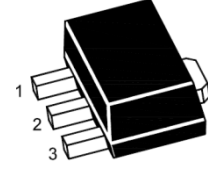


78L05K THRU 78L15K

3-Terminal Positive Voltage Regulator

FEATURES

- Maximum Output Current I_O : 0.1 A
- Output Voltage V_O : 5V/6V/8V/9V/10V/12V/15V
- Continuous Total Dissipation
- P_D : 0.5W ($T_a = 25^\circ\text{C}$)
- Thermal overload protection
- Short circuit current limiting



1: OUT 2: GND 3: IN

SOT-89 PLASTIC PACKAGE

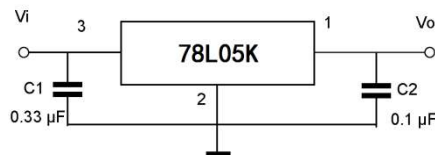
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

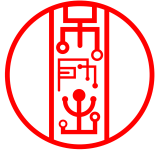
Parameter		Symbol	Rating	Unit
Input Voltage	78L05K~78L08K	V_I	30	V
	78L09K~78L15K		35	V
Power Dissipation		P_{tot}	500 ¹⁾	mW
Operating Temperature		T_{opr}	- 20 to + 120	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	- 55 to +150	$^\circ\text{C}$

1) 15 mm X 25 mm X 0.7 mm alumina ceramic board, $T_a \leq 25^\circ\text{C}$

Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 10\text{ V}$, $I_O = 40\text{ mA}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	4.8	5	5.2	V
		$7\text{ V} \leq V_I \leq 20\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	4.75	--	5.25	V
		$V_I = 10\text{ V}$, $1\text{ mA} \leq I_O \leq 70\text{ mA}$	4.75	--	5.25	V
Line Regulation	Regline	$7\text{ V} \leq V_I \leq 20\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	150	mV
		$8\text{ V} \leq V_I \leq 20\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	100	
Load Regulation	Regload	$1\text{ mA} \leq I_O \leq 100\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	60	mV
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	30	
Quiescent Current	I_Q	$T_J = 25^\circ\text{C}$	--	--	5.5	mA
Quiescent Current Change	ΔI_Q	$8\text{ V} \leq V_I \leq 20\text{ V}$	--	--	1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$	--	--	0.1	
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ KHz}$, $T_J = 25^\circ\text{C}$	--	40	--	$\mu\text{ V}$
Ripple Rejection	RR	$f = 120\text{ Hz}$, $8\text{ V} \leq V_I \leq 18\text{ V}$, $T_J = 25^\circ\text{C}$	41	--	--	dB
Dropout Voltage	V_{Drop}	$T_J = 25^\circ\text{C}$	--	1.7	--	V

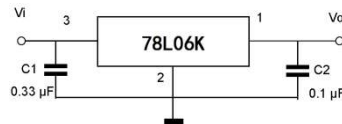




78L05K THRU 78L15K

Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 11\text{ V}$, $I_O = 40\text{ mA}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	5.76	6	6.24	V
		$8.5\text{ V} \leq V_I \leq 21\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	5.7	--	6.3	V
		$V_I = 11\text{ V}$, $1\text{ mA} \leq I_O \leq 70\text{ mA}$	5.7	--	6.3	V
Line Regulation	Regline	$8.5\text{ V} \leq V_I \leq 21\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	155	mV
		$9\text{ V} \leq V_I \leq 21\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	105	
Load Regulation	Regload	$1\text{ mA} \leq I_O \leq 100\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	65	mV
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	35	
Quiescent Current	I_Q	$T_J = 25^\circ\text{C}$	--	--	5.5	mA
Quiescent Current Change	ΔI_Q	$9\text{ V} \leq V_I \leq 21\text{ V}$, $I_O = 40\text{ mA}$	--	--	1.5	mA
		$V_I = 11\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	--	--	0.1	
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ KHz}$, $T_J = 25^\circ\text{C}$	--	49	--	$\mu\text{ V}$
Ripple Rejection	RR	$f = 120\text{ Hz}$, $9\text{ V} \leq V_I \leq 19\text{ V}$, $T_J = 25^\circ\text{C}$	40	--	--	dB
Dropout Voltage	V_{Drop}	$T_J = 25^\circ\text{C}$	--	1.7	--	V



Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 14\text{ V}$, $I_O = 40\text{ mA}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

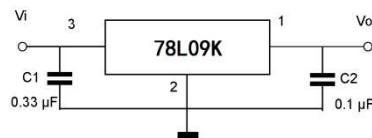
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	7.7	8	8.3	V
		$10.5\text{ V} \leq V_I \leq 23\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	7.6	--	8.4	V
		$V_I = 14\text{ V}$, $1\text{ mA} \leq I_O \leq 70\text{ mA}$	7.6	--	8.4	V
Line Regulation	Regline	$10.5\text{ V} \leq V_I \leq 23\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	175	mV
		$11\text{ V} \leq V_I \leq 23\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	125	
Load Regulation	Regload	$1\text{ mA} \leq I_O \leq 100\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	80	mV
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	40	
Quiescent Current	I_Q	$T_J = 25^\circ\text{C}$	--	--	5.5	mA
Quiescent Current Change	ΔI_Q	$12\text{ V} \leq V_I \leq 23\text{ V}$, $I_O = 40\text{ mA}$	--	--	1.5	mA
		$V_I = 14\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	--	--	0.1	
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ KHz}$, $T_J = 25^\circ\text{C}$	--	60	--	$\mu\text{ V}$
Ripple Rejection	RR	$f = 120\text{ Hz}$, $12\text{ V} \leq V_I \leq 22\text{ V}$, $T_J = 25^\circ\text{C}$	39	--	--	dB
Dropout Voltage	V_{Drop}	$T_J = 25^\circ\text{C}$	--	1.7	--	V



78L05K THRU 78L15K

Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 15\text{ V}$, $I_O = 40\text{ mA}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	8.64	9	9.36	V
		$11.4\text{ V} \leq V_I \leq 24\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	8.55	--	9.45	V
		$V_I = 15\text{ V}$, $1\text{ mA} \leq I_O \leq 70\text{ mA}$	8.55	--	9.45	V
Line Regulation	Regline	$11.4\text{ V} \leq V_I \leq 24\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	200	mV
		$12\text{ V} \leq V_I \leq 24\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	160	
Load Regulation	Regload	$1\text{ mA} \leq I_O \leq 100\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	90	mV
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	45	
Quiescent Current	I_Q	$T_J = 25^\circ\text{C}$	--	--	6	mA
Quiescent Current Change	ΔI_Q	$12\text{ V} \leq V_I \leq 24\text{ V}$, $I_O = 40\text{ mA}$	--	--	1.5	mA
		$V_I = 15\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	--	--	0.1	
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ KHz}$, $T_J = 25^\circ\text{C}$	--	70	--	$\mu\text{ V}$
Ripple Rejection	RR	$f = 120\text{ Hz}$, $12\text{ V} \leq V_I \leq 24\text{ V}$, $T_J = 25^\circ\text{C}$	38	--	--	dB
Dropout Voltage	V_{Drop}	$T_J = 25^\circ\text{C}$	--	1.7	--	V



Electrical Characteristics ($T_a = 25^\circ\text{C}$) at specified virtual junction temperature, $V_I = 17\text{ V}$, $I_O = 40\text{ mA}$ (unless otherwise noted)

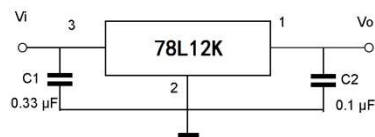
Parameter	Test Conditions*		78L10			Units
			Min	Typ	Max	
Output voltage**		25°C	9.6	10	10.4	V
	$I_O = 1\text{ mA to } 40\text{ mA}$, $V_I = 13\text{ V to } 25\text{ V}$	$0^\circ\text{C to } 125^\circ\text{C}$	9.5	10	10.5	
	$I_O = 1\text{ mA to } 70\text{ mA}$,		9.5	10	10.5	
Input regulation	$V_I = 13\text{ V to } 25\text{ V}$	25°C		51	175	mV
	$V_I = 14\text{ V to } 25\text{ V}$			42	125	
Ripple rejection	$V_I = 15\text{ V to } 25\text{ V}$, $f = 120\text{ Hz}$	$0^\circ\text{C to } 125^\circ\text{C}$	37	44		dB
Output regulation	$I_O = 1\text{ mA to } 100\text{ mA}$	25°C		20	90	mV
	$I_O = 1\text{ mA to } 40\text{ mA}$			11	40	
Output noise voltage	$f = 10\text{ Hz to } 100\text{ KHz}$	25°C		62		$\mu\text{ V}$
Dropout voltage		25°C		1.7		V
Bias current		25°C		4.2	6	mA
		125°C			5.5	
Bias current change	$V_I = 14\text{ V to } 25\text{ V}$	$0^\circ\text{C to } 125^\circ\text{C}$			1.5	
	$I_O = 1\text{ mA to } 40\text{ mA}$				0.1	



78L05K THRU 78L15K

Electrical Characteristics ($T_a = 25^\circ\text{C}$) (Unless otherwise specified, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $V_I = 19\text{ V}$, $I_O = 40\text{ mA}$, $C_I = 0.33\text{ }\mu\text{F}$, $C_2 = 0.1\text{ }\mu\text{F}$)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = 25^\circ\text{C}$	11.5	12	12.5	V
		$14.5\text{ V} \leq V_I \leq 27\text{ V}$, $1\text{ mA} \leq I_O \leq 40\text{ mA}$	11.4	--	12.6	V
		$V_I = 19\text{ V}$, $1\text{ mA} \leq I_O \leq 70\text{ mA}$	11.4	--	12.6	V
Line Regulation	Regline	$14.5\text{ V} \leq V_I \leq 27\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	250	mV
		$16\text{ V} \leq V_I \leq 27\text{ V}$, $T_J = 25^\circ\text{C}$	--	--	200	
Load Regulation	Regload	$1\text{ mA} \leq I_O \leq 100\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	100	mV
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$, $T_J = 25^\circ\text{C}$	--	--	50	
Quiescent Current	I_Q	$T_J = 25^\circ\text{C}$	--	--	6	mA
Quiescent Current Change	ΔI_Q	$16\text{ V} \leq V_I \leq 27\text{ V}$	--	--	1.5	mA
		$1\text{ mA} \leq I_O \leq 40\text{ mA}$	--	--	0.1	
Output Noise Voltage	V_N	$10\text{ Hz} \leq f \leq 100\text{ KHz}$, $T_J = 25^\circ\text{C}$	--	80	--	$\mu\text{ V}$
Ripple Rejection	RR	$f = 120\text{ Hz}$, $15\text{ V} \leq V_I \leq 25\text{ V}$, $T_J = 25^\circ\text{C}$	37	--	--	dB
Dropout Voltage	V_{Drop}	$T_J = 25^\circ\text{C}$	--	1.7	--	V



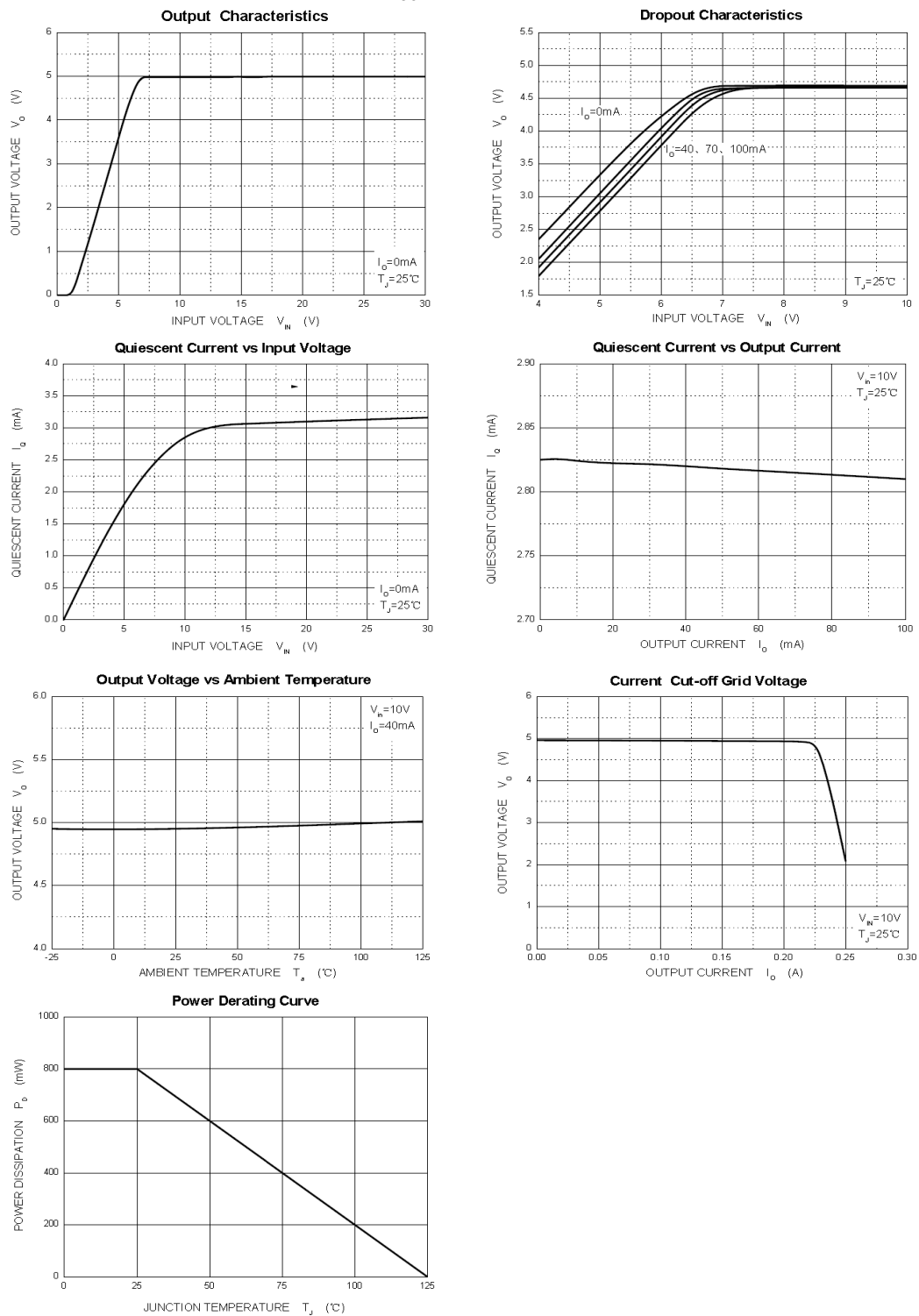
Electrical Characteristics (Unless otherwise specified, $V_{IN} = 23\text{ V}$, $I_{OUT} = 40\text{ mA}$, $C_{IN} = 0.33\text{ }\mu\text{F}$, $C_{OUT} = 0.1\text{ }\mu\text{F}$, $T_J = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	14.4	15	15.6	V
Output Voltage $17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$, $1\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	V_{OUT}	14.25	-	15.75	V
Output Voltage $V_{IN} = 23\text{ V}$, $1\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$	V_{OUT}	14.25	-	15.75	V
Input Regulation $17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ $19\text{ V} \leq V_{IN} \leq 30\text{ V}$	Reg. line	-	-	300	mV
		-	-	250	
Load Regulation $1\text{ mA} \leq I_{OUT} \leq 100\text{ mA}$ $1\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	Reg. load	-	-	150	mV
		-	-	75	
Quiescent Current	I_Q	-	-	6.5	mA
Quiescent Current Change $19\text{ V} \leq V_{IN} \leq 30\text{ V}$ $1\text{ mA} \leq I_{OUT} \leq 40\text{ mA}$	ΔI_Q	-	-	1.5	mA
		-	-	0.1	
Output Noise Voltage at $T_a = 25^\circ\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ KHz}$	V_{NO}	-	90	-	μV
Ripple Rejection at $f = 120\text{ Hz}$, $18.5\text{ V} \leq V_{IN} \leq 28.5\text{ V}$, $T_J = 25^\circ\text{C}$	RR	34	-	-	dB
Dropout Voltage at $T_J = 25^\circ\text{C}$	$ V_{IN} - V_{OUT} $	-	1.7	-	V



78L05K THRU 78L15K

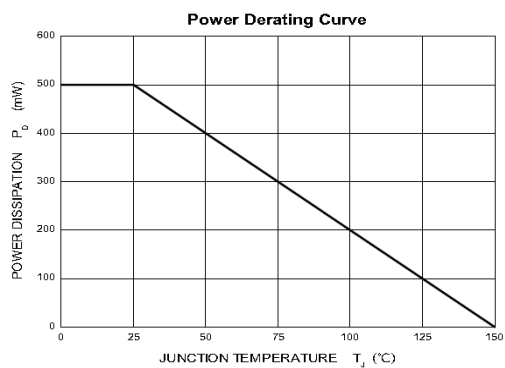
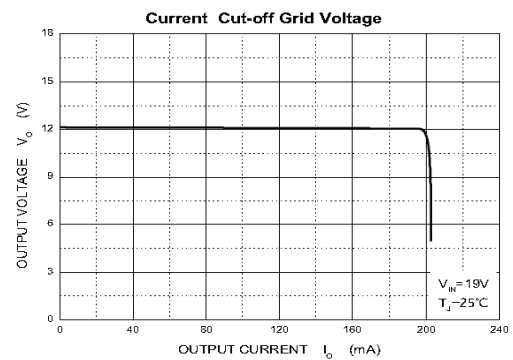
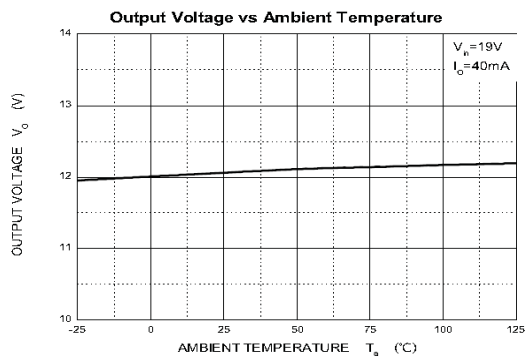
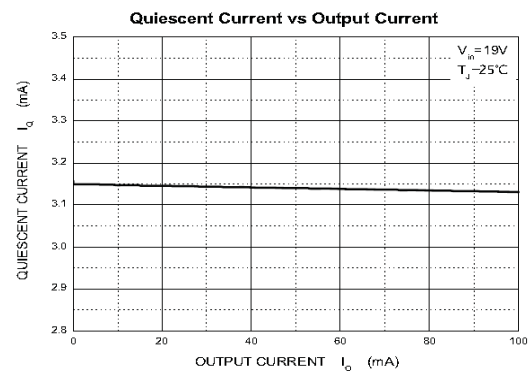
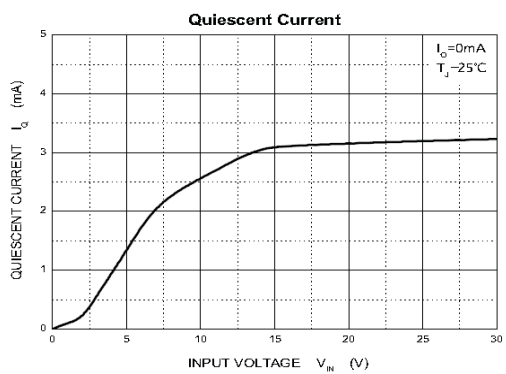
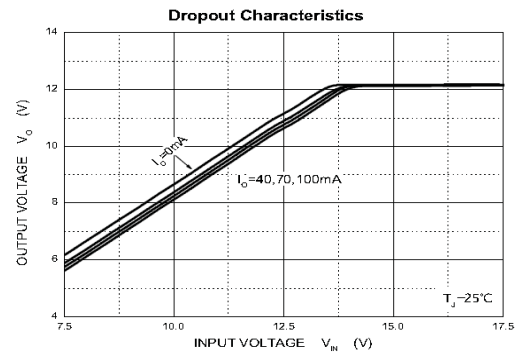
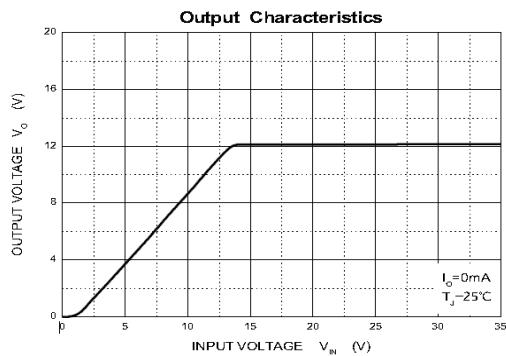
78L05K Typical Characteristics





78L05K THRU 78L15K

78L12K Typical Characteristics





78L05K THRU 78L15K

SOT-89 PACKAGE OUTLINE

Unit: mm

