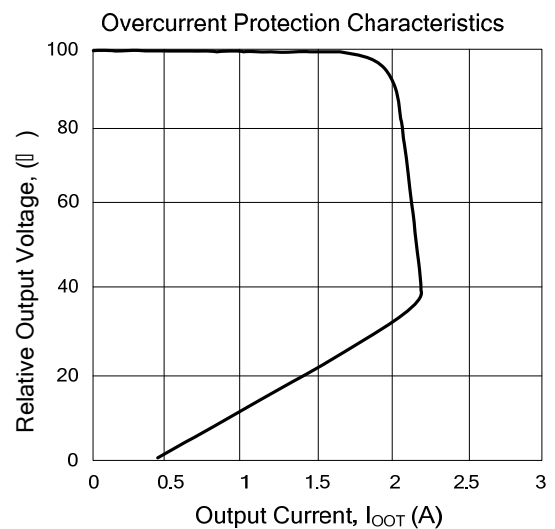
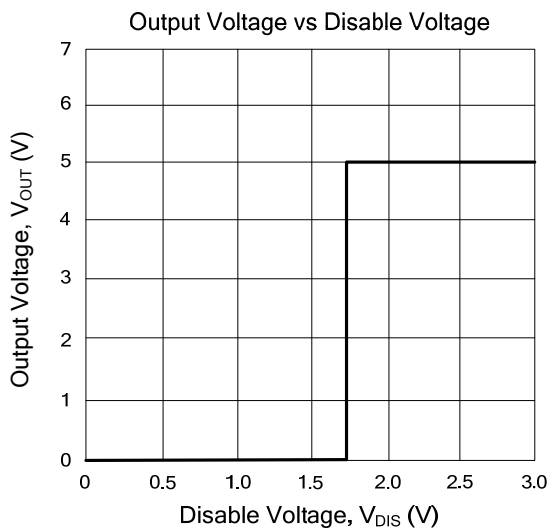
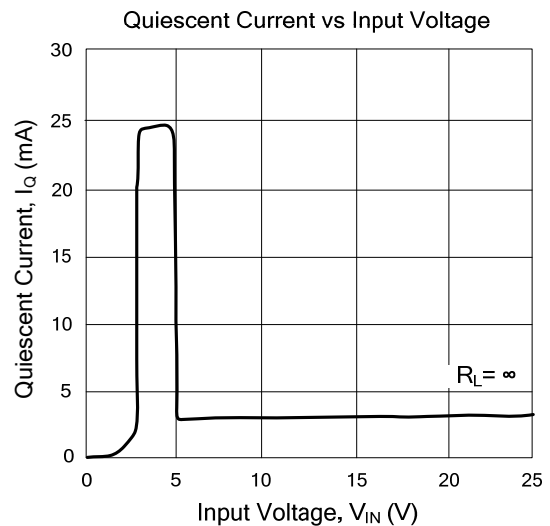
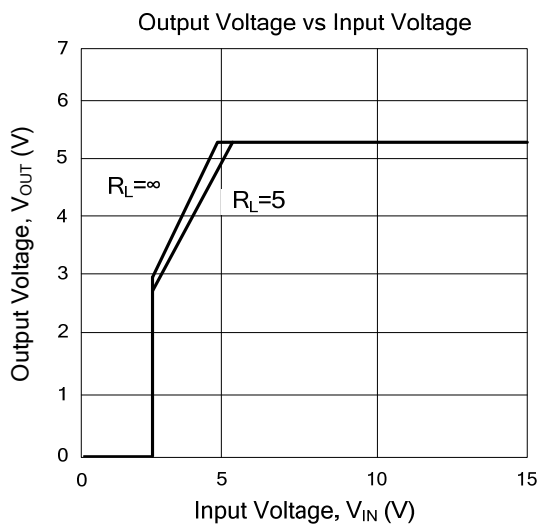
(1) 78R33



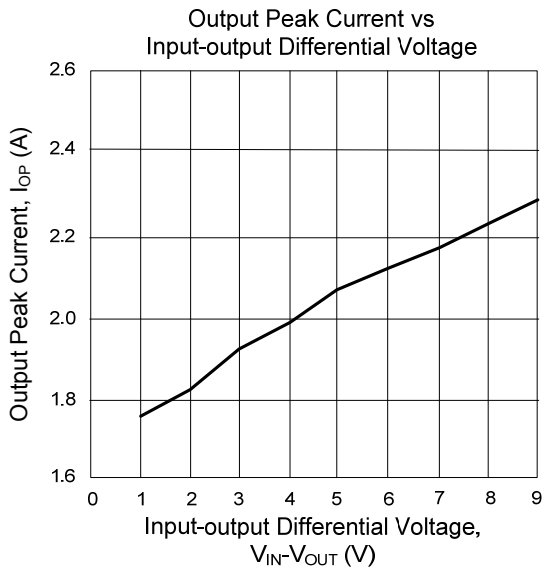
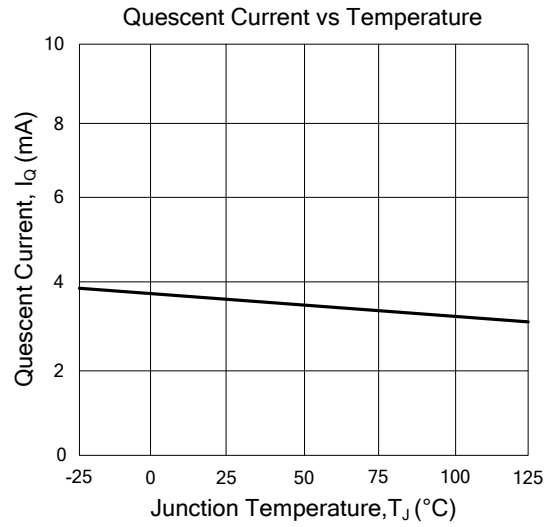
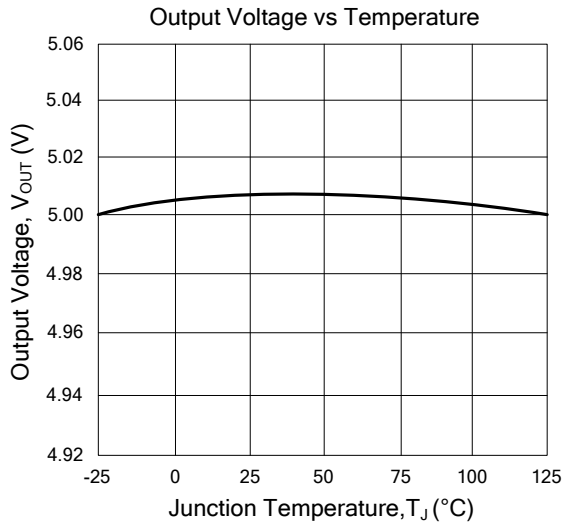
■ TYPICAL CHARACTERISTICS(Cont.)



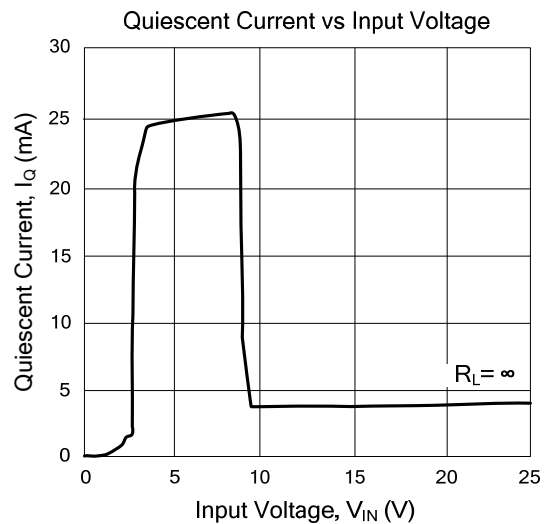
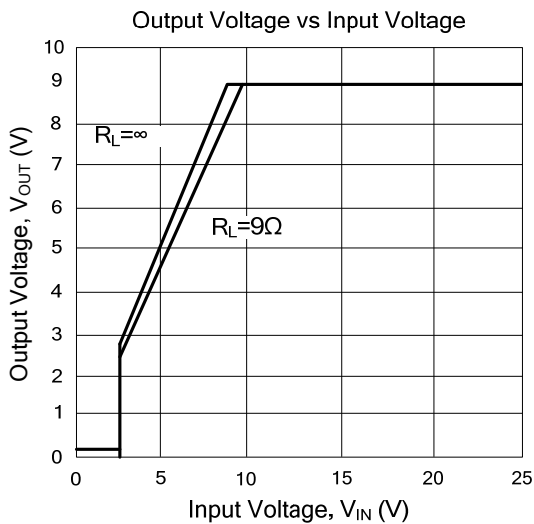
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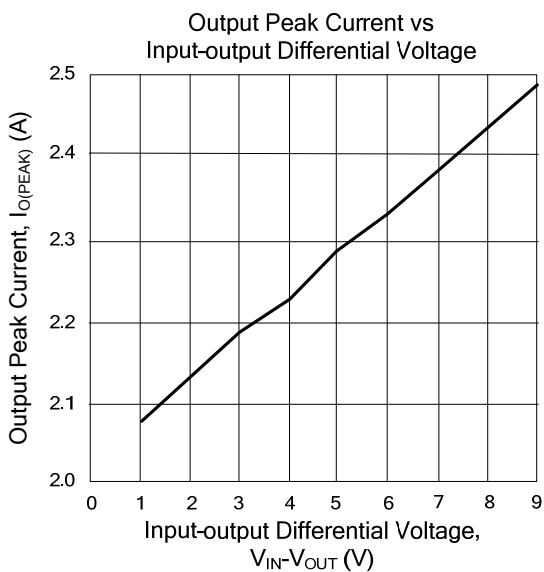
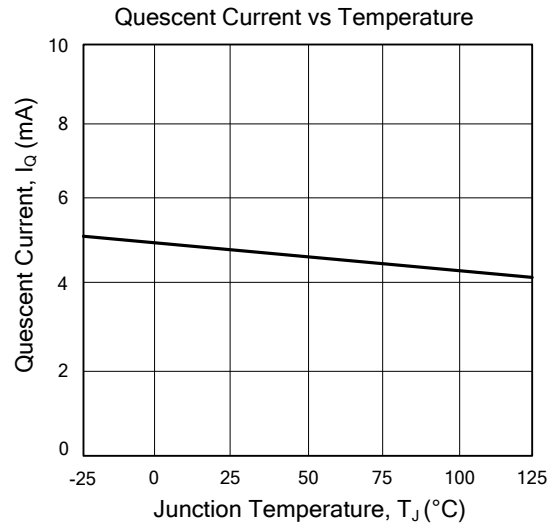
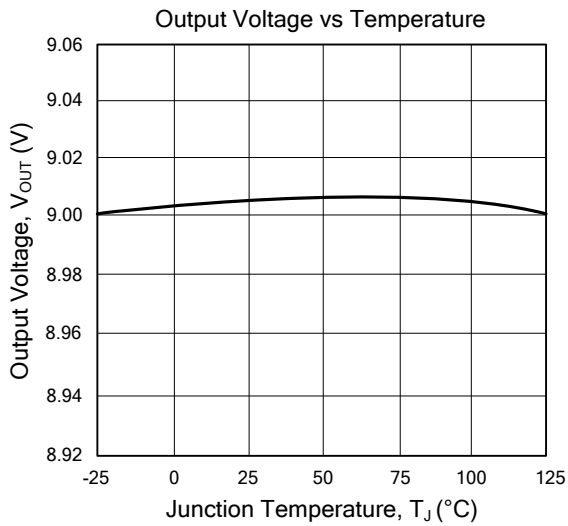
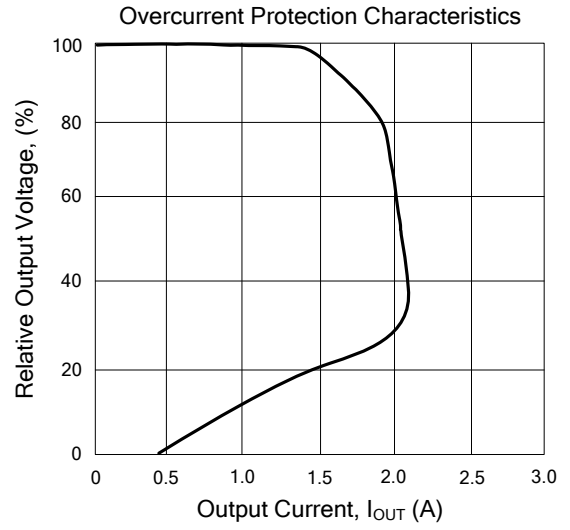
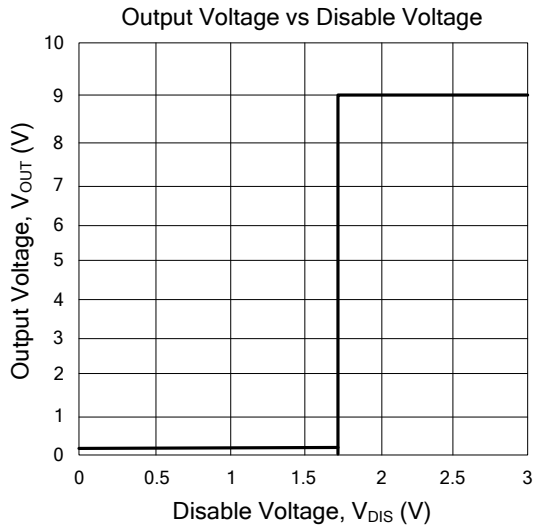
■ TYPICAL CHARACTERISTICS(Cont.)



(3) 78R09



■ TYPICAL CHARACTERISTICS(Cont.)



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