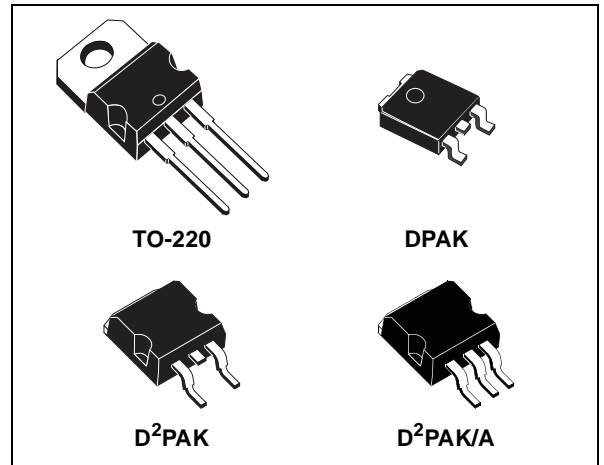


## 1.5A LOW DROP POSITIVE VOLTAGE REGULATOR ADJUSTABLE AND FIXED

- TYPICAL DROPOUT 1.3V AT 1.5A
- THREE TERMINAL ADJUSTABLE OR FIXED OUTPUT VOLTAGE 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 3.6V, 5V, 8V, 9V, 12V.
- GUARANTEED OUTPUT CURRENT UP TO 1.5A
- OUTPUT TOLERANCE  $\pm 1\%$  AT 25°C AND  $\pm 2\%$  IN FULL TEMPERATURE RANGE
- INTERNAL POWER AND THERMAL LIMIT
- WIDE OPERATING TEMPERATURE RANGE -40°C TO 125°C
- PACKAGE AVAILABLE: TO-220, D<sup>2</sup>PAK, D<sup>2</sup>PAK/A, DPAK
- PINOUT COMPATIBILITY WITH STANDARD ADJUSTABLE VREG



### DESCRIPTION

The LD1086 is a LOW DROP Voltage Regulator able to provide up to 1.5A of Output Current. Dropout is guaranteed at a maximum of 1.2V at the maximum output current, decreasing at lower loads. The LD1086 is pin to pin compatible with the older 3-terminal adjustable regulators, but has better performances in term of drop and output tolerance.

A 2.85V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1086 quiescent current flows into the load, so increase efficiency. Only a 10 $\mu$ F minimum capacitor is need for stability. The device is supplied in TO-220, D<sup>2</sup>PAK, D<sup>2</sup>PAK/A and DPAK. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 1\%$  at 25°C.

**Table 1: Order Codes**

TO-220	D <sup>2</sup> PAK (*)	D <sup>2</sup> PAK/A (*)	DPAK (*)	OUTPUT VOLTAGE
LD1086V15	LD1086D2T15	LD1086D2M15	LD1086DT15	1.5 V
LD1086V18	LD1086D2T18	LD1086D2M18	LD1086DT18	1.8 V
LD1086V25	LD1086D2T25	LD1086D2M25	LD1086DT25	2.5 V
LD1086V28	LD1086D2T28	LD1086D2M28	LD1086DT28	2.85 V
LD1086V33	LD1086D2T33	LD1086D2M33	LD1086DT33	3.3 V
LD1086V36	LD1086D2T36	LD1086D2M36	LD1086DT36	3.6 V
LD1086V50	LD1086D2T50	LD1086D2M50	LD1086DT50	5.0 V
LD1086V80	LD1086D2T80	LD1086D2M80	LD1086DT80	8.0 V
LD1086V90	LD1086D2T90	LD1086D2M90	LD1086DT90	9.0 V
LD1086V12	LD1086D2T12	LD1086D2M12	LD1086DT12	12.0 V
LD1086V	LD1086D2T	LD1086D2M	LD1086DT	ADJ

(\*) Available in Tape & Reel with the suffix "TR".

Figure 1: Pin Connection (top view)

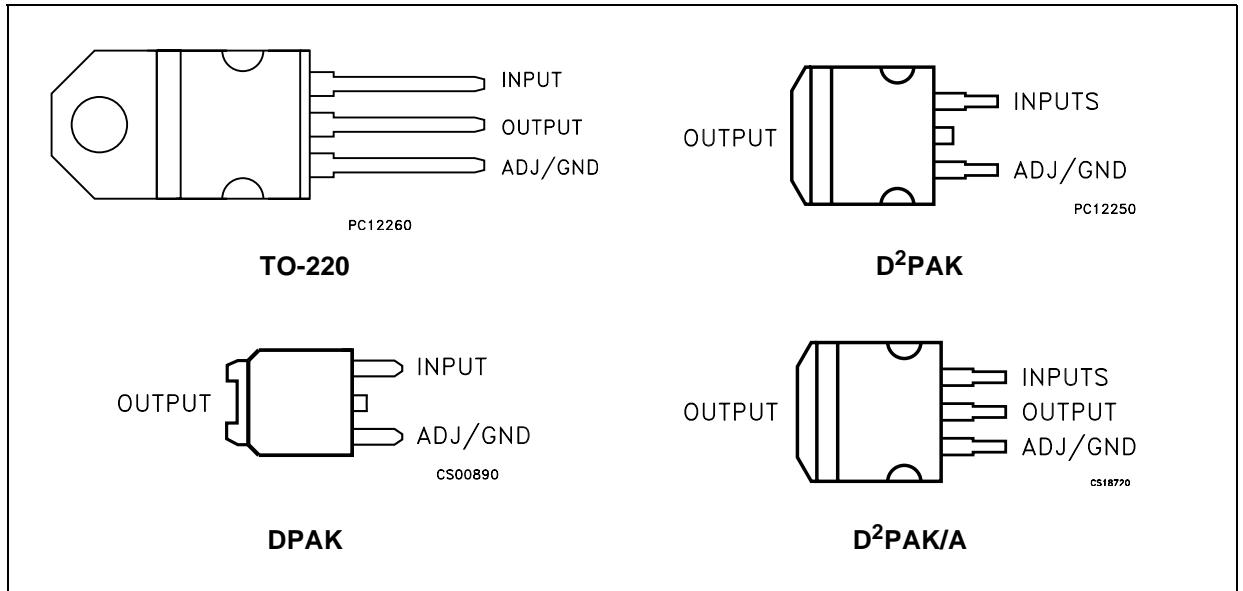


Table 2: Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
$V_I$	DC Input Voltage	30	V
$I_O$	Output Current	Internally Limited	mA
$P_D$	Power Dissipation	Internally Limited	mW
$T_{stg}$	Storage Temperature Range	-55 to +150	°C
$T_{op}$	Operating Junction Temperature Range	-40 to +125	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 3: Thermal Data

Symbol	Parameter	TO-220	D <sup>2</sup> PAK	DPAK	Unit
$R_{thj-case}$	Thermal Resistance Junction-case	3	3	8	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	50	62.5		°C/W

Figure 2: Application Circuits

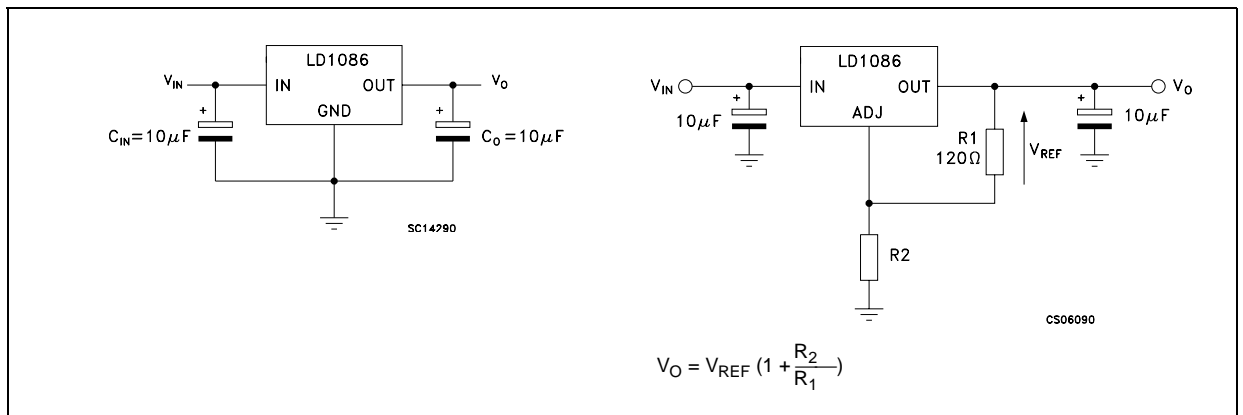
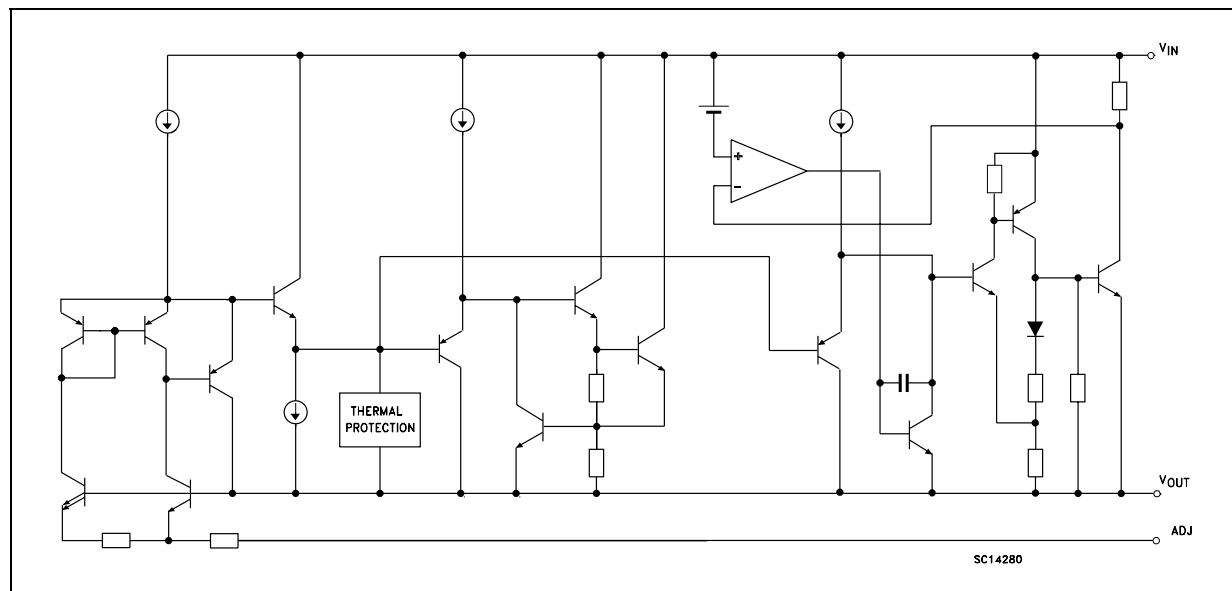


Figure 3: Schematic Diagram



**Table 4: Electrical Characteristics Of LD1086#15** ( $V_I = 4.5V$ ,  $C_I = C_O = 10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	1.485	1.5	1.515	V
		$I_O = 0$ to $1.5A$ $V_I = 3.4$ to $30V$	1.47	1.5	1.53	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 3.1$ to $18V$ $T_J = 25^\circ C$		0.2	4	mV
		$I_O = 0 \text{ mA}$ $V_I = 3.1$ to $15V$		0.4	4	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		0.5	8	mV
		$I_O = 0$ to $1.5A$		1	16	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.02		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 6.5 \pm 3V$	60	82		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 5: Electrical Characteristics Of LD1086#18** ( $V_I=4.8V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	1.782	1.8	1.818	V
		$I_O = 0$ to $1.5A$ $V_I = 3.4$ to $30V$	1.764	1.8	1.836	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 3.4$ to $18V$ $T_J = 25^\circ C$		0.2	4	mV
		$I_O = 0 \text{ mA}$ $V_I = 3.4$ to $15V$		0.4	4	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		0.5	8	mV
		$I_O = 0$ to $1.5A$		1	16	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.02		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 6.8 \pm 3V$	60	82		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 6: Electrical Characteristics Of LD1086#25** ( $V_I=5.5V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	2.475	2.5	2.525	V
		$I_O = 0$ to $1.5A$ $V_I = 4.1$ to $30V$	2.45	2.5	2.55	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 4.1$ to $18V$ $T_J = 25^\circ C$		0.2	4	mV
		$I_O = 0 \text{ mA}$ $V_I = 4.1$ to $18V$		0.4	4	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		0.5	8	mV
		$I_O = 0$ to $1.5A$		1	16	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.008	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 7.5 \pm 3V$	60	81		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 7: Electrical Characteristics Of LD1086#285** ( $V_I=5.85V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0$ mA $T_J = 25^\circ C$	2.821	2.85	2.879	V
		$I_O = 0$ to 1.5A $V_I = 4.5$ to 30V	2.793	2.85	2.907	V
$\Delta V_O$	Line Regulation	$I_O = 0$ mA $V_I = 4.5$ to 18V $T_J = 25^\circ C$		0.2	6	mV
		$I_O = 0$ mA $V_I = 4.5$ to 18V		0.5	6	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to 1.5A $T_J = 25^\circ C$		1	12	mV
		$I_O = 0$ to 1.5A		2	20	mV
$V_d$	Dropout Voltage	$I_O = 1.5$ A		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30$ V		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5$ V	1.5	2		A
		$V_I - V_O = 25$ V	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120$ Hz, $C_O = 25$ $\mu F$ , $I_O = 1.5$ A $V_I = 7.85 \pm 3$ V	60	80		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10$ Hz to 10KHz		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 8: Electrical Characteristics Of LD1086#33** ( $V_I=6.3V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0$ mA $T_J = 25^\circ C$	3.267	3.3	3.333	V
		$I_O = 0$ to 1.5A' $V_I = 4.9$ to 30V	3.234	3.3	3.366	V
$\Delta V_O$	Line Regulation	$I_O = 0$ mA $V_I = 4.9$ to 18V $T_J = 25^\circ C$		0.5	6	mV
		$I_O = 0$ mA $V_I = 4.9$ to 18V		1	6	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to 1.5A $T_J = 25^\circ C$		1	10	mV
		$I_O = 0$ to 1.5A		7	25	mV
$V_d$	Dropout Voltage	$I_O = 1.5$ A		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30$ V		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5$ V	1.5	2		A
		$V_I - V_O = 25$ V	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.008	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120$ Hz, $C_O = 25$ $\mu F$ , $I_O = 1.5$ A $V_I = 8.3 \pm 3$ V	60	79		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10$ Hz to 10KHz		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 9: Electrical Characteristics Of LD1086#36** ( $V_I=6.6V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	3.564	3.6	3.636	V
		$I_O = 0$ to $1.5A$ $V_I = 5.2$ to $30V$	3.528	3.6	3.672	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 5.2$ to $18V$ $T_J = 25^\circ C$		0.5	10	mV
		$I_O = 0 \text{ mA}$ $V_I = 5.2$ to $18V$		1	10	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		3	15	mV
		$I_O = 0$ to $1.5A$		7	25	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 8.6 \pm 3V$	60	78		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 10: Electrical Characteristics Of LD1086#50** ( $V_I=8V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	4.95	5	5.05	V
		$I_O = 0$ to $1.5A$ $V_I = 6.6$ to $30V$	4.9	5	5.1	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 6.6$ to $20V$ $T_J = 25^\circ C$		0.5	10	mV
		$I_O = 0 \text{ mA}$ $V_I = 6.6$ to $20V$		1	10	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		5	20	mV
		$I_O = 0$ to $1.5A$		10	35	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 10 \pm 3V$	60	75		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 11: Electrical Characteristics Of LD1086#80** ( $V_I=11V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	7.92	8	8.08	V
		$I_O = 0$ to $1.5A$ $V_I = 9.8$ to $30V$	7.84	8	8.16	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 9.8$ to $20V$ $T_J = 25^\circ C$		1	18	mV
		$I_O = 0 \text{ mA}$ $V_I = 9.8$ to $20V$		2	18	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		8	30	mV
		$I_O = 0$ to $1.5A$		12	60	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.04	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 13 \pm 3V$	54	71		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 12: Electrical Characteristics Of LD1086#90** ( $V_I=12V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0 \text{ mA}$ $T_J = 25^\circ C$	8.91	9	9.09	V
		$I_O = 0$ to $1.5A$ $V_I = 11$ to $30V$	8.82	9	9.18	V
$\Delta V_O$	Line Regulation	$I_O = 0 \text{ mA}$ $V_I = 11$ to $20V$ $T_J = 25^\circ C$		1	20	mV
		$I_O = 0 \text{ mA}$ $V_I = 11$ to $20V$		2	20	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		8	30	mV
		$I_O = 0$ to $1.5A$		12	60	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu F$ , $I_O = 1.5A$ $V_I = 14 \pm 3V$	54	70		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 13: Electrical Characteristics Of LD1086#12** ( $V_I=15V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 0\text{ mA}$ $T_J = 25^\circ C$	11.88	12	12.12	V
		$I_O = 0$ to $1.5A$ $V_I = 13.8$ to $30V$	11.76	12	12.24	V
$\Delta V_O$	Line Regulation	$I_O = 0\text{ mA}$ $V_I = 13.8$ to $25V$ $T_J = 25^\circ C$		1	25	mV
		$I_O = 0\text{ mA}$ $V_I = 13.8$ to $25V$		2	25	mV
$\Delta V_O$	Load Regulation	$I_O = 0$ to $1.5A$ $T_J = 25^\circ C$		12	36	mV
		$I_O = 0$ to $1.5A$		24	72	mV
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_q$	Quiescent Current	$V_I \leq 30V$		5	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2		A
		$V_I - V_O = 25V$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120\text{ Hz}$ , $C_O = 25\ \mu F$ , $I_O = 1.5A$ $V_I = 17 \pm 3V$	54	66		dB
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

**Table 14: Electrical Characteristics Of LD1086#** ( $V_I=4.25V$ ,  $C_I = C_O=10\mu F$ ,  $T_A = -40$  to  $125^\circ C$ , unless otherwise specified.)

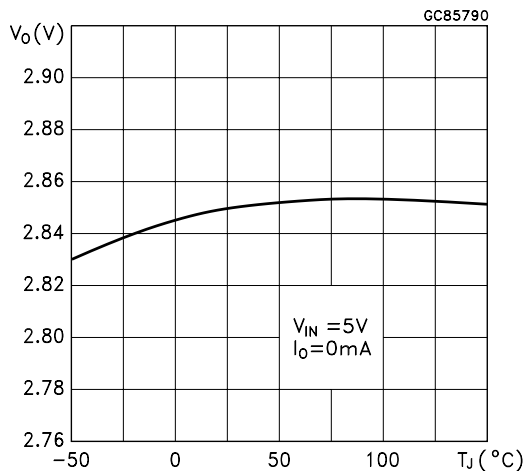
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage (note 1)	$I_O = 10\text{ mA}$ $T_J = 25^\circ C$	1.237	1.25	1.263	V
		$I_O = 10\text{ mA}$ to $1.5A$ $V_I = 2.85$ to $30V$	1.225	1.25	1.275	V
$\Delta V_O$	Line Regulation	$I_O = 10\text{ mA}$ $V_I = 2.8$ to $16.5V$ $T_J = 25^\circ C$		0.015	0.2	%
		$I_O = 10\text{ mA}$ $V_I = 2.8$ to $16.5V$		0.035	0.2	%
$\Delta V_O$	Load Regulation	$I_O = 10\text{ mA}$ to $1.5A$ $T_J = 25^\circ C$		0.1	0.3	%
		$I_O = 0$ to $1.5A$		0.2	0.4	%
$V_d$	Dropout Voltage	$I_O = 1.5A$		1.3	1.5	V
$I_{O(\min)}$	Minimum Load Current	$V_I = 30V$		3	10	mA
$I_{sc}$	Short Circuit Current	$V_I - V_O = 5V$	1.5	2.3		A
		$V_I - V_O = 25V$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ C$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120\text{ Hz}$ , $C_O = 25\ \mu F$ , $C_{ADJ} = 25\ \mu F$ , $I_O = 1.5A$ $V_I = 6.25 \pm 3V$	60	88		dB
$I_{ADJ}$	Adjust Pin Current	$V_I = 4.25V$ $I_O = 10\text{ mA}$		40	120	$\mu A$
$\Delta I_{ADJ}$	Adjust Pin Current Change	$I_O = 10\text{ mA}$ to $1.5A$ $V_I = 2.8$ to $16.5V$ (note 1)		0.2	5	$\mu A$
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ C$ $f = 10\text{Hz}$ to $10\text{KHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ C$ 1000Hrs		0.5		%

NOTE 1: See short-circuit current curve for available output current at fixed dropout.

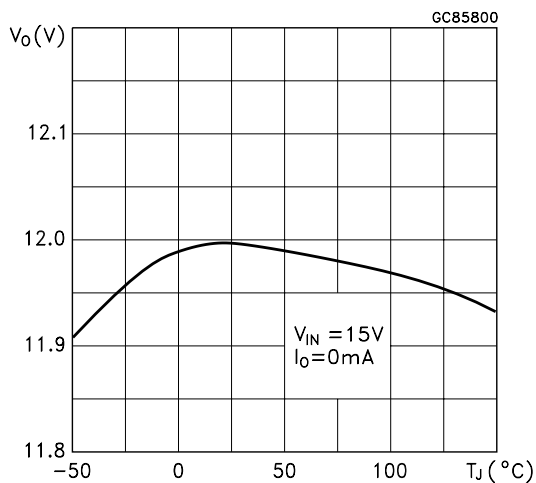


**TYPICAL CHARACTERISTICS** (unless otherwise specified  $T_j = 25^\circ\text{C}$ ,  $C_i=C_o=10\mu\text{F}$ )

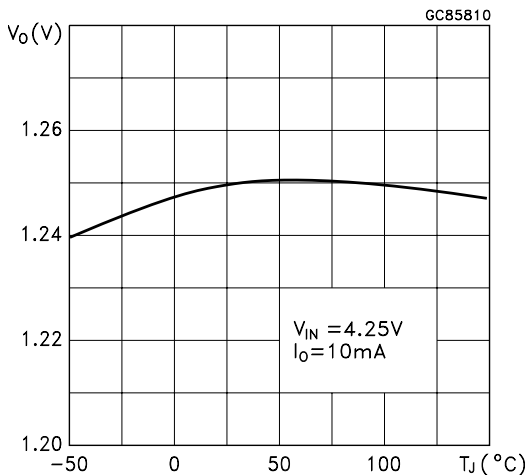
**Figure 4:** Output Voltage vs Temperature



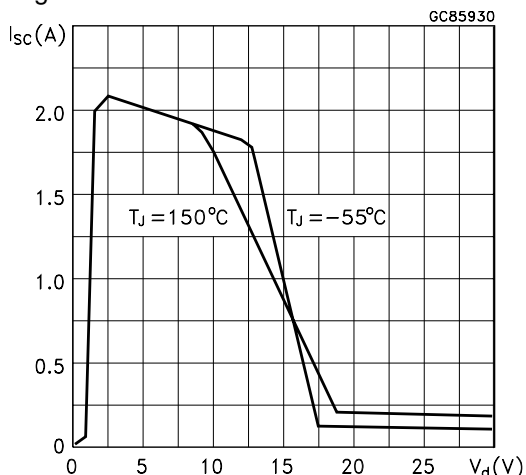
**Figure 5:** Output Voltage vs Temperature



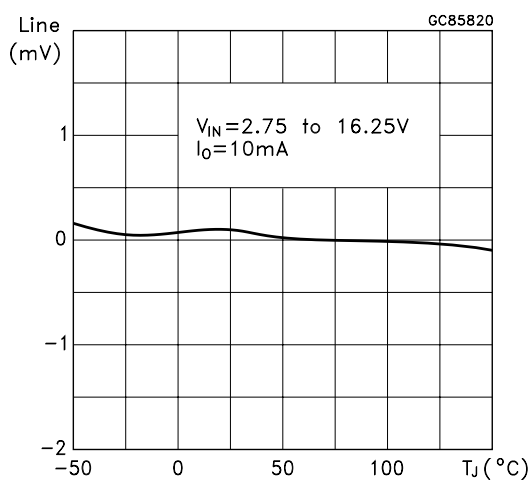
**Figure 6:** Output Voltage vs Temperature



**Figure 7:** Short Circuit Current vs Dropout Voltage



**Figure 8:** Line Regulation vs Temperature



**Figure 9:** Load Regulation vs Temperature

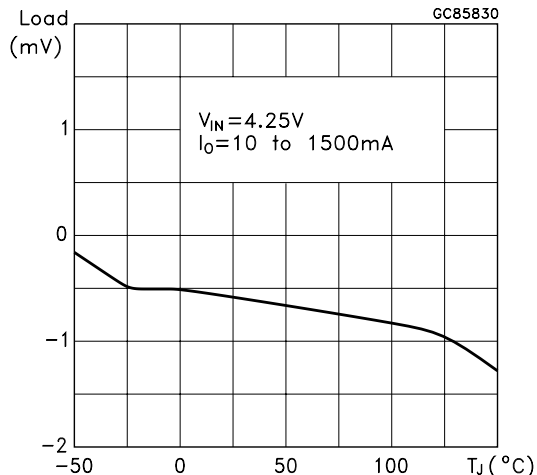


Figure 10: Dropout Voltage vs Temperature

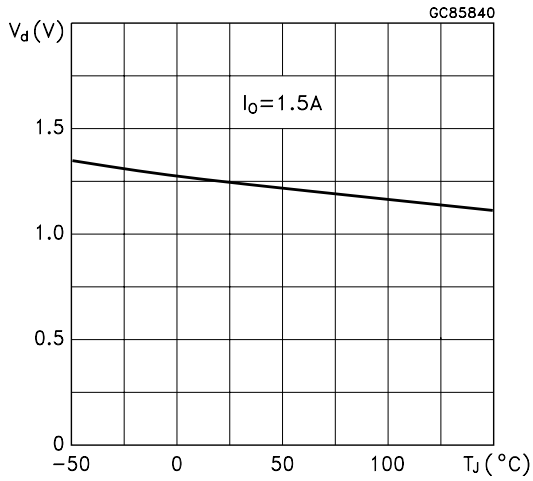


Figure 11: Dropout Voltage vs Output Current

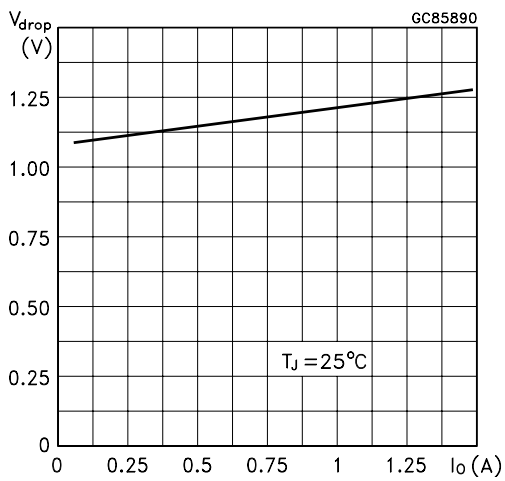


Figure 12: Adjust Pin Current vs Input Voltage

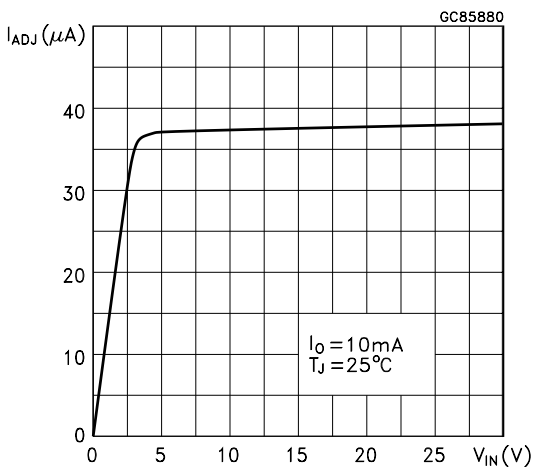


Figure 13: Adjust Pin Current vs Temperature

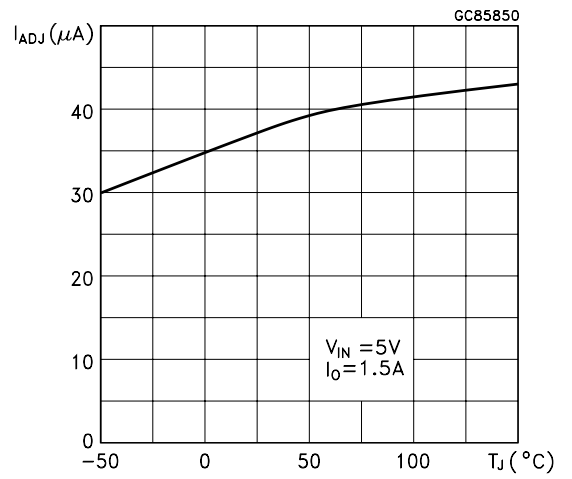


Figure 14: Adjust Pin Current vs Output Current

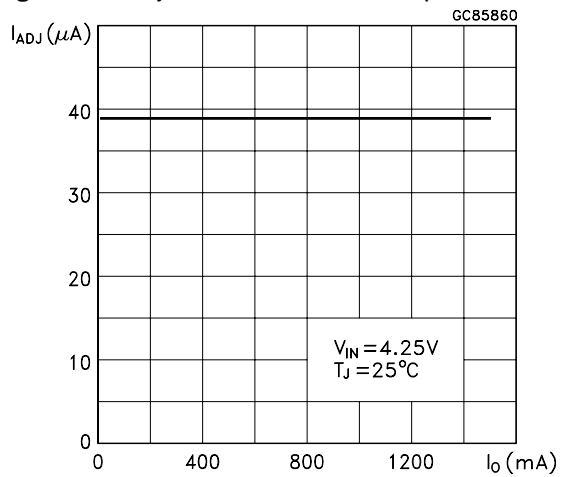


Figure 15: Quiescent Current vs Output Current

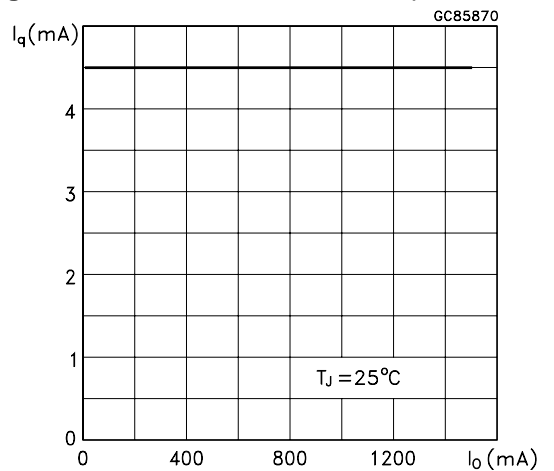


Figure 16: Quiescent Current vs Input Voltage

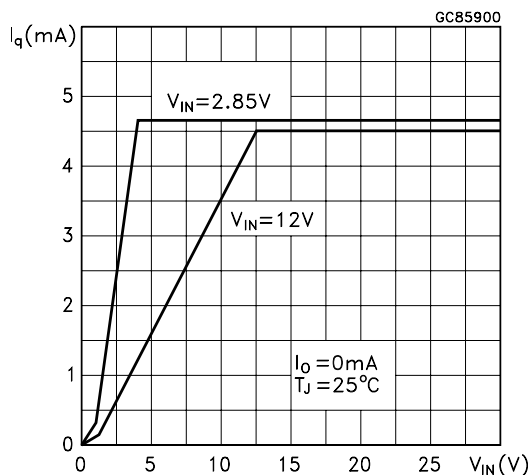


Figure 19: Supply Voltage Rejection vs Temperature

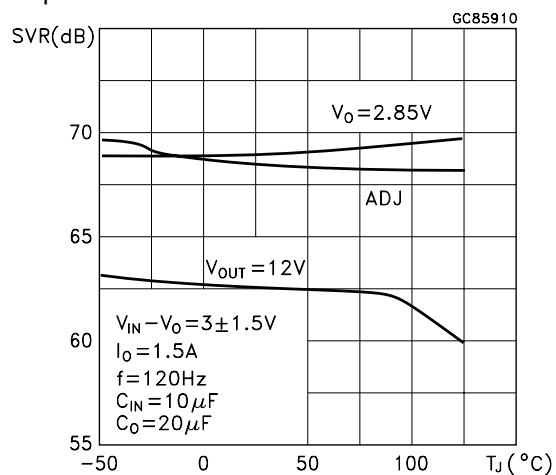


Figure 17: Supply Voltage Rejection vs Output Current

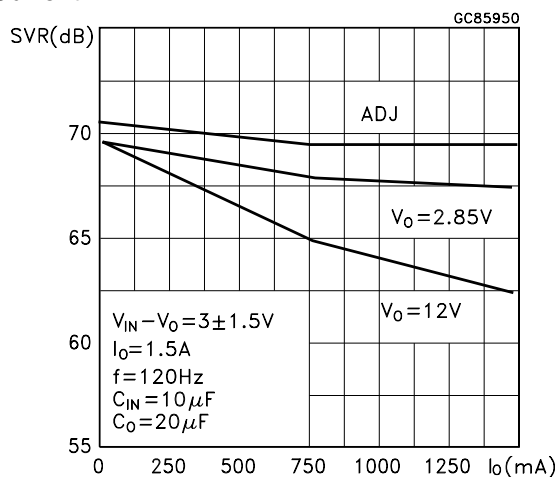


Figure 20: Minimum Load Current vs Temperature

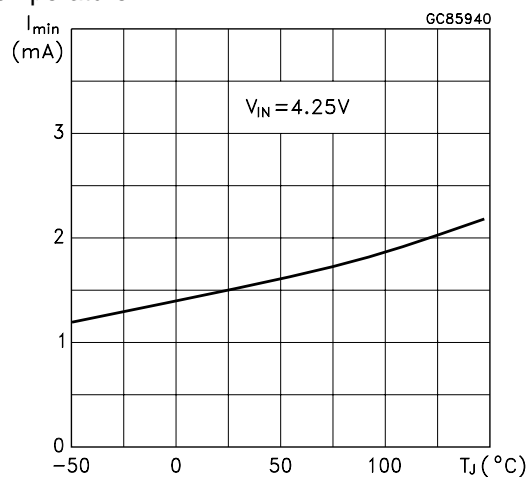


Figure 18: Supply Voltage Rejection vs Frequency

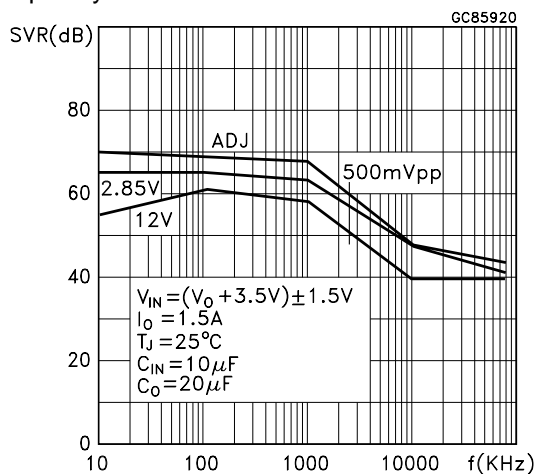


Figure 21: Stability for Adjustable

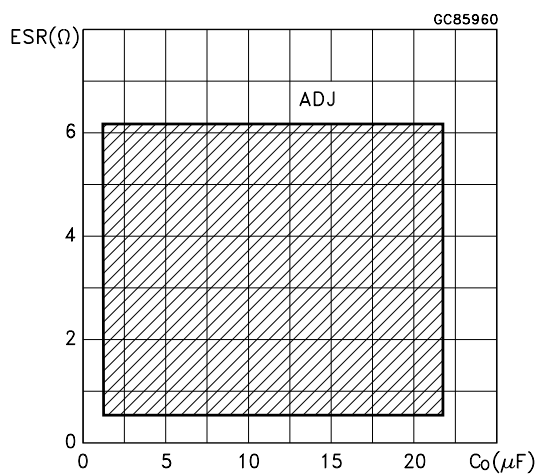


Figure 22: Stability for 2.85V

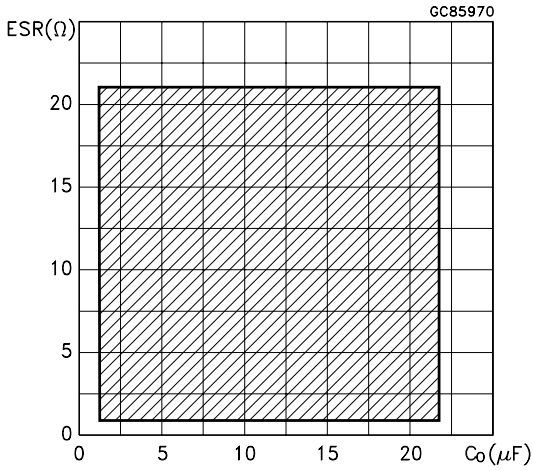


Figure 23: Stability for 12V

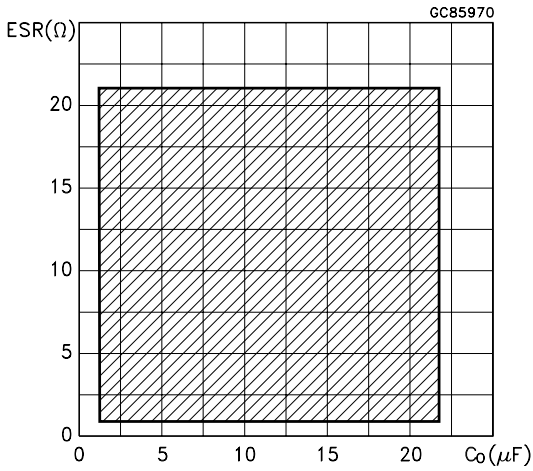


Figure 24: Line Transient

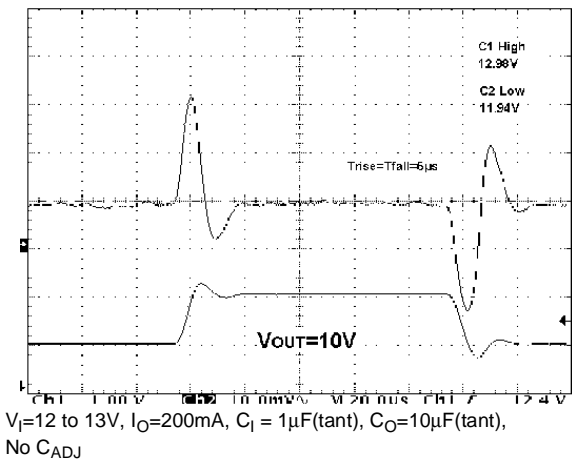


Figure 25: Line Transient

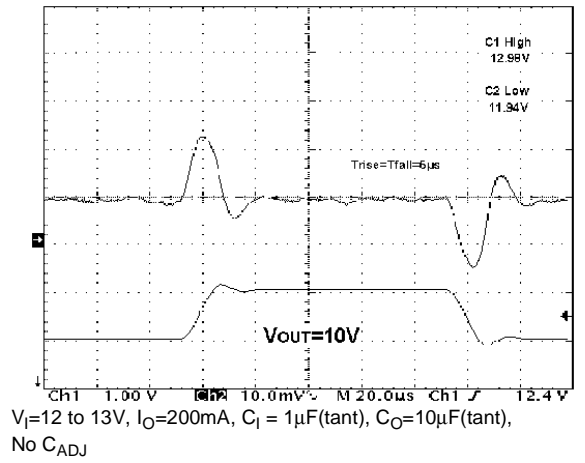


Figure 26: Line Transient

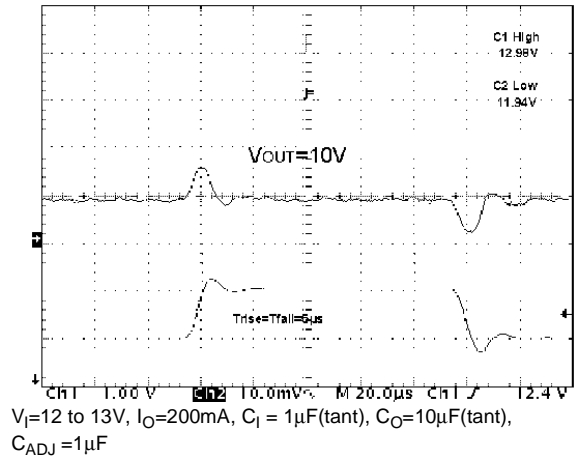


Figure 27: Load Transient

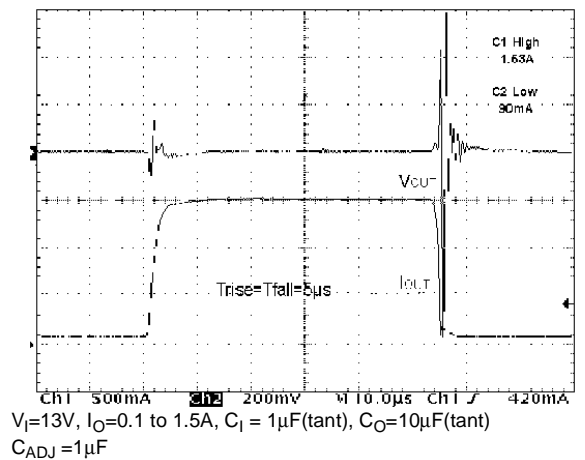


Figure 28: Load Transient

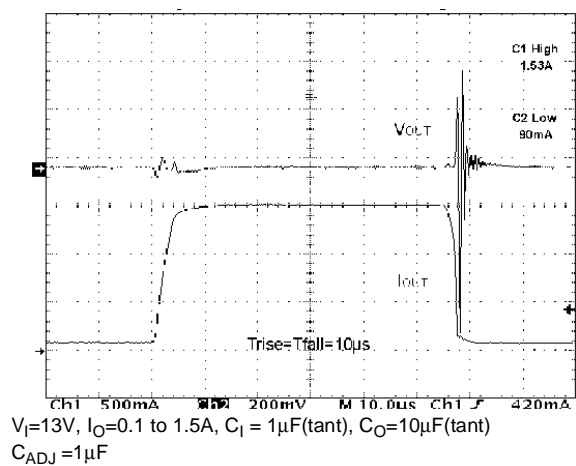
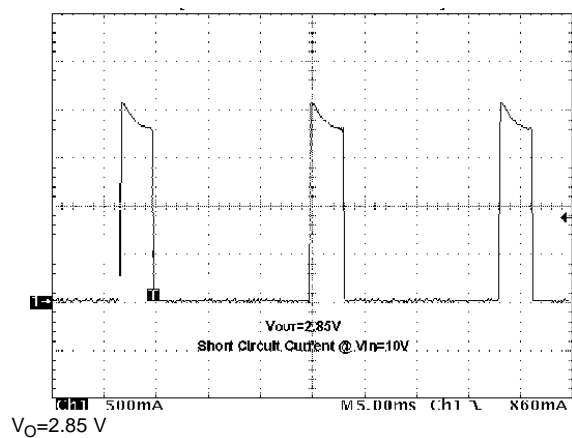
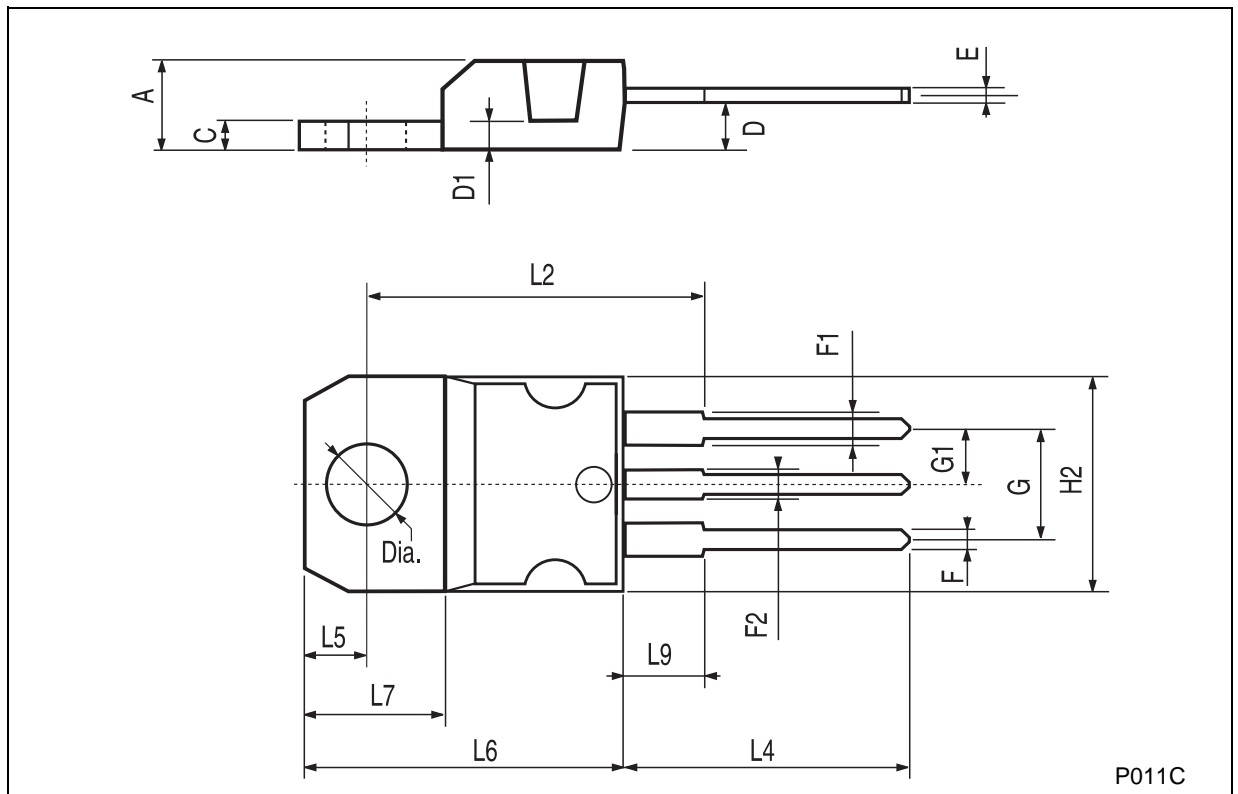


Figure 29: Thermal Protection



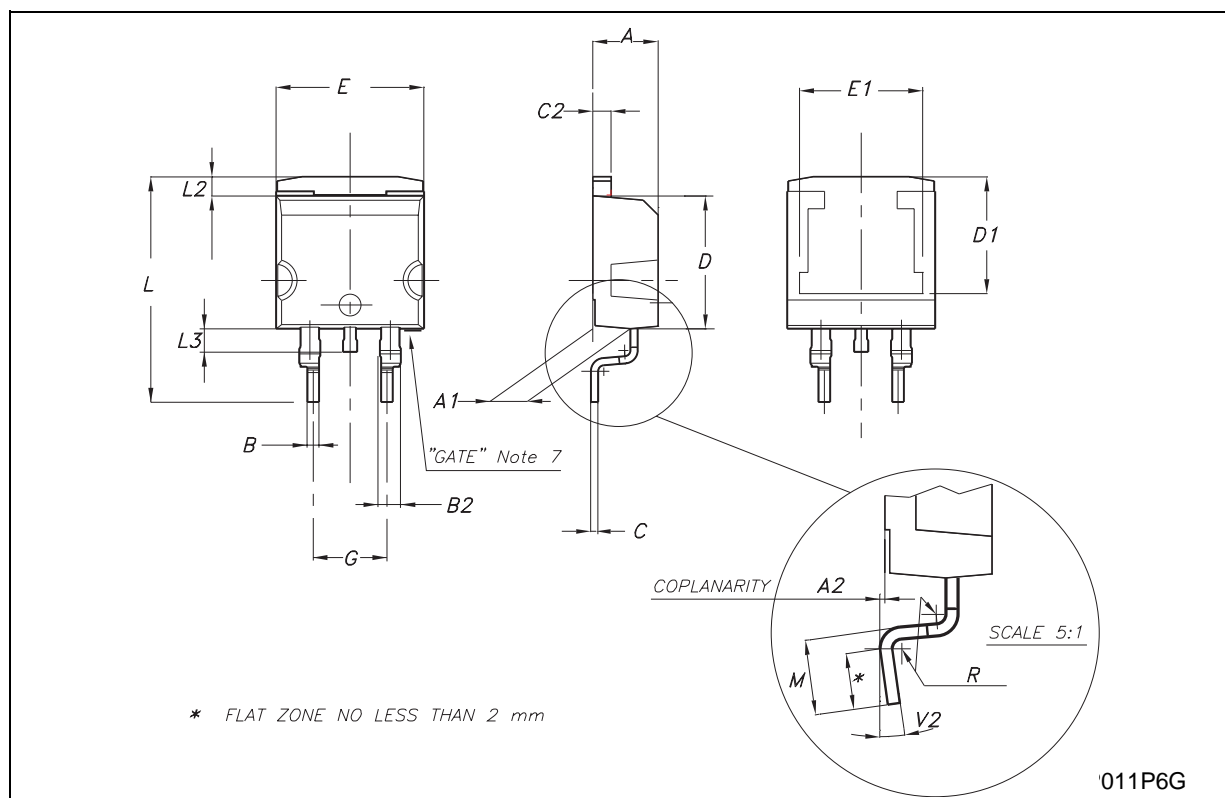
## TO-220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



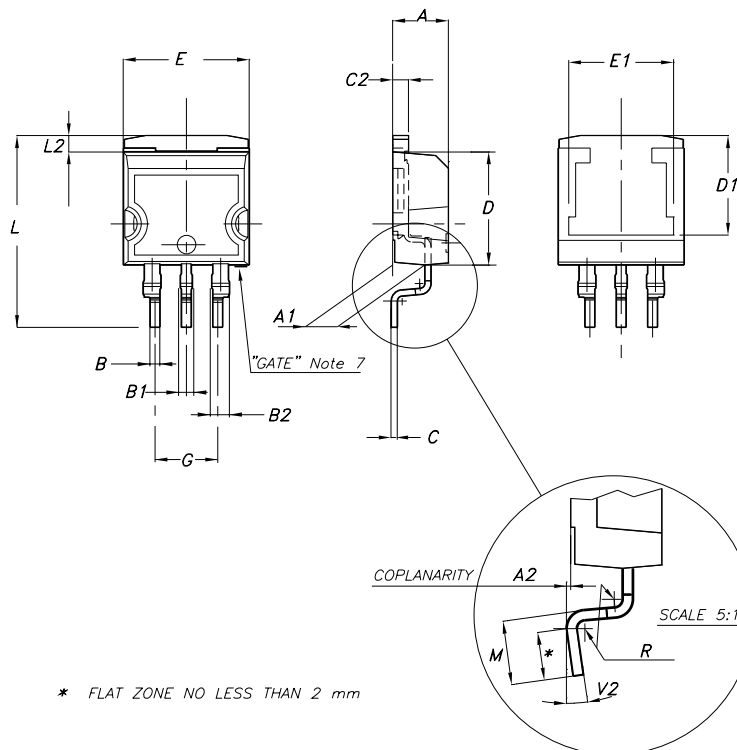
D<sup>2</sup>PAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		0.409
E1		8.5			0.335	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126
R		0.4			0.016	
V2	0°		8°	0°		8°



D<sup>2</sup>PAK/A MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.028		0.037
B1	0.8		1.3	0.031		0.051
B2	1.14		1.7	0.045		0.067
C	0.45		0.60	0.018		0.024
C2	1.23		1.36	0.048		0.054
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.394		0.409
E1		8.5			0.335	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.591		0.624
L2	1.27		1.4	0.050		0.055
M	2.4		3.2	0.094		0.126
R		0.4			0.016	
V2	0°		8°	0°		8°

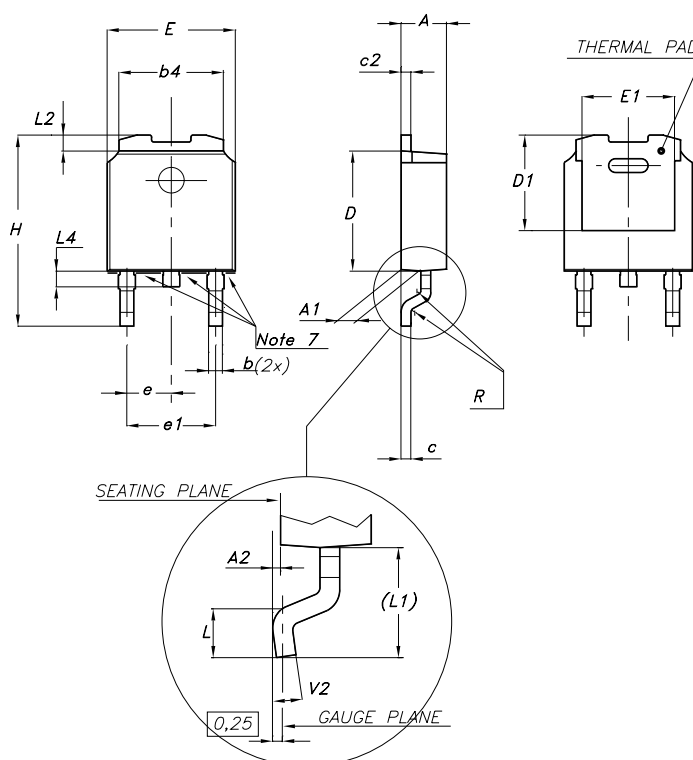


7106164/D



## DPAK MECHANICAL DATA

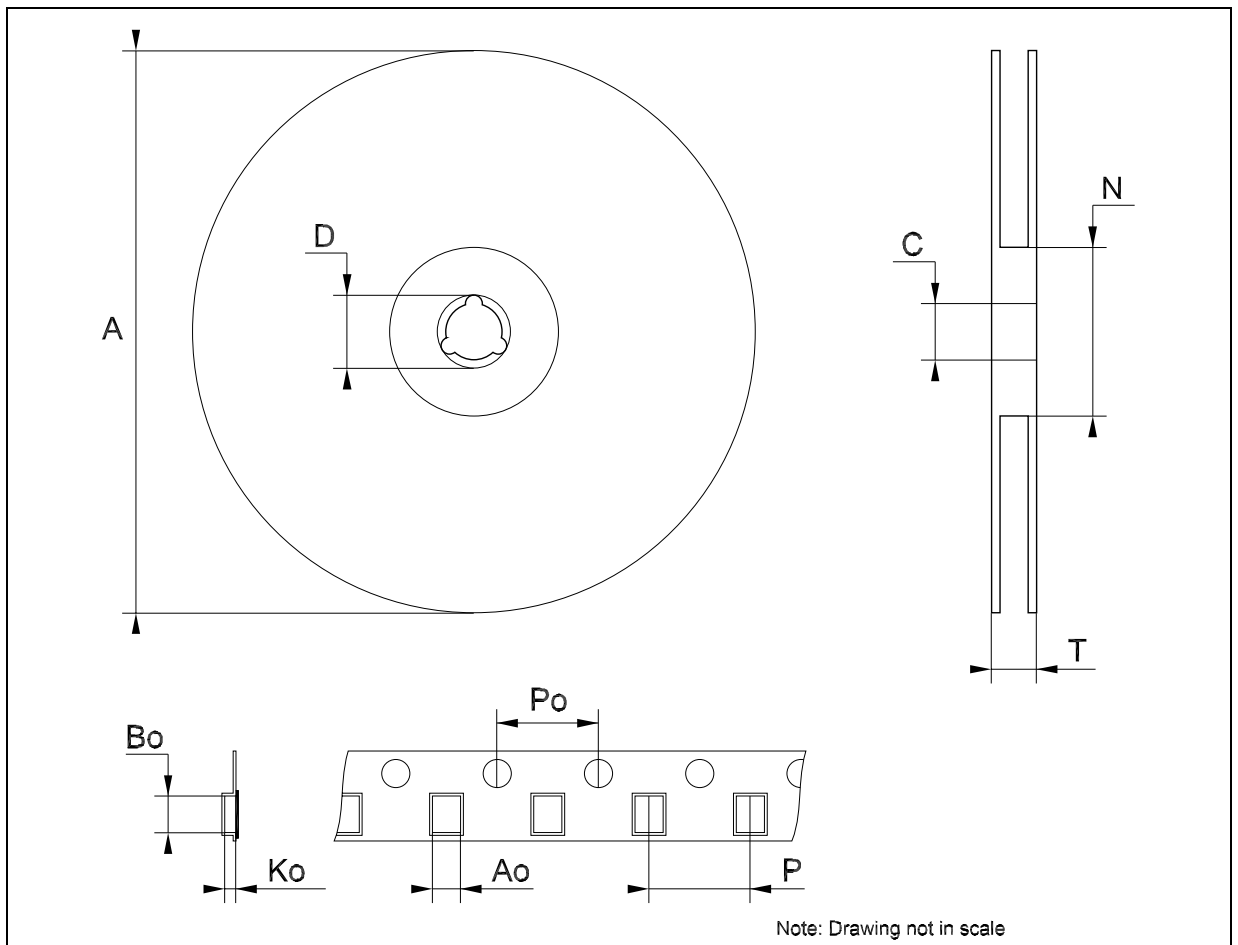
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L	1			0.039		
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039



0068772-F

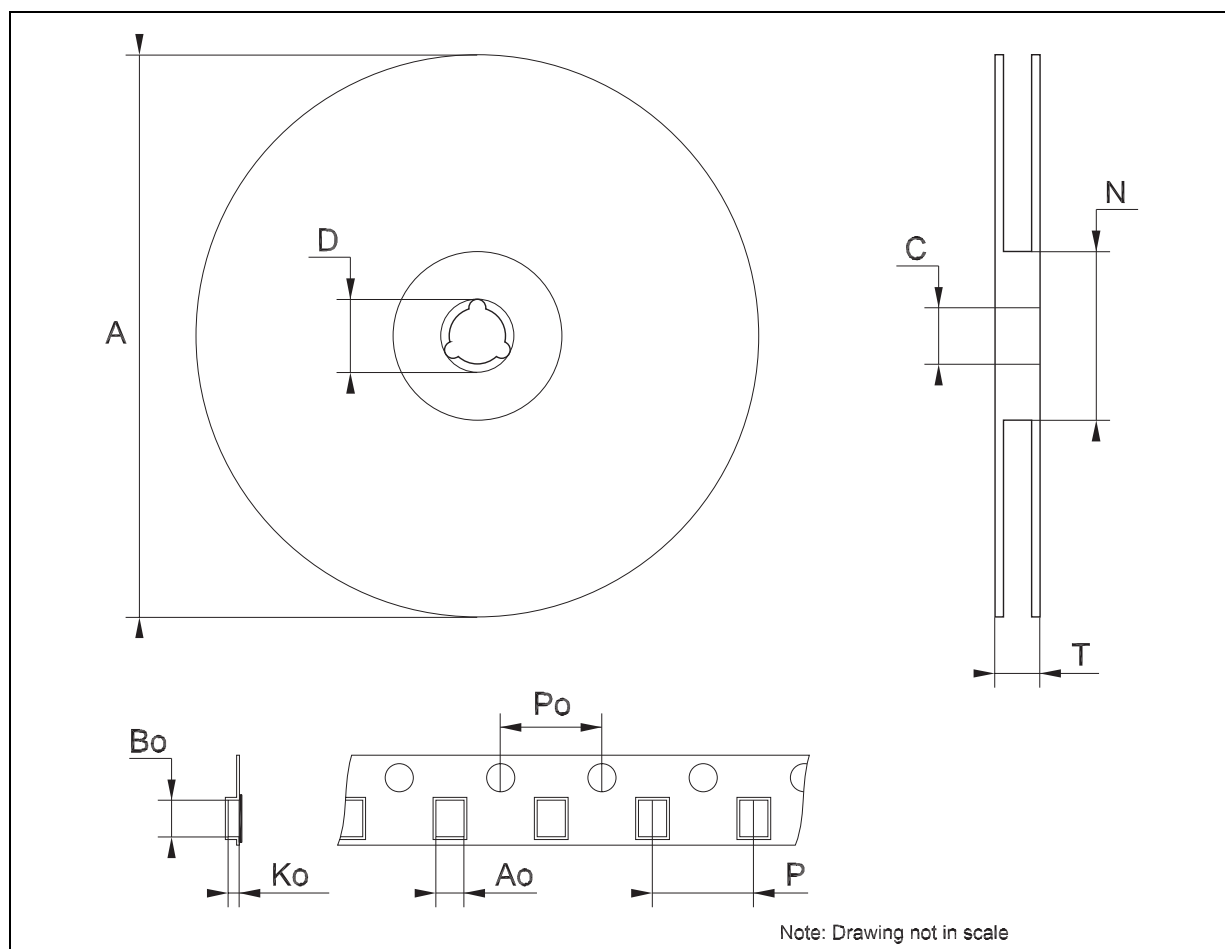
## Tape &amp; Reel DPAK-PPAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.80	6.90	7.00	0.268	0.272	0.276
Bo	10.40	10.50	10.60	0.409	0.413	0.417
Ko	2.55	2.65	2.75	0.100	0.104	0.105
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



Tape & Reel D<sup>2</sup>PAK-P<sup>2</sup>PAK-D<sup>2</sup>PAK/A-P<sup>2</sup>PAK/A MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	10.50	10.6	10.70	0.413	0.417	0.421
Bo	15.70	15.80	15.90	0.618	0.622	0.626
Ko	4.80	4.90	5.00	0.189	0.193	0.197
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	11.9	12.0	12.1	0.468	0.472	0.476



**Table 15: Revision History**

<b>Date</b>	<b>Revision</b>	<b>Description of Changes</b>
25-Aug-2004	11	Mistake Vo (typ.), table 9 - pag. 6.
07-Oct-2004	12	Mistake Order Codes - Table 1.
08-Feb-2005	13	Mistake U.M. Load Regulation - V ==> mV.

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