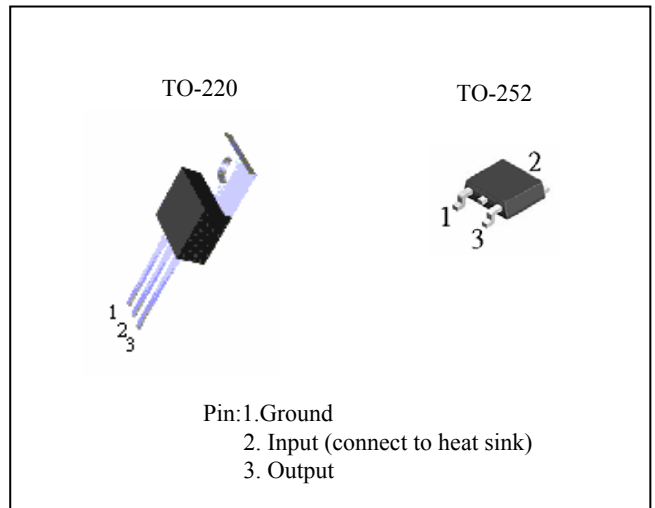


3-Terminal Medium Current Negative Voltage Regulators

The PJ79M00 Series negative voltage regulators are identical to the popular PJ7900 Series devices, except that they are specified for only half the output current. Like the PJ7900 devices, the PJ79M00 Terminal regulators are intended for local, on-card voltage regulation.

Internal current limiting, thermal shutdown circuitry and safe-area compensation for the internal pass transistor combine to make these devices remarkably rugged under most operating conditions. Maximum output current, with adequate heat sinking is 500mA



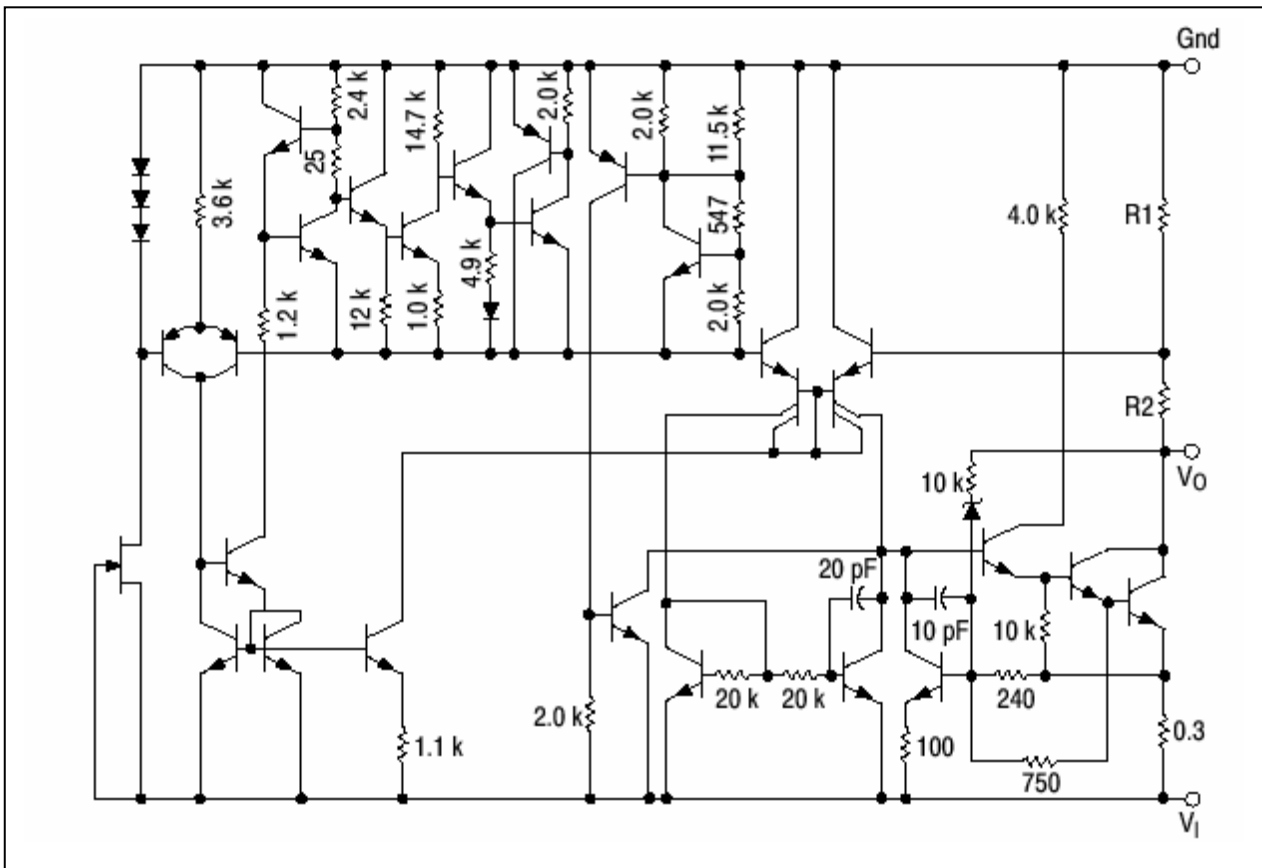
FEATURES

- No External Components Required
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe-Area Compensation
- Output Voltage Offered in 4% Tolerance

ORDERING INFORMATION

Device	Operating Temperature (Ambient)	Package
PJ79MxxCZ	-20 °C ~ +85°C	TO-220
PJ79MxxCP		TO-252

Figure 1. Representative Schematic Diagram



3-Terminal Medium Current Negative Voltage Regulators

ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise noted.) (Note 1)

Rating	Symbol	Value	Unit
Input Voltage (-5.0V~ -15V) (-18V~ -24V)	Vin	-35 -40	Vdc
Power Dissipation (Package Limitation) Plastic Package, TO-220 TA=25°C	PD	Internally Limited	
Thermal Resistance, Junction-to-Air	ΘJA	70	°C/W
Thermal Resistance, Junction-to-Case	ΘJC	5.0	°C/W
Plastic Package, DPAK (TO-252) TA=25°C	PD	Internally Limited	
Thermal Resistance, Junction-to-Air	ΘJA	92	°C/W
Thermal Resistance, Junction-to-Case	ΘJC	5.0	°C/W
Operating Junction Temperature Range	Tj	+150	°C
Storage Temperature Range	Tstg	-65 to +150	°C

PJ79M05 ELECTRICAL CHARACTERISTIC (Vin= -10V, Io=350mA, 0°C ≤ Tj ≤ 125°C, PD ≤ 5.0W)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage (Tj=25°C)	(-7.0Vdc ≤ Vin ≤ -20Vdc, 5.0mA ≤ Io ≤ 350mA)	Vo	-4.8	-5.0	-5.2	Vdc
	(-7.0Vdc ≤ Vin ≤ -20Vdc, 5.0mA ≤ Io ≤ 350mA)		-4.75	-5.0	-5.25	
Line Regulation (Tj=25°C, -7.0Vdc ≤ Vin ≤ -25Vdc, Io=200mA)		Regline	-	3.0	50	mV
Load Regulation (Tj=25°C, 5.0mA ≤ Io ≤ 500mA)		Regload	-	20	100	mV
(Tj=25°C, 5.0mA ≤ Io ≤ 200mA)			-	10	50	
Input Bias Current (Tj=25°C)		IIB	-	3.2	8.0	mA
Quiescent Current Change (-8.0Vdc ≤ Vin ≤ -25Vdc, Io=200mA)		ΔIIB	-	-	0.8	mA
(5.0mA ≤ Io ≤ 350mA)			-	-	0.5	
Output Noise Voltage (Ta=25°C, 10Hz ≤ f ≤ 100kHz)		Vn	-	40	-	μA
Ripple Rejection (Io=100mA, f=120Hz, -9.0V ≤ Vin ≤ -19V)		RR	62	-	-	dB
(Io=300mA, f=120Hz, -9.0V ≤ Vin ≤ -19V, Tj=25°C)			62	80	-	
Dropout Voltage (Tj=25°C)		Vin-Vo	-	2.0	-	Vdc
Short Circuit Current Limit (Tj=25°C, Vin=-35V)		Ios	-	50	-	mA
Average Temperature Coefficient of Output Voltage (Io=5.0mA)		ΔVo/ΔT	-	0.4	-	mV/°C
Peak Output Current (Tj=25°C)		Io	-	700	-	mA

3-Terminal Medium Current Negative Voltage Regulators

PJ79M06 ELECTRICAL CHARACTERISTIC ($V_{in} = -11V$, $I_o = 350mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $PD \leq 5.0W$, unless otherwise noted)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-5.75	-6	-6.25	Vdc
	($-8.0V_{dc} \leq V_{in} \leq -21V_{dc}$, $5.0mA \leq I_o \leq 350mA$)		-5.70	-6	-6.30	
Line Regulation ($T_j = 25^\circ C$, $-8.0V_{dc} \leq V_{in} \leq -25V_{dc}$, $I_o = 200mA$)		Regline	-	3.0	50	mV
Load Regulation ($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 500mA$)		Regload	-	20	120	mV
($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 200mA$)			-	10	60	
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	8.0	mA
Quiescent Current Change ($-9.0V_{dc} \leq V_{in} \leq -25V_{dc}$, $I_o = 200mA$)		ΔI_{IB}	-	-	0.8	mA
($5.0mA \leq I_o \leq 350mA$)			-	-	0.5	
Output Noise Voltage ($T_a = 25^\circ C$, $10Hz \leq f \leq 100kHz$)		V_n	-	45	-	μA
Ripple Rejection ($I_o = 100mA$, $f = 120Hz$, $-9.0V \leq V_{in} \leq -19V$)		RR	59	-	-	dB
($I_o = 300mA$, $f = 120Hz$, $-9.0V \leq V_{in} \leq -19V$, $T_j = 25^\circ C$)			59	80	-	
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C$, $V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.4	-	$mV/^\circ C$
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

PJ79M08 ELECTRICAL CHARACTERISTIC ($V_{in} = -14V$, $I_o = 350mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $PD \leq 5.0W$, unless otherwise noted)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-7.70	-8	-8.30	Vdc
	($-10.5V_{dc} \leq V_{in} \leq -23V_{dc}$, $5mA \leq I_o \leq 350mA$)		-7.84	-8	-8.16	
Line Regulation ($T_j = 25^\circ C$, $-10.5V_{dc} \leq V_{in} \leq -25V_{dc}$, $I_o = 200mA$)		Regline	-	60	50	mV
Load Regulation ($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 500mA$)		Regload	-	25	160	mV
($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 200mA$)			-	10	80	
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	8.0	mA
Quiescent Current Change ($-10.5V_{dc} \leq V_{in} \leq -25V_{dc}$, $I_o = 200mA$)		ΔI_{IB}	-	-	0.8	mA
($5.0mA \leq I_o \leq 350mA$)			-	-	0.5	
Output Noise Voltage ($T_A = 25^\circ C$, $10Hz \leq f \leq 100kHz$)		V_n	-	52	-	μV
Ripple Rejection ($I_o = 100mA$, $f = 120Hz$, $-11.5V \leq V_{in} \leq -21.5V$)		RR	56	-	-	dB
($I_o = 300mA$, $f = 120Hz$, $-11.5V \leq V_{in} \leq -21.5V$, $T_j = 25^\circ C$)			56	80	-	
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C$, $V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.4	-	$mV/^\circ C$
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

3-Terminal Medium Current Negative Voltage Regulators

PJ79M09 ELECTRICAL CHARACTERISTIC ($V_{in} = -15V$, $I_o = 350mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $PD \leq 5.0W$, unless otherwise noted)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-8.64	-9	-9.36	Vdc
	($-11.5 V_{dc} \leq V_{in} \leq -23V_{dc}$, $5mA \leq I_o \leq 350mA$)		-8.55	-9	-9.45	
Line Regulation ($T_j = 25^\circ C$, $-11.5V_{dc} \leq V_{in} \leq -25V_{dc}$, $I_o = 200mA$)		Regline	-	60	50	mV
Load Regulation		Regload				
($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 500mA$)			-	25	180	mV
($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 200mA$)		-	10	90		
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	8.0	mA
Quiescent Current Change		ΔI_{IB}				
($-11.5V_{dc} \leq V_{in} \leq -25V_{dc}$, $I_o = 200mA$)			-	-	0.8	mA
($5.0mA \leq I_o \leq 350mA$)		-	-	0.5		
Output Noise Voltage ($T_a = 25^\circ C$, $10Hz \leq f \leq 100kHz$)		V_n	-	52	-	μV
Ripple Rejection		RR				
($I_o = 100mA$, $f = 120Hz$, $-12.5V \leq V_{in} \leq -22.5V$)			56	-	-	dB
($I_o = 300mA$, $f = 120Hz$, $-12.5V \leq V_{in} \leq -22.5V$, $T_j = 25^\circ C$)		56	80	-		
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C$, $V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.4	-	$mV/^\circ C$
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

PJ79M12 ELECTRICAL CHARACTERISTIC ($V_{in} = -19V$, $I_o = 350mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $PD \leq 5.0W$, unless otherwise noted)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-11.52	-12	-12.48	Vdc
	($-14.5V_{dc} \leq V_{in} \leq -27V_{dc}$, $5mA \leq I_o \leq 350mA$)		-11.40	-12	-12.60	
Line Regulation ($T_j = 25^\circ C$, $-14.5V_{dc} \leq V_{in} \leq -30V_{dc}$, $I_o = 200mA$)		Regline	-	80	50	mV
Load Regulation		Regload				
($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 500mA$)			-	25	240	mV
($T_j = 25^\circ C$, $5.0mA \leq I_o \leq 200mA$)		-	10	120		
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	8.0	mA
Quiescent Current Change		ΔI_{IB}				
($-14.5V_{dc} \leq V_{in} \leq -30V_{dc}$, $I_o = 200mA$)			-	-	0.8	mA
($5.0mA \leq I_o \leq 350mA$)		-	-	0.5		
Output Noise Voltage ($T_a = 25^\circ C$, $10Hz \leq f \leq 100kHz$)		V_n	-	75	-	μV
Ripple Rejection		RR				
($I_o = 100mA$, $f = 120Hz$, $-15V \leq V_{in} \leq -25V$)			55	-	-	dB
($I_o = 300mA$, $f = 120Hz$, $-15V \leq V_{in} \leq -25V$, $T_j = 25^\circ C$)		55	80	-		
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C$, $V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.4	-	$mV/^\circ C$
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

3-Terminal Medium Current Negative Voltage Regulators

PJ79M15 ELECTRICAL CHARACTERISTIC ($V_{in} = -19V, I_o = 350mA, 0^\circ C \leq T_j \leq 125^\circ C, PD \leq 5.0W$, unless otherwise noted) (Note 5)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-14.40	-15	-15.60	Vdc
	($-17.5V_{dc} \leq V_{in} \leq -30V_{dc}, 5mA \leq I_o \leq 350mA$)		-14.25	-15	-15.75	
Line Regulation ($T_j = 25^\circ C, -17.5V_{dc} \leq V_{in} \leq -30V_{dc}, I_o = 200mA$)		Regline	-	10	50	mV
Load Regulation ($T_j = 25^\circ C, 5.0mA \leq I_o \leq 500mA$) ($T_j = 25^\circ C, 5.0mA \leq I_o \leq 200mA$)		Regload	-	25	300	mV
			-	10	150	
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	8.0	mA
Quiescent Current Change ($-17.5V_{dc} \leq V_{in} \leq -30V_{dc}, I_o = 200mA$) ($5.0mA \leq I_o \leq 350mA$)		ΔI_{IB}	-	-	0.8	mA
			-	-	0.5	
Output Noise Voltage ($T_a = 25^\circ C, 10Hz \leq f \leq 100kHz$)		V_n	-	90	-	μV
Ripple Rejection ($I_o = 100mA, f = 120Hz, -18.5V \leq V_{in} \leq -28.5V$) ($I_o = 300mA, f = 120Hz, -18.5V \leq V_{in} \leq -28.5V, T_j = 25^\circ C$)		RR	54	-	-	dB
			54	70	-	
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C, V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.4	-	$mV/^\circ C$
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

PJ79M18 ELECTRICAL CHARACTERISTIC ($V_{in} = -23V, I_o = 350mA, 0^\circ C \leq T_j \leq 125^\circ C, PD \leq 5.0W$, unless otherwise noted)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-17.28	-18	-18.72	Vdc
	($-21V_{dc} \leq V_{in} \leq -33V_{dc}, 5mA \leq I_o \leq 350mA$)		-17.10	-18	-18.90	
Line Regulation ($T_j = 25^\circ C, -21V_{dc} \leq V_{in} \leq -33V_{dc}, I_o = 200mA$)		Regline	-	10	50	mV
Load Regulation ($T_j = 25^\circ C, 5.0mA \leq I_o \leq 500mA$) ($T_j = 25^\circ C, 5.0mA \leq I_o \leq 200mA$)		Regload	-	30	360	mV
			-	10	180	
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	9	mA
Quiescent Current Change ($-21V_{dc} \leq V_{in} \leq -33V_{dc}, I_o = 200mA$) ($5.0mA \leq I_o \leq 350mA$)		ΔI_{IB}	-	-	0.8	mA
			-	-	0.5	
Output Noise Voltage ($T_a = 25^\circ C, 10Hz \leq f \leq 100kHz$)		V_n	-	100	-	μV
Ripple Rejection ($I_o = 100mA, f = 120Hz, -22V \leq V_{in} \leq -32V$) ($I_o = 300mA, f = 120Hz, -22V \leq V_{in} \leq -32V, T_j = 25^\circ C$)		RR	53	-	-	dB
			53	70	-	
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C, V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.4	-	$mV/^\circ C$
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

3-Terminal Medium Current Negative Voltage Regulators

PJ79M24 ELECTRICAL CHARACTERISTIC ($V_{in} = -27V$, $I_o = 350mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $P_D \leq 5.0W$, unless otherwise noted)

Characteristics		Symbol	Min	Typ	Max	Unit
Output Voltage	($T_j = 25^\circ C$)	V_o	-23.0	-24	-25.0	Vdc
	($-27V_{dc} \leq V_{in} \leq -38V_{dc}$, $5.0mA \leq I_o \leq 350mA$)		-22.8	-24	-25.2	
Line Regulation ($T_j = 25^\circ C$, $-27V_{dc} \leq V_{in} \leq -38V_{dc}$, $I_o = 200mA$)		Regline	-	10	50	mV
Load Regulation		Regload	-	30	480	mV
(Tj=25°C, 5.0mA ≤ Io ≤ 500mA)			-	10	240	
Input Bias Current ($T_j = 25^\circ C$)		I_{IB}	-	3.2	9	mA
Quiescent Current Change		ΔI_{IB}	-	-	0.8	mA
(-27Vdc ≤ Vin ≤ -38Vdc, Io=200mA)			-	-	0.5	
(5.0mA ≤ Io ≤ 350mA)						
Output Noise Voltage ($T_a = 25^\circ C$, $10Hz \leq f \leq 100kHz$)		V_n	-	170	-	μV
Ripple Rejection		RR	50	-	-	dB
(Io=100mA, f=120Hz, -28V ≤ Vin ≤ -38V)			50	70	-	
(Io=300mA, f=120Hz, -28V ≤ Vin ≤ -38V, Tj=25°C)						
Dropout Voltage ($T_j = 25^\circ C$)		$V_{in} - V_o$	-	2.0	-	Vdc
Short Circuit Current Limit ($T_j = 25^\circ C$, $V_{in} = -35V$)		I_{os}	-	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_o = 5.0mA$)		$\Delta V_o / \Delta T$	-	0.5	-	mV/°C
Peak Output Current ($T_j = 25^\circ C$)		I_o	-	700	-	mA

DEFINITIONS

Line-Regulation-The change in ooutput voltage for a change in the input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature in not significantly affected.

Load-Regulation-The change in output voltage for a change in load current at constant chip temperature.

Maximum Power dissipation-The maximum total device dissipation for which the regulator will operate within specifications.

Input Bias Current-That part of the input current that is not delivered to the load.

Output Noise Voltage-The rms AC voltage at the output,with constant load and no input ripple,measured over a specified frequency range.

Long Term Stability-Output voltage stability under accelerated life test conditions with the maximum rated voltage listed in the devices' electrical characteristics and maximum power dissipation.

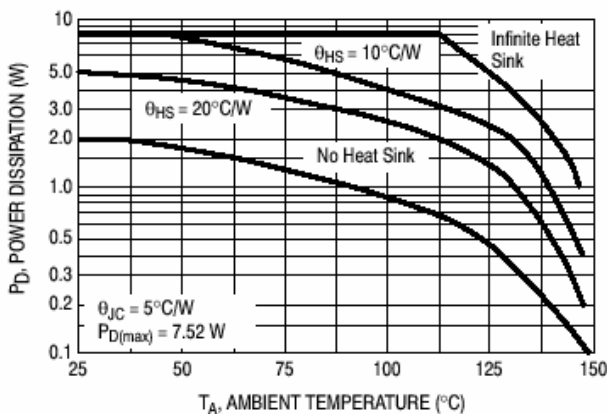


Figure 2. Worst Case Power Dissipation versus Ambient Temperature (TO-220)

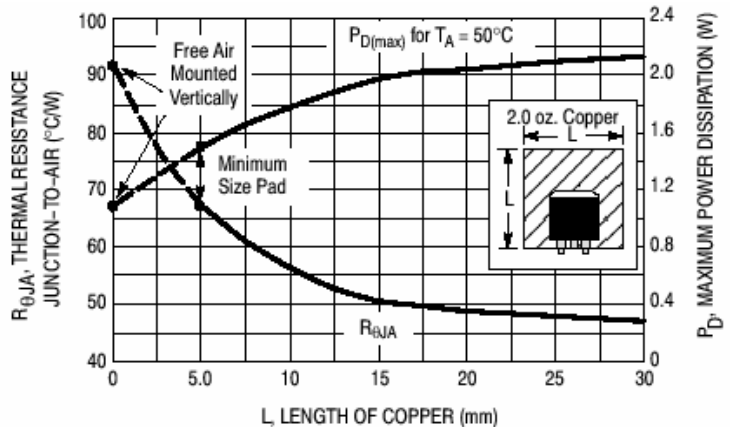


Figure 3. DPAK Thermal Resistance and Maximum Power Dissipation versus P.C.B. Copper Length

3-Terminal Medium Current Negative Voltage Regulators

APPLICATIONS INFORMATION

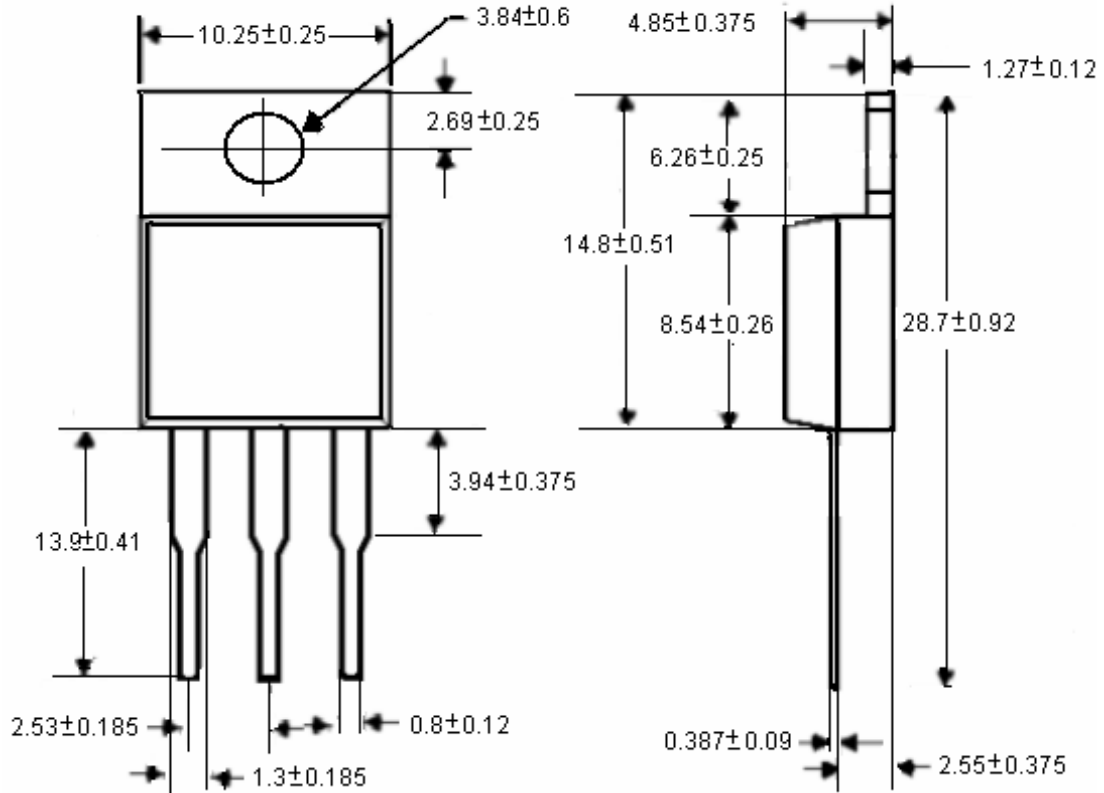
Design Considerations

The PJ79Mxx Series of fixed voltage regulators are designed with Thermal Overload Protection that shuts down the circuit when subjected to an excessive power overload condition, Internal Short Circuit Protection that limits the maximum current the circuit will pass, and Output Transistor Safe-Area Compensation that reduces the output short circuit current as the voltage across the pass transistor is increased.

In many low current applications, compensation capacitors are not required. However, it is recommended that the regulator input be bypassed with a capacitor if the regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. An input bypass capacitor should be selected to provide good high frequency characteristics to insure stable operation under all load conditions. A 0.33 mF or larger tantalum, Mylar, or other capacitor having low internal impedance at high frequencies should be chosen. The bypass capacitor should be mounted with the shortest possible leads directly across the regulator's input terminals. Normally good construction techniques should be used to minimize ground loops and lead resistance drops since the regulator has no external sense lead.

3-Terminal Medium Current Negative Voltage Regulators

TO-220 Unit:mm



TO-252 Unit:mm

