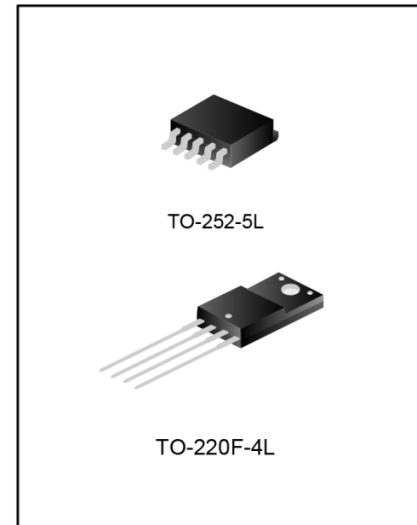


3A Low Dropout Voltage Regulator

General Description

The GGA378RXX is a positive voltage regulator with low dropout voltage below 0.5V at 3A.

The GGA378RXX provides two versions: fixed and adjustable versions. The GGA378RXX is available in fixed output voltages 3.3V, 5V, 8V, 9V, 12V, 15V and 18V. The GGA378RXX offers some key features including thermal shutdown, peak current protection, overvoltage protection and output disable function. The GGA378RXX is an excellent device for use in various electronic equipment.



Features

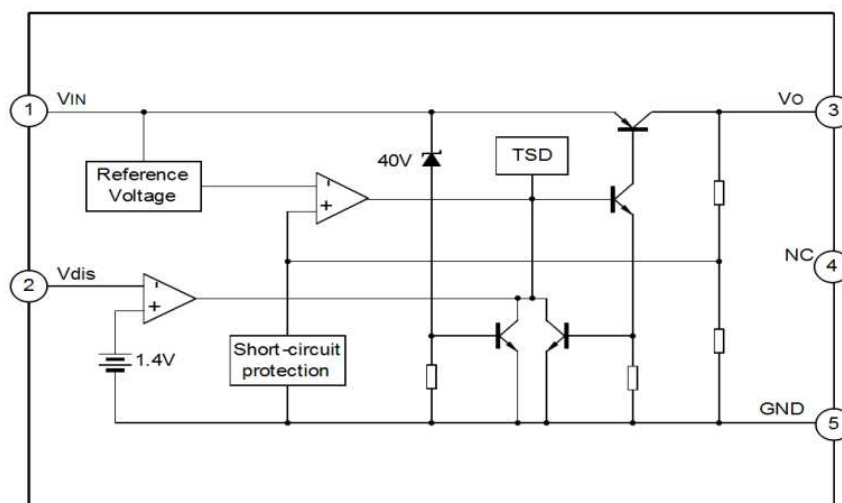
- Available fixed version 3.3V, 5V, 8V, 9V, 12V, 15V, 18V and adjustable version
- Low Dropout Voltage: 300mV at 3A output current
- Current limiting: 4A
- Overvoltage protection: 40V
- Built-in output disable function
- TO-220 full-mold package (4pin) and TO-252-5L package (5pin)
- Overcurrent protection, thermal shutdown
- Overvoltage protection, short circuit protection

Applications

- High Efficiency Linear Regulators
- Post Regulators for Switching Supplies
- Battery Charger
- Microprocessor Supply
- Desktop PCs, RISC and Embedded Processors Supply

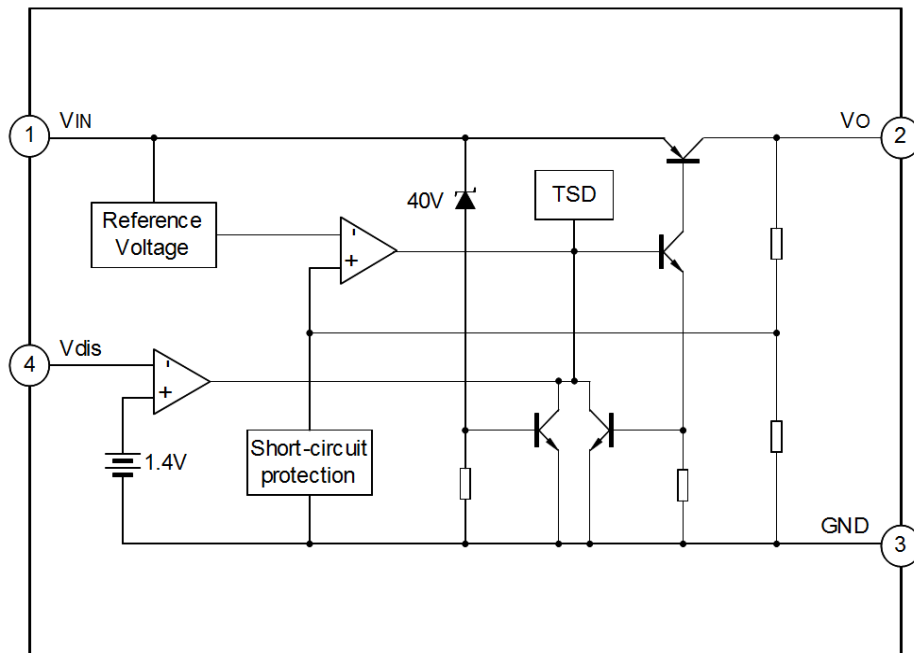
Block Diagram

GGA378RXXD

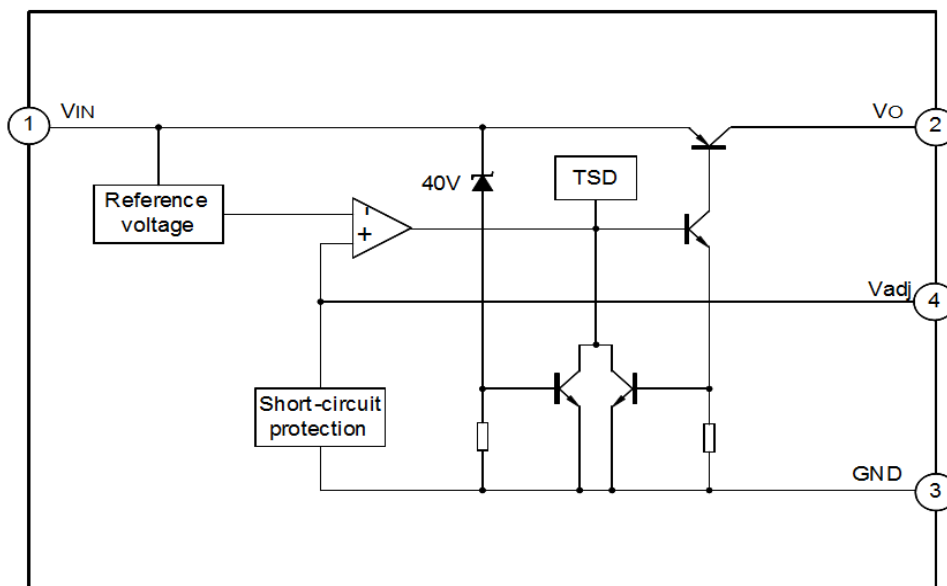


Fixed Mode

GGA378RXXF



Fixed Mode



Adjustable Mode

Absolute Maximum Ratings (Operating Temperature Range Applies Unless Otherwise Specified)

Characteristics	Symbol	Ratings	Unit
Input Supply Voltage	V _{IN}	35	V
Disable Voltage	V _{dis}	35	V
Output Current	I _o	3.0	A
Power Dissipation 1 (No Heatsink)	P _{d1}	1.5	W
Power Dissipation 2 (With Heatsink)	P _{d2}	15	W
Operating Junction Temperature	T _J	150	°C
Operating Temperature Range	T _{opr}	-20~+85	°C
Thermal Resistance, Junction-To Case	R _{θjc}	2.9	°C/W
Thermal Resistance, Junction-To Air	R _{θja}	48.51	°C/W

Recommended Operating Conditions

Characteristics	Symbol	Ratings		Unit
Input Voltage	V _{IN}	GGA378R33	5	V
		GGA378R05	7	
		GGA378R08	10	
		GGA378R09	11	
		GGA378R12	15	
		GGA378R15	20	
		GGA378R18	21	

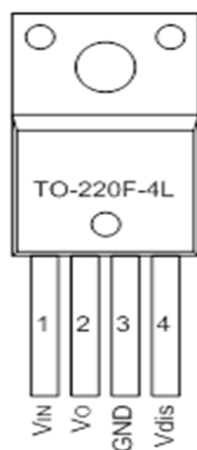
Electrical Characteristics (V_{IN}=Note1, I_o=1.0A, T_a=25°C, unless otherwise specified)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V _{OUT}	GGA378R33	3.22	3.3	3.38	V
		GGA378R05	4.88	5	5.12	
		GGA378R08	7.8	8	8.2	
		GGA378R09	8.78	9	9.22	
		GGA378R12	11.7	12	12.3	
		GGA378R15	14.6	15	15.4	
		GGA378R18	17.55	18	18.45	
Line Regulation	R _{line}	GGA378R33 : V _{in} =4V to 10V		0.5	2.5	%
		GGA378R05 : V _{in} =6V to 12V				
		GGA378R08 : V _{in} =9V to 25V				
		GGA378R09 : V _{in} =10V to 25V				
		GGA378R12 : V _{in} =13V to 29V				
		GGA378R15 : V _{in} =16V to 30V				
		GGA378R18 : V _{in} =19V to 30V				
Load Regulation	R _{LOAD}	5mA < I _o < 3A		0.1	2.0	%
Dropout Voltage	V _{DROP}	I _{OUT} =3A,		0.3	0.5	V
Quiescent Current	I _Q	I _o =0A; V _{DIS} =0.4V		3	10	mA
Ripple Rejection	PSRR		45	55		dB

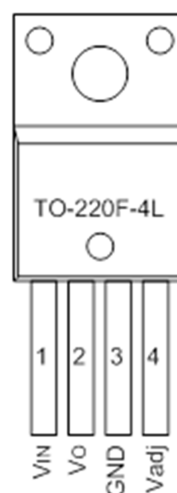
Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Disable Voltage High	VdisH	Output active	2.0			V
Disable Voltage Low	VdisL	Output disabled			0.8	V
Disable Bias Current High	IdisH	V _{DIS} = 2.7V			20	μA
Disable Bias Current Low	IdisL	V _{DIS} = 0.4V			-0.4	mA
Reference Voltage	V _{ref}	GGA378R00	1.24	1.27	1.30	V

Pin Description

GGA378RXXF

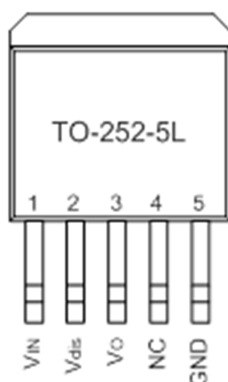


Fixed mode



Adjustable mode

GGA378RXXD



GGA378RXXF Fixed mode

Pin No.	Pin name	I/O	Functions
1	V _{IN}	I	Input supply voltage
2	V _O	O	Output voltage
3	GND	--	Ground
4	V _{dis}	I	Disable voltage

GGA378RXXF Adjustable mode

Pin No.	Pin name	I/O	Functions
1	V _{IN}	I	Input supply voltage
2	V _O	O	Output voltage
3	GND	--	Ground
4	V _{adj}	I	Adjustable voltage

GGA378RXXD Fixed mode

Pin No.	Pin name	I/O	Functions
1	V _{IN}	I	Input supply voltage
2	V _{dis}	I	Disable voltage
3	V _O	O	Output voltage
4	NC		Not connect
5	GND	--	Ground

Function Description

Output disable function

The GGA378RXX comes with a V_{dis} pin that allows the regulator to be disabled. Forcing the V_{dis} pin low disables the regulator. Forcing the V_{dis} pin high enables the output voltage.

1. Input Capacitor

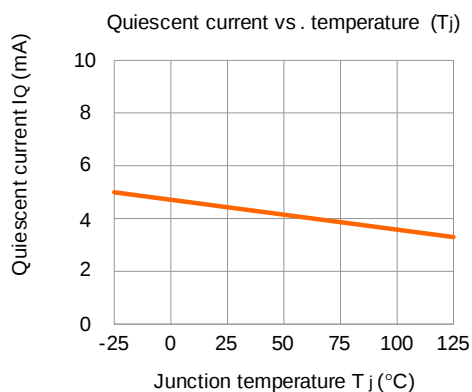
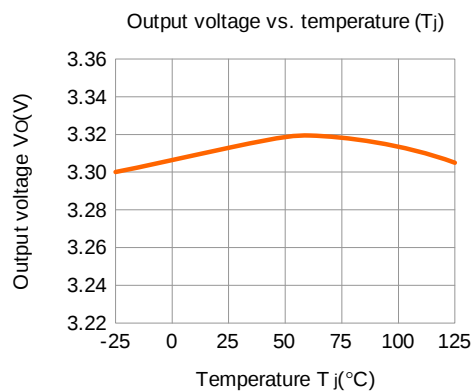
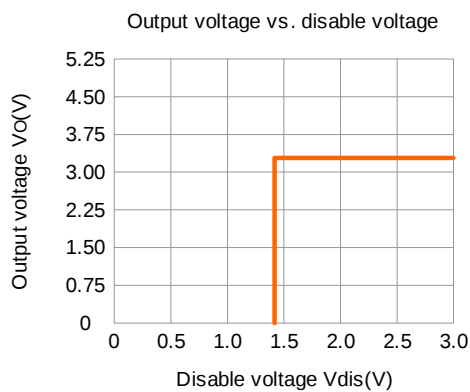
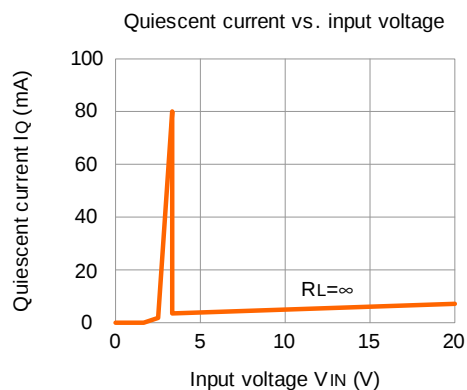
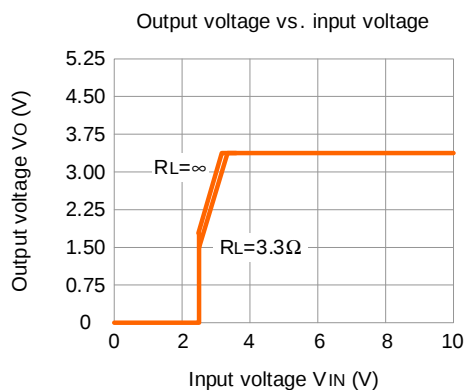
The GGA378RXX requires a well-bypassed input capacitor for optimal performance. An input capacitor is required if regulator is located at an appreciable distance from power supply filter.

2. Output Capacitor

The GGA378RXX requires an output capacitor of 47uF (or based on the real application) to maintain stability.

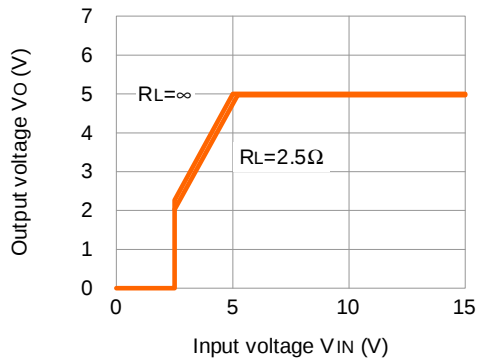
Typical Characteristics

GGA378R33

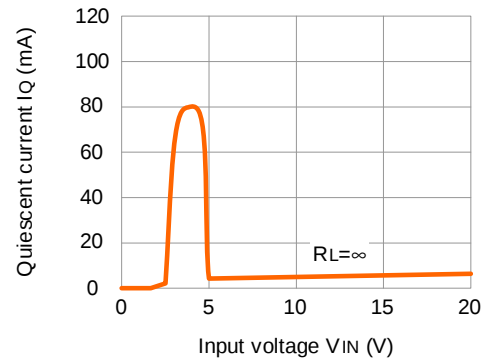


GGA378R05

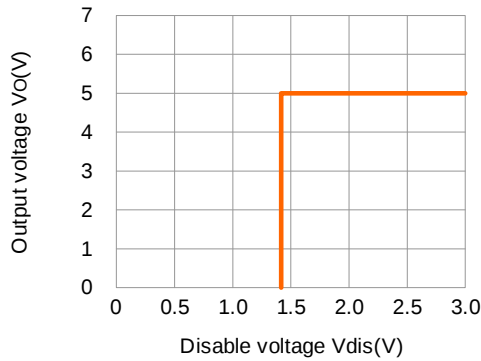
Output voltage vs. input voltage



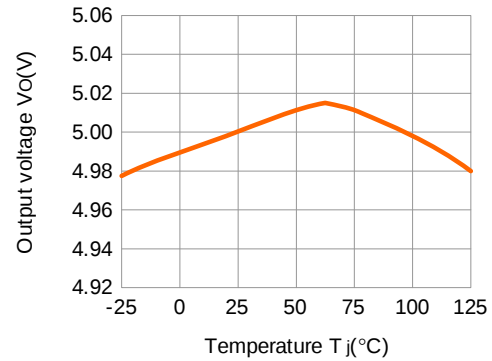
Quiescent current vs. input voltage



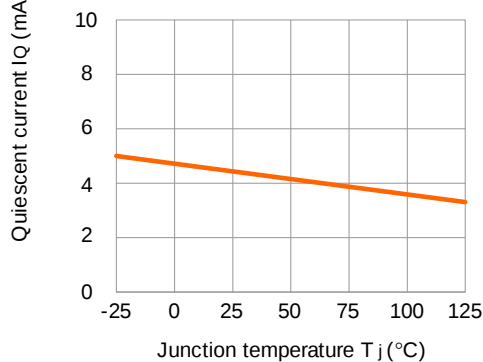
Output voltage vs. disable voltage



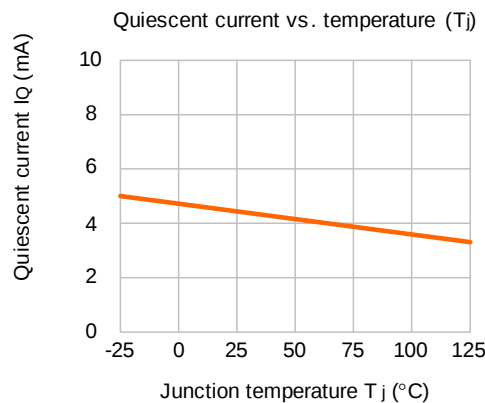
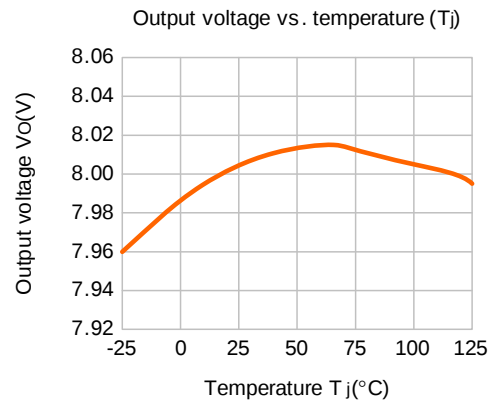
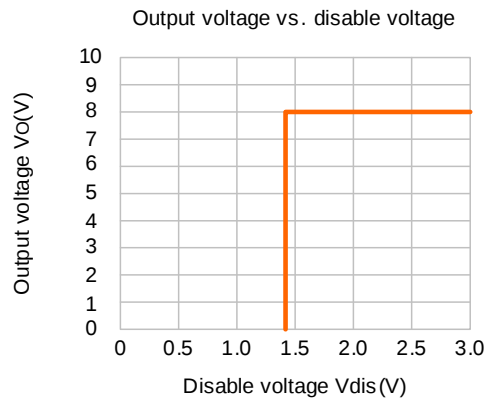
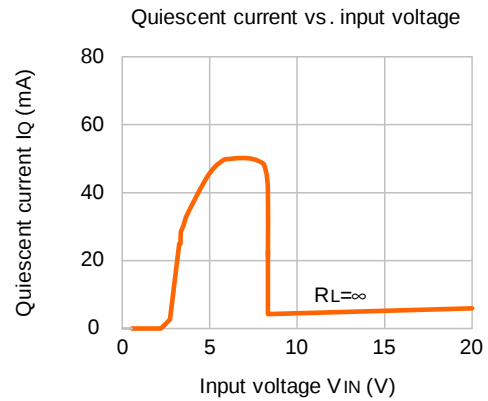
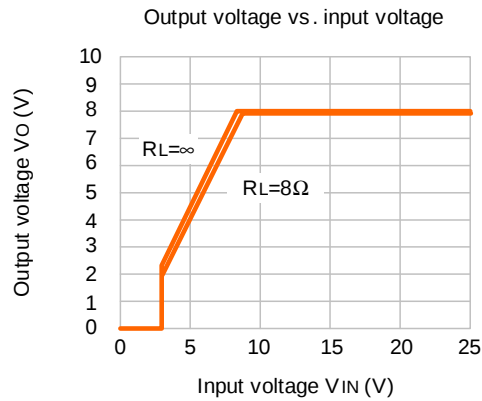
Output voltage vs. temperature (T_j)



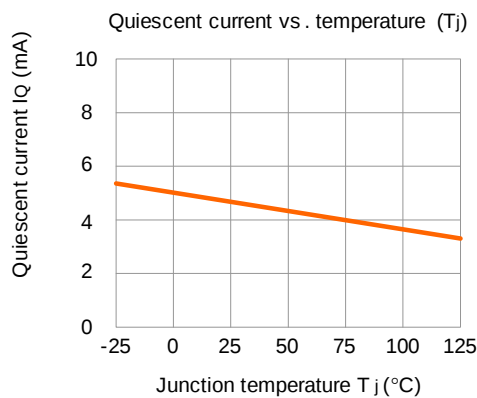
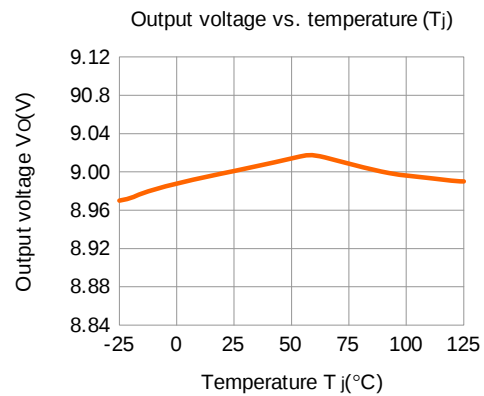
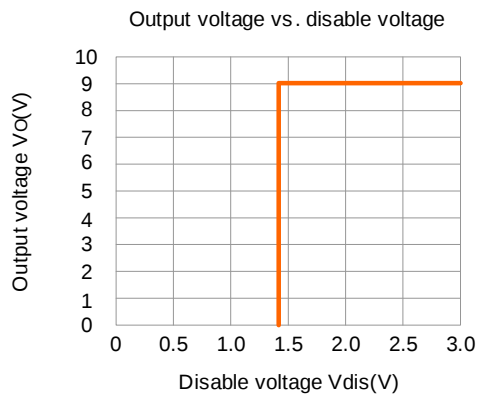
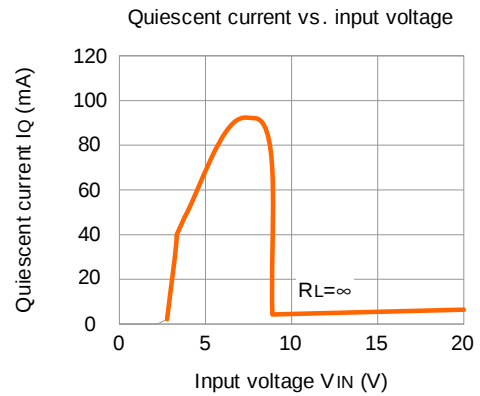
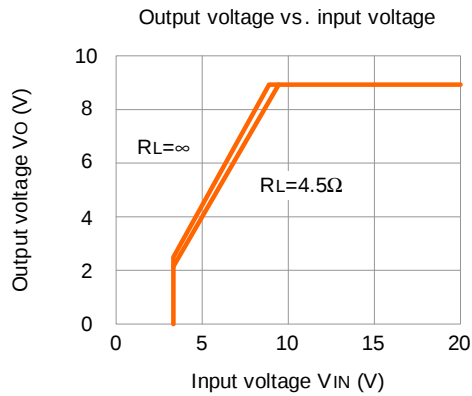
Quiescent current vs. temperature (T_j)



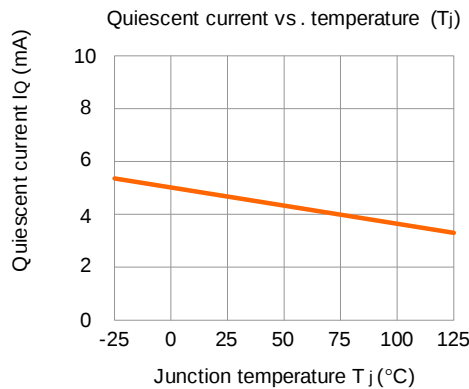
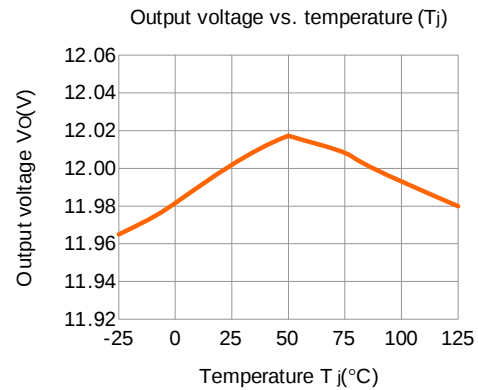
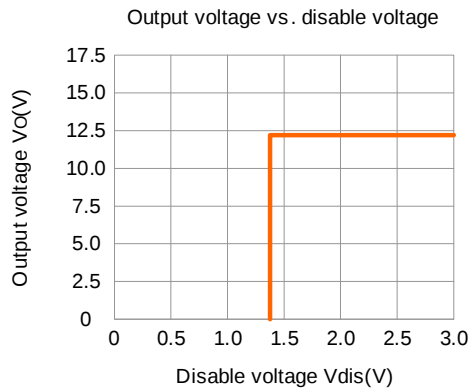
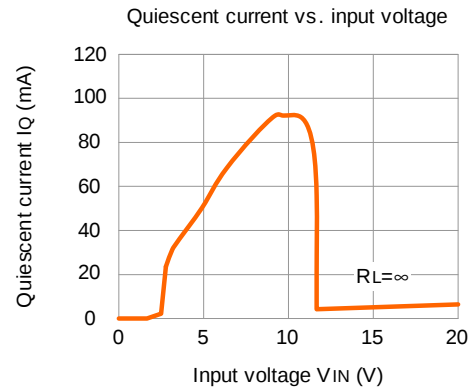
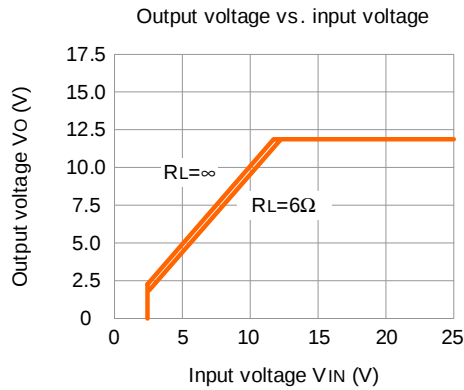
GGA378R08



GGA378R09

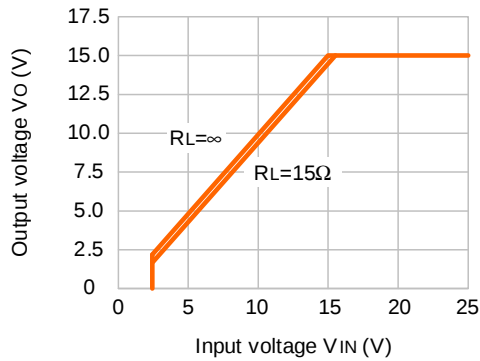


GGA378R12

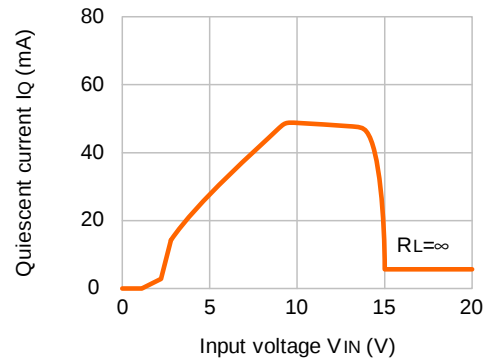


GGA378R15

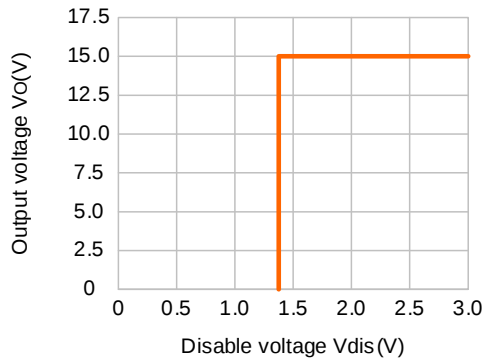
Output voltage vs. input voltage



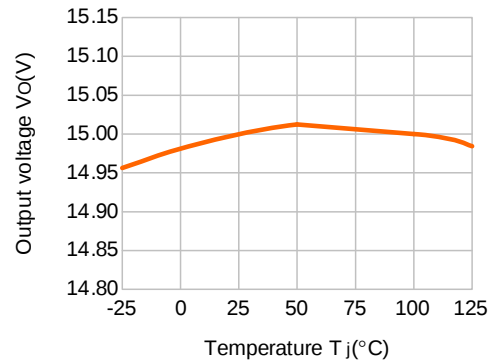
Quiescent current vs. input voltage



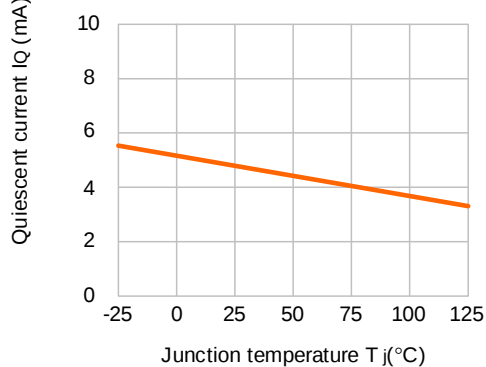
Output voltage vs. disable voltage



Output voltage vs. temperature (T_j)

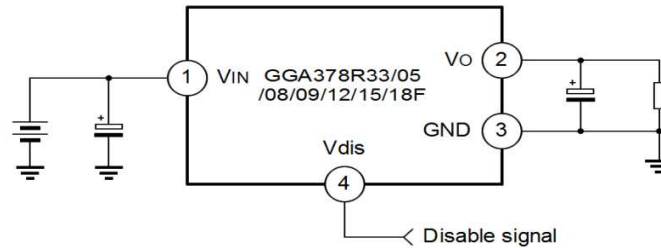


Quiescent current vs. temperature (T_j)

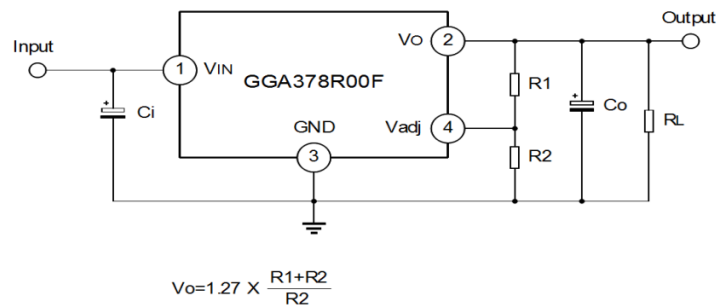


Applications Circuits

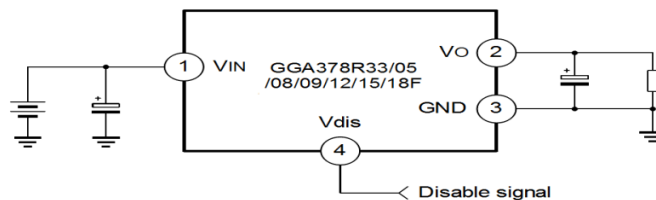
GGA378RXXF Fixed mode



GGA378RXXF Adjustable mode

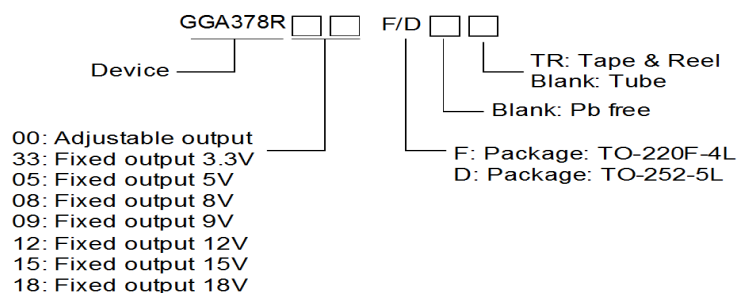


GGA378RXXD Fixed mode



Note:

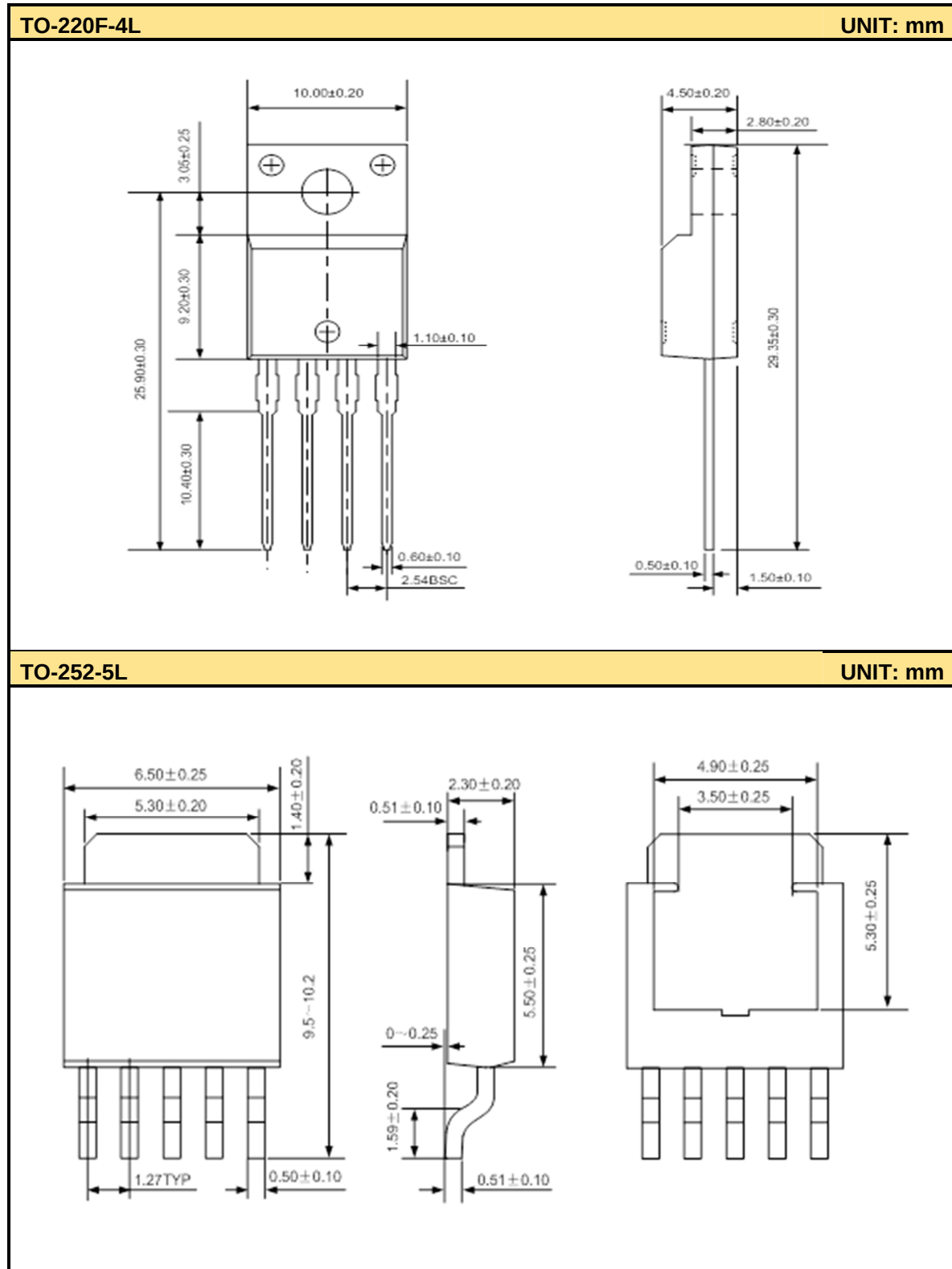
1. $C_o = 47\mu F$ or based on the real application
2. The circuit and parameters are for reference only, please set the parameters of the real application circuit based on actual testing

Ordering Information (Temperature range: -40°C ~125°C)


Part No.	Package	Marking	Material	Packing Type
GGA378R00F	TO-220F-4L	GGA378R00F	Pb free	Tube
GGA378R33F		GGA378R33F	Pb free	Tube
GGA378R05F		GGA378R05F	Pb free	Tube
GGA378R08F		GGA378R08F	Pb free	Tube
GGA378R09F		GGA378R09F	Pb free	Tube
GGA378R12F		GGA378R12F	Pb free	Tube
GGA378R15F		GGA378R15F	Pb free	Tube
GGA378R18F		GGA378R18F	Pb free	Tube
GGA378R33DTR	TO-252-5L	GGA378R33D	Pb free	Tape & Reel
GGA378R05DTR		GGA378R05D	Pb free	Tape & Reel
GGA378R08DTR		GGA378R08D	Pb free	Tape & Reel
GGA378R09DTR		GGA378R09D	Pb free	Tape & Reel
GGA378R12DTR		GGA378R12D	Pb free	Tape & Reel
GGA378R15DTR		GGA378R15D	Pb free	Tape & Reel
GGA378R18DTR		GGA378R18D	Pb free	Tape & Reel
GGA378R33D	TO-252-5L	GGA378R33D	Pb free	Tube
GGA378R05D		GGA378R05D	Pb free	Tube
GGA378R08D		GGA378R08D	Pb free	Tube
GGA378R09D		GGA378R09D	Pb free	Tube
GGA378R12D		GGA378R12D	Pb free	Tube
GGA378R15D		GGA378R15D	Pb free	Tube
GGA378R18D		GGA378R18D	Pb free	Tube



Package Outline



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