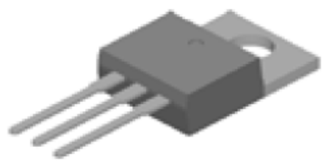
1A Positive Voltage Regulator

Features

- Output Current up to 1A
- Fixed output voltage of 5V, 6V, 8V, 9V, 10V, 12V,15V, 18V and 24V available
- Thermal overload shutdown protection
- Short circuit current limiting
- Output transistor SOA protection
- RoHS Compliance

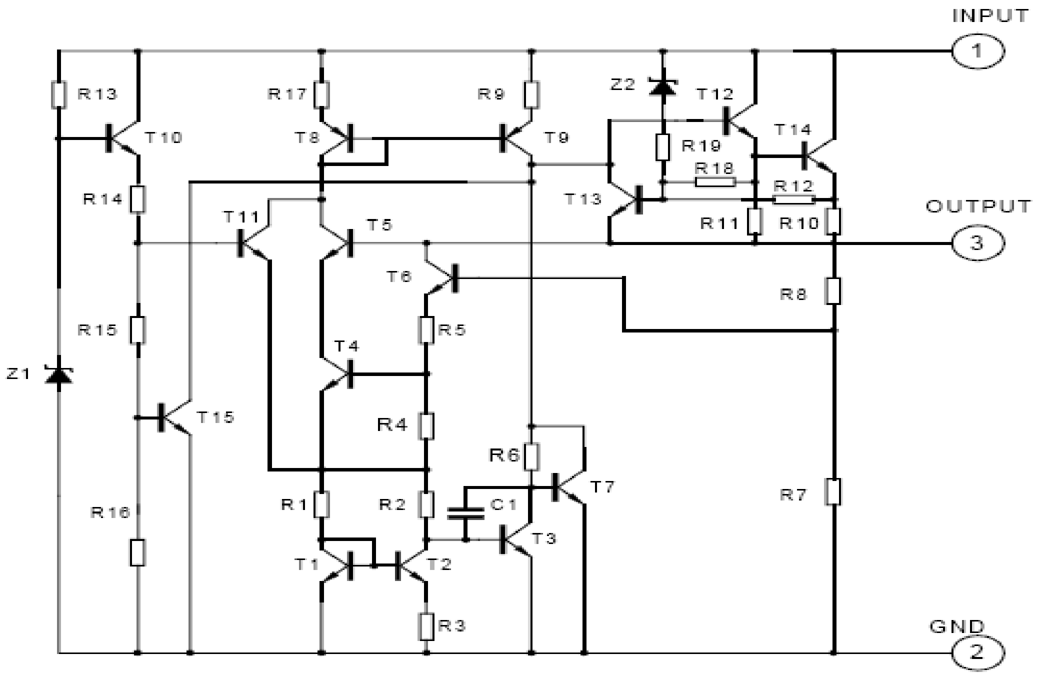


TO-220

Applications

- High Efficiency Linear Regulator
- Post Regulation for Switching Supply
- Microprocessor Power Supply
- Mother Board

Block Diagram



Absolute Maximum Ratings

Symbol	Description		Ratings	Unit
V_{IN}	Input Voltage	V_{OUT}=3.3~18V	35	V
		V_{OUT}=20~24V	40	
I_{OUT}	Output Current		1	A
P_D	Power Dissipation	TO-220	Internally Limited	mW
T_J	Junction Temperature		150	
T_{OPR}	Operating Temperature Range		-20 ~ 150	° C
T_{STG}	Storage Temperature Range		-55 ~ 150	° C

Note: 1. Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.
2. The maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data are showed as electrical characteristics table represents pulse test conditions with junction temperatures specified at the initiation of test.

Electrical Characteristics (T_J=25° C, P_D≦15W, unless otherwise specified)

For SL7805 (V_{IN}=10V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7805			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	4.80	5.0	5.20	V	I_{OUT}=5mA-1.0A
		4.75	-	5.25	V	7.5V≤V_{IN}≤20V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	50	mV	I_{OUT}=5mA-1.0A
		-	-	25	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	50	mV	7V≤V_{IN}≤25V
		-	-	50	mV	7.5V≤V_{IN}≤20V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	7.5V≤V_{IN}≤20V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	40	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-0.6	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	62	80	-	dB	8V≤V_{IN}≤18V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7806 (V_{IN}=11V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7806			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	5.76	6.0	6.24	V	I_{OUT}=5mA-1.0A
		5.70	-	6.30	V	8.5V≤V_{IN}≤21V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	60	mV	I_{OUT}=5mA-1.0A
		-	-	30	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	60	mV	8V≤V_{IN}≤25V
		-	-	60	mV	8.5V≤V_{IN}≤21V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	8.5V≤V_{IN}≤21V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	45	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-0.7	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	59	75	-	dB	9V≤V_{IN}≤19V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7808 (V_{IN}=14V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7808			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	7.68	8.0	8.32	V	I_{OUT}=5mA-1.0A
		7.60	-	8.40	V	10.5V≤V_{IN}≤23V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	80	mV	I_{OUT}=5mA-1.0A
		-	-	40	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	80	mV	10.5V≤V_{IN}≤25V
		-	-	80	mV	10.5V≤V_{IN}≤23V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	10.5V≤V_{IN}≤23V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	58	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-0.9	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	56	72	-	dB	11.5V≤V_{IN}≤21.5V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7809 (V_{IN}=15V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7809			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	8.64	9.0	9.36	V	I_{OUT}=5mA-1.0A
		8.55	-	9.45	V	11.5V≤V_{IN}≤24V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	90	mV	I_{OUT}=5mA-1.0A
		-	-	45	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	90	mV	11.5V≤V_{IN}≤25V
		-	-	90	mV	11.5V≤V_{IN}≤24V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	11.5V≤V_{IN}≤24V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	58	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-1.1	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	56	72	-	dB	12.5V≤V_{IN}≤22.5V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7810 (V_{IN}=16V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7810			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	9.60	10.0	10.40	V	I_{OUT}=5mA-1.0A
		9.50	-	10.50	V	12.5V≤V_{IN}≤25V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	100	mV	I_{OUT}=5mA-1.0A
		-	-	50	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	100	mV	13V≤V_{IN}≤25V
		-	-	100	mV	13V≤V_{IN}≤25V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	12.6V≤V_{IN}≤25V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	58	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-1.1	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	56	72	-	dB	13V≤V_{IN}≤23V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7812 (V_{IN}=19V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7812			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	11.52	12.0	12.48	V	I_{OUT}=5mA-1.0A
		11.40	-	12.60	V	14.5V≤V_{IN}≤27V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	120	mV	I_{OUT}=5mA-1.0A
		-	-	60	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	120	mV	14.5V≤V_{IN}≤30V
		-	-	120	mV	14.6V≤V_{IN}≤27V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	14.5V≤V_{IN}≤30V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	75	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-1.5	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	55	72	-	dB	15V≤V_{IN}≤25V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7815 (V_{IN}=23V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7815			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	14.40	15.0	15.60	V	I_{OUT}=5mA-1.0A
		14.25	-	15.75	V	17.5V≤V_{IN}≤30V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	150	mV	I_{OUT}=5mA-1.0A
		-	-	75	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	150	mV	18.5V≤V_{IN}≤30V
		-	-	150	mV	17.7V≤V_{IN}≤30V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	17.5V≤V_{IN}≤30V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	90	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-1.8	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	54	70	-	dB	18.5V≤V_{IN}≤28.5V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7818 (V_{IN}=27V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7818			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	17.28	18.0	18.72	V	I_{OUT}=5mA-1.0A
		17.10	-	18.90	V	21V≤V_{IN}≤33V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	180	mV	I_{OUT}=5mA-1.0A
		-	-	90	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	180	mV	21V≤V_{IN}≤33V
		-	-	180	mV	21V≤V_{IN}≤33V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	21.5V≤V_{IN}≤33V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	110	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-2.2	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	53	69	-	dB	22V≤V_{IN}≤32V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

For SL7824 (V_{IN}=33V, I_{OUT}=0.5A, C1=0.33μF, C_O =0.1μF)

Symbol	Description	SL7824			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{OUT}	Output Voltage	23.04	24.0	24.96	V	I_{OUT}=5mA-1.0A
		22.80	-	25.20	V	27V≤V_{IN}≤38V, I_{OUT}=5mA-1.0A
ΔV_{OUT}	Load Regulation	-	-	240	mV	I_{OUT}=5mA-1.0A
		-	-	120	mV	I_{OUT}=0.25A-0.75A
ΔV_{OUT}	Line Regulation	-	-	240	mV	27V≤V_{IN}≤38V
		-	-	240	mV	27V≤V_{IN}≤38V, I_{OUT}=1.0A
I_Q	Quiescent Current	-	-	8.0	mA	I_{OUT}≦1.0A
ΔI_Q	Quiescent Current Change	-	-	1.0	mA	28V≤V_{IN}≤38V
		-	-	0.5	mA	I_{OUT}=5mA-1.0A
eN	Output Noise Voltage	-	170	-	μV	10Hz≤f≤100KHz
$\Delta V_O/\Delta T$	Temperature coefficient of V_{OUT}	-	-2.8	-	mV/℃	I_{OUT}=5mA
RR	Ripple Rejection	50	66	-	dB	28V≤V_{IN}≤38V, f=120Hz
I_{PEAK}	Peak Output Current	-	1.8	-	A	-
I_{SC}	Short-Circuit Current	-	250	-	mA	V_{IN}=35V
V_D	Dropout Voltage	-	2.0	-	V	-

Typical Characteristics Curves

Fig.1- Peak Output Current vs. Input/Output Differential Voltage

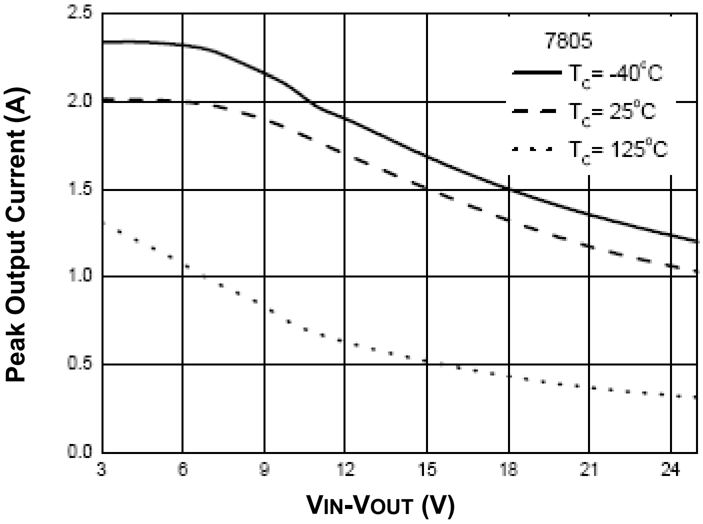


Fig.2- Output Voltage vs. Junction Temperature

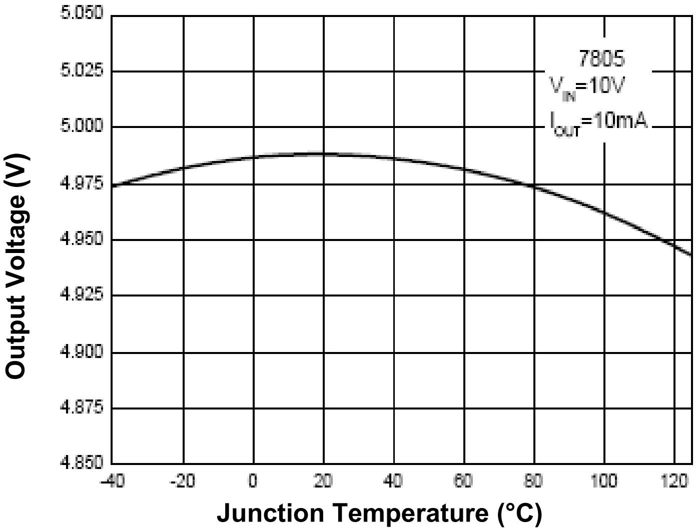


Fig.3- Quiescent Current vs. Junction Temperature

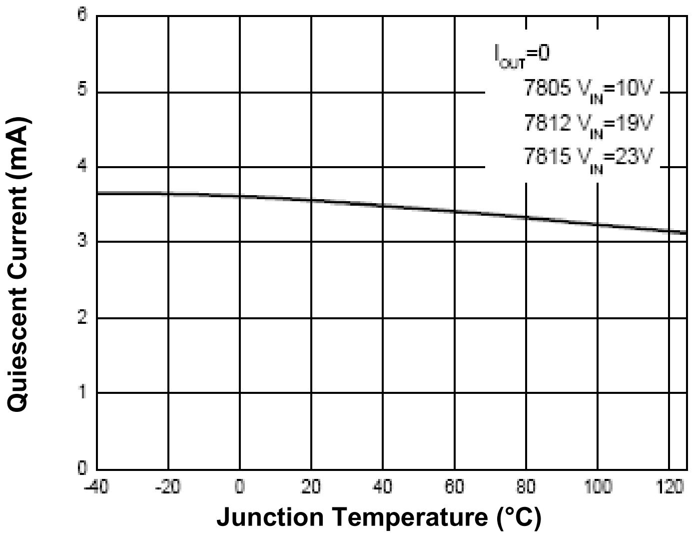
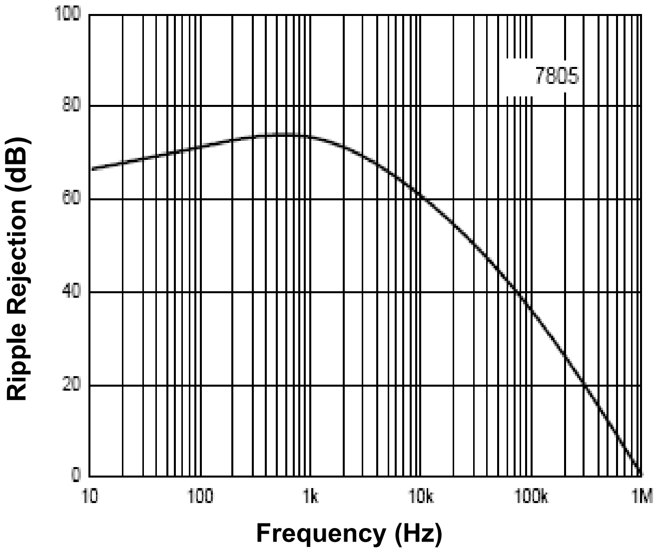


Fig.4- Ripple Rejection vs. Frequency



Typical Characteristics Curves (Continued)

Fig.5- Dropout Voltage vs. Junction Temperature

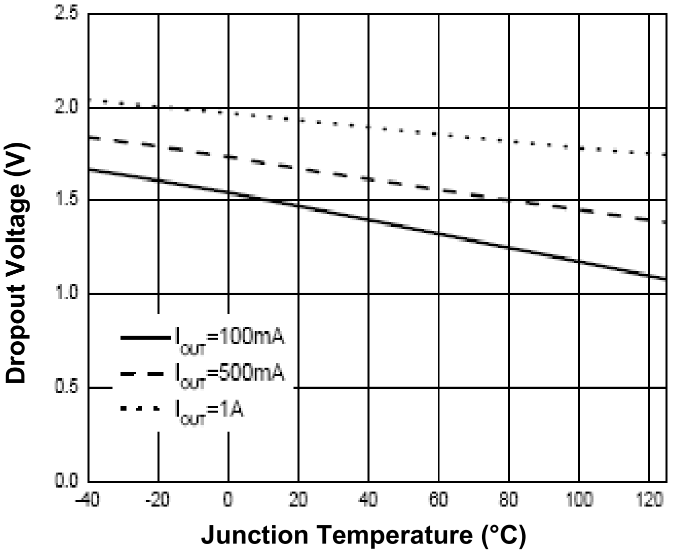


Fig.6- Power Dissipation vs. Case Temperature

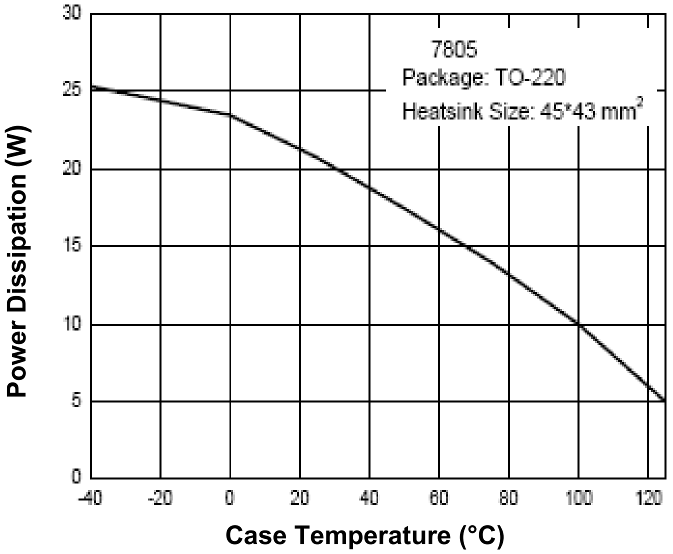
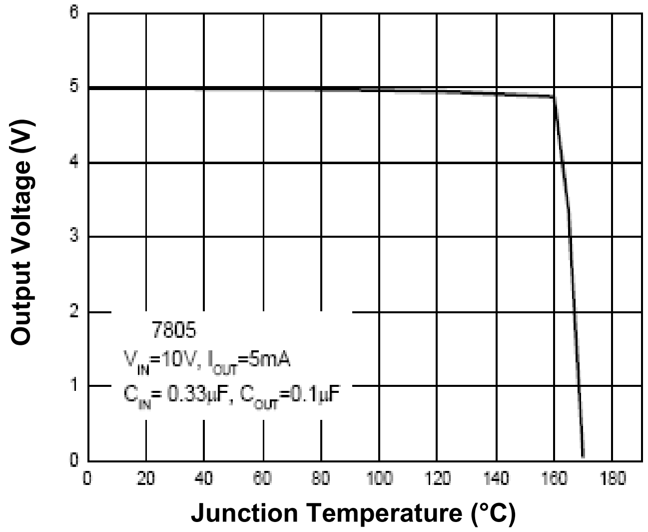


Fig.7- Thermal Shutdown Protection



TO-220 Package Information