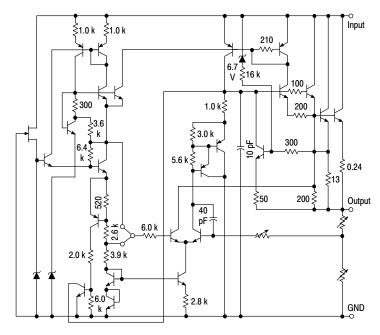
500 mA Positive Voltage Regulators

The MC78M00/MC78M00A Series positive voltage regulators are identical to the popular MC7800 Series devices, except that they are specified for only half the output current. Like the MC7800 devices, the MC78M00 three–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 heatsinking is 500 mA.

Features

- No External Components Required
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe–Area Compensation
- MC78M00A High Accuracy (±2%) Available for 5.0 V, 8.0 V, 12 V and 15 V
- Pb-Free Packages are Available



This device contains 28 active transistors.

Figure 1. Representative Schematic Diagram



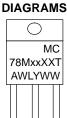
ON Semiconductor®

http://onsemi.com



TO-220-3 T SUFFIX CASE 221A

Heatsink surface connected to Pin 2.



MARKING

xx = Voltage Option

XX = Appropriate Suffix Options

A = Assembly Location

WL = Wafer Lot Y = Year

WW = Work Week



DPAK-3 DT SUFFIX CASE 369C



Heatsink surface (shown as terminal 4 in case outline drawing) is connected to Pin 2.

xxxxx = Device Type and Voltage Option Code

A = Assembly Location

L = Wafer Lot Y = Year WW = Work Week

Pin 1. Input

2. Ground

3. Output

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 10 of this data sheet.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 10 of this data sheet.

MAXIMUM RATINGS (T_A = 25°C, unless otherwise noted) (Note 1)

Rating	Symbol	Value	Unit
Input Voltage (5.0 V-18 V)	V _I	35	Vdc
(20 V-24V)		40	
Power Dissipation (Package Limitation)			
Plastic Package, T Suffix			
$T_A = 25^{\circ}C$	P _D	Internally Limited	
Thermal Resistance, Junction-to-Air	θ_{JA}	70	°C/W
Thermal Resistance, Junction-to-Case	$\theta_{\sf JC}$	5.0	°C/W
Plastic Package, DT Suffix			
$T_A = 25$ °C	P _D	Internally Limited	
Thermal Resistance, Junction-to-Air	θ_{JA}	92	°C/W
Thermal Resistance, Junction-to-Case	$\theta_{\sf JC}$	5.0	°C/W
Operating Junction Temperature Range	TJ	+150	°C
Storage Temperature Range	T _{stg}	-65 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

Machine Model Method 200 V.

MC78M05C/AC/B/AB ELECTRICAL CHARACTERISTICS ($V_I = 10 \text{ V}$, $I_O = 350 \text{ mA}$, $T_J = T_{low}$ to T_{high} , $P_D \le 5.0 \text{ W}$, unless otherwise noted) (Note 2)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C) MC78M05C MC78M05AC	Vo	4.8 4.9	5.0 5.0	5.2 5.1	Vdc
Output Voltage Variation $ (7.0 \text{ Vdc} \leq \text{V}_{\text{I}} \leq 20 \text{ Vdc}, 5.0 \text{ mA} \leq \text{I}_{\text{O}} \leq 350 \text{ mA}) \\ \text{MC78M05C} \\ \text{MC78M05AC} $	Vo	4.75 4.80	- -	5.25 5.20	Vdc
Line Regulation $(T_J = 25^{\circ}C, 7.0 \text{ Vdc} \le V_I \le 25 \text{ Vdc}, I_O = 200 \text{ mA})$	Reg _{line}	_	3.0	50	mV
Load Regulation $ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \leq I_O \leq 500 \text{ mA}) \\ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \leq I_O \leq 200 \text{ mA}) $	Reg _{load}	_ _	20 10	100 50	mV
Input Bias Current (T _J = 25°C)	I _{IB}	_	3.2	6.0	mA
Quiescent Current Change (8.0 Vdc \leq V _I \leq 25 Vdc, I _O = 200 mA) (5.0 mA \leq I _O \leq 350 mA)	ΔI_IB	_ _		0.8 0.5	mA
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	_	40	_	μV
Ripple Rejection $ (I_O = 100 \text{ mA, } f = 120 \text{ Hz, } 8.0 \text{ V} \leq \text{V}_I \leq 18 \text{ V}) \\ (I_O = 300 \text{ mA, } f = 120 \text{ Hz, } 8.0 \leq \text{V}_I \leq 18 \text{ V, } T_J = 25^{\circ}\text{C}) $	RR	62 62	- 80	- -	dB
Dropout Voltage $(T_J = 25^{\circ}C)$	V _I –V _O	_	2.0	_	Vdc
Short Circuit Current Limit ($T_J = 25$ °C, $V_I = 35$ V)	I _{OS}	_	50	-	mA
Average Temperature Coefficient of Output Voltage ($I_O = 5.0 \text{ mA}$)	$\Delta V_{O}/\Delta T$	_	±0.2	_	mV/°C
Peak Output Current $(T_J = 25^{\circ}C)$	lo	_	700	_	mA

^{2.} $T_{low} = 0$ °C for MC78MxxAC, C = -40°C for MC78MxxAB, B

 T_{high} = +125°C for MC78MxxAB, AC, B, C

This device series contains ESD protection and exceeds the following tests:
 Human Body Model 2000 V per MIL–STD–883, Method 3015.

$\textbf{MC78M06C ELECTRICAL CHARACTERISTICS} \ (V_I = 11 \ V, \ I_O = 350 \ \text{mA}, \ 0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}, \ P_D \leq 5.0 \ W, \ unless \ otherwise \ noted)$

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	V _O	5.75	6.0	6.25	Vdc
Output Voltage Variation	Vo	5.7	_	6.3	Vdc
$(8.0 \text{ Vdc} \le V_{\text{I}} \le 21 \text{ Vdc}, 5.0 \text{ mA} \le I_{\text{O}} \le 350 \text{ mA})$					
Line Regulation	Reg _{line}	-	5.0	50	mV
$(T_J = 25^{\circ}C, 8.0 \text{ Vdc} \le V_I \le 25 \text{ Vdc}, I_O = 200 \text{ mA})$					
Load Regulation	Reg _{load}				mV
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 500 \text{ mA})$		-	20	120	
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 200 \text{ mA})$		_	10	60	
Input Bias Current (T _J = 25°C)	I _{IB}	_	3.2	6.0	mA
Quiescent Current Change	ΔI_{IB}				mA
$(9.0 \text{ Vdc} \le \text{V}_{\text{I}} \le 25 \text{ Vdc}, \text{ I}_{\text{O}} = 200 \text{ mA})$		-	_	8.0	
$(5.0 \text{ mA} \le I_{O} \le 350 \text{ mA})$		-	_	0.5	
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	-	45	_	μV
Ripple Rejection	RR				dB
$(I_O = 100 \text{ mA}, f = 120 \text{ Hz}, 9.0 \text{ V} \le V_I \le 19 \text{ V})$		59	_	_	
$(I_O = 300 \text{ mA}, f = 120 \text{ Hz}, 9.0 \text{ V} \le V_I \le 19 \text{ V}, T_J = 25^{\circ}\text{C})$		59	80	_	
Dropout Voltage	$V_I - V_O$	-	2.0	_	Vdc
$(T_{J} = 25^{\circ}C)$					
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	los	-	50	_	mA
Average Temperature Coefficient of Output Voltage	$\Delta V_{O}/\Delta T$	_	±0.2	_	mV/°C
$(I_O = 5.0 \text{ mA})$					
Peak Output Current	Ι _Ο	_	700	_	mA
$(T_{J} = 25^{\circ}C)$					

MC78M08C/AC/B/AB ELECTRICAL CHARACTERISTICS (V_I = 14 V, I_O = 350 mA, T_J = T_{low} to T_{high} , $P_D \le 5.0$ W, unless otherwise noted) (Note 3)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo				Vdc
MC78M08C		7.70	8.0	8.30	
MC78M08AC		7.84	8.0	8.16	
Output Voltage Variation	V _O				Vdc
$(10.5 \text{ Vdc} \le V_I \le 23 \text{ Vdc}, 5.0 \text{ mA} \le I_O \le 350 \text{ mA})$					
MC78M08C		7.6	_	8.4	
MC78M08AC		7.7	-	8.3	
Line Regulation	Reg _{line}	-	6.0	50	mV
$(T_J = 25^{\circ}C, 10.5 \text{ Vdc} \le V_I \le 25 \text{ Vdc}, I_O = 200 \text{ mA})$					
Load Regulation	Reg _{load}				mV
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 500 \text{ mA})$		_	25	160	
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 200 \text{ mA})$		-	10	80	
Input Bias Current (T _J = 25°C)	I _{IB}	-	3.2	6.0	mA
Quiescent Current Change	ΔI_{IB}				mA
$(10.5 \text{ Vdc} \le V_1 \le 25 \text{ Vdc}, I_0 = 200 \text{ mA})$		_	_	0.8	
$(5.0 \text{ mA} \le I_0 \le 350 \text{ mA})$		-	-	0.5	
Output Noise Voltage (T _A = 25°C, 10 Hz ≤ f ≤ 100 kHz)	V _n	_	52	-	μV
Ripple Rejection	RR				dB
$(I_O = 100 \text{ mA}, f = 120 \text{ Hz}, 11.5 \text{ V} \le V_I \le 21.5 \text{ V})$		56	_	_	
$(I_O = 300 \text{ mA}, f = 120 \text{ Hz}, 11.5 \text{ V} \le V_I \le 21.5 \text{ V}, T_J = 25^{\circ}\text{C})$		56	80	_	
Dropout Voltage	V_I – V_O	-	2.0	-	Vdc
$(T_J = 25^{\circ}C)$					
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	los	_	50	-	mA
Average Temperature Coefficient of Output Voltage	ΔV _O /ΔΤ	_	±0.2	-	mV/°C
$(I_O = 5.0 \text{ mA})$					
Peak Output Current	Io	-	700	-	mA
$(T_J = 25^{\circ}C)$					

^{3.} $T_{low} = 0$ °C for MC78MxxAC, C = -40°C for MC78MxxAB, B

 T_{high} = +125°C for MC78MxxAB, AC, B, C

MC78M09C/B ELECTRICAL CHARACTERISTICS ($V_I = 15 \text{ V}$, $I_O = 350 \text{ mA}$, $T_J = T_{low}$ to T_{high} , $P_D \le 5.0 \text{ W}$, unless otherwise noted) (Note 4)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	8.64	9.0	9.45	Vdc
Output Voltage Variation (11.5 Vdc \leq V _I \leq 23 Vdc, 5.0 mA \leq I _O \leq 350 mA)	Vo	8.55	_	9.45	Vdc
Line Regulation $(T_J = 25^{\circ}C, 11.5 \text{ Vdc} \le V_I \le 25 \text{ Vdc}, I_O = 200 \text{ mA})$	Reg _{line}	_	6.0	50	mV
Load Regulation $ (T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 500 \text{ mA}) \\ (T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 200 \text{ mA}) $	Reg _{load}	- -	25 10	180 90	mV
Input Bias Current (T _J = 25°C)	I _{IB}	-	3.2	6.0	mA
Quiescent Current Change (11.5 Vdc \leq V _I \leq 25 Vdc, I _O = 200 mA) (5.0 mA \leq I _O \leq 350 mA)	ΔI_IB	- -	- -	0.8 0.5	mA
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	_	52	_	μV
Ripple Rejection $ (I_O = 100 \text{ mA, } f = 120 \text{ Hz, } 12.5 \text{ V} \leq V_I \leq 22.5 \text{ V}) \\ (I_O = 300 \text{ mA, } f = 120 \text{ Hz, } 12.5 \text{ V} \leq V_I \leq 22.5 \text{ V, } T_J = 25^{\circ}\text{C}) $	RR	56 56	- 80	- -	dB
Dropout Voltage $(T_J = 25^{\circ}C)$	V _I –V _O	_	2.0	_	Vdc
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	I _{OS}	-	50	_	mA
Average Temperature Coefficient of Output Voltage (I _O = 5.0 mA)	$\Delta V_{O}/\Delta T$	_	±0.2	_	mV/°C
Peak Output Current $(T_J = 25^{\circ}C)$	Io	_	700	_	mA

MC78M12C/AC/B/AB ELECTRICAL CHARACTERISTICS (V_I = 19 V, I_O = 350 mA, T_J = T_{low} to T_{high} , $P_D \le 5.0$ W, unless otherwise noted) (Note 4)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo				Vdc
MC78M12C		11.50	12	12.50	
MC78M12AC		11.76	12	12.24	
Output Voltage Variation	Vo				Vdc
$(14.5 \text{ Vdc} \le V_1 \le 27 \text{ Vdc}, 5.0 \text{ mA} \le I_0 \le 350 \text{ mA})$					
MC78M12C		11.4	-	12.6	
MC78M12AC		11.5	-	12.5	
Line Regulation	Reg _{line}	_	8.0	50	mV
$(T_J = 25^{\circ}C, 14.5 \text{ Vdc} \le V_I \le 30 \text{ Vdc}, I_O = 200 \text{ mA})$					
Load Regulation	Reg _{load}				mV
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 500 \text{ mA})$		_	25	240	
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 200 \text{ mA})$		_	10	120	
Input Bias Current (T _J = 25°C)	I _{IB}	-	3.2	6.0	mA
Quiescent Current Change	ΔI_{IB}				mA
$(14.5 \text{ Vdc} \le V_1 \le 30 \text{ Vdc}, I_0 = 200 \text{ mA})$		-	-	0.8	
$(5.0 \text{ mA} \le I_{O} \le 350 \text{ mA})$		-	-	0.5	
Output Noise Voltage (T _A = 25°C, 10 Hz ≤ f ≤ 100 kHz)	V _n	_	75	-	μV
Ripple Rejection	RR				dB
$(I_O = 100 \text{ mA}, f = 120 \text{ Hz}, 15 \text{ V} \le V_I \le 25 \text{ V})$		55	-	_	
$(I_O = 300 \text{ mA}, f = 120 \text{ Hz}, 15 \text{ V} \le V_I \le 25 \text{ V}, T_J = 25^{\circ}\text{C})$		55	80	_	
Dropout Voltage	$V_I - V_O$	-	2.0	_	Vdc
$(T_{J} = 25^{\circ}C)$					
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	Ios	-	50	-	mA
Average Temperature Coefficient of Output Voltage	$\Delta V_{O}/\Delta T$	-	±0.3	_	mV/°C
$(I_O = 5.0 \text{ mA})$					
Peak Output Current	I _O	-	700	_	mA
$(T_J = 25^{\circ}C)$					

^{4.} $T_{low} = 0$ °C for MC78MxxAC, C = -40°C for MC78MxxAB, B

 T_{high} = +125°C for MC78MxxAB, AC, B, C

MC78M15C/AC/B/AB ELECTRICAL CHARACTERISTICS (V_I = 23 V, I_O = 350 mA, T_J = T_{low} to T_{high} , $P_D \le 5.0$ W, unless otherwise noted) (Note 5)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo				Vdc
MC78M15C		14.4	15	15.6	
MC78M15AC		14.7	15	15.3	
Output Voltage Variation	V _O				Vdc
$(17.5 \text{ Vdc} \le V_I \le 30 \text{ Vdc}, 5.0 \text{ mA} \le I_O \le 350 \text{ mA})$					
MC78M15C		14.25	_	15.75	
MC78M15AC		14.40	_	15.60	
Input Regulation	Reg _{line}	-	10	50	mV
$(T_J = 25^{\circ}C, 17.5 \text{ Vdc} \le V_I \le 30 \text{ Vdc}, I_O = 200 \text{ mA})$					
Load Regulation	Reg _{load}				mV
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 500 \text{ mA})$		-	25	300	
$(T_J = 25^{\circ}C, 5.0 \text{ mA} \le I_O \le 200 \text{ mA})$		_	10	150	
Input Bias Current (T _J = 25°C)	I _{IB}	-	3.2	6.0	mA
Quiescent Current Change	Δl_{IB}				mA
$(17.5 \text{ Vdc} \le V_1 \le 30 \text{ Vdc}, I_0 = 200 \text{ mA})$		-	_	0.8	
$(5.0 \text{ mA} \le I_0 \le 350 \text{ mA})$		-	_	0.5	
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	-	90	-	μV
Ripple Rejection	RR				dB
$(I_O = 100 \text{ mA}, f = 120 \text{ Hz}, 18.5 \text{ V} \le V_I \le 28.5 \text{ V})$		54	_	_	
$(I_O = 300 \text{ mA}, f = 120 \text{ Hz}, 18.5 \text{ V} \le V_I \le 28.5 \text{ V}, T_J = 25^{\circ}\text{C})$		54	70	_	
Dropout Voltage	$V_I - V_O$	-	2.0	_	Vdc
$(T_{J} = 25^{\circ}C)$					
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	los	-	50	-	mA
Average Temperature Coefficient of Output Voltage	$\Delta V_{O}/\Delta T$	_	±0.3	-	mV/°C
$(I_O = 5.0 \text{ mA})$					
Peak Output Current	Ι _Ο	_	700	_	mA
$(T_J = 25^{\circ}C)$					

MC78M18C/B ELECTRICAL CHARACTERISTICS (V_I = 27 V, I_O = 350 mA, T_J = T_{low} to T_{high} , $P_D \le 5.0$ W, unless otherwise noted) (Note 5)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	17.3	18	18.7	Vdc
Output Voltage Variation (21 Vdc \leq V _I \leq 33 Vdc, 5.0 mA \leq I _O \leq 350 mA)	Vo	17.1	_	18.9	Vdc
Line Regulation $ (T_J = 25^{\circ}C, 21 \text{ Vdc} \le V_I \le 33 \text{ Vdc}, I_O = 200 \text{ mA}) $	Reg _{line}	_	10	50	mV
Load Regulation $ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \le I_O \le 500 \text{ mA}) $ $ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \le I_O \le 200 \text{ mA}) $	Reg _{load}	_ _	30 10	360 180	mV
Input Bias Current (T _J = 25°C)	I _{IB}	_	3.2	6.5	mA
Quiescent Current Change (21 Vdc \leq V ₁ \leq 33 Vdc, I _O = 200 mA) (5.0 mA \leq I _O \leq 350 mA)	Δl _{IB}	-		0.8 0.5	mA
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	_	100	_	μV
Ripple Rejection (I _O = 100 mA, f = 120 Hz, 22 V \leq V _I \leq 32 V) (I _O = 300 mA, f = 120 Hz, 22 V \leq V _I \leq 32 V, T _J = 25°C)	RR	53 53	- 70	_ _	dB
Dropout Voltage (T _J = 25°C)	V _I –V _O	_	2.0	-	Vdc
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	Ios	_	50	_	mA
Average Temperature Coefficient of Output Voltage (I _O = 5.0 mA)	$\Delta V_{O}/\Delta T$	_	±0.3	-	mV/°C
Peak Output Current $(T_J = 25^{\circ}C)$	lo	_	700	_	mA

^{5.} $T_{low} = 0$ °C for MC78MxxAC, C = -40°C for MC78MxxAB, B

 T_{high} = +125°C for MC78MxxAB, AC, B, C

MC78M20C/B ELECTRICAL CHARACTERISTICS (V_I = 29 V, I_O = 350 mA, T_J = T_{low} to T_{high} , $P_D \le 5.0$ W, unless otherwise noted) (Note 6)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	19.2	20	20.8	Vdc
Output Voltage Variation (23 Vdc \leq V $_{I}$ \leq 35 Vdc, 5.0 mA \leq I $_{O}$ \leq 350 mA)	Vo	19	_	21	Vdc
Line Regulation $(T_J = 25^{\circ}\text{C}, 23 \text{ Vdc} \leq \text{V}_\text{I} \leq 35 \text{ Vdc}, \text{ I}_\text{O} = 200 \text{ mA})$	Reg _{line}	-	10	50	mV
Load Regulation $ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \le I_O \le 500 \text{ mA}) \\ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \le I_O \le 200 \text{ mA}) $	Reg _{load}	1 1	30 10	400 200	mV
Input Bias Current (T _J = 25°C)	I _{IB}	_	3.2	6.5	mA
Quiescent Current Change (23 Vdc \leq V _I \leq 35 Vdc, I _O = 200 mA) (5.0 mA \leq I _O \leq 350 mA)	ΔI_{IB}	- -	_ _	0.8 0.5	mA
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	_	110	-	μV
Ripple Rejection $ \begin{aligned} &(I_O = 100 \text{ mA, } f = 120 \text{ Hz, } 24 \text{ V} \leq \text{V}_I \leq 34 \text{ V}) \\ &(I_O = 300 \text{ mA, } f = 120 \text{ Hz, } 24 \text{ V} \leq \text{V}_I \leq 34 \text{ V, } T_J = 25^{\circ}\text{C}) \end{aligned} $	RR	52 52	- 70	_ _	dB
Dropout Voltage $(T_J = 25^{\circ}C)$	V _I –V _O	-	2.0	_	Vdc
Short Circuit Current Limit (T _J = 25°C, V _I = 35 V)	los	_	50	_	mA
Average Temperature Coefficient of Output Voltage $(I_O = 5.0 \text{ mA})$	$\Delta V_{O}/\Delta T$	-	±0.5	_	mV/°C
Peak Output Current (T _J = 25°C)	lo	_	700	_	mA

MC78M24C/B ELECTRICAL CHARACTERISTICS (V_I = 33 V, I_O = 350 mA, T_J = T_{low} to T_{high} , $P_D \le 5.0$ W, unless otherwise noted) (Note 6)

Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T _J = 25°C)	Vo	23	24	25	Vdc
Output Voltage Variation (27 Vdc \leq V _I \leq 38 Vdc, 5.0 mA \leq I _O \leq 350 mA)	Vo	22.8	_	25.2	Vdc
Line Regulation $(T_J = 25^{\circ}C, 27 \text{ Vdc} \le V_I \le 38 \text{ Vdc}, I_O = 200 \text{ mA})$	Reg _{line}	_	10	50	mV
Load Regulation $ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \le I_O \le 500 \text{ mA}) $ $ (T_J = 25^{\circ}\text{C}, 5.0 \text{ mA} \le I_O \le 200 \text{ mA}) $	Reg _{load}	_ _	30 10	480 240	mV
Input Bias Current (T _J = 25°C)	I _{IB}	-	3.2	7.0	mA
Quiescent Current Change (27 Vdc \leq V _I \leq 38 Vdc, I _O = 200 mA) (5.0 mA \leq I _O \leq 350 mA)	$\Delta l_{ m lB}$	_ _	_ _	0.8 0.5	mA
Output Noise Voltage ($T_A = 25^{\circ}C$, 10 Hz \leq f \leq 100 kHz)	V _n	-	170	-	μV
Ripple Rejection $ \begin{aligned} &(I_O = 100 \text{ mA, } f = 120 \text{ Hz, } 28 \text{ V} \leq \text{V}_I \leq 38 \text{ V}) \\ &(I_O = 300 \text{ mA, } f = 120 \text{ Hz, } 28 \text{ V} \leq \text{V}_I \leq 38 \text{ V, } T_J = 25^{\circ}\text{C}) \end{aligned} $	RR	50 50	- 70		dB
Dropout Voltage (T _J = 25°C)	V_I – V_O	_	2.0	-	Vdc
Short Circuit Current Limit (T _J = 25°C)	los	-	50	-	mA
Average Temperature Coefficient of Output Voltage (I _O = 5.0 mA)	$\Delta V_{O}/\Delta T$	-	±0.5	_	mV/°C
Peak Output Current $(T_J = 25^{\circ}C)$	lo	_	700	_	mA

^{6.} $T_{low} = 0^{\circ}C$ for MC78MxxAC, C = -40°C for MC78MxxAB, B

 T_{high} = +125°C for MC78MxxAB, AC, B, C

DEFINITIONS

Line Regulation – The change in output 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 is 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.

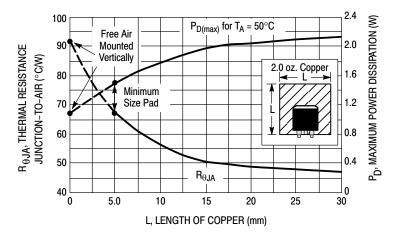


Figure 2. DPAK Thermal Resistance and Maximum Power Dissipation versus P.C.B. Copper Length

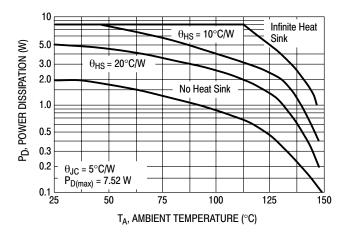


Figure 3. Worst Case Power Dissipation versus Ambient Temperature (TO-220)

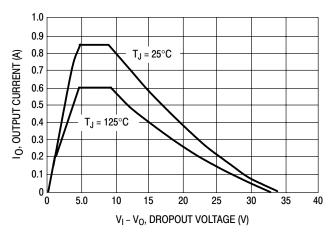


Figure 4. Peak Output Current versus Dropout Voltage

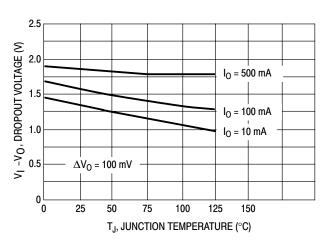


Figure 5. Dropout Voltage versus Junction Temperature

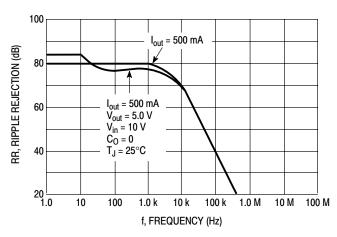


Figure 6. Ripple Rejection versus Frequency

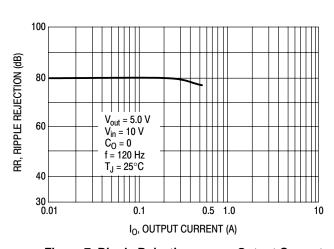


Figure 7. Ripple Rejection versus Output Current

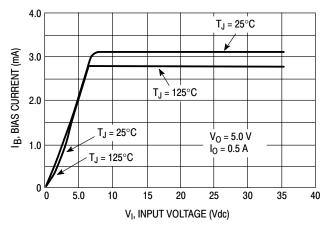


Figure 8. Bias Current versus Input Voltage

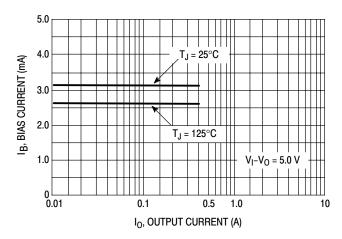


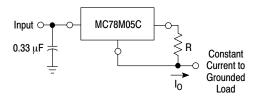
Figure 9. Bias Current versus Output Current

APPLICATIONS INFORMATION

Design Considerations

The MC78M00/MC78M00A 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



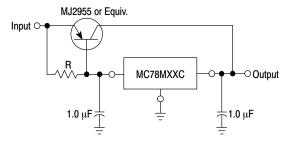
The MC78M00 regulators can also be used as a current source when connected as above. In order to minimize dissipation the MC78M05C is chosen in this application. Resistor R determines the current as follows:

$$I_0 = \frac{5.0 \text{ V}}{\text{R}} + I_{IB}$$

I_{IR} = 1.5 mA over line and load changes.

For example, a 500 mA current source would require R to be a 5.0 Ω , 10 W resistor and the output voltage compliance would be the input voltage less 7.0 V.

Figure 10. Current Regulator

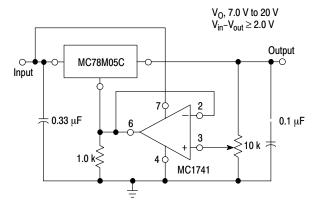


XX = 2 digits of type number indicating voltage.

The MC78M00 series can be current boosted with a PNP transistor. The MJ2955 provides current to 5.0 A. Resistor R in conjunction with the V_{BE} of the PNP determines when the pass transistor begins conducting; this circuit is not short circuit proof. Input-output differential voltage minimum is increased by V_{BE} of the pass transistor.

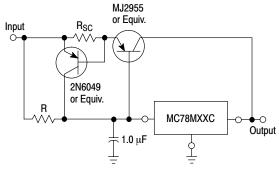
Figure 12. Current Boost Regulator

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 μF 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.



The addition of an operational amplifier allows adjustment to higher or intermediate values while retaining regulation characteristics. The minimum voltage obtainable with this arrangement is 2.0 V greater than the regulator voltage.

Figure 11. Adjustable Output Regulator



XX = 2 digits of type number indicating voltage.

The circuit of Figure 12 can be modified to provide supply protection against short circuits by adding a short circuit sense resistor, $R_{\rm SC}$, and an additional PNP transistor. The current sensing PNP must be able to handle the short circuit current of the three–terminal regulator .Therefore, a 4.0 A plastic power transistor is specified.

Figure 13. Current Boost with Short Circuit Protection

ORDERING INFORMATION

Device Voltage Temperature Range Package Marking (No Suffix) (RK Suffix) MC78M05CDT/RKG MC78M05CDTG/RKG PARA-3 (Pb-Free) 75M05 75 Units/Rail 2500 Units MC78M05ACDT/RK MC78M05ACT TO-220-3 (Pb-Free) 75M005ACT 50 Units/Rail 2500 Units MC78M05ADT/RK MC78M05ADT TO-220-3 (Pb-Free) 8M05A 75 Units/Rail 2500 Units MC78M05ADT MC78M05ADT DPAK-3 (Pb-Free) 8M05A 75 Units/Rail 2500 Units MC78M05ADT MC78M05ADT DPAK-3 (Pb-Free) 8M05A 75 Units/Rail 2500 Units MC78M06CDT MC78M06CDT TO-220-3 (Pb-Free) 75M06BT 50 Units/Rail 2500 Units MC78M06CDT/RK MC78M06CDT/RK TO-220-3 (Pb-Free) 78M06BT 75 Units/Rail 2500 Units MC78M06CDT/RK MC78M06CDT/RK To-20-3 (Pb-Free) 78M06BT 50 Units/Rail 2500 Units MC78M08CDT/RK MC78M08CDT/RK To-20-3 (Pb-Free) 78M06BT 50 Units/Rail 2500 Units MC78M08CTG MC78M08						Ship	ping [†]
MC78M05CDTG/RKG MC78M05ADT/RK MC78M05CDT/RK MC78M05CT MC78M05CDT/RK MC78M05CDT/	Device		Temperature Range	Package	Marking		Tape & Reel (RK Suffix)
MC78M05ACDT/RK MC78M05ACT	MC78M05CDT/RK			DPAK-3	78M05	75 Units/Rail	2500 Units/Reel
MC78M05CT TO-220-3 78M05CT 50 Units/Rail 2500 Units TO-220-3 78M05ACT TO-220-3 78M05CT TO-220-3 78M05CT TO-220-3 78M05CT TO-220-3 78M06CT TO-220-3 TRM06CT TO-220-3 TRM06	MC78M05CDTG/RKG						
MC78M05ACT MC78M05ABDT/RK DPAK-3 DPAK-3 (Pb-Free) 8M05A T5 Units/Rail 2500 Units/Rail 250	MC78M05ACDT/RK		$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	DPAK-3	8M05D	75 Units/Rail	2500 Units/Reel
MC78M05ABDT/RK MC78M05ABDTG	MC78M05CT			TO-220-3	78M05CT	50 Units/Rail	-
MC78M05ABDTR DPAK-3 (Pb-Free) 75 Units/Rail 2500 Units/Rail MC78M05ABDTG TJ = −40° to +125°C TO-220-3 78M05ABT 50 Units/Rail 2500 Units/Rail MC78M05BT TO-220-3 78M05BT 50 Units/Rail 50 Units/Rail − MC78M06CDT/RK MC78M06CDT/RK DPAK-3 78M06 75 Units/Rail 2500 Units/Rail − MC78M06CT TJ = 0° to +125°C DPAK-3 78M06 75 Units/Rail 2500 Units/Rail − MC78M08CDT/RK MC78M08CDT/RK DPAK-3 78M06 75 Units/Rail 2500 Units/Rail − MC78M08CDT/RKG DPAK-3 78M06 T 75 Units/Rail 2500 Units/Rail − MC78M08CDT/RKG DPAK-3 78M08 T 75 Units/Rail 2500 Units/Rail − MC78M08CT MC78M08CTG TJ = 0° to +125°C DPAK-3 78M08CT 50 Units/Rail − MC78M08ADT/RK MC78M08ADT/RK DPAK-3 8M08D 75 Units/Rail − MC78M08BDT/RKG MC78M08BDT/RK TO-220-3 78M08ACT 50 Units/Rail − MC78M08BDT/RK MC78M08BDT/RK DPAK-3 8M08B 75 Units/Rail − MC78M08BT TO-220-3 78M08BT 50 Units/Rail − MC78M09CT <td< td=""><td>MC78M05ACT</td><td>501/</td><td></td><td></td><td>78M05ACT</td><td></td><td></td></td<>	MC78M05ACT	501/			78M05ACT		
T_j = -40° to +125°C (Pb_Free) TO-220-3 78M05ABT 50 Units/Rail 50	MC78M05ABDT/RK	5.0 V		DPAK-3	8M05A	75 Units/Rail	2500 Units/Reel
MC78M059BT/RK MC78M05BT/RK MC78M05BT/RK MC78M06CDT/RK MC78M06CDT/RK MC78M06CDTG MC78M06CT MC78M06BT MC78M06CT MC78M06CT MC78M06CT MC78M08CDT/RK MC78M08CDT MC78M09CDT/RK MC78M09CDT/RK MC78M09CDT MC78M09CT	MC78M05ABDTG						
MC78M05BT	MC78M05ABT		$T_J = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M05ABT	50 Units/Rail	_
MC78M06CDT/RK MC78M06CDTG MC78M06CDTG MC78M06CT MC78M06BT MC78M08CDT/RK MC78M08CDT MC78M08CT MC78M08CT MC78M08CT MC78M08ACT MC78M08ADDT/RK MC78M08ADDT/RK MC78M08ADDT/RK MC78M08ADDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08DT MC78M09CDT/RK MC78M09CDT/RK MC78M09CT MC78M12CDT/RK MC7	MC78M05BDT/RK			DPAK-3	8M05B	75 Units/Rail	2500 Units/Reel
$ \begin{array}{c} MC78M06CDTG \\ MC78M06CT \\ MC78M06BT \\ MC78M06BT \\ MC78M08CDT/RK \\ MC78M08CDT/RKG \\ MC78M08CDT/RKG \\ MC78M08ACDT/RK \\ MC78M08ACDT/RK \\ MC78M08ACDT/RK \\ MC78M08ACT \\ MC78M08ADT/RK \\ MC78M08ABDT/RK \\ MC78M08ABDT/RK \\ MC78M08BDT/RK \\ MC78M08BDT/RK \\ MC78M08BDT/RK \\ MC78M09CT \\ MC78M09CT \\ MC78M09CT \\ MC78M09CT \\ MC78M09CT \\ MC78M09DT/RK \\ MC78M12CDT/RK \\ MC78M$	MC78M05BT			TO-220-3	78M05BT	50 Units/Rail	-
MC78M06CT	MC78M06CDT/RK			DPAK-3	78M06	75 Units/Rail	2500 Units/Reel
MC78M08BT	MC78M06CDTG	6.0 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$		78M06	75 Units/Rail	2500 Units/Reel
MC78M08CDT/RK MC78M08CDT/RKG MC78M08CDT/RKG DPAK-3 (Pb-Free) MC78M08CDT/RKG DPAK-3 (Pb-Free) DPAK-3 75 Units/Rail 2500 Units/Rail 2500 Units/Rail DPAK-3 RM08D 75 Units/Rail 2500 Units/Rail DPAK-3 RM08D T0-220-3 78M08CT 50 Units/Rail DPAK-3 T0-220-3 78M08CT 50 Units/Rail DPAK-3 RM08D T0-220-3 78M08CT 50 Units/Rail DPAK-3 RM08ADT DPAK-3 RM08ADT S0 Units/Rail DPAK-3 RM08ADT DPAK-3 RM08ADT S0 Units/Rail DPAK-3 RM08BDT/RK DPAK-3 RM09BDT/RK DPAK-3 RM09BDT/RK DPAK-3 RM09BDT/RK DPAK-3 RM09DT T0-220-3 T8M09CT	MC78M06CT			TO-220-3	78M06CT	50 Units/Rail	_
MC78M08CDT/RKG MC78M08CDT/RK MC78M08CT MC78M08CT MC78M08CT MC78M08CT TO−220−3 78M08CT 50 Units/Rail − C TO−220−3 78M08ACT TO−220−3 78M08ACT TO−220−3 78M09CT TO−220−3 78M09CT TO−220−3 78M09CT 50 Units/Rail − C T	MC78M06BT		$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$		78M06BT		
MC78M08ACDT/RK MC78M08CT MC78M08CT MC78M08CT MC78M08CT MC78M08ACT MC78M08ACT MC78M08ACT MC78M08ACT MC78M08ACT MC78M08ACT MC78M08ABDT/RK MC78M08ABDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDTG/RKG MC78M09CDT/RK MC78M09CDTG/RKG MC78M09CT MC78M09	MC78M08CDT/RK			DPAK-3	78M08	75 Units/Rail	2500 Units/Reel
MC78M08CT	MC78M08CDT/RKG			_			
MC78M08CTG	MC78M08ACDT/RK		T 00 to 140500	DPAK-3	8M08D	75 Units/Rail	2500 Units/Reel
MC78M08ACT	MC78M08CT		$I_{\rm J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M08CT	50 Units/Rail	-
MC78M08ACT MC78M08ABDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDT/RK MC78M08BDTG/RKG MC78M08BDTG/RKG MC78M08BT MC78M08BT MC78M09CDT/RK MC78M09CDT/RK MC78M09CT MC78M09CT MC78M09BDT/RK MC78M09BDT/RK MC78M09BDT/RK MC78M09BDT/RK MC78M09BDT/RK MC78M09BDT/RK MC78M09BDT/RK MC78M09BT MC78M12CDT/RK MC78M1	MC78M08CTG				78M08CT	50 Units/Rail	-
MC78M08ABT MC78M08BDT/RK MC78M08BDT/RK DPAK-3 8M08B 75 Units/Rail 2500 Units/Rail 250	MC78M08ACT	8.0 V		TO-220-3	78M08ACT	50 Units/Rail	_
MC78M08BDT/RK MC78M08BDTG/RKG DPAK-3 8M08B 75 Units/Rail 2500 Units/Rail -	MC78M08ABDT/RK			DPAK-3	8M08A	75 Units/Rail	2500 Units/Reel
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	MC78M08ABT			TO-220-3	78M08ABT	50 Units/Rail	-
MC78M08BDTG/RKG DPAK-3 (Pb-Free) 8M08B 75 Units/Rail 2500 Units/ MC78M08BT TO-220-3 78M08BT 50 Units/Rail - MC78M09CDT/RKG DPAK-3 78M09 75 Units/Rail 2500 Units/ MC78M09CT DPAK-3 (Pb-Free) TO-220-3 (Pb-Free) 78M09CT 50 Units/Rail - MC78M09BDT/RK TO-220-3 (Pb-Free) 78M09CT 50 Units/Rail - MC78M12CDT/RK DPAK-3 (Pb-Free) 78M09BT 50 Units/Rail 2500 Units/ MC78M12CDTG/RKG DPAK-3 (Pb-Free) 78M12 75 Units/Rail 2500 Units/ DPAK-3 (Pb-Free) 78M12 75 Units/Rail 2500 Units/ DPAK-3 (Pb-Free) 75 Units/Rail 2500 Units/	MC78M08BDT/RK		T. = _40° to ±125°C	DPAK-3	8M08B	75 Units/Rail	2500 Units/Reel
	MC78M08BDTG/RKG		11 = -40 10 1120 0		8M08B	75 Units/Rail	2500 Units/Reel
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	MC78M08BT			TO-220-3	78M08BT	50 Units/Rail	-
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	MC78M09CDT/RK			DPAK-3	78M09	75 Units/Rail	2500 Units/Reel
MC78M09CT 9.0 V TO-220-3 (Pb-Free) 78M09CT 50 Units/Rail - MC78M09BDT/RK TJ = -40° to +125°C DPAK-3 8M09B 75 Units/Rail 2500 Units/Rail - MC78M12CDT/RK DPAK-3 78M12 75 Units/Rail 2500 Units/Rail - MC78M12CDTG/RKG DPAK-3 78M12 75 Units/Rail 2500 Units/Rail </td <td>MC78M09CDTG/RKG</td> <td></td> <td>T 00 to :4050C</td> <td></td> <td></td> <td></td> <td></td>	MC78M09CDTG/RKG		T 00 to :4050C				
	MC78M09CT	0.01/	$I_{J} = 0^{\circ} t0 + 125^{\circ}C$	TO-220-3	78M09CT	50 Units/Rail	-
	MC78M09CTG	9.0 V			78M09CT	50 Units/Rail	-
MC78M09B1 10-220-3 78M09B1 50 Units/Rail - MC78M12CDT/RK DPAK-3 78M12 75 Units/Rail 2500 Units/ MC78M12CDTG/RKG DPAK-3 (Pb-Free) 78M12 75 Units/Rail 2500 Units/	MC78M09BDT/RK		T = 400 to :40500	DPAK-3	8M09B	75 Units/Rail	2500 Units/Reel
MC78M12CDTG/RKG DPAK-3 78M12 75 Units/Rail 2500 Units/ (Pb-Free) 75 Units/Rail 2500 Units/	MC78M09BT		$I_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M09BT	50 Units/Rail	_
(Pb-Free)	MC78M12CDT/RK			DPAK-3	78M12	75 Units/Rail	2500 Units/Reel
	MC78M12CDTG/RKG				78M12	75 Units/Rail	2500 Units/Reel
MC78M12ACDT/RK 12 V $T_J = 0^{\circ}$ to +125°C DPAK-3 8M12D 75 Units/Rail 2500 Units/	MC78M12ACDT/RK	12 V	T _J = 0° to +125°C	DPAK-3	8M12D	75 Units/Rail	2500 Units/Reel
MC78M12CT TO-220-3 78M12CT 50 Units/Rail -	MC78M12CT			TO-220-3	78M12CT	50 Units/Rail	-
MC78M12CTG TO-220-3 78M12CT 50 Units/Rail - (Pb-Free)	MC78M12CTG				78M12CT	50 Units/Rail	-

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

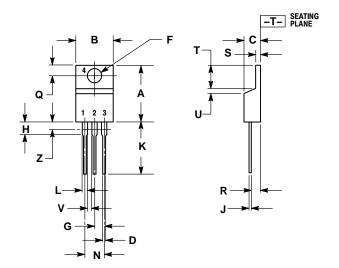
ORDERING INFORMATION

					Ship	ping [†]
Device	Output Voltage	Temperature Range	Package	Marking	Rails (No Suffix)	Tape & Reel (RK Suffix)
MC78M12ACT		$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M12ACT	50 Units/Rail	-
MC78M12ABDT/RK			DPAK-3	8M12A	75 Units/Rail	2500 Units/Reel
MC78M12ABT			TO-220-3	78M12ABT	50 Units/Rail	-
MC78M12BDT/RK	12 V	$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	DPAK-3	8M12B	75 Units/Rail	2500 Units/Reel
MC78M12BDTG/RKG			DPAK-3 (Pb-Free)	8M12B	75 Units/Rail	2500 Units/Reel
MC78M12BT		$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M12BT	50 Units/Rail	-
MC78M15CDT/RK	15 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	DPAK-3	78M15	75 Units/Rail	2500 Units/Reel
MC78M15ACDT/RK				8M15D		
MC78M15ACDTG/RKG	15 V	T _J = 0° to +125°C	DPAK-3 (Pb-Free)	8M15D	75 Units/Rail	2500 Units/Reel
MC78M15CT	15 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M15CT	50 Units/Rail	-
MC78M15CTG	15 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3 (Pb-Free)	78M15CT	50 Units/Rail	-
MC78M15ACT	15 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-220-3	78M15ACT	50 Units/Rail	-
MC78M15ACTG	15 V	T _J = 0° to +125°C	TO-220-3 (Pb-Free)	78M15ACT	50 Units/Rail	-
MC78M15ABDT/RK	15 V	$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	DPAK-3	8M15A	75 Units/Rail	2500 Units/Reel
MC78M15ABT	7		TO-220-3	78M15ABT	50 Units/Rail	_
MC78M15BDT/RK			DPAK-3	8M15B	75 Units/Rail	2500 Units/Reel
MC78M15BT			TO-220-3	78M15BT	50 Units/Rail	-
MC78M18CDT/RK	18 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$	DPAK-3	78M18	75 Units/Rail	2500 Units/Reel
MC78M18CT			TO-220-3	78M18CT	50 Units/Rail	-
MC78M18BT		$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$		78M18BT		
MC78M20CT	20 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$		78M20CT		
MC78M20BT	7	$T_{J} = -40^{\circ} \text{ to } +125^{\circ}\text{C}$		78M20BT		
MC78M24CT	24 V	$T_{J} = 0^{\circ} \text{ to } +125^{\circ}\text{C}$		78M24CT		
MC78M24BT		$T_J = -40^{\circ} \text{ to } +125^{\circ}\text{C}$		78M24BT		

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

TO-220-3 T SUFFIX CASE 221A-09 **ISSUE AA**

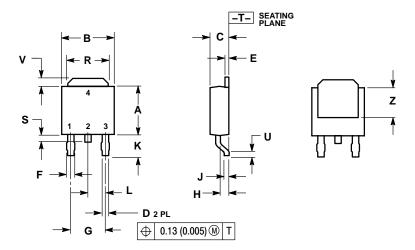


- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
Α	0.570	0.620	14.48	15.75
В	0.380	0.405	9.66	10.28
С	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
Н	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
٧	0.045		1.15	
Z		0.080		2.04

PACKAGE DIMENSIONS

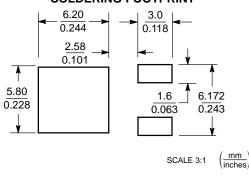
DPAK-3 **DT SUFFIX** CASE 369C-01 ISSUE O



- NOTES: 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. 2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
Α	0.235	0.245	5.97	6.22
В	0.250	0.265	6.35	6.73
С	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
Е	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
G	0.180 BSC		4.58 BSC	
Н	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.180	0.215	4.57	5.45
S	0.025	0.040	0.63	1.01
U	0.020		0.51	
٧	0.035	0.050	0.89	1.27
Z	0.155		3.93	

SOLDERING FOOTPRINT*



^{*}For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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