1.5A Low Dropout Linear Regulator

General Description

- The LD1086 is a series of low dropout positive voltage regulators with a maximum dropout of 1.5V at 1.5A of load current.
- The LD1086 series is available in 1.5V, 1.8V, 2.5V, 3.0V, 3.3V and 5.0V versions. The fixed versions integrate the adjust resistors. It is also available in an adjustable version which can set the output voltage with two external resistors.
- The LD1086 series features on-chip thermal shutdown. It also includes a band gap reference and a current limiting circuit.
- The LD1086 series is available in standard packages of DPAK(TO-252-2), D^2PAK(TO-263-3), TO-220 and SOT-223.

DPAK (TO-252-2)

D^2PAK (TO-263-3)

TO-220

SOT-223

Features

- Low dropout voltage: 1.3V typical at 1.5A
- Current limiting and thermal protection
- Output current: 1.5A
- Current limit: 2.3A
- Operation junction temperature: 0 to 125°C
- Line regulation: 0.015% typical
- Load regulation: 0.1% typical
- RoHS compliant and halogen free

Applications

- High Efficiency Linear Regulator
- Battery Chargers
- Post Regulation for Switching Supply
- Microprocessor Supply
- Motherboard Power Supply
- Cable and ADSL Modem
- DVD-Video Player
- Telecom Equipment
- Set Top Boxes and Web Boxes Modules' Supply

RoHS Compliant

HALOGEN FREE

LD1086 Series

Ordering Information

LD1086 □□ - □□□ - 08 - □□□□

Circuit Type
Io=1.5A

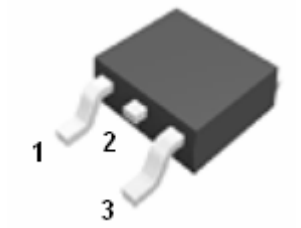
Outline
D: DPAK(TO-252-2)
MC: D^2PAK-2(TO-263-2)
T: TO-220
H: SOT-223

Output Voltage
ADJ: Adjustable Output
1.5: Fixed Output 1.5V
1.8: Fixed Output 1.8V
2.5: Fixed Output 2.5V
3.0: Fixed Output 3.0V
3.3: Fixed Output 3.3V
5.0: Fixed Output 5.0V

Factory Location Code

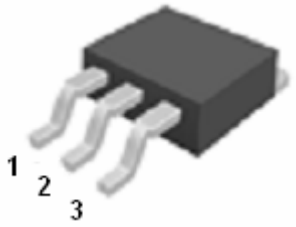
Packing Code
TU: Tube, RoHS
UG: Tube, RoHS&HF
TR30: 13” Reel, RoHS
RG30: 13” Reel, RoHS&HF

Pin Configuration



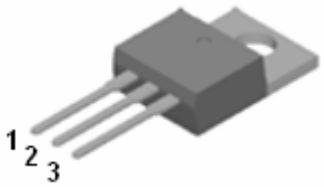
1: GND/ADJ 2: OUTPUT 3: INPUT

DPAK(TO-252-2)



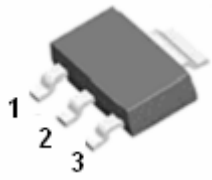
1: GND/ADJ 2: OUTPUT 3: INPUT

D^2PAK(TO-263-3)



1: GND/ADJ 2: OUTPUT 3: INPUT

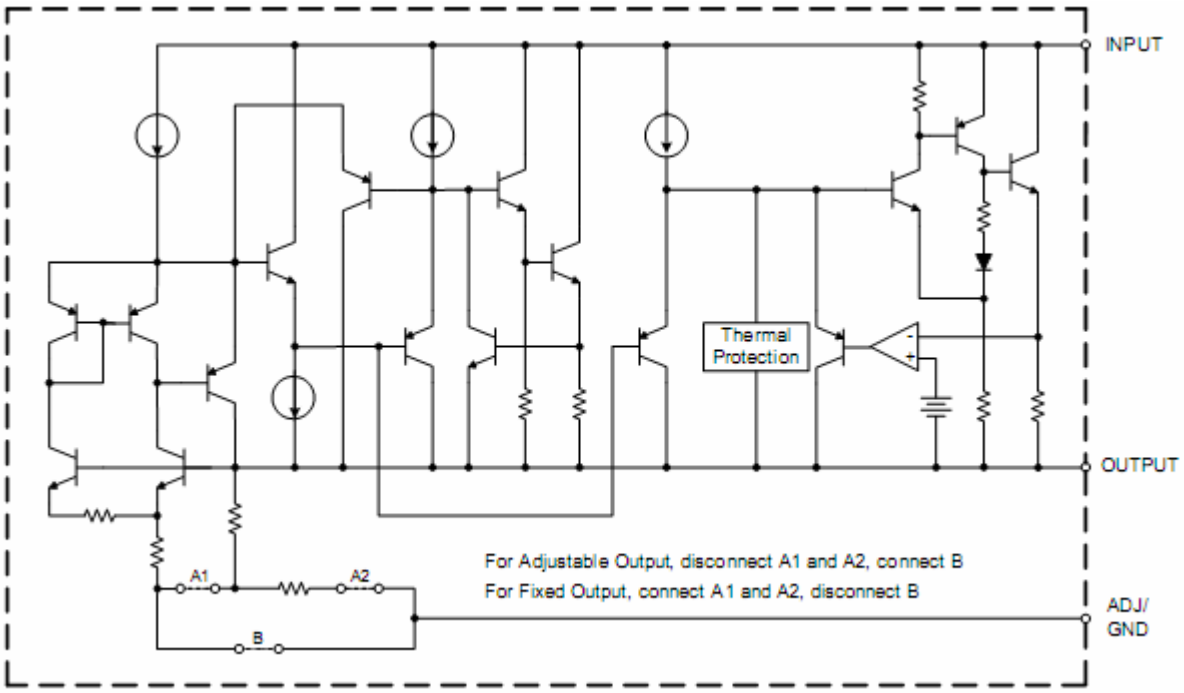
TO-220



1: GND/ADJ 2: OUTPUT 3: INPUT

SOT-223

Block Diagram



Absolute Maximum Ratings (Note 1)

Symbol	Description		Ratings	Unit
T_J	Operating Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-65 ~ +150	°C
T_{LEAD}	Lead Temperature (Soldering, 10 sec.)		260	°C
θ_{JA}	Junction-to-Ambient Thermal Resistance (Note 2)	DPAK(TO-252-2)	100	°C/W
		D^2PAK (TO-263-3)	60	
		TO-220	60	
		SOT-223	120	
θ_{JC}	Junction-to-Case Thermal Resistance (Note 2)	DPAK(TO-252-2)	12.81	°C/W
		D^2PAK (TO-263-3)	7.22	
		TO-220	7.22	
		SOT-223	19.35	
ESD	ESD (Machine Model)		400	V

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

2. Absolute maximum ratings indicate limits, beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings.

Recommended Operating Conditions

Symbol	Description	Min.	Max.	Unit
V_{IN}	Input Voltage	-	15	V
T_J	Operating Junction Temperature Range	0	125	°C

Electrical Characteristics

(Unless otherwise specified, T_J=25°C)

LD1086-ADJ

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{REF}	Reference Voltage	1.238	1.250	1.262	V	I_{OUT}=10mA, V_{IN}-V_{OUT}=2V
		1.225	1.250	1.270	V	10mA≤I_{OUT}≤1.5A,1.4V≤V_{IN}-V_{OUT}≤6V 0°C≤T_J≤125°C
ΔV_{LINE}	Line Regulation	-	0.015	0.2	%	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	0.035	0.2	%	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	0.1	0.3	%	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	0.2	0.4	%	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{REF} =1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_{LOAD}	Min. Load Current	-	2	5	mA	1.4V≤V_{IN}-V_{OUT}≤10V, 0°C≤T_J≤125°C
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
I_{ADJ}	Adjust Pin Current	-	60	120	uA	0°C≤T_J≤125°C
ΔI_{ADJ}	Adjust Pin Current Change	-	0.2	5	uA	10mA≤I_{OUT}≤1.5A,1.4V≤V_{IN}-V_{OUT}≤10V, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

LD1086-1.5

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{OUT}	Output Voltage	1.485	1.5	1.515	V	I_{OUT}=10mA, V_{IN}=3.5V
		1.47	1.5	1.53	V	10mA≤I_{OUT}≤1.5A, 3V≤V_{IN}≤10V, 0°C≤T_J≤125°C
ΔV_{LINE}	Line Regulation	-	0.3	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	0.6	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	3	12	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	6	20	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{OUT}=1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

LD1086-1.8

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{OUT}	Output Voltage	1.782	1.8	1.818	V	I_{OUT}=10mA, V_{IN}=3.8V
		1.746	1.8	1.854	V	10mA≤I_{OUT}≤1.5A, 0°C≤T_J≤125°C 3.2V≤V_{IN}≤10V,
ΔV_{LINE}	Line Regulation	-	0.3	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	0.6	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	3	12	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	6	20	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{OUT}=1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

LD1086-2.5

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{OUT}	Output Voltage	2.475	2.5	2.525	V	I_{OUT}=10mA, V_{IN}=4.5V
		2.45	2.5	2.55	V	10mA≤I_{OUT}≤1.5A, 0°C≤T_J≤125°C 3.9V≤V_{IN}≤10V,
ΔV_{LINE}	Line Regulation	-	0.3	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	0.6	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	3	12	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	6	20	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{OUT}=1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

LD1086-3.0

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{OUT}	Output Voltage	2.97	3.0	3.03	V	I_{OUT}=10mA, V_{IN}=4.5V
		2.94	3.0	3.06	V	10mA≤I_{OUT}≤1.5A, 0°C≤T_J≤125°C 4.75V≤V_{IN}≤10V,
ΔV_{LINE}	Line Regulation	-	0.3	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	0.6	6	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	3	15	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	7	20	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{OUT}=1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

LD1086-3.3

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{OUT}	Output Voltage	3.267	3.3	3.333	V	I_{OUT}=10mA, V_{IN}=5V
		3.235	3.3	3.365	V	10mA≤I_{OUT}≤1.5A, 0°C≤T_J≤125°C 4.9V≤V_{IN}≤10V,
ΔV_{LINE}	Line Regulation	-	0.5	10	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	1	10	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	3	15	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	7	20	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{OUT}=1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

LD1086-5.0

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
V_{OUT}	Output Voltage	4.95	5.0	5.05	V	I_{OUT}=10mA, V_{IN}=7V
		4.9	5.0	5.10	V	10mA≤I_{OUT}≤1.5A, 0°C≤T_J≤125°C 6.5V≤V_{IN}≤10V,
ΔV_{LINE}	Line Regulation	-	0.5	10	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V
		-	1	10	mV	I_{OUT}=10mA, 1.5V≤V_{IN}-V_{OUT}≤10V 0°C≤T_J≤125°C
ΔV_{LOAD}	Load Regulation	-	5	20	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V
		-	10	35	mV	10mA≤I_{OUT}≤1.5A, V_{IN}-V_{OUT}=2V 0°C≤T_J≤125°C
V_D	Dropout Voltage	-	1.3	1.5	V	I_{OUT}=1.5A, ΔV_{OUT}=1%
I_{LIMIT}	Current Limit	1.5	2.3	-	A	V_{IN}-V_{OUT}=2V
I_Q	Quiescent Current	-	5	10	mA	V_{IN}= V_{OUT}+1.3V, 0°C≤T_J≤125°C
ΔeN	RMS Noise(ΔV_{OUT})	-	0.003	-	%	10Hz≤f≤10KHz, T_A=25°C
RR	Ripple Rejection	60	75	-	dB	I_{OUT}=1.5A, C_{OUT}=25uF(Tantalum) V_{IN}-V_{OUT}=3V, f=120Hz, 0°C≤T_J≤125°C
	Temperature Stability	-	0.5	-	%	0°C≤T_J≤125°C
	Thermal Shutdown	-	165	-	°C	Junction Temperature
	Thermal Shutdown Hysteresis	-	30	-	°C	

Typical Characteristics Curves

Fig.1- Dropout Voltage vs. Output Current

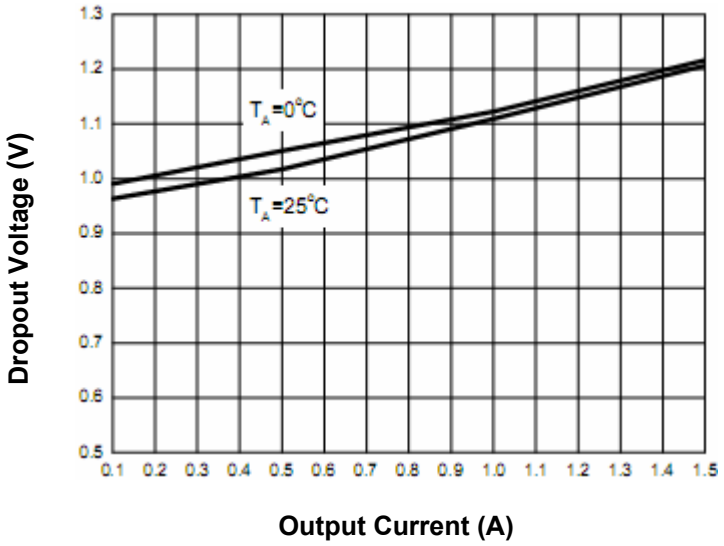


Fig.2- Max Power Dissipation vs. Case Temperature

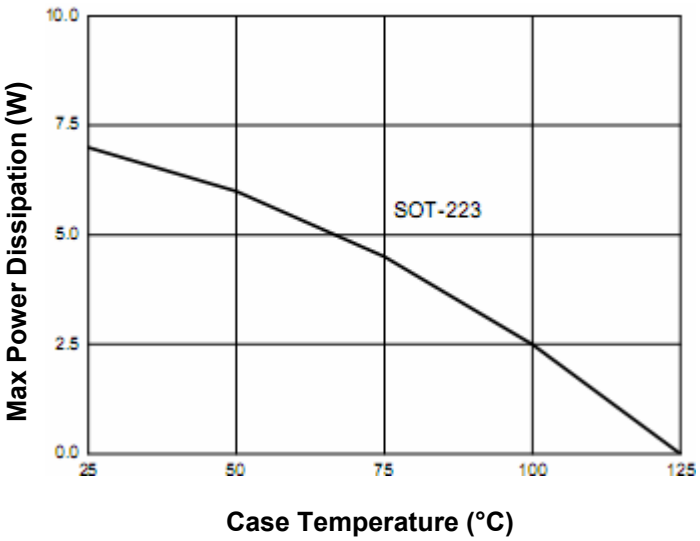


Fig.3- Output Voltage vs. Junction Temperature

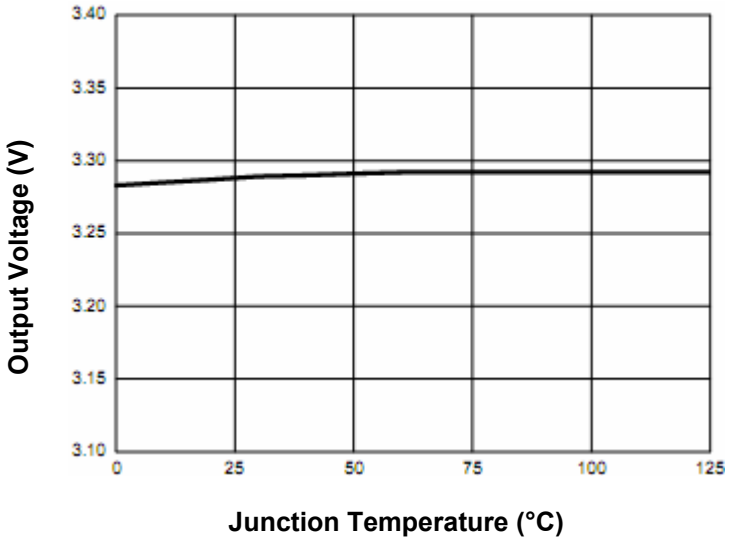


Fig.4- Dropout Voltage vs. Junction Temperature

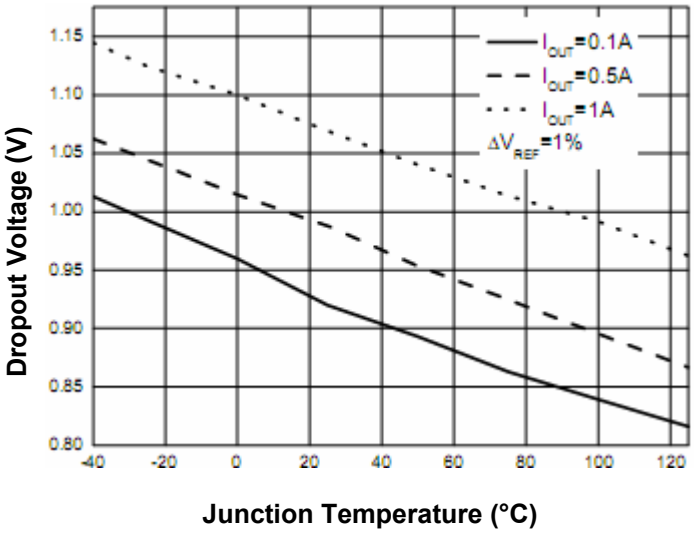


Fig.5- Reference Voltage vs. Junction Temperature

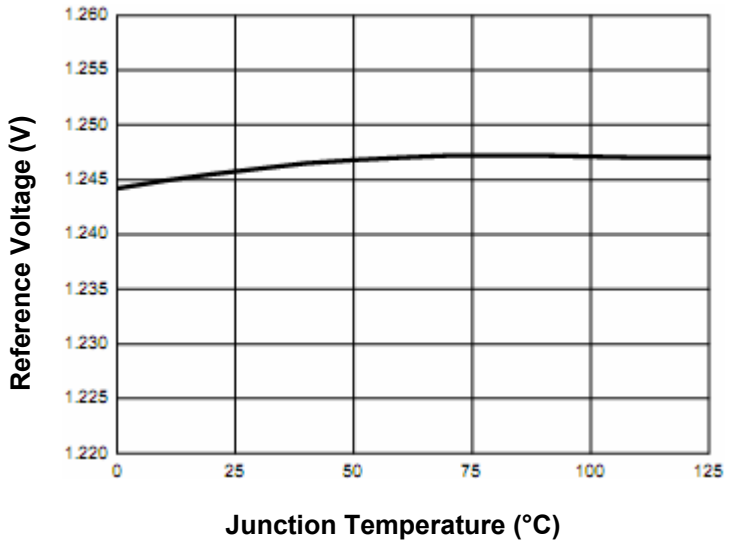


Fig.6- Min. Load Current vs. Junction Temperature

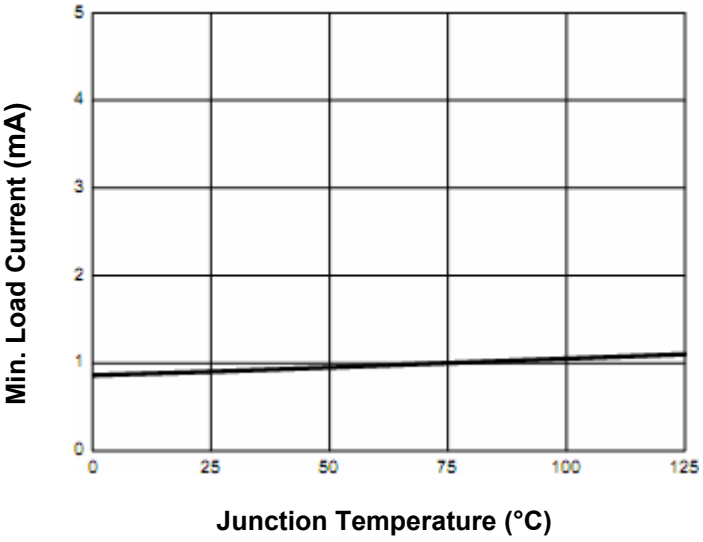


Fig.7- Adjust Pin Current vs. Junction Temperature

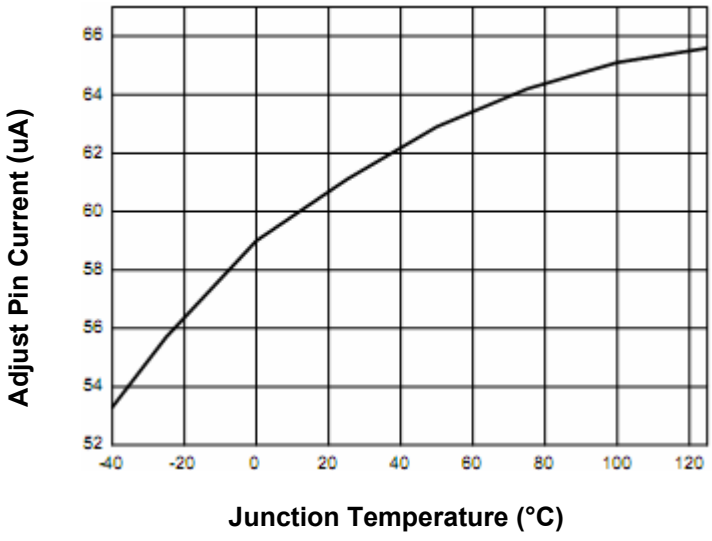


Fig.8- Short Circuit Current vs. Junction Temperature

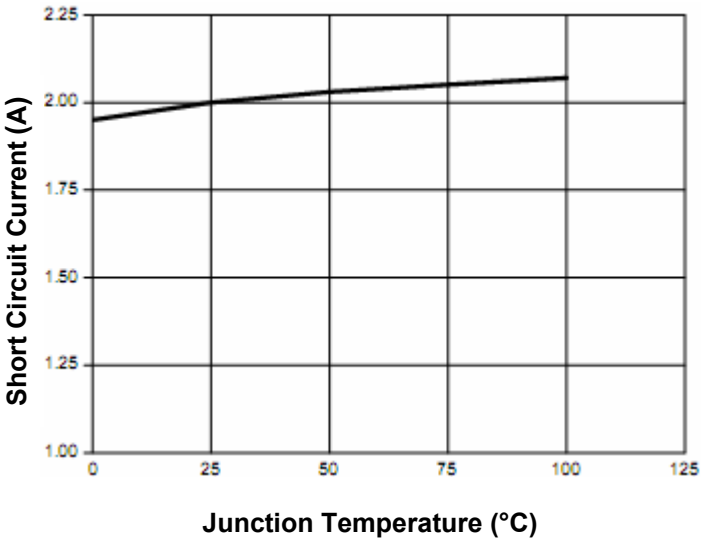


Fig.9- Load Regulation vs. Junction Temperature

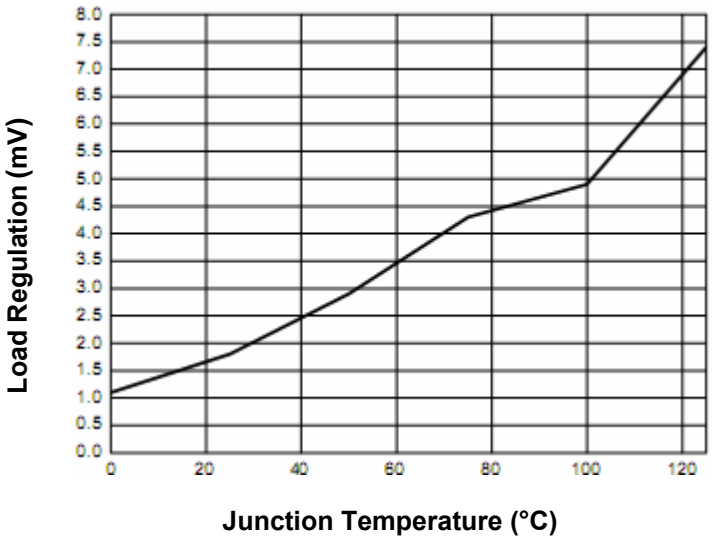


Fig.10- Ripple Rejection vs. Frequency

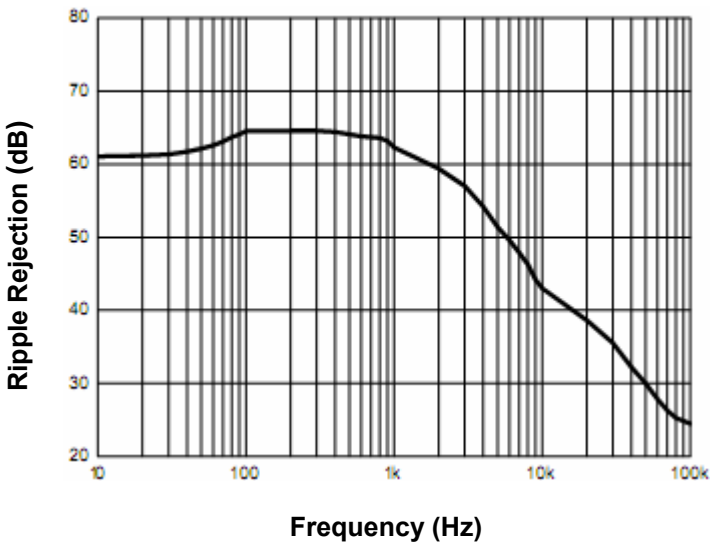
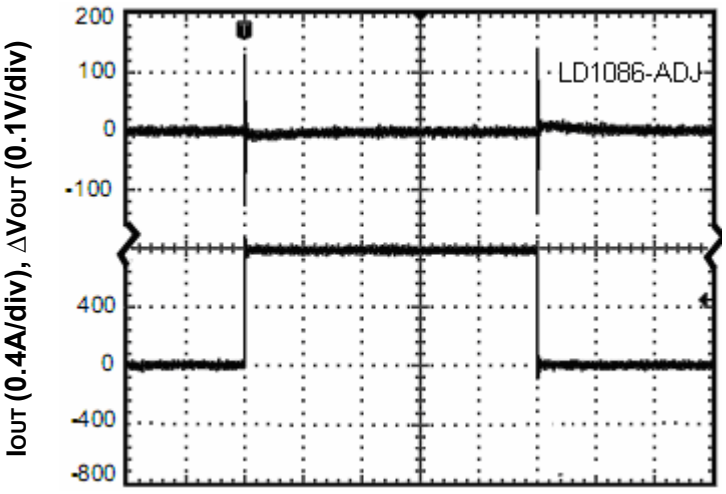


Fig.11- Load Transient Response

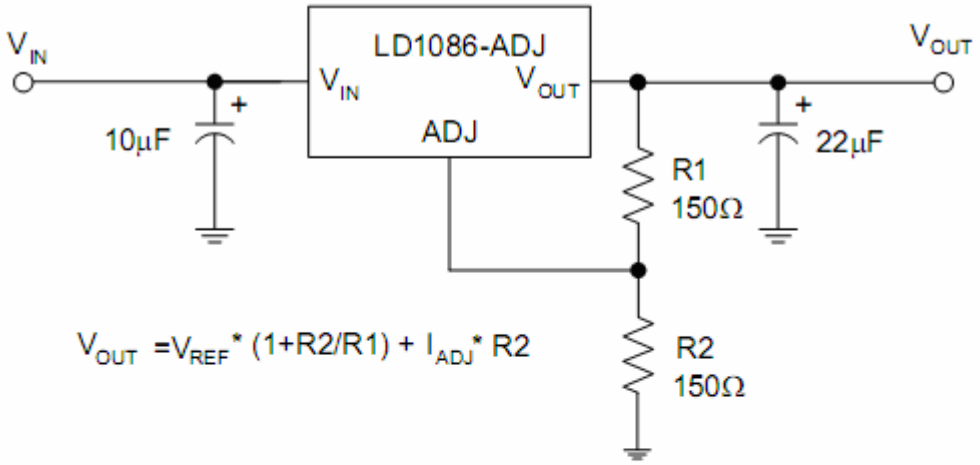


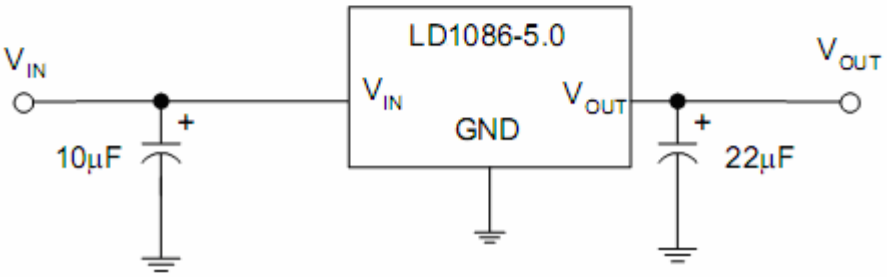
Conditions: V_{IN}=4.8V, V_{OUT}=3.3V,I_{OUT}=0.1A to 0.75A, C_{IN}=10uF, C_{OUT}=10uF

Fig.12- Line Transient Response

Conditions: V_{IN}=4.8V to 5.8V, V_{OUT}=3.3V, I_{OUT}=100mA, C_{IN}=1uF, C_{OUT}=10uF

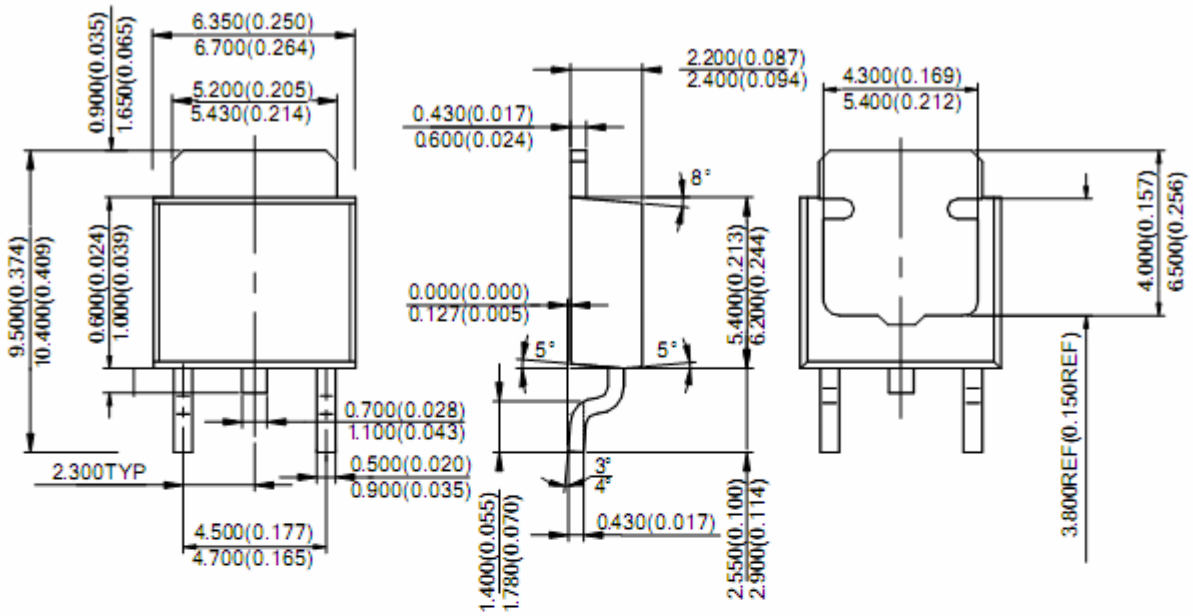
Typical Applications

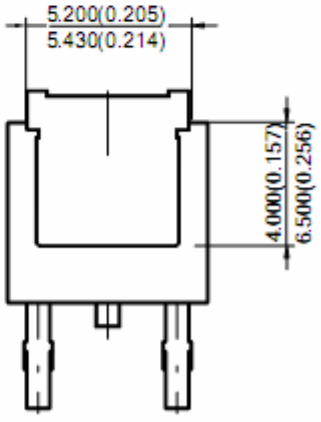




Dimensions in mm(inch)

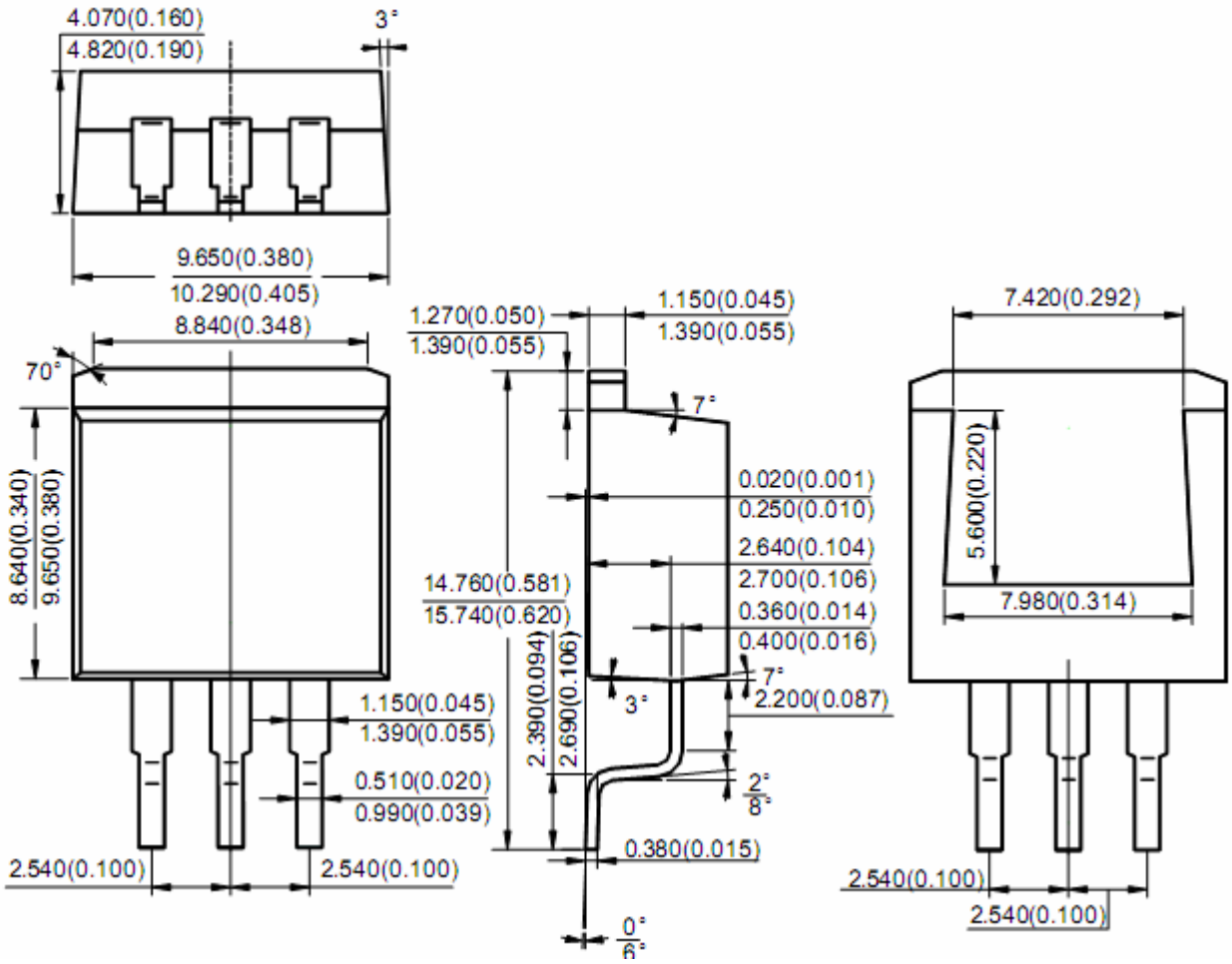
DPAK(TO-252-2)



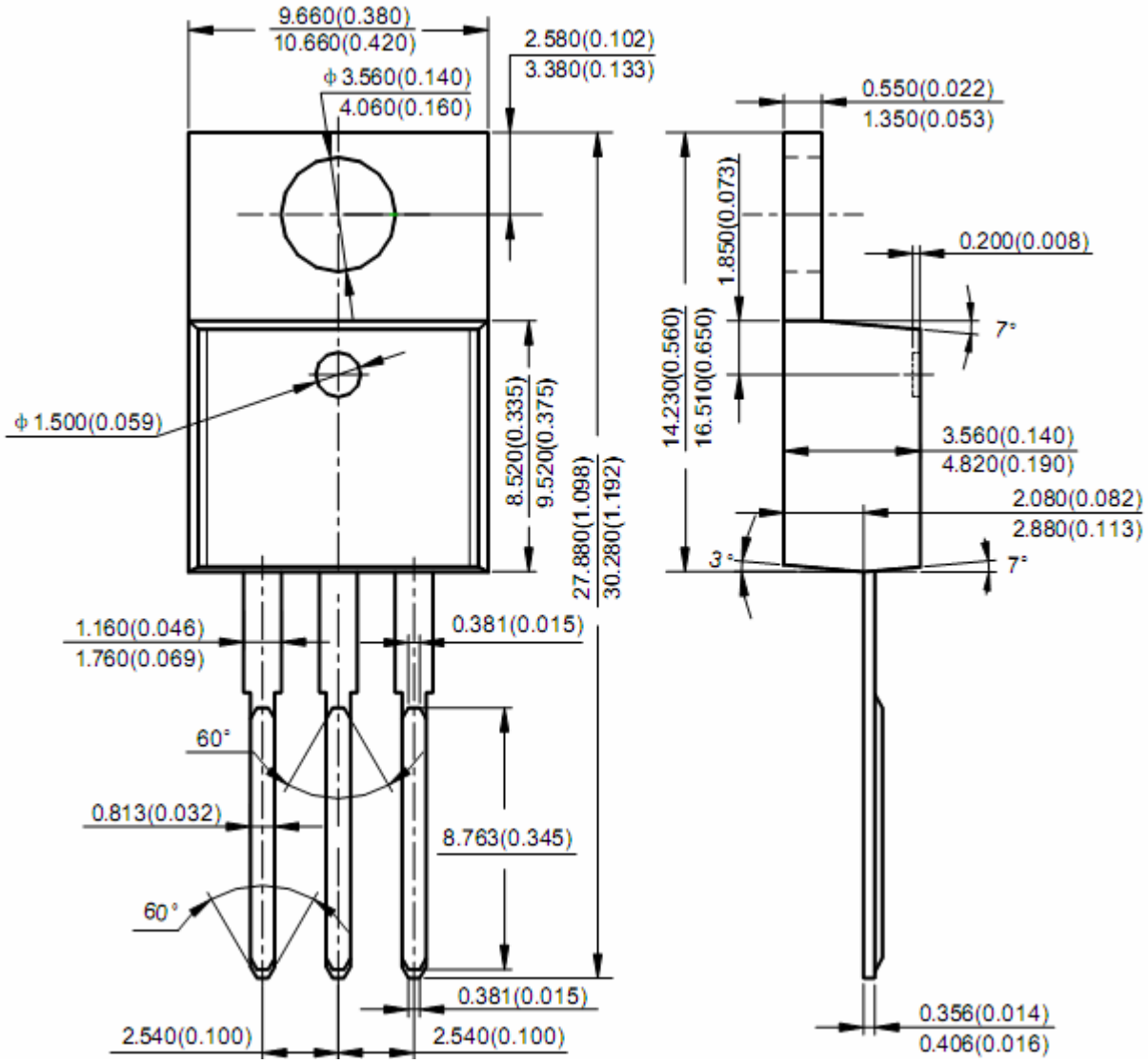


OPTIONAL
CONSTRUCTION

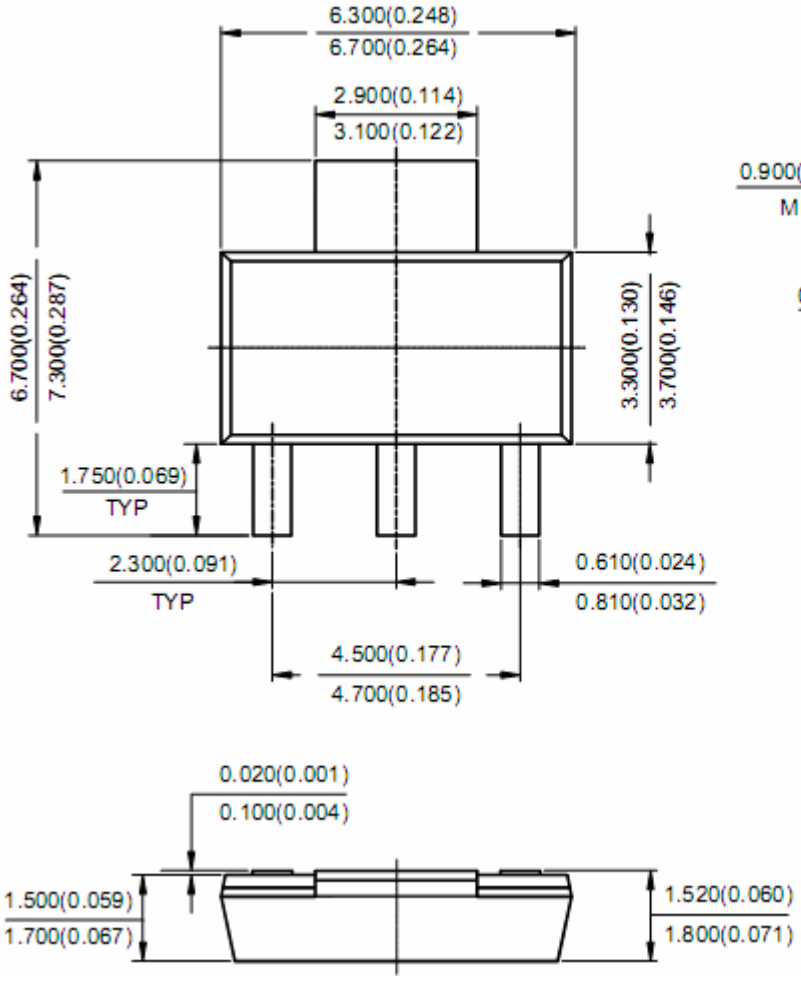
D²PAK (TO-263-3)



TO-220


9.660(0.380)
10.660(0.420)
2.580(0.102)
3.380(0.133)
ϕ3.560(0.140)
4.060(0.160)
ϕ1.500(0.059)
8.520(0.335)
9.520(0.375)
27.880(1.098)
30.280(1.192)
1.160(0.046)
1.760(0.069)
0.381(0.015)
60°
0.813(0.032)
8.763(0.345)
60°
0.381(0.015)
2.540(0.100)
2.540(0.100)
0.550(0.022)
1.350(0.053)
1.850(0.073)
0.200(0.008)
7°
14.230(0.560)
16.510(0.650)
3.560(0.140)
4.820(0.190)
2.080(0.082)
2.880(0.113)
3°
7°
0.356(0.014)
0.406(0.016)

SOT-223


6.300(0.248)
6.700(0.264)
2.900(0.114)
3.100(0.122)
6.700(0.264)
7.300(0.287)
3.300(0.130)
3.700(0.146)
1.750(0.069)
TYP
2.300(0.091)
TYP
0.610(0.024)
0.810(0.032)
4.500(0.177)
4.700(0.185)
0.250(0.010)
0.350(0.014)
0.900(0.035)
MIN
0.250(0.010)
0°
10°
0.020(0.001)
0.100(0.004)
1.500(0.059)
1.700(0.067)
1.520(0.060)
1.800(0.071)

Packing information

Package	Packing Type	Min. Packing		Inner Box Packing		Carton Packing	
		Qty.	Dimensions(mm)	Qty.	Dimensions(mm)	Qty.	Dimensions(mm)
DPAK (TO-252-2)	Tube	80	540	4K	554x135x70	20K	575x386x165
	T & R	2.5K	330x330x18	2.5K	355x340x36	25K	400x370x365
D^2PAK	Tube	50	534	1K	554x135x70	5K	575x386x165
	T & R	0.8K	330x330x18	0.8K	355x340x36	8K	400x370x365
TO-220	Tube	50	534	1K	554x135x70	5K	575x386x165
SOT-223	T & R	4K	330x330x18	8K	360x360x60	64K	520x380x390

How to contact us:

US HEADQUARTERS

28040 WEST HARRISON PARKAWAY, VALENCIA, CA 91355-4162
Tel: (800) TAITRON (800) 824-8766 (661) 257-6060
Fax: (800) TAITFAX (800) 824-8329 (661) 257-6415
Email: taitron@taitroncomponents.com
Http://www.taitroncomponents.com

TAITRON COMPONENTS MEXICO, S.A .DE C.V.

BOULEVARD CENTRAL 5000 INTERIOR 5 PARQUE INDUSTRIAL ATITALAQUIA, HIDALGO C.P. 42970 MEXICO
Tel: +52-55-5560-1519
Fax: +52-55-5560-2190

TAITRON COMPONETS INCORPORATED E REPRESENTAÇÕES DO BRASIL LTDA

RUA DOMINGOS DE MORAIS, 2777, 2.ANDAR, SALA 24 SAÚDE - SÃO PAULO-SP 04035-001 BRAZIL
Tel: +55-11-5574-7949
Fax: +55-11-5572-0052

TAITRON COMPONETS INCORPORATED, SHANGHAI REPRESENTATIVE OFFICE

METROBANK PLAZA, 1160 WEST YAN' AN ROAD, SUITE 1503, SHANGHAI, 200052, CHINA
Tel: +86-21-5424-9942
Fax: +86-21-5424-9931