

Parameter	Test Conditions	IP7805A LM,IP140A-05			IP7805 LM,IP140-05			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_O Output Voltage	$I_O = 1A$ $V_{IN} = 10V$	4.95	5	5.05	4.8	5	5.2	V
	$I_O = 5mA$ to I_{MAX} $P_D \leq P_{MAX}$ $V_{IN} = 7.5V$ to $20V$ $T_J = -55$ to $150^\circ C$	4.85		5.15	4.75		5.25	
V_O Low Supply	$I_O = 5mA$ to I_{MAX} $P_D \leq P_{MAX}$ $V_{IN} = 7V$ to $20V$	4.75		5.15	4.75		5.25	V
ΔV_O Line Regulation	$I_O = 0.5 I_{MAX}$	$V_{IN} = 7V$ to $25V$		3	10		50	mV
		$V_{IN} = 7.5V$ to $25V$ $T_J = -55$ to $150^\circ C$		3	10		50	
	$I_O \leq I_{MAX}$	$V_{IN} = 7.3V$ to $20V$		3	10		50	
	$V_{IN} = 8V$ to $12V$			1	4		20	
		$T_J = -55$ to $150^\circ C$		2	12		25	
ΔV_O Load Regulation	$V_{IN} = 10V$	$I_O = 5mA$ to $1.5A$		10	25		50	mV
		$I_O = 250mA$ to $750mA$		4	15		25	
	$V_{IN} = 10V$	$I_O = 5mA$ to I_{MAX} $T_J = -55$ to $150^\circ C$		7	25		50	
I_Q Quiescent Current	$I_O \leq I_{MAX}$			4	6		6	mA
	$V_{IN} = 10V$	$T_J = -55$ to $150^\circ C$		4	6.5		7	
ΔI_Q Quiescent Current Change	$I_O = 5mA$ to I_{MAX}	$V_{IN} = 10V$		0.2	0.5		0.5	mA
	$I_O \leq I_{MAX}$	$V_{IN} = 7.5V$ to $20V$ $T_J = -55$ to $150^\circ C$		0.1	0.8		0.8	
	$I_O \leq 0.5 I_{MAX}$	$V_{IN} = 8V$ to $25V$		0.1	0.8		0.8	
	$I_O \leq 0.5 I_{MAX}$	$V_{IN} = 7V$ to $25V$ $T_J = -55$ to $150^\circ C$		0.2	1		1.0	
V_N Output Noise Voltage	$f = 10Hz$ to $100kHz$ $V_{IN} = 10V$		40	200		40		μV
$\frac{\Delta V_{IN}}{\Delta V_O}$ Ripple Rejection	$f = 120Hz$ $V_{IN} = 8V$ to $18V$	$I_O \leq I_{MAX}$		68	80		68	dB
		$I_O \leq 0.5 I_{MAX}$ $T_J = -55$ to $150^\circ C$		68	80		68	
Dropout Voltage	$I_O = I_{MAX}$		2	2.5		2		V
R_O Output Resistance	$f = 1 kHz$		5			5		m Ω
I_{sc} Short Circuit Current	$V_{IN} = 35V$		0.6	1.2		0.6	1.2	A
I_{pk} Peak Output Current	$V_{IN} = 10V$		2.4	3.3		2.4	3.3	
Average Temperature Coefficient of V_O	$I_O = 5mA$		0.2	2		0.6		mV/ $^\circ C$
Input Voltage required to maintain line regulation	$I_O \leq I_{MAX}$		7.3			7.3		V

- 1) All characteristics are measured with a capacitor across the input of $0.22\mu F$ and a capacitor across the output of $0.1\mu F$. All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques ($t_p \leq 10ms$, $\delta \leq 5\%$). Output voltage changes due to changes in internal temperature must be taken into account separately.
- 2) Although power dissipation is internally limited, these specifications are applicable for maximum power dissipation P_{MAX} of $20W$, $I_{MAX} = 1.0A$.
- 3) $T_J = 25^\circ C$ unless otherwise stated.

Parameter	Test Conditions	IP7812A LM,IP140A-12			IP7812 LM,IP140-12			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V _O Output Voltage	I _O = 1A V _{IN} = 19V	11.88	12	12.12	11.5	12	12.5	V
	I _O = 5mA to I _{MAX} P _D ≤ P _{MAX} V _{IN} = 14.8V to 27V T _J = -55 to 150°C	11.64		12.36	11.4		12.6	
V _O Low Supply	I _O = 5mA to I _{MAX} P _D ≤ P _{MAX} V _{IN} = 14.5V to 27V	11.40		12.36	11.4		12.6	V
ΔV _O Line Regulation	I _O = 0.5 I _{MAX}	V _{IN} = 14.5V to 30V		4	18		120	mV
		V _{IN} = 14.8V to 30V T _J = -55 to 150°C		4	18		120	
	I _O ≤ I _{MAX}	V _{IN} = 14.5V to 27V		4	18		120	
	V _{IN} = 16V to 22V			2	9		50	
	T _J = -55 to 150°C			4	30		60	
ΔV _O Load Regulation	V _{IN} = 19V	I _O = 5mA to 1.5A		12	32		120	mV
		I _O = 250mA to 750mA		4	19		60	
	V _{IN} = 19V	I _O = 5mA to I _{MAX} T _J = -55 to 150°C		8	60		120	
I _Q Quiescent Current	I _O ≤ I _{MAX}			4	6		6	mA
	V _{IN} = 19V	T _J = -55 to 150°C		4	6.5		7	
ΔI _Q Quiescent Current Change	I _O = 5mA to I _{MAX}	V _{IN} = 19V		0.2	0.5		0.5	mA
	I _O ≤ I _{MAX}	V _{IN} = 14.8V to 27V T _J = -55 to 150°C		0.1	0.8		0.8	
	I _O ≤ 0.5 I _{MAX}	V _{IN} = 15V to 30V		0.1	0.8		0.8	
	I _O ≤ 0.5 I _{MAX}	V _{IN} = 14.5V to 30V T _J = -55 to 150°C		0.2	1		1	
V _N Output Noise Voltage	f = 10Hz to 100kHz V _{IN} = 19V		75	480		75		μV
ΔV _{IN} / ΔV _O Ripple Rejection	f = 120Hz V _{IN} = 15V to 25V	I _O ≤ I _{MAX}		61	72		61	dB
		I _O ≤ 0.5 I _{MAX} T _J = -55 to 150°C		61	72		61	
Dropout Voltage	I _O = I _{MAX}		2	2.5		2		V
R _O Output Resistance	f = 1 kHz		8			8		mΩ
I _{sc} Short Circuit Current	V _{IN} = 35V		0.6	1.2		0.6	1.2	A
I _{pk} Peak Output Current	V _{IN} = 19V		2.4	3.3		2.4	3.3	
Average Temperature Coefficient of V _O	I _O = 5mA		0.5	4.8		1.5		mV / °C
Input Voltage required to maintain line regulation	I _O ≤ I _{MAX}		14.5			14.6		V

- 1) All characteristics are measured with a capacitor across the input of 0.22μF and a capacitor across the output of 0.1μF. All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques (t_p ≤ 10ms, δ ≤ 5%). Output voltage changes due to changes in internal temperature must be taken into account separately.
- 2) Although power dissipation is internally limited, these specifications are applicable for maximum power dissipation P_{MAX} of 20W , I_{MAX} = 1.0A.
- 3) T_J = 25°C unless otherwise stated.

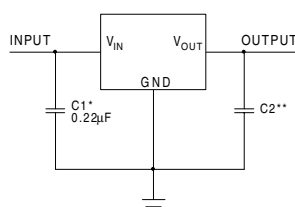
Parameter	Test Conditions	IP7815A LM,IP140A-15			IP7815 LM,IP140-15			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_O Output Voltage	$I_O = 1A$ $V_{IN} = 23V$	14.85	15	15.15	14.4	15	15.60	V
	$I_O = 5mA$ to I_{MAX} $P_D \leq P_{MAX}$ $V_{IN} = 17.9V$ to $30V$ $T_J = -55$ to $150^\circ C$	14.55		15.45	14.25		15.75	
V_O Low Supply	$I_O = 5mA$ to I_{MAX} $P_D \leq P_{MAX}$ $V_{IN} = 17.5V$ to $30V$	14.25		15.45	14.25		15.75	V
ΔV_O Line Regulation	$I_O = 0.5 I_{MAX}$	$V_{IN} = 17.5V$ to $30V$		4	22		150	mV
		$V_{IN} = 17.9V$ to $30V$ $T_J = -55$ to $150^\circ C$		4	22		150	
	$I_O \leq I_{MAX}$	$V_{IN} = 17.5V$ to $30V$		4	22		150	
	$V_{IN} = 20V$ to $26V$			2	10		60	
	$T_J = -55$ to $150^\circ C$			5	30		75	
ΔV_O Load Regulation	$V_{IN} = 23V$	$I_O = 5mA$ to $1.5A$		12	35		150	mV
		$I_O = 250mA$ to $750mA$		4	21		75	
	$V_{IN} = 23V$	$I_O = 5mA$ to I_{MAX} $T_J = -55$ to $150^\circ C$		9	75		150	
I_Q Quiescent Current	$I_O \leq I_{MAX}$ $V_{IN} = 23V$	$T_J = -55$ to $150^\circ C$		4	6		6	mA
				4	6.5		7	
ΔI_Q Quiescent Current Change	$I_O = 5mA$ to I_{MAX}	$V_{IN} = 23V$		0.2	0.5		0.5	mA
	$I_O \leq I_{MAX}$	$V_{IN} = 17.9V$ to $30V$ $T_J = -55$ to $150^\circ C$		0.1	0.8		0.8	
	$I_O \leq 0.5 I_{MAX}$	$V_{IN} = 18.5V$ to $30V$		0.1	0.8		0.8	
	$I_O \leq 0.5 I_{MAX}$	$V_{IN} = 17.5V$ to $30V$ $T_J = -55$ to $150^\circ C$		0.2	1		1	
V_N Output Noise Voltage	$f = 10Hz$ to $100kHz$ $V_{IN} = 23V$		90	600		90		μV
$\frac{\Delta V_{IN}}{\Delta V_O}$ Ripple Rejection	$f = 120Hz$	$I_O \leq I_{MAX}$		60	70		60	dB
	$V_{IN} = 18.5V$ to $28.5V$	$I_O \leq 0.5 I_{MAX}$ $T_J = -55$ to $150^\circ C$		60	70		60	
Dropout Voltage	$I_O = I_{MAX}$		2	2.5		2		V
R_O Output Resistance	$f = 1 kHz$		9			9		$m\Omega$
I_{sc} Short Circuit Current	$V_{IN} = 35V$		0.6	1.2		0.6	1.2	A
I_{pk} Peak Output Current	$V_{IN} = 23V$		2.4	3.3		2.4	3.3	
Average Temperature Coefficient of V_O	$I_O = 5mA$		0.6	6		1.8		$\frac{mV}{^\circ C}$
Input Voltage required to maintain line regulation	$I_O \leq I_{MAX}$		17.5			17.7		V

- 1) All characteristics are measured with a capacitor across the input of $0.22\mu F$ and a capacitor across the output of $0.1\mu F$. All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques ($t_p \leq 10ms$, $\delta \leq 5\%$). Output voltage changes due to changes in internal temperature must be taken into account separately.
- 2) Although power dissipation is internally limited, these specifications are applicable for maximum power dissipation P_{MAX} of $20W$, $I_{MAX} = 1.0A$.
- 3) $T_J = 25^\circ C$ unless otherwise stated.

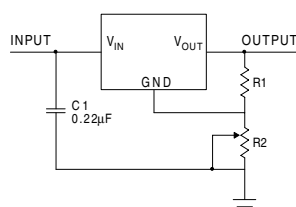
THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	MAX	
		K-Pack	3°C/W
		R-Pack	7°C/W
		G/IG-Pack	5°C/W
		LCC4	13°C/W
		SMD	1.3°C/W

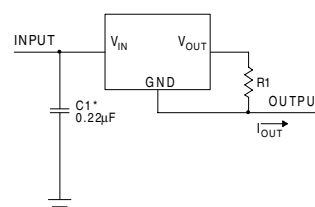
APPLICATIONS INFORMATION



Fixed Output Regulator



Adjustable Output Regulator



Current Regulator

* Required if the regulator is located far from the power supply.

** Although no output capacitor is needed for stability, it does help transient response. (If needed, use 0.1µF ceramic disc)

$$V_{OUT} = 5V + \left(\frac{5V}{R1 + V} \right) R2$$

$$\left(\frac{5V}{R1} \right) > 3I_Q, \text{ Load Regulation } \approx$$

$$\left[\frac{R1+R2}{R1} \right] (L_R \text{ of Regulator})$$

$$I_{OUT} = \left(\frac{V2 - V3}{R1} \right) + I_Q$$

$\Delta I_Q = 1.3\text{mA}$ over line and load changes

Order Information

Part Number	K-Pack (TO-3)	R-Pack (TO-66)	G/IG-Pack (TO-257)	SMD 1 SMD 05	LCC4	Temp. Range	Note: To order, add the package identifier to the part number. eg. IP7805AK IP140SMD-12
IP7800A	✓	✓	✓	✓	✓	-55 to +150°C	
IP7800	✓	✓	✓	✓	✓	"	
IP140A	✓	✓	✓	✓	✓	"	
IP140	✓	✓	✓	✓	✓	"	
LM140	✓	✓	✓	✓	✓	"	