KA78RXXC-Series

1A Output Low Dropout Voltage Regulators

Features

- 1A/3.3V, 5V, 8V, 9V, 12V, 15V output low dropout voltage regulator
- TO-220 full-mold package (4pin)
- Overcurrent protection, thermal shutdown
- Overvoltage protection, short circuit protection
- With output disable function

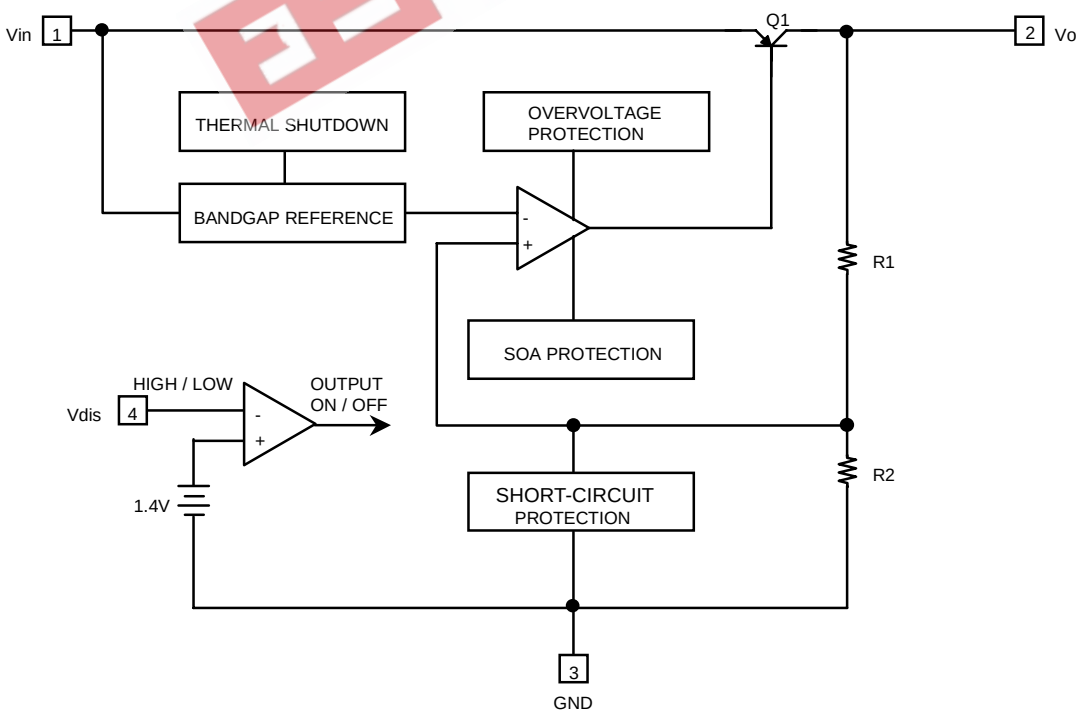
Description

The KA78RXXC is a low-dropout voltage regulator suitable for various electronic equipments.
It provides constant voltage power source with TO-220-4 lead full mold package. Dropout voltage of KA78RXXC is below 0.5V in full rated current(1A).
This regulator has various functions such as peak current protection, thermal shut down, overvoltage protection and output disable function.

TO-220F-4L

1. Vin 2. Vo 3. GND 4. Vdis

Internal Block Diagram



Absolute Maximum Ratings

KA78RXXC

Parameter	Symbol	Value	Unit	Remark
Input voltage	Vin	35	V	-
Disable voltage	Vdis	35	V	-
Output current	Io	1.0	A	-
Power dissipation 1	Pd1	1.5	W	No heatsink
Power dissipation 2	Pd2	15	W	With heatsink
Junction temperature	Tj	+150	°C	-
Operating temperature	Topr	-20 ~ +80	°C	-
Thermal resistance, junction-to case (Note2)	Rθjc	4.31	°C/W	-
Thermal resistance, junction-to-air (Note2)	Rθja	48.83	°C/W	-

Electrical Characteristics

(Vin = Note3, Io = 0.5A, Ta = 25°C, unless otherwise specified)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	KA78R33C	Vo	-	3.22	3.3	3.38	V
	KA78R05C		-	4.88	5	5.12	
	KA78R08C		-	7.8	8	8.2	
	KA78R09C		-	8.78	9	9.22	
	KA78R12C		-	11.7	12	12.3	
	KA78R15C		-	14.6	15	15.4	
Load regulation		Rload	5mA < Io < 1A	-	0.1	2.0	%
Line regulation		Rline	Note4	-	0.5	2.5	%
Ripple rejection ratio		RR	Note1	45	55	-	dB
Dropout voltage		Vdrop	Io = 1A	-	-	0.5	V
Disable voltage high		VdisH	Output active	2.0	-	-	V
Disable voltage low		VdisL	Output disabled	-	-	0.8	V
Disable bias current high		IdisH	Vdis = 2.7V	-	-	20	μA
Disable bias current low		IdisL	Vdis = 0.4V	-	-	-0.4	mA
Quiescent current		Iq	Io = 0A	-	-	10	mA

Note:

1.These parameters, although guaranteed, are not 100% tested in production.

2. Junction -to -case thermal resistance test environments.

-. Pneumatic heat sink fixture.

-. Clamping pressure 60psi through 12mm diameter cylinder.

-. Thermal grease applied between PKG and heat sink fixture.

3. KA78R33C :Vin = 5V
   KA78R05C : Vin = 7V
   KA78R08C : Vin = 10V
   KA78R09C : Vin = 11V
   KA78R12C : Vin = 15V
   KA78R15C : Vin = 20V

4. KA78R33C :Vin = 4V to 10V
   KA78R05C : Vin = 6V to 12V
   KA78R08C : Vin = 9V to 25V
   KA78R09C : Vin = 10V to 25V
   KA78R12C : Vin = 13V to 29V
   KA78R15C : Vin = 16V to 30V

Typical Performance Characteristics

KA78R33

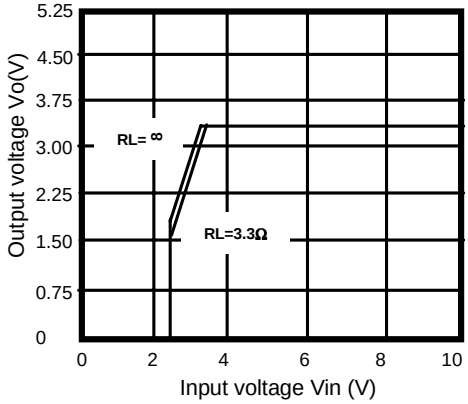


Figure 1. Output Voltage vs. Input Voltage

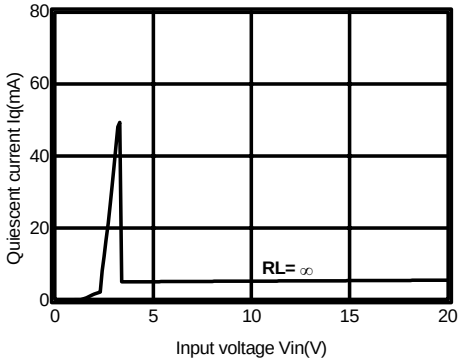


Figure 2. Quiescent Current vs. Input Voltage

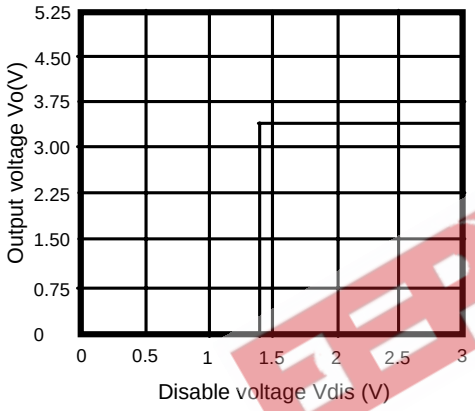


Figure 3. Output Voltage vs. Disable Voltage

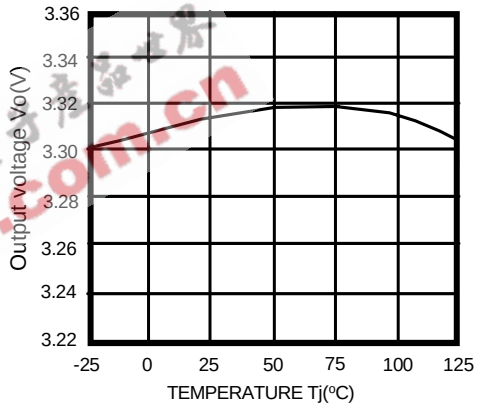


Figure 4. Output Voltage vs. Temperature(Tj)

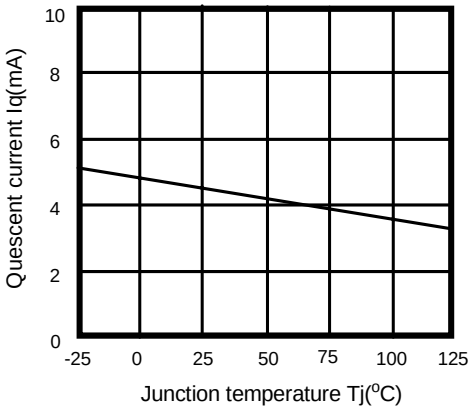


Figure 5. Quiescent Current vs. Temperature(Tj)

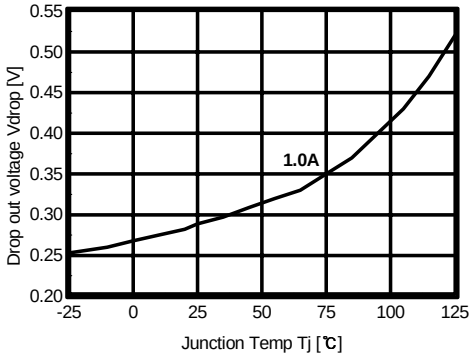


Figure 6. Dropout Voltage vs.Junction Temperature

Typical Performance Characteristics (Continued)

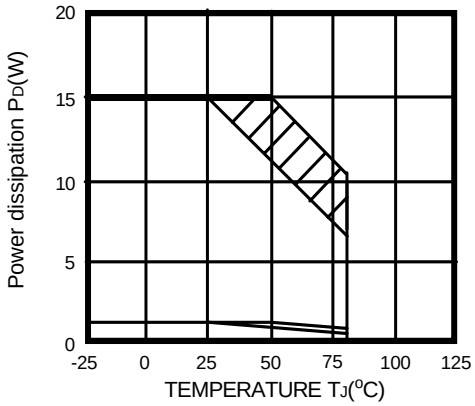


Figure 7. Power Dissipation vs. Temperature(Tj)

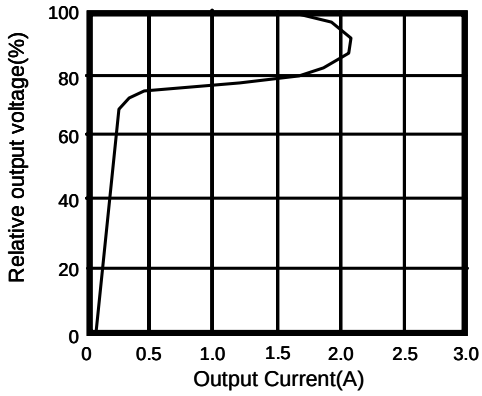


Figure 8. Overcurrent Protection Characteristics (Typical Value)

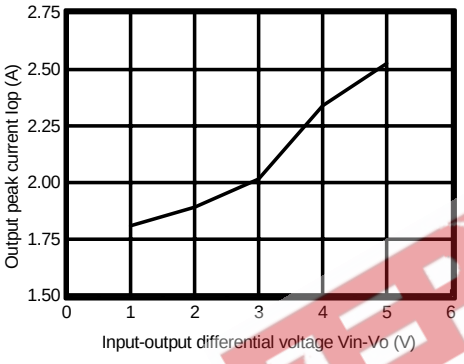


Figure 9. Output Peak Currenrt vs. Input-Output Differential Voltage

Typical Performance Characteristics

KA78R05C

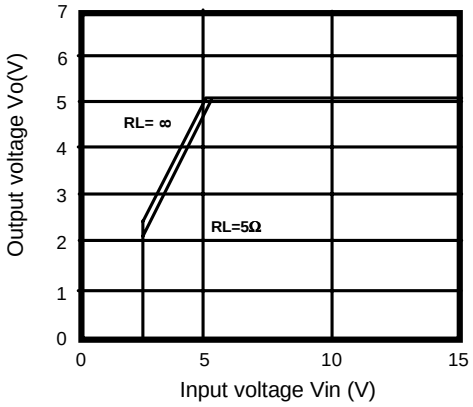


Figure 1. Output Voltage vs. Input Voltage

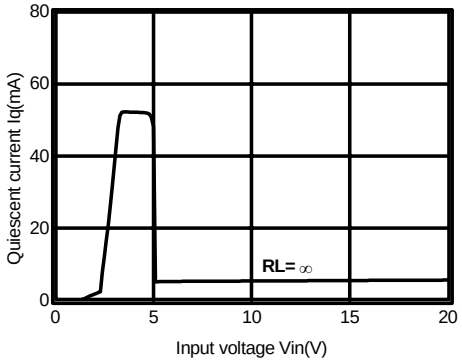


Figure 2. Quiescent Current vs. Input Voltage

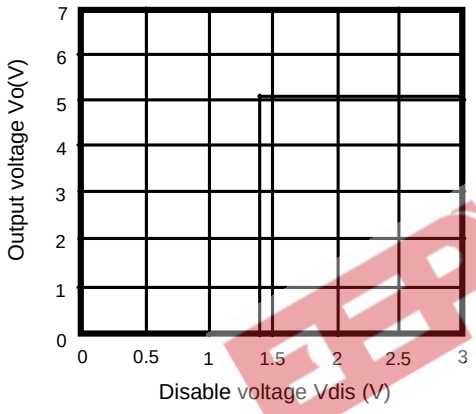


Figure 3. Output Voltage vs. Disable Voltage

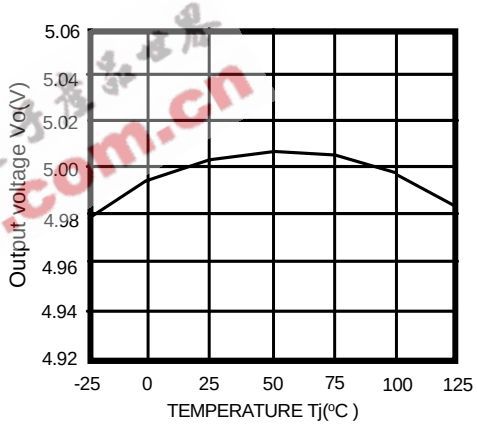


Figure 4. Output Voltage vs. Temperature(Tj)

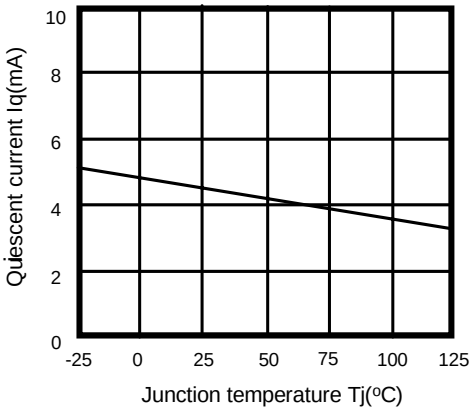


Figure 5. Quiescent Current vs. Temperature(Tj)

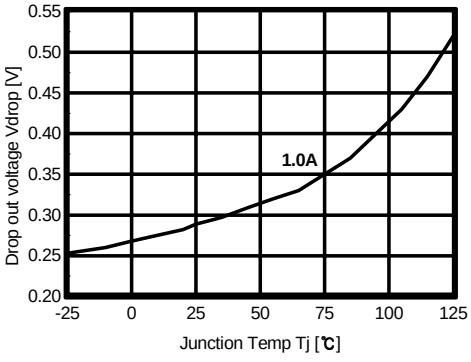


Figure 6. Dropout Voltage vs. Junction Temperature

Typical Performance Characteristics (Continued)

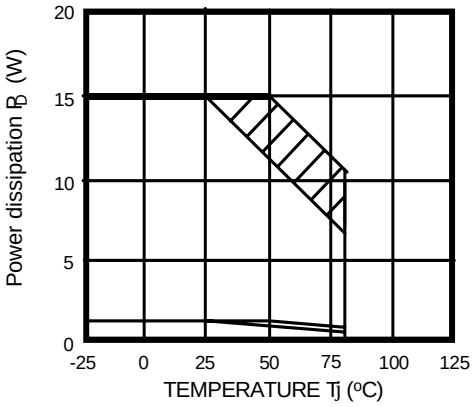


Figure 7. Power Dissipation vs. Temperature(Tj)

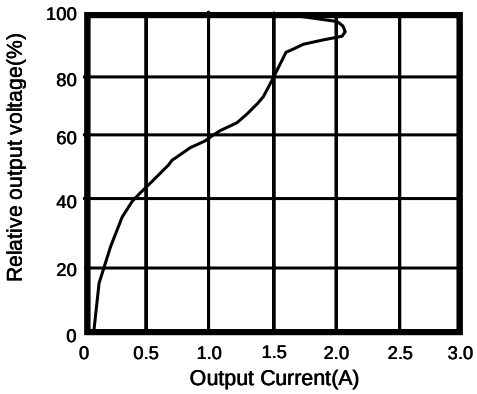


Figure 8. Overcurrent Protection Characteristics (Typical Value)

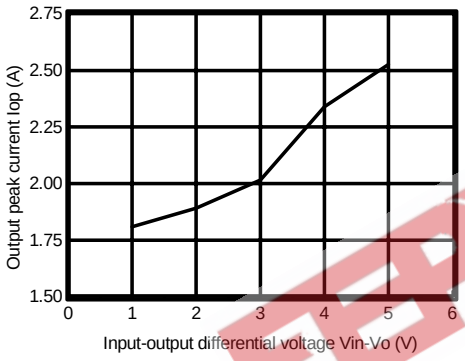


Figure 9. Output Peak Currenrt vs. Input-Output Differential Voltage

Typical Performance Characteristics (Continued)

KA78R08C

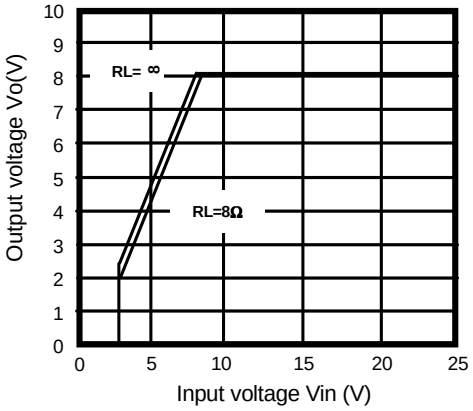


Figure 1. Output Voltage vs. Input Voltage

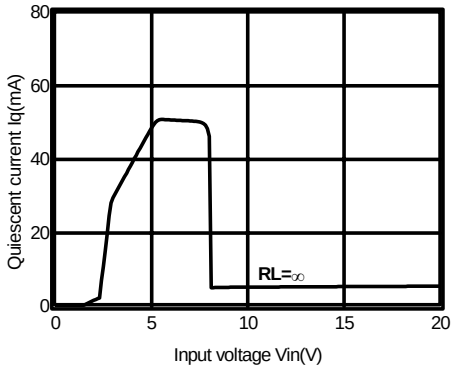


Figure 2. Quiescent Current vs. Input Voltage

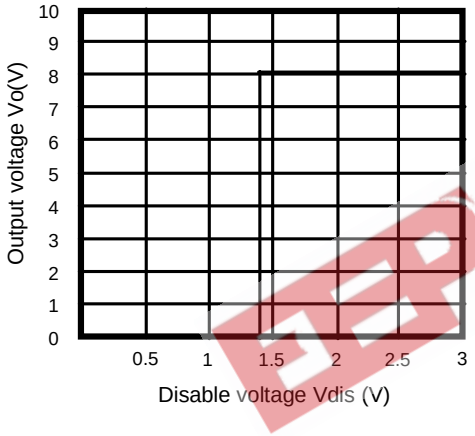


Figure 3. Output Voltage vs. Disable Voltage

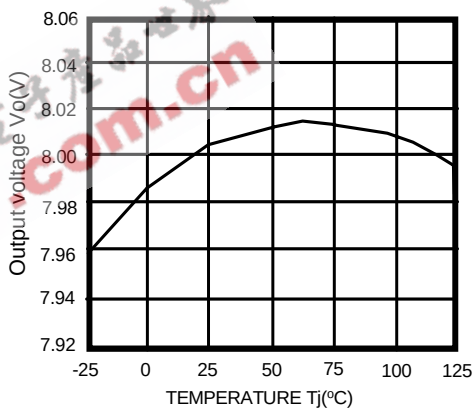


Figure 4. Output Voltage vs. Temperature(Tj)

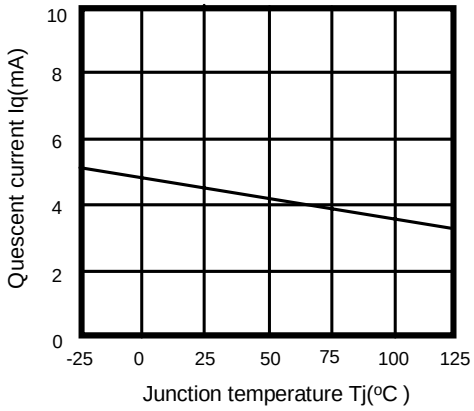


Figure 5. Quiescent Current vs. Temperature(Tj)

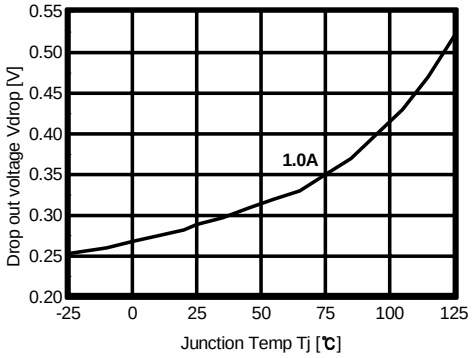


Figure 6. Dropout Voltage vs.Junction Temperature

Typical Performance Characteristics (Continued)

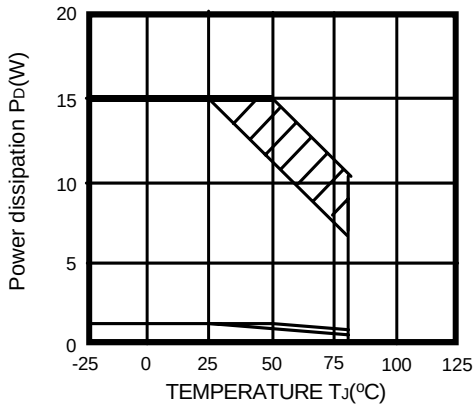


Figure 7. Power Dissipation vs. Temperature(Tj)

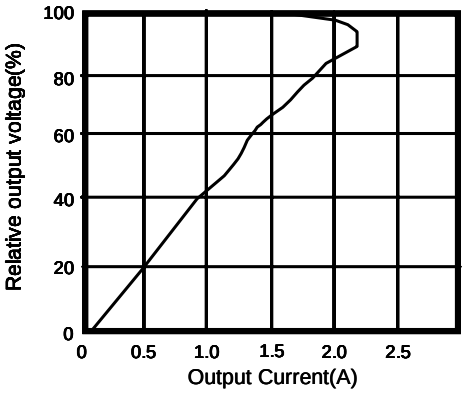


Figure 8. Overcurrent Protection Characteristics (Typical Value)

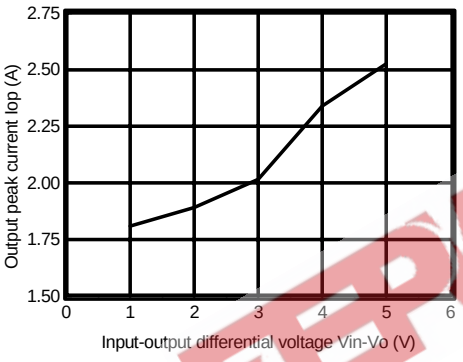


Figure 9. Output Peak Currenrt vs. Input-Output Differential Voltage

Typical Performance Characteristics (Continued)

KA78R09C

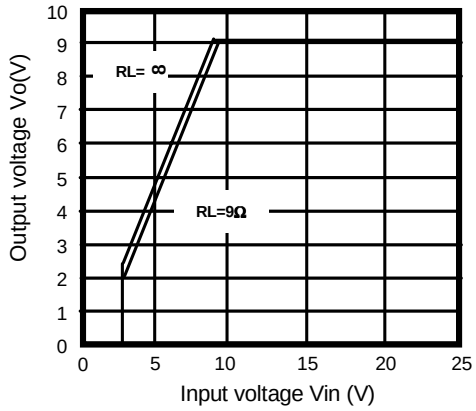


Figure 1. Output Voltage vs. Input Voltage

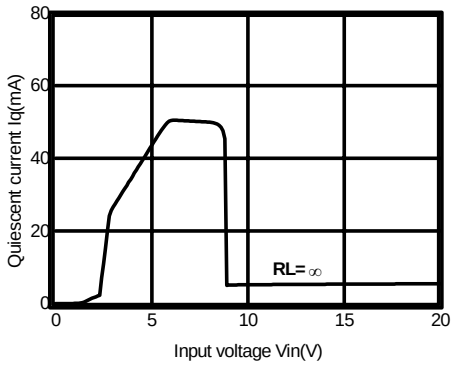


Figure 2. Quiescent Current vs. Input Voltage

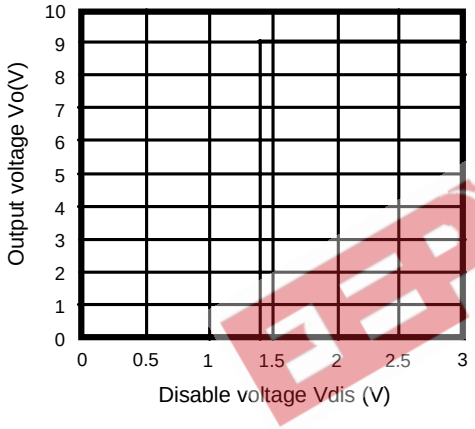


Figure 3. Output Voltage vs. Disable Voltage

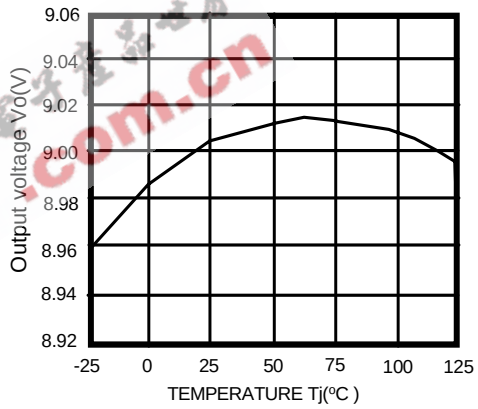


Figure 4. Output Voltage vs. Temperature(Tj)

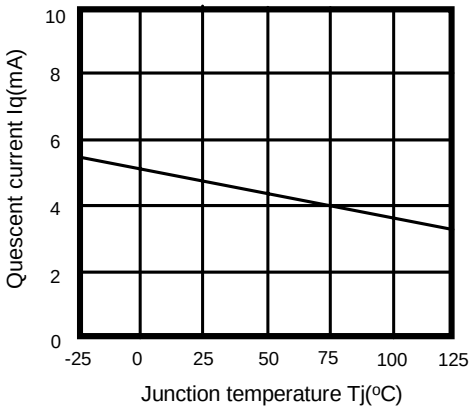


Figure 5. Quiescent Current vs. Temperature(Tj)

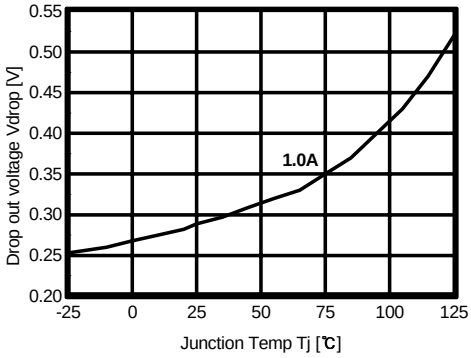


Figure 6. Dropout Voltage vs.Junction Temperature

Typical Performance Characteristics (Continued)

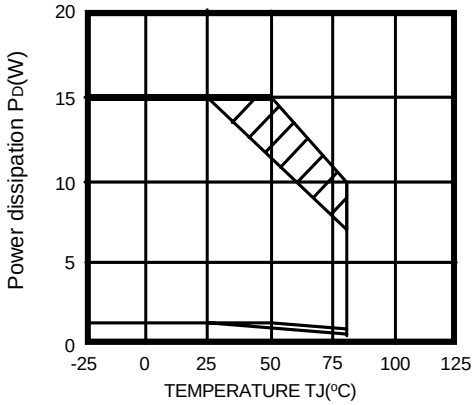


Figure 7. Power Dissipation vs. Temperature(Tj)

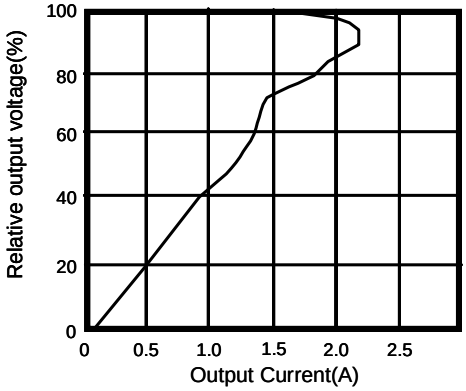


Figure 8. Overcurrent Protection Characteristics (Typical Value)

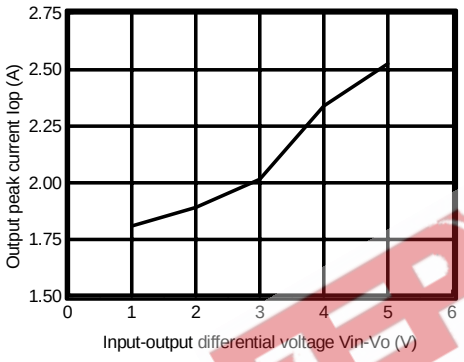


Figure 9. Output Peak Currenrt vs. Input-Output Differential Voltage

Typical Performance Characteristics (Continued)

KA78R12C

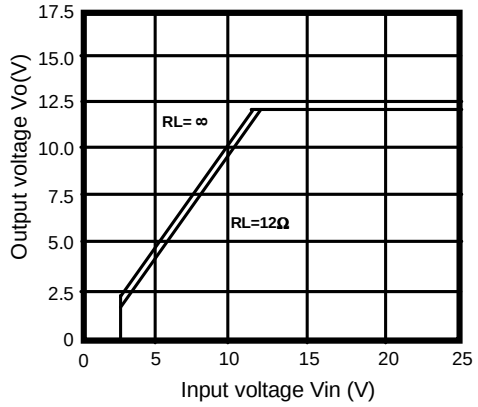


Figure 1. Output Voltage vs. Input Voltage

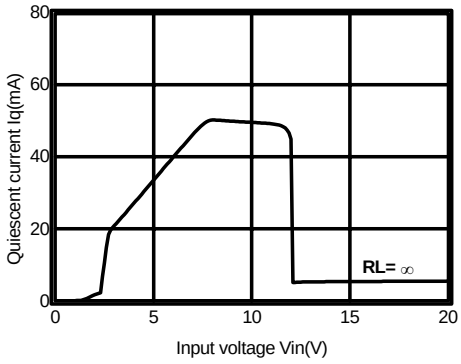


Figure 2. Quiescent Current vs. Input Voltage

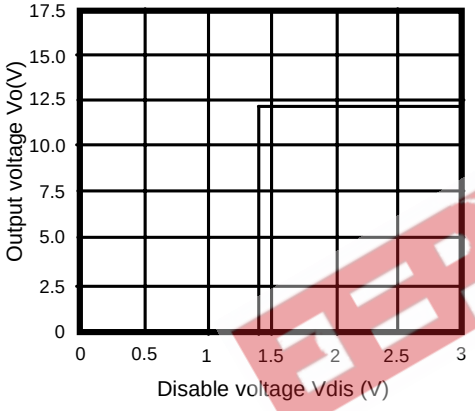


Figure 3. Output Voltage vs. Disable Voltage

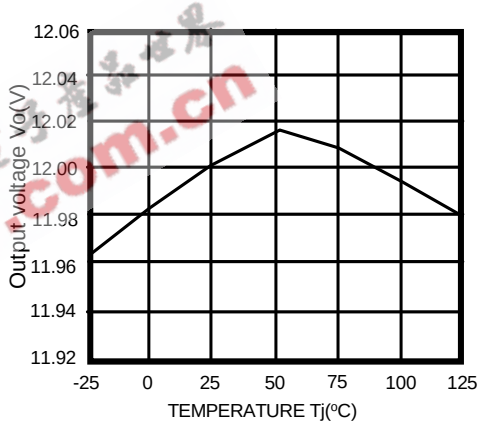


Figure 4. Output Voltage vs. Temperature(Tj)

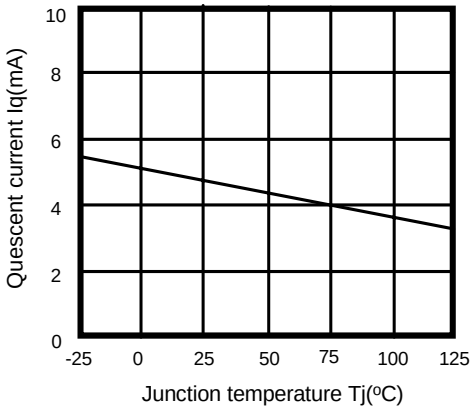


Figure 5. Quiescent Current vs. Temperature(Tj)

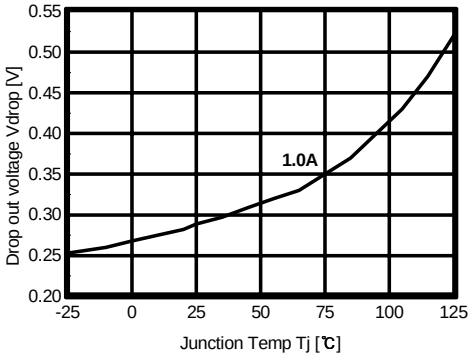


Figure 6. Dropout Voltage vs.Junction Temperature

Typical Performance Characteristics (Continued)

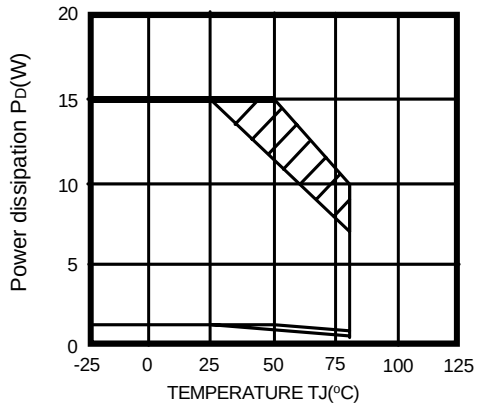


Figure 7. Power Dissipation vs. Temperature(Tj)

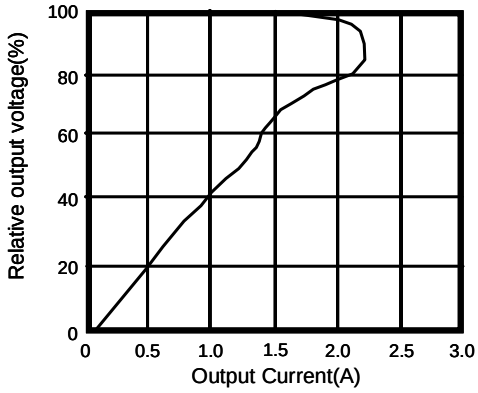


Figure 8. Overcurrent Protection Characteristics (Typical Value)

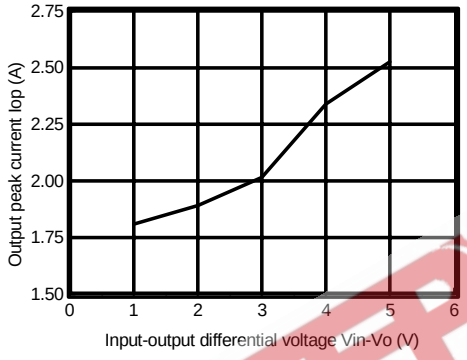


Figure 9. Output Peak Currenrt vs. Input-Output Differential Voltage

Typical Performance Characteristics (Continued)

KA78R15C

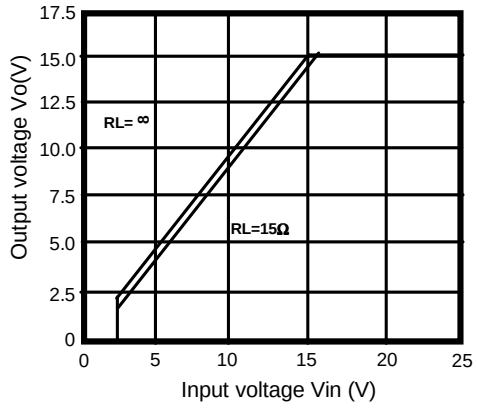


Figure 1. Output Voltage vs. Input Voltage

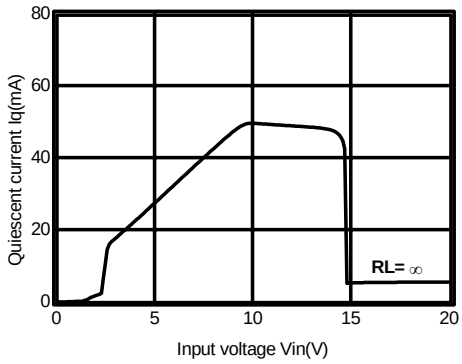


Figure 2. Quiescent Current vs. Input Voltage

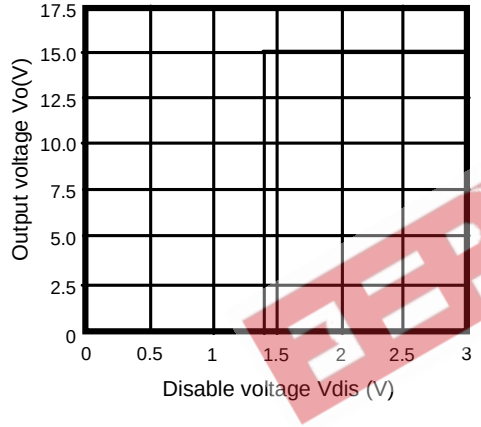


Figure 3. Output Voltage vs. Disable Voltage

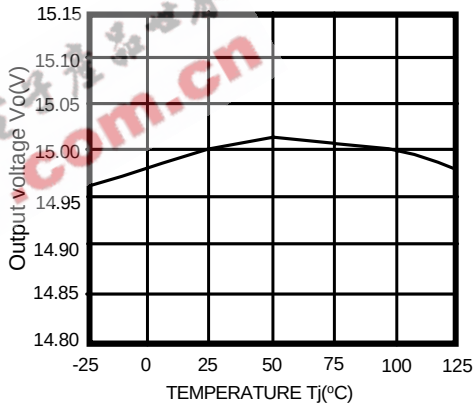


Figure 4. Output Voltage vs. Temperature(Tj)

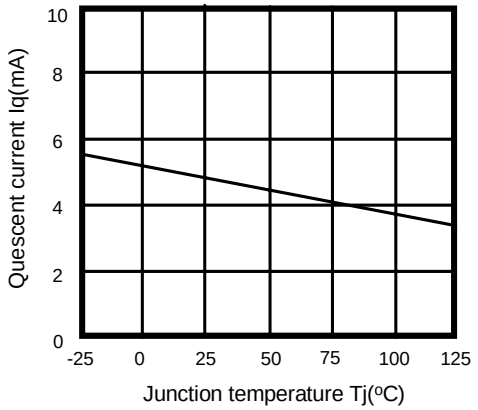


Figure 5. Quiescent Current vs. Temperature(Tj)

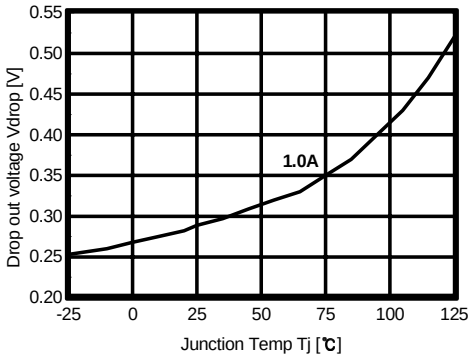


Figure 6. Dropout Voltage vs.Junction Temperature

Typical Performance Characteristics (Continued)

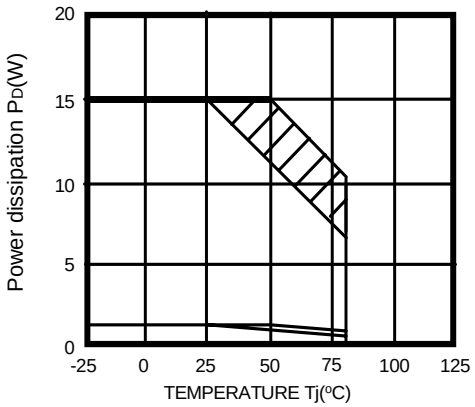


Figure 7. Power Dissipation vs. Temperature(Tj)

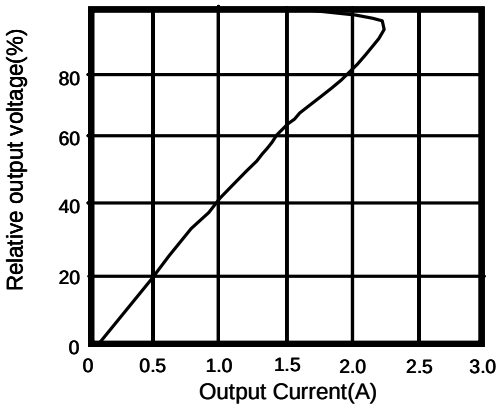


Figure 8. Overcurrent Protection Characteristics (Typical Value)

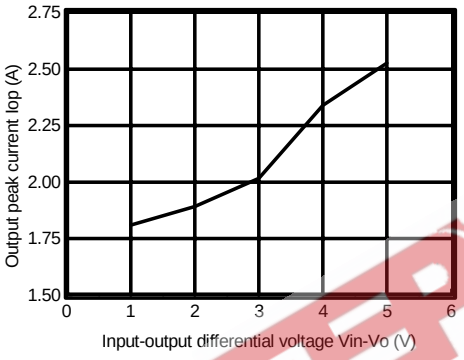


Figure 9. Output Peak Currenrt vs. Input-Output Differential Voltage

Typical Application

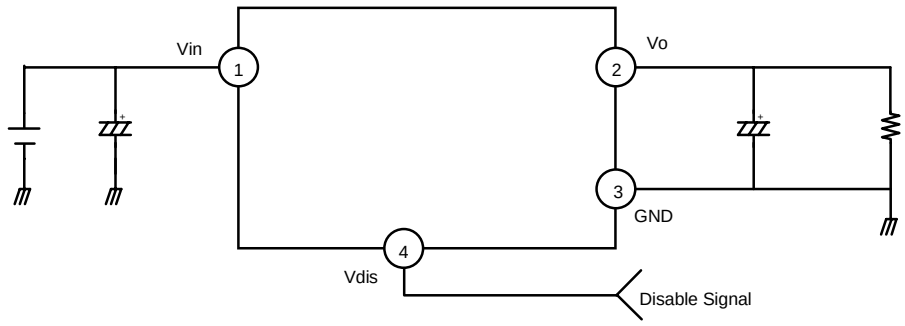


Figure 1. Application Circuit

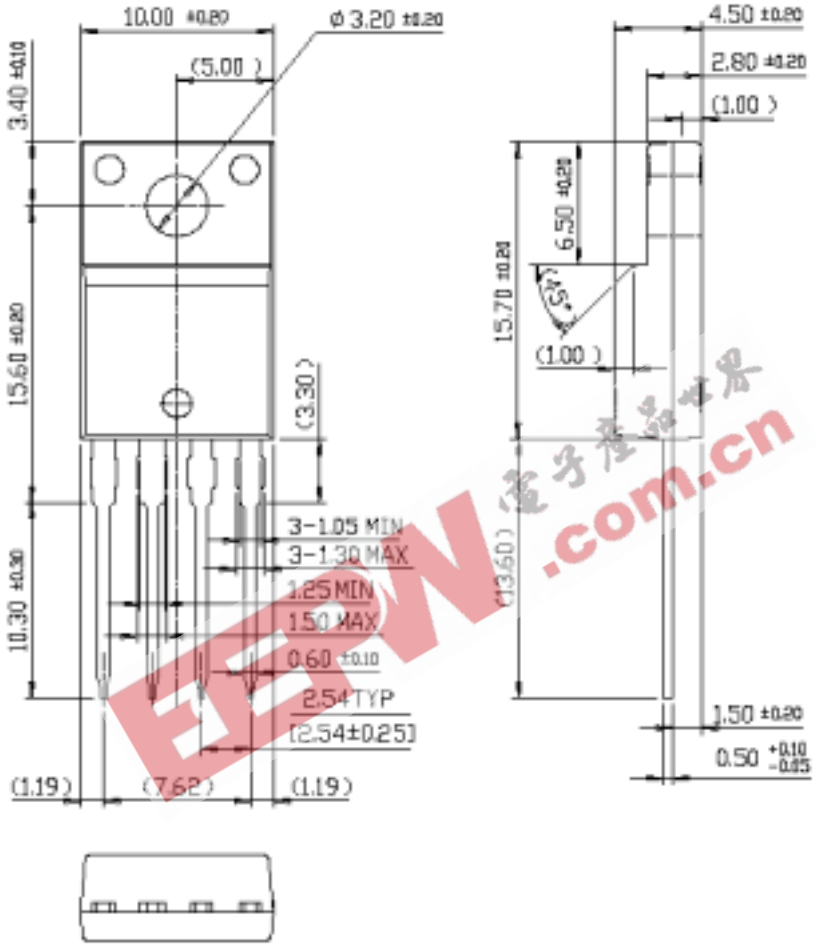
- Ci is required if regulator is located at an appreciable distance from power supply filter.
- Co improves stability and transient response.(Co > 47μF)

Mechanical Dimensions

Package

Dimensions in millimeters

TO-220F-4L

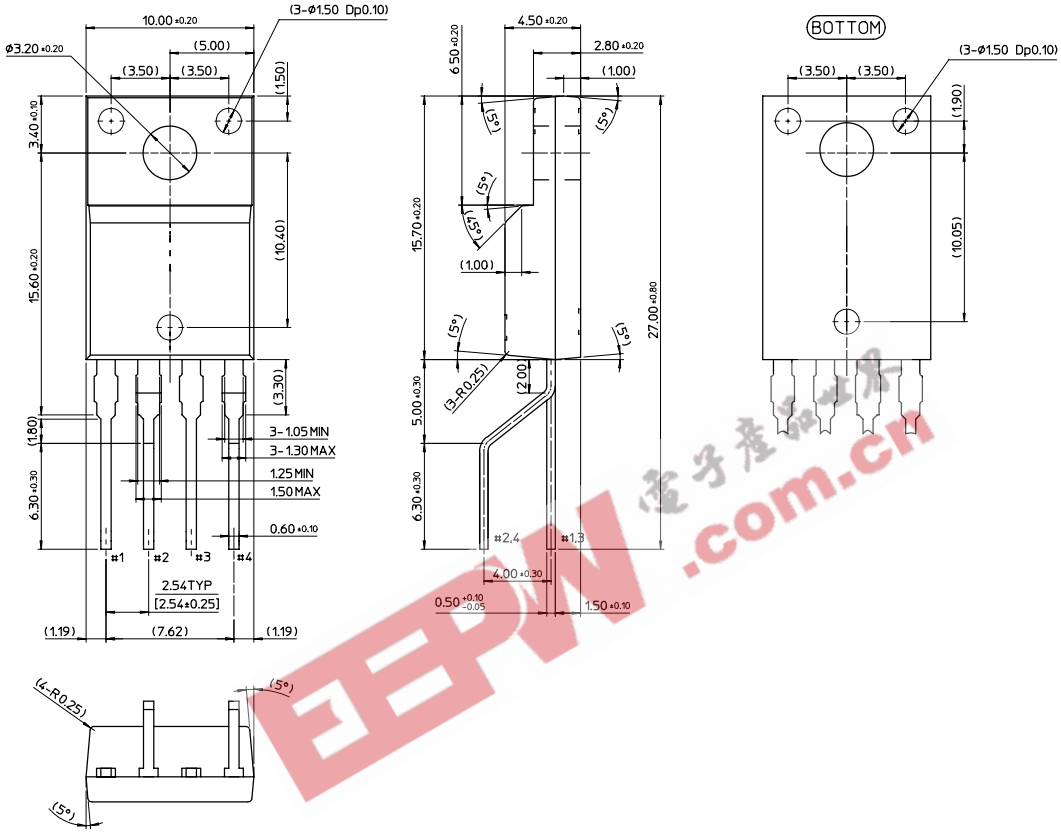


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

TO-220F-4L(Forming)

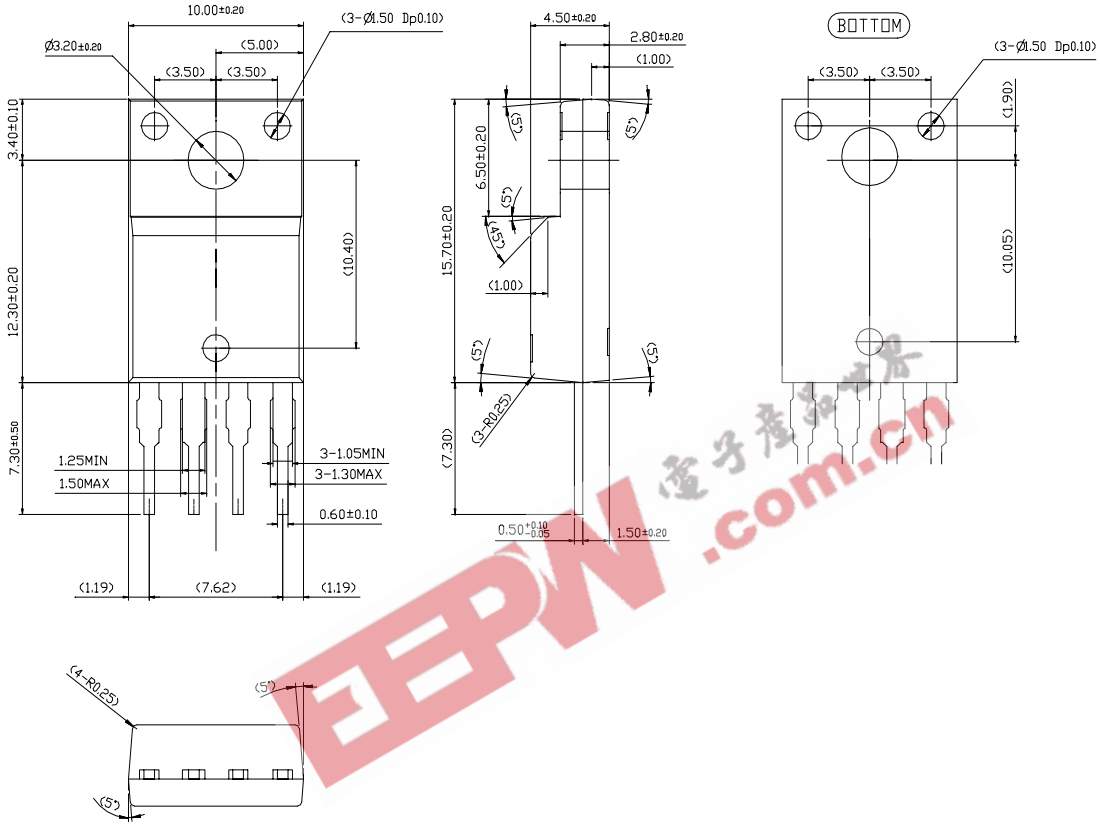


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

TO-220F-4L(Short Lead)



Ordering Information

Product Number	Package	Operating Temperature
KA78R33CTU	TO-220F-4L	-20°C to +80°C
KA78R05CTU		
KA78R08CTU		
KA78R09CTU		
KA78R12CTU		
KA78R15CTU		
KA78R33CYDTU	TO-220F-4L(Forming)	
KA78R05CYDTU		
KA78R09CYDTU		
KA78R33CTSTU	TO-220F-4L(Short Lead)	
KA78R05CTSTU		
KA78R08CTSTU		
KA78R09CTSTU		
KA78R12CTSTU		