



PJ78XXSTE

3-Terminal Voltage Regulators

Description

The PJ78XXSTE series of three-terminal positive regulators are available in TO-252 package. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, it can deliver over 1.5A output current. Although designed as fixed voltage regulator, This device can be used with external components to obtain adjustable voltage and currents.

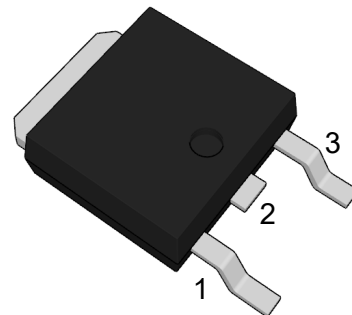
Features

- Input voltage: up to 40V
- Output voltage: 5V,6V,8V,9V,12V,15V,18V,24V
- Output current up to 1.5 A
- Thermal overload protection
- Short circuit current limiting

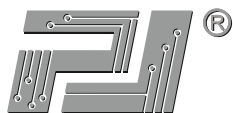
Applications

- DC motor drivers
- Household electric appliances
- Industrial power supplies
- Test and measurement equipment

TO-252



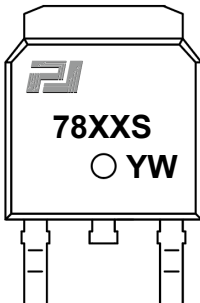
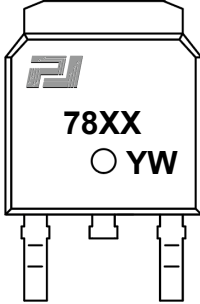
1. VIN 2. GND 3. VOUT



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Ordering Information

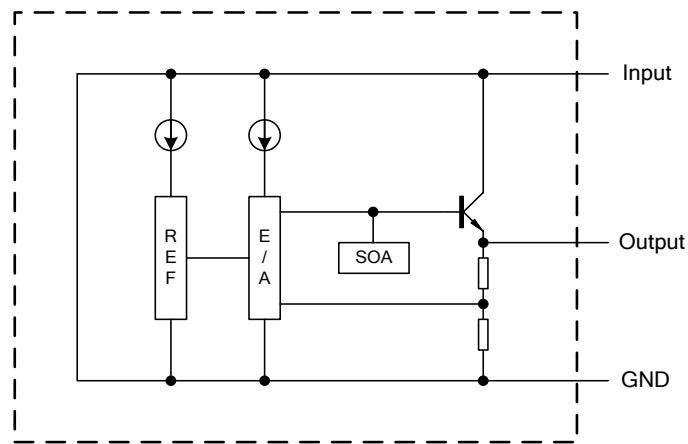
Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan ^{Note}	MSL Level	Marking Code
PJ7805STE	TO-252	13	2500	RoHS & Green	MSL3	 78XXS: Product code e.g. PJ7805STE:7805S YW: Year code and Week code
PJ7806STE						
PJ7808STE						
PJ7809STE						
PJ7812STE						
PJ7815STE						
PJ7818TE	TO-252	13	2500	RoHS & Green	MSL3	 78XX: Product code e.g. PJ7818TE:7818 YW: Year code and Week code
PJ7824TE						

Note:

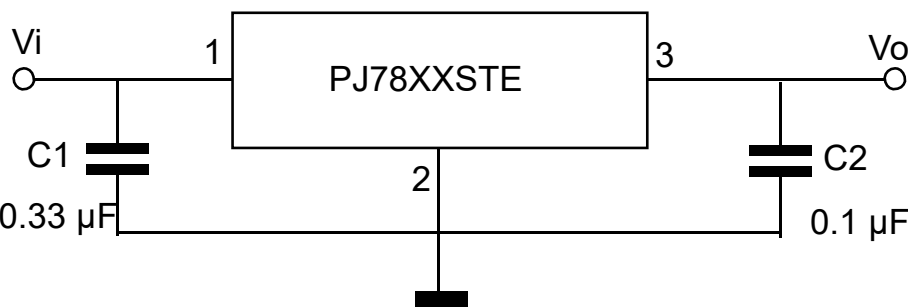
RoHS: PJ defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials.

Green: PJ defines "Green" to mean Halogen-Free and Antimony-Free.

Function Block Diagram



Typical Application Circuit



Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter		Symbol	Value	Unit
Input Voltage	$V_O=5\text{V}\sim 18\text{V}$	V_I	35	V
	$V_O=24\text{V}$		40	
Output Current		I_O	1.5	A
Maximum Power Dissipation		P_D	1.6	W
Operating Temperature Range		T_{OPR}	-40 to +125	°C
Storage Temperature Range		T_{STG}	-65 to +150	°C



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PJ7805STE Electrical Characteristics

$V_I=10V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	4.8	5.0	5.2	V
		$I_O=5mA$ to $1A$, $V_I=7.5V$ to $20V$, $P_D<15W$	4.75	5.0	5.25	V
Line Regulation	ΔV_O	$V_I=7.5V$ to $25V$, $T_J=25^{\circ}C$	--	--	100	mV
		$V_I=8V$ to $12V$, $T_J=25^{\circ}C$	--	--	50	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	100	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	50	mV
Ripple Rejection	RR	$V_I=8V$ to $18V$, $f=120Hz$	--	73	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	0.8	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=8V$ to $25V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz\leq f\leq 100kHz$, $T_A=25^{\circ}C$	--	40	--	μV



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3-Terminal Voltage Regulators

PJ7806STE Electrical Characteristics

$V_I=11V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	5.75	6.0	6.25	V
		$I_O=5mA$ to 1A, $V_I=8.5V$ to 21V, $P_D<15W$	5.7	6.0	6.3	V
Line Regulation	ΔV_O	$V_I=8.5V$ to 25V, $T_J=25^{\circ}C$	--	--	120	mV
		$V_I=9V$ to 13V, $T_J=25^{\circ}C$	--	--	60	mV
Load Regulation	ΔV_O	$I_O=5mA$ to 1.5A, $T_J=25^{\circ}C$	--	--	130	mV
		$I_O=250mA$ to 750mA, $T_J=25^{\circ}C$	--	--	60	mV
Ripple Rejection	RR	$V_I=9V$ to 19V, $f=120Hz$	--	70	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	0.9	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=9V$ to 25V	--	--	0.8	mA
		$I_O=5mA$ to 1A	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$, $T_A=25^{\circ}C$	--	45	--	μV



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3-Terminal Voltage Regulators

PJ7808STE Electrical Characteristics

$V_I=14V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	7.7	8.0	8.3	V
		$I_O=5mA$ to $1A$, $V_I=11V$ to $23V$, $P_D<15W$	7.6	8.0	8.4	V
Line Regulation	ΔV_O	$V_I=10.5V$ to $25V$, $T_J=25^{\circ}C$	--	--	160	mV
		$V_I=11V$ to $17V$, $T_J=25^{\circ}C$	--	--	80	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	160	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	80	mV
Ripple Rejection	RR	$V_I=11.5V$ to $21.5V$, $f=120Hz$	--	67	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	1.2	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=11V$ to $25V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz\leq f\leq 100kHz$, $T_A=25^{\circ}C$	--	52	--	μV



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3-Terminal Voltage Regulators

PJ7809STE Electrical Characteristics

$V_I=15V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	8.65	9.0	9.35	V
		$I_O=5mA$ to $1A$, $V_I=11.5V$ to $24V$, $P_D<15W$	8.6	9.0	9.4	V
Line Regulation	ΔV_O	$V_I=11.5V$ to $25V$, $T_J=25^{\circ}C$	--	--	180	mV
		$V_I=12V$ to $25V$, $T_J=25^{\circ}C$	--	--	90	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	180	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	90	mV
Ripple Rejection	RR	$V_I=13V$ to $23V$, $f=120Hz$	--	66	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	1.3	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=12V$ to $26V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz\leq f\leq 100kHz$, $T_A=25^{\circ}C$	--	58	--	μV



PJ78XXSTE

3-Terminal Voltage Regulators

PJ7812STE Electrical Characteristics

$V_I=19V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	11.5	12	12.5	V
		$I_O=5mA$ to $1A$, $V_I=14.5V$ to $27V$, $P_D<15W$	11.4	12	12.6	V
Line Regulation	ΔV_O	$V_I=14.5V$ to $30V$, $T_J=25^{\circ}C$	--	--	240	mV
		$V_I=16V$ to $22V$, $T_J=25^{\circ}C$	--	--	120	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	240	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	120	mV
Ripple Rejection	RR	$V_I=15V$ to $25V$, $f=120Hz$	--	64	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	1.7	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=15V$ to $30V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz\leq f\leq 100kHz$, $T_A=25^{\circ}C$	--	76	--	μV



PJ78XXSTE

3-Terminal Voltage Regulators

PJ7815STE Electrical Characteristics

$V_I=23V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	14.4	15	15.6	V
		$I_O=5mA$ to $1A$, $V_I=17.5V$ to $30V$, $P_D<15W$	14.25	15	15.75	V
Line Regulation	ΔV_O	$V_I=17.5V$ to $30V$, $T_J=25^{\circ}C$	--	--	300	mV
		$V_I=20V$ to $26V$, $T_J=25^{\circ}C$	--	--	150	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	300	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	150	mV
Ripple Rejection	RR	$V_I=18.5V$ to $28.5V$, $f=120Hz$	--	62	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	2	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=18V$ to $30.5V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz\leq f\leq 100kHz$, $T_A=25^{\circ}C$	--	90	--	μV



PJ78XXSTE

3-Terminal Voltage Regulators

PJ7818TE Electrical Characteristics

$V_I=26V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	17.3	18	18.7	V
		$I_O=5mA$ to $1A$, $V_I=21V$ to $33V$, $P_D<15W$	17.1	18	18.9	V
Line Regulation	ΔV_O	$V_I=21V$ to $33V$, $T_J=25^{\circ}C$	--	--	360	mV
		$V_I=24V$ to $30V$, $T_J=25^{\circ}C$	--	--	180	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	360	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	180	mV
Ripple Rejection	RR	$V_I=22V$ to $32V$, $f=120Hz$	--	57	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	2.3	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=21V$ to $33V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$, $T_A=25^{\circ}C$	--	110	--	μV



PJ78XXSTE

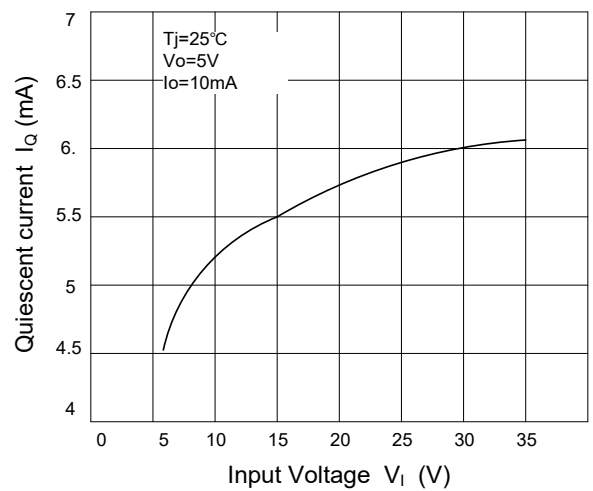
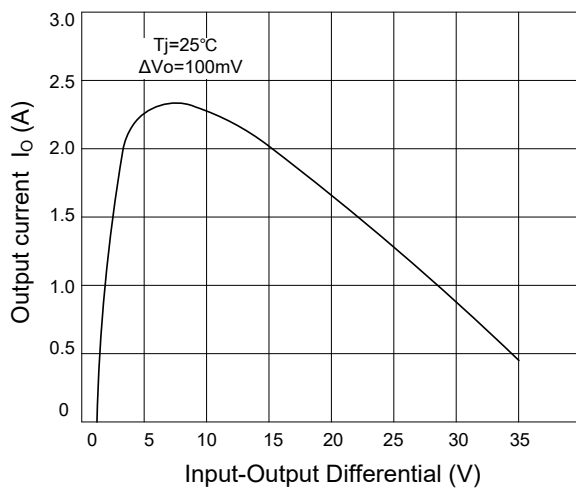
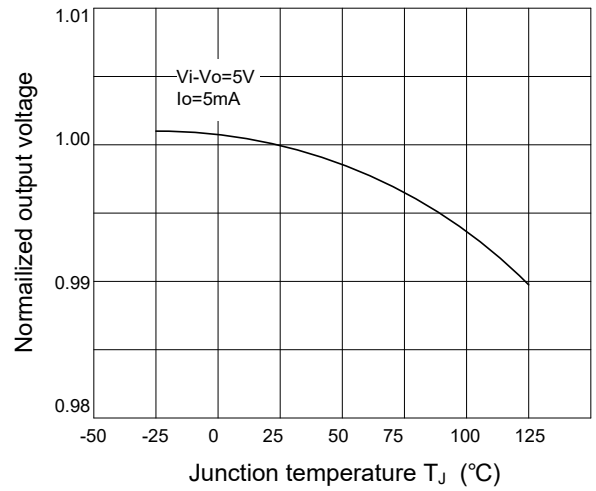
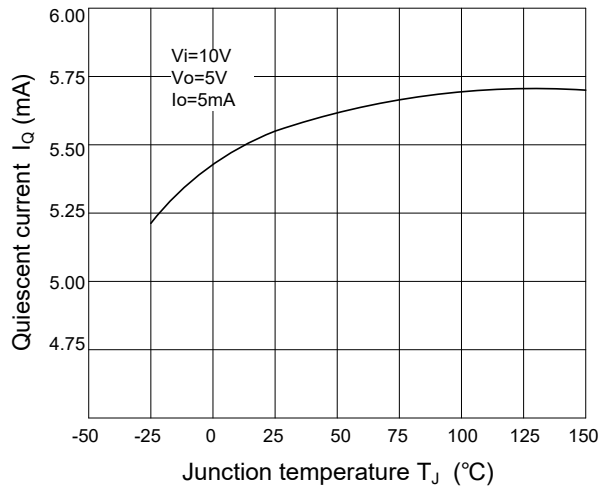
3-Terminal Voltage Regulators

PJ7824TE Electrical Characteristics

$V_I=33V$, $I_O=500mA$, $0<T_J<125^{\circ}C$, $C_I=0.33\mu F$, $C_O=0.1\mu F$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J=25^{\circ}C$	23	24	25	V
		$I_O=5mA$ to $1A$, $V_I=27V$ to $38V$, $P_D<15W$	22.8	24	25.2	V
Line Regulation	ΔV_O	$V_I=27V$ to $38V$, $T_J=25^{\circ}C$	--	--	480	mV
		$V_I=30V$ to $36V$, $T_J=25^{\circ}C$	--	--	240	mV
Load Regulation	ΔV_O	$I_O=5mA$ to $1.5A$, $T_J=25^{\circ}C$	--	--	480	mV
		$I_O=250mA$ to $750mA$, $T_J=25^{\circ}C$	--	--	240	mV
Ripple Rejection	RR	$V_I=28V$ to $38V$, $f=120Hz$	--	54	--	dB
Dropout Voltage	V_D	$I_O=1A$, $T_J=25^{\circ}C$	--	2	--	V
Quiescent Current	I_Q	$T_J=25^{\circ}C$	--	--	8	mA
Temperature coefficient of V_O	$\Delta V_O/\Delta T$	$I_O=5mA$	--	3	--	mV/ $^{\circ}C$
Quiescent Current Change	ΔI_Q	$V_I=27V$ to $38V$	--	--	0.8	mA
		$I_O=5mA$ to $1A$	--	--	0.5	mA
Output Noise Voltage	V_N	$10Hz\leq f\leq 100kHz$, $T_A=25^{\circ}C$	--	170	--	μV

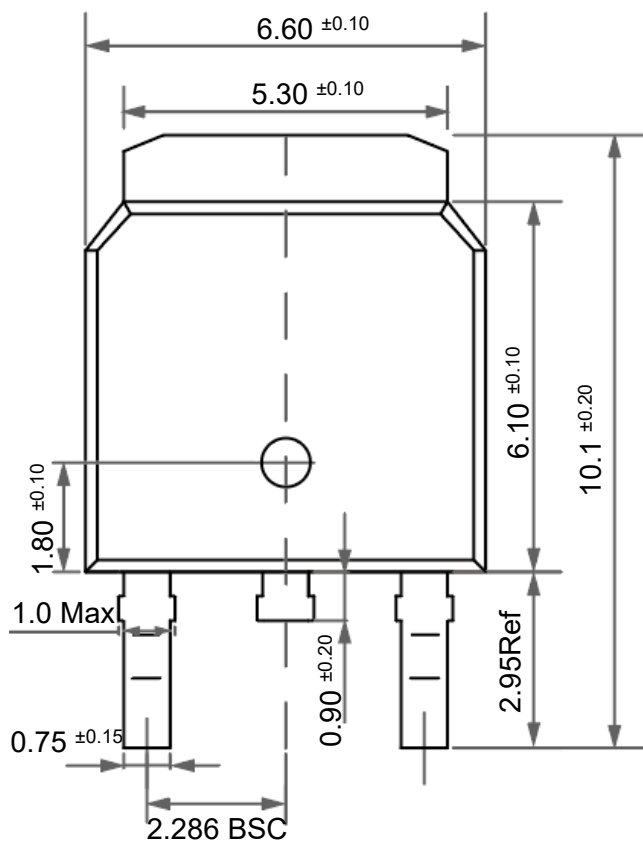
Typical Characteristic Curves



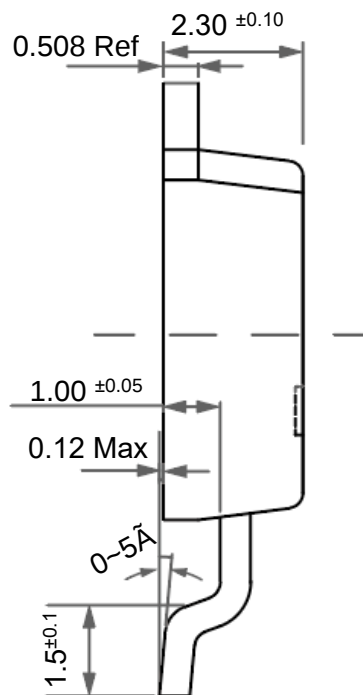
Package Outline

TO-252

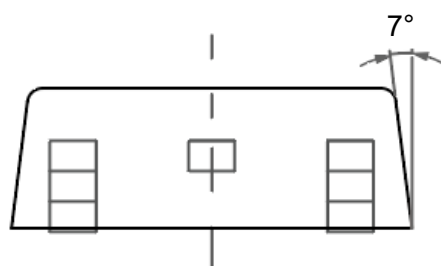
Dimensions in mm



Front View



Side View



Bottom View