Description

The YJ78XX is a voltage regulator with output current at 1.0A and output voltage at 5V, 12V, 15V.

The device is designed to suit wide range of applications where good voltage regulation, current limiting, and thermal overload protection are essential to reliable long-term operations. With adequate heat sink attached, the regulator delivers output current to the maximum value of 1.0A.

Packages offered include TO-252-3L.

Features and Benefits

- Fixed output voltages at 5/12/15V with accuracy ≤ ±4%
- Output current up to 1.0A with foldback style current limiting
- Good immunization from input noise with PSRR at ≥ 70dB typical
- Wide operating temperature range at T_J = -40 ~ 125ºC
- Built-in thermal shut-down to ensure reliable operation
- No external components needed for proper operation
- Lead-free package assembled with 'green' molding compound

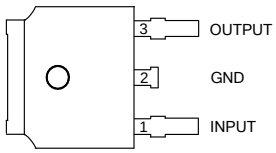
Applications

- Supply of glitch-free operating voltage to MCUs, system ICs, motor driving units, wireless sub-systems (WiFi, 5G/IoT NTN, 5G RedCap, etc.)
- Commonly populated in e-Bike, 2/4-wheel scooters, power adapters, set-top boxes, industrial controls & machineries, test equipment, home appliances, computing peripherals, network switches & routers, telecommunication hubs

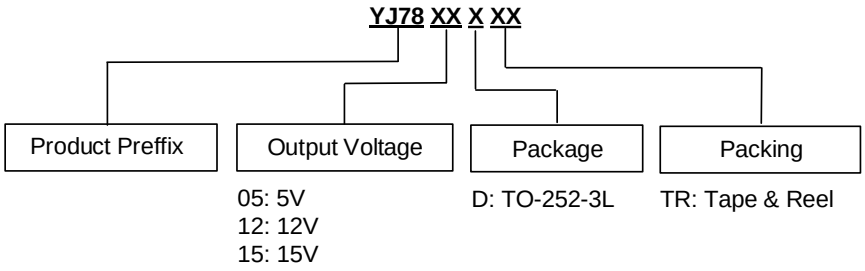
Pin Assignment

TO-252-3L

(Top View)



Ordering Information

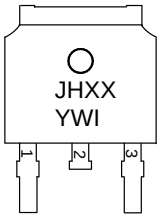


Product Name	Package	Marking	MSL	T_J (℃)	Media	Quantity (pcs)
YJ7805D	TO-252-3L	JH05	3	-40 ~ 125	13" T&R	2,500
YJ7812D		JH12				
YJ7815D		JH15				

Marking Information

TO-252-3L

(Top View)



First Line: Marking (see *Ordering Information*)

Second Line: Date Code
Y: Year of Molding
W: Work-week of Molding
I: Internal Code

Typical Application Circuit

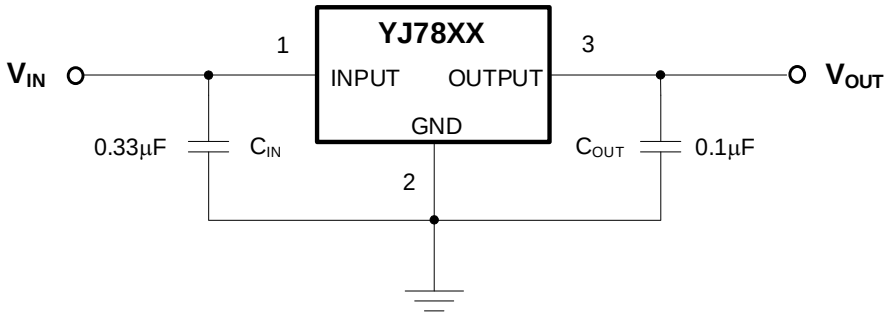


Fig. 1: Application Circuit

Diagram of Functional Blocks

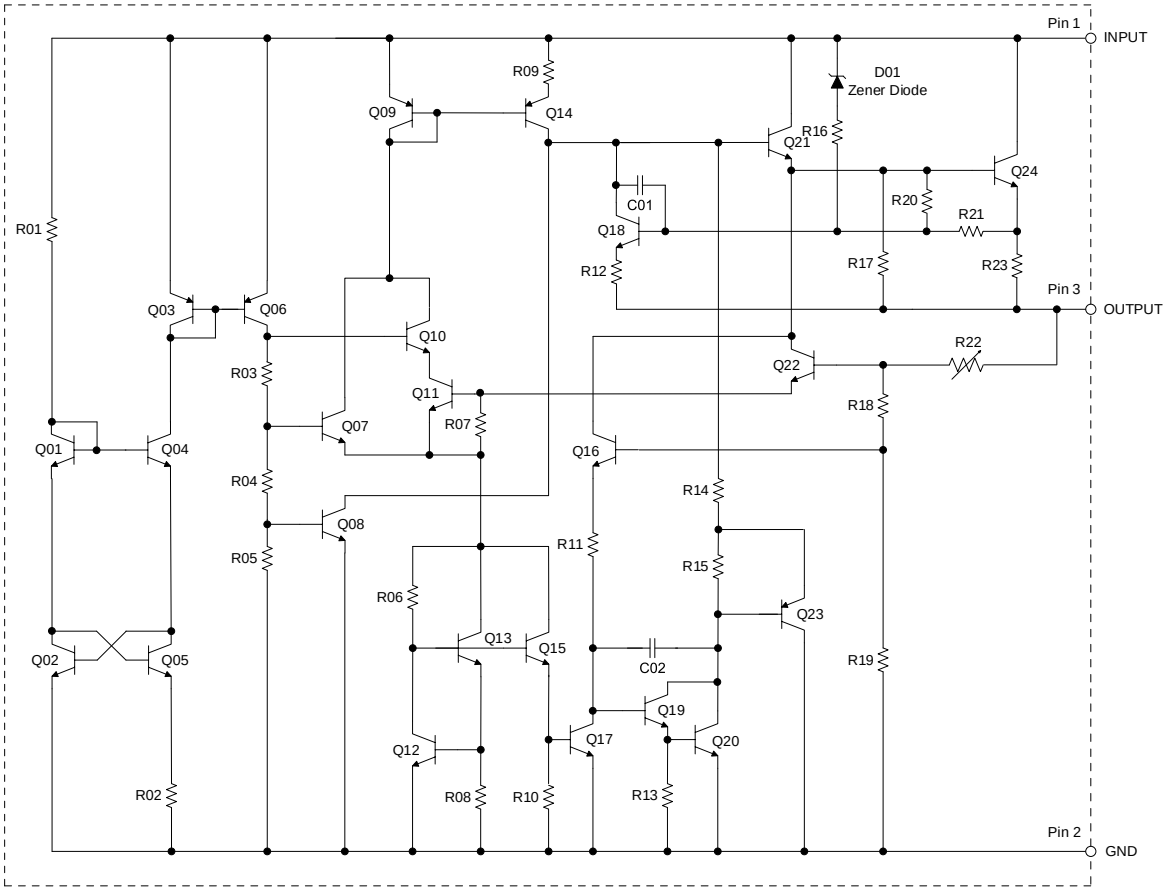


Fig. 2: Diagram of Internal Functional Blocks

Absolute Maximum Ratings *1 (All measurements were made at T_A = 25°C unless stated otherwise)

Symbol	Parameter	Values	Unit
V_{IN}	Input Voltage	36	V
P_D	Power Dissipation	Internally Limited	W
T_J	Operating Junction Temperature	150	ºC
T_{LEAD}	Lead Temperature (soldering, 10s)	260	ºC
T_{STG}	Storage Temperature Range	-65 ~ 150	ºC
HBM	ESD (Human Body Model)	6	kV
MM	ESD (Machine Model)	500	V

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. While these are stress ratings only, functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” are not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Recommended Operating Conditions (All measurements were made at T_A = 25°C unless stated otherwise)

Symbol	Parameter		Min.	Max.	Unit
V_{IN}	Input Voltage	YJ7805	–	25	V
		YJ7812	–	32	
		YJ7815	–	32	
T_J	Operating Junction Temperature Range		-40	125	ºC

Electrical Characteristics

YJ7805: (V_{IN} = 10V, I_{OUT} = 40mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25ºC; *Italic* & **Bold** typefaces applies over -40ºC ≤ T_J ≤ 125ºC unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	T_A = 25ºC	4.9	5.0	5.1	V
		7.5V ≤ V_{IN} ≤ 20.0V; 5mA ≤ I_{OUT} ≤ 1A P_D ≤ 15W	***4.8***	–	***5.2***	
$\Delta V_{R\text{-}Load}$	Load Regulation	V_{IN} = 10V; 5mA ≤ I_{OUT} ≤ 1A T_A = 25ºC	–	20	50	mV
$\Delta V_{R\text{-}Line}$	Line Regulation	7.5V ≤ V_{IN} ≤ 20.0V; 5mA ≤ I_{OUT} ≤ 1A T_A = 25ºC	–	25	50	mV
I_Q	Quiescent Current	V_{IN} = 10V; I_{OUT} = 0A	–	3.2	6.0	mA
ΔI_Q	Change to Quiescent Current	8V ≤ V_{IN} ≤ 25V; I_{OUT} = 0.5A T_A = 25ºC	–	0.3	0.8	mA
		5mA ≤ I_{OUT} ≤ 1A; T_A = 25ºC	–	0.08	0.50	
PSRR	Power Supply Rejection Ratio	Frequency = 120Hz; 8V ≤ V_{IN} ≤ 18V I_{OUT} = 0.5A	–	70	–	dB
V_{DROP}	Drop-out Voltage	ΔV_{OUT} = 1%; I_{OUT} = 1A; T_A = 25ºC	–	2.0	–	V
V_{NOISE}	Noise over Output Voltage	10Hz ≤ Frequency ≤ 100kHz; T_A = 25ºC	–	10	–	µV/V_O
R_{OUT}	Output Resistance	Frequency = 1kHz	–	10	–	mΩ
I_{SC}	Short-circuit Current	V_{IN} = 35V; T_A = 25ºC	–	0.05	–	A
I_{PK}	Peak Output Current	V_{IN} = 10V; T_A = 25ºC	–	2.2	–	A
$\Delta V_{OUT}/\Delta T$	Temperature Coefficient of Output Voltage	–	–	0.4	–	mV/ºC
$(\Delta V_{OUT}/V_{OUT})/\Delta T$		–	–	80	–	ppm/ºC

Electrical Characteristics (Continued)

YJ7812: (V_{IN} = 19V, I_{OUT} = 40mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25ºC; *Italic* & **Bold** typefaces applies over -40ºC ≤ T_J ≤ 125ºC unless otherwise stated)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	T_A = 25ºC	11.75	12.00	12.25	V
		14.8V ≤ V_{IN} ≤ 27.0V; 5mA ≤ I_{OUT} ≤ 1A P_D ≤ 15W	***11.5***	–	***12.5***	
$\Delta V_{R\text{-}Load}$	Load Regulation	V_{IN} = 19V; 5mA ≤ I_{OUT} ≤ 1A T_A = 25ºC	–	40	120	mV
$\Delta V_{R\text{-}Line}$	Line Regulation	14.8V ≤ V_{IN} ≤ 27.0V; I_{OUT} = 0.5A T_A = 25ºC	–	25	120	mV
I_Q	Quiescent Current	V_{IN} = 19V; I_{OUT} = 0A	–	3.4	6.0	mA
ΔI_Q	Change to Quiescent Current	14.8V ≤ V_{IN} ≤ 30.0V; I_{OUT} = 0.5A T_A = 25ºC	–	0.3	0.8	mA
		5mA ≤ I_{OUT} ≤ 1A; T_A = 25ºC	–	0.08	0.50	
PSRR	Power Supply Rejection Ratio	Frequency = 120Hz; 15V ≤ V_{IN} ≤ 25V I_{OUT} = 0.5A	–	60	–	dB
V_{DROP}	Drop-out Voltage	ΔV_{OUT} = 1%; I_{OUT} = 1A; T_A = 25ºC	–	2.0	–	V
V_{NOISE}	Noise over Output Voltage	10Hz ≤ Frequency ≤ 100kHz; T_A = 25ºC	–	10	–	µV/V_O
R_{OUT}	Output Resistance	Frequency = 1kHz	–	11	–	mΩ
I_{SC}	Short-circuit Current	V_{IN} = 35V; T_A = 25ºC	–	0.2	–	A
I_{PK}	Peak Output Current	V_{IN} = 18V; T_A = 25ºC	–	2.2	–	A
$\Delta V_{OUT}/\Delta T$	Temperature Coefficient of Output Voltage	–	–	0.96	–	mV/ºC
$(\Delta V_{OUT}/V_{OUT})/\Delta T$		–	–	80	–	ppm/ºC

Electrical Characteristics (Continued)

YJ7815: (V_{IN} = 23V, I_{OUT} = 40mA, C_{IN} = 0.33µF, C_{OUT} = 0.1µF, T_J = 25ºC; *Italic* & **Bold** typefaces applies over -40ºC ≤ T_J ≤ 125ºC unless otherwise stated)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	T_A = 25ºC	14.7	15.0	15.3	V
		17.9V ≤ V_{IN} ≤ 30.0V; 5mA ≤ I_{OUT} ≤ 1A P_D ≤ 15W	***14.4***	–	***15.6***	
$\Delta V_{R\text{-}Load}$	Load Regulation	V_{IN} = 23V; 5mA ≤ I_{OUT} ≤ 1A T_A = 25ºC	–	70	150	mV
$\Delta V_{R\text{-}Line}$	Line Regulation	17.9V ≤ V_{IN} ≤ 30.0V; I_{OUT} = 0.5A T_A = 25ºC	–	35	150	mV
I_Q	Quiescent Current	V_{IN} = 23V; I_{OUT} = 0A	–	3.4	6.0	mA
ΔI_Q	Change to Quiescent Current	17.9V ≤ V_{IN} ≤ 30.0V; I_{OUT} = 0.5A T_A = 25ºC	–	0.3	0.8	mA
		5mA ≤ I_{OUT} ≤ 1A; T_A = 25ºC	–	0.08	0.50	
PSRR	Power Supply Rejection Ratio	Frequency = 120Hz; I_{OUT} = 0.5A 18.5V ≤ V_{IN} ≤ 28.5V	–	58	–	dB
V_{DROP}	Drop-out Voltage	ΔV_{OUT} = 1%; I_{OUT} = 1A; T_A = 25ºC	–	2.0	–	V
V_{NOISE}	Noise over Output Voltage	10Hz ≤ Frequency ≤ 100kHz; T_A = 25ºC	–	10	–	µV/V_O
R_{OUT}	Output Resistance	Frequency = 1kHz	–	11	–	mΩ
I_{SC}	Short-circuit Current	V_{IN} = 35V; T_A = 25ºC	–	0.2	–	A
I_{PK}	Peak Output Current	V_{IN} = 21V; T_A = 25ºC	–	2.2	–	A
$\Delta V_{OUT}/\Delta T$	Temperature Coefficient of Output Voltage	–	–	1.2	–	mV/ºC
$(\Delta V_{OUT}/V_{OUT})/\Delta T$		–	–	80	–	ppm/ºC

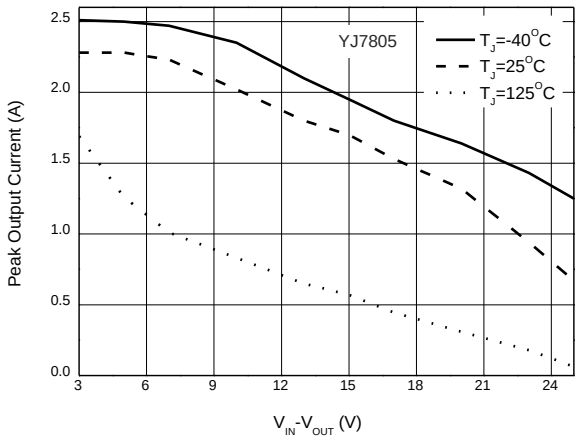
Thermal Properties

Test Condition: Device mounted on FR-4 substrate, 2-layer PCB, 2oz copper, with minimum recommended cooling pad to dissipate heat

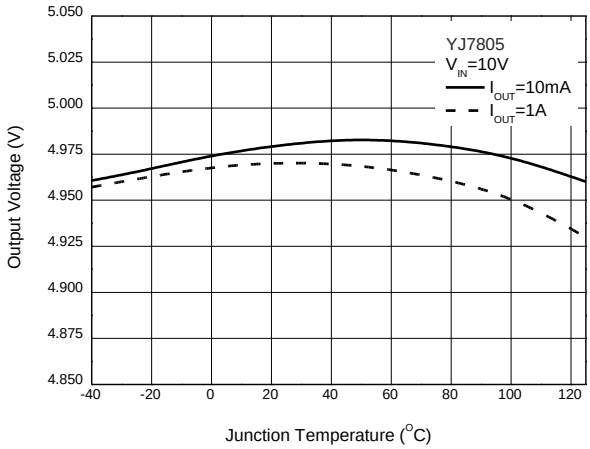
Symbol	Parameter	Package	Rating	Unit
$R_{\Theta JC}$	Thermal Resistance (junction-to-case)	TO-252-3L	16	°C/W

Typical Performance Characteristics

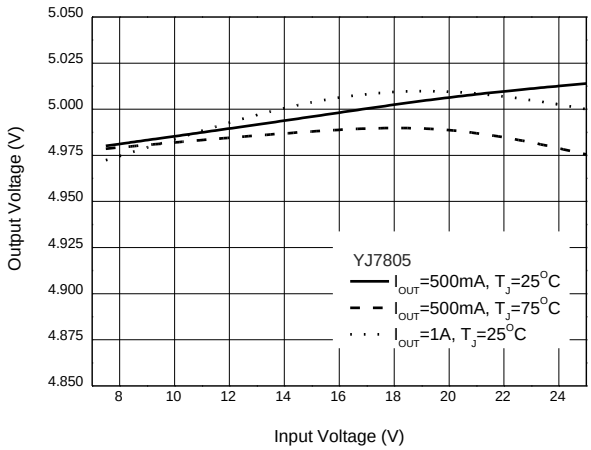
Graph 1: Peak O/P Current vs. Voltage Difference



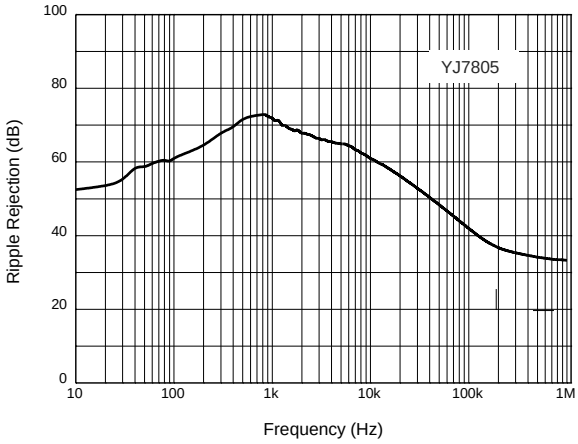
Graph 2: Output Voltage vs. Junction Temperature



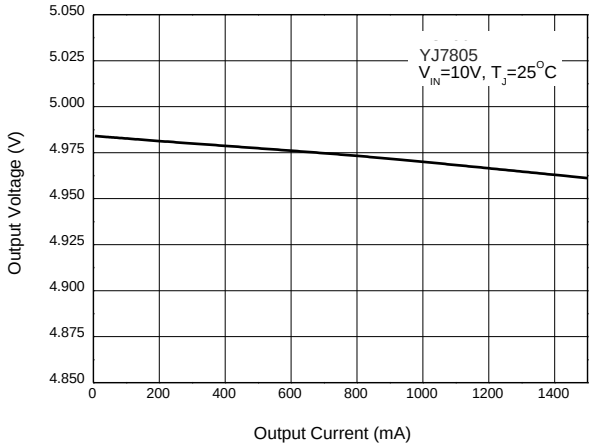
Graph 3: Output Voltage vs. Input Voltage



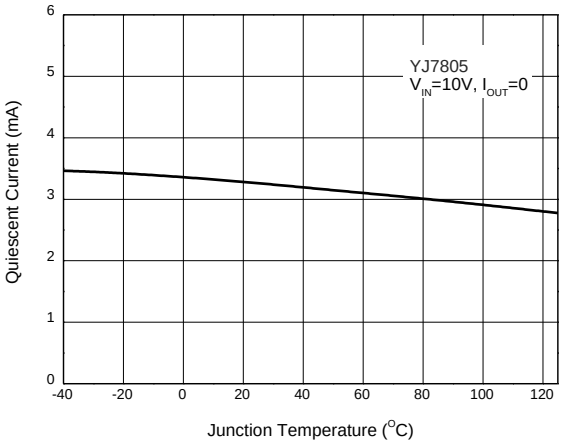
Graph 4: Ripple Rejection vs. Frequency



Graph 5: Output Voltage vs. Output Current

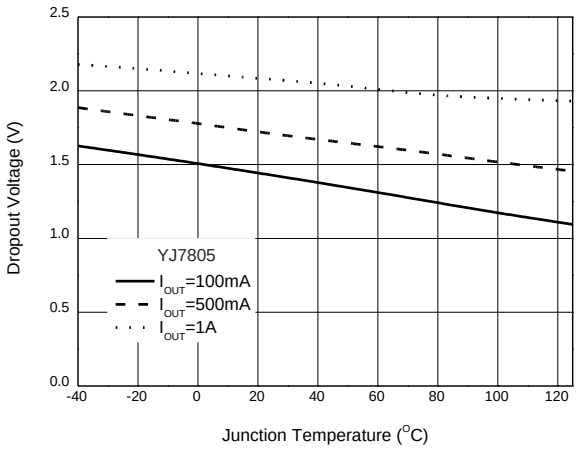


Graph 6: Quiescent Current vs. Junction Temperature



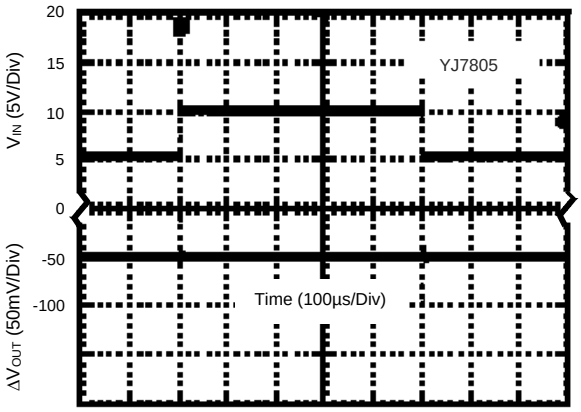
Typical Performance Characteristics (Continued)

Graph 7: Drop-out Voltage vs. Junction Temperature



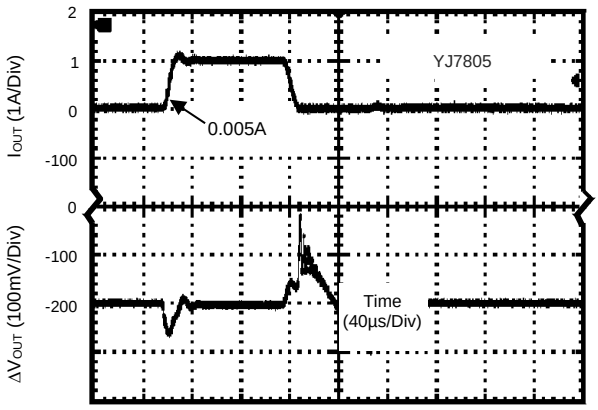
Graph 8: Line Transient

(Conditions: I_{OUT} = 500mA; C_{IN} = 0.33µF; C_{OUT} = 0.1µF; T_J = 25ºC)



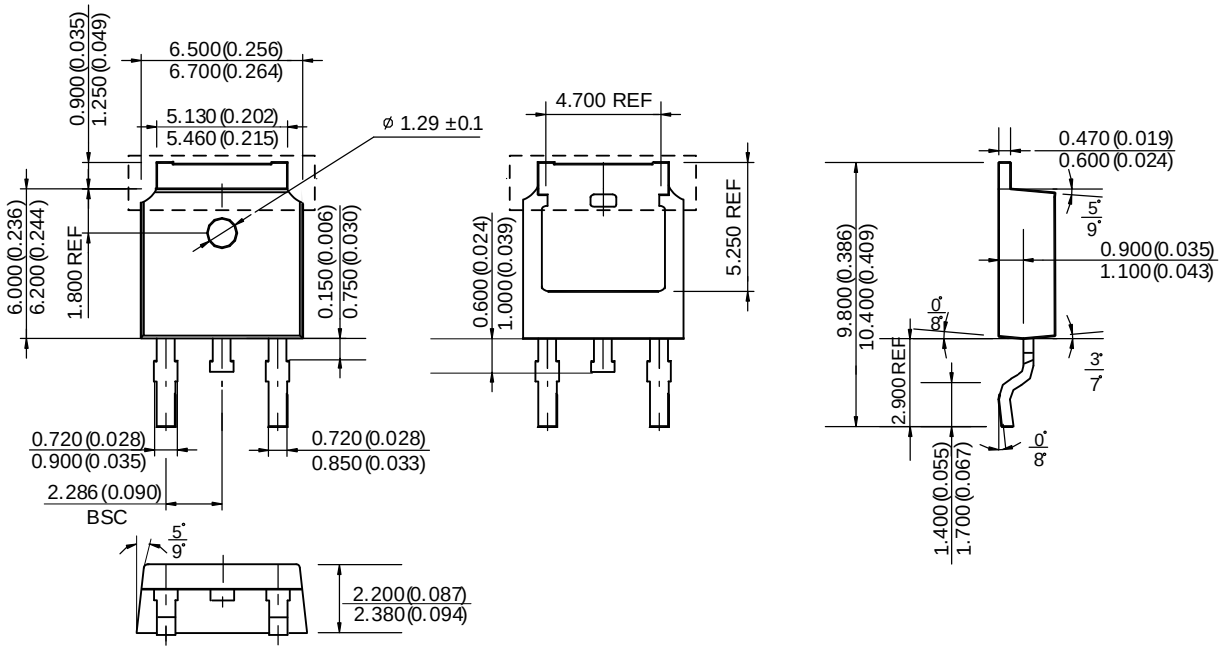
Graph 9: Load Transient

(Conditions: V_{IN} = 10V; C_{IN} = 0.33µF; C_{OUT} = 0.1µF; T_J = 25ºC)



Package Outline (All measurements in mm & inch)

Package Type: TO-252-3L (J1)



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