

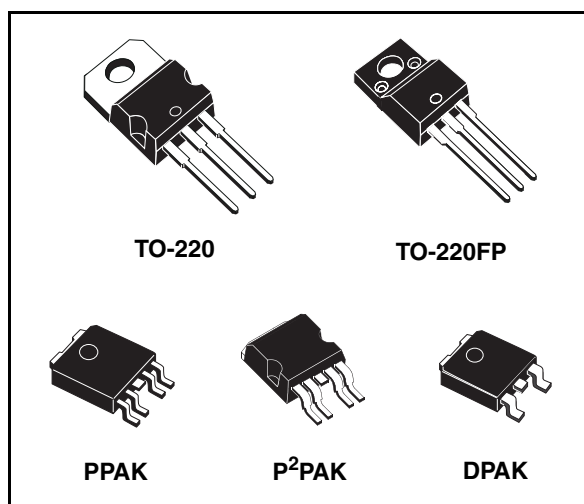
## 1.5A, Very low drop voltage regulators

### Feature summary

- Very low dropout voltage (typ. 0.4 at 1.5A)
- Guaranteed output current up to 1.5A
- Fixed and adjustable output voltage ( $\pm 1\%$  at 25°C)
- Internal current and thermal limit
- Logic controlled electronic shutdown available in PPAK and P<sup>2</sup>PAK

### Description

The LD29150 is a high current, high accuracy, low-dropout voltage regulator series. These regulators feature 400mV dropout voltage and very low ground current. Designed for high current loads, these devices are also used in lower current, extremely low dropout-critical systems, where their tiny dropout voltage and ground current values are important attributes.



Typical applications are in Power supply switching post regulation, Series power supply for monitors, Series power supply for VCRs and TVs, Computer Systems and Battery powered systems.

### Order code

Part numbers					Output voltage
TO-220	TO-220FP <sup>(1)</sup>	DPAK	PPAK	P <sup>2</sup> PAK	
LD29150V15 <sup>(1)</sup>	LD29150P15	LD29150DT15R	LD29150PT15R		1.5 V
LD29150V18 <sup>(1)</sup>	LD29150P18	LD29150DT18R	LD29150PT18R		1.8 V
LD29150V25	LD29150P25	LD29150DT25R	LD29150PT25R		2.5 V
LD29150V33 <sup>(1)</sup>	LD29150P33	LD29150DT33R	LD29150PT33R	LD29150P2T33R	3.3 V
LD29150V50 <sup>(1)</sup>	LD29150P50	LD29150DT50R	LD29150PT50R		5.0 V
LD29150V80	LD29150P80	LD29150DT80R	LD29150PT80R		8.0 V
			LD29150PTR		ADJ

1. Available on request.

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# 1 Diagram

Figure 1. Schematic diagram for adjustable version

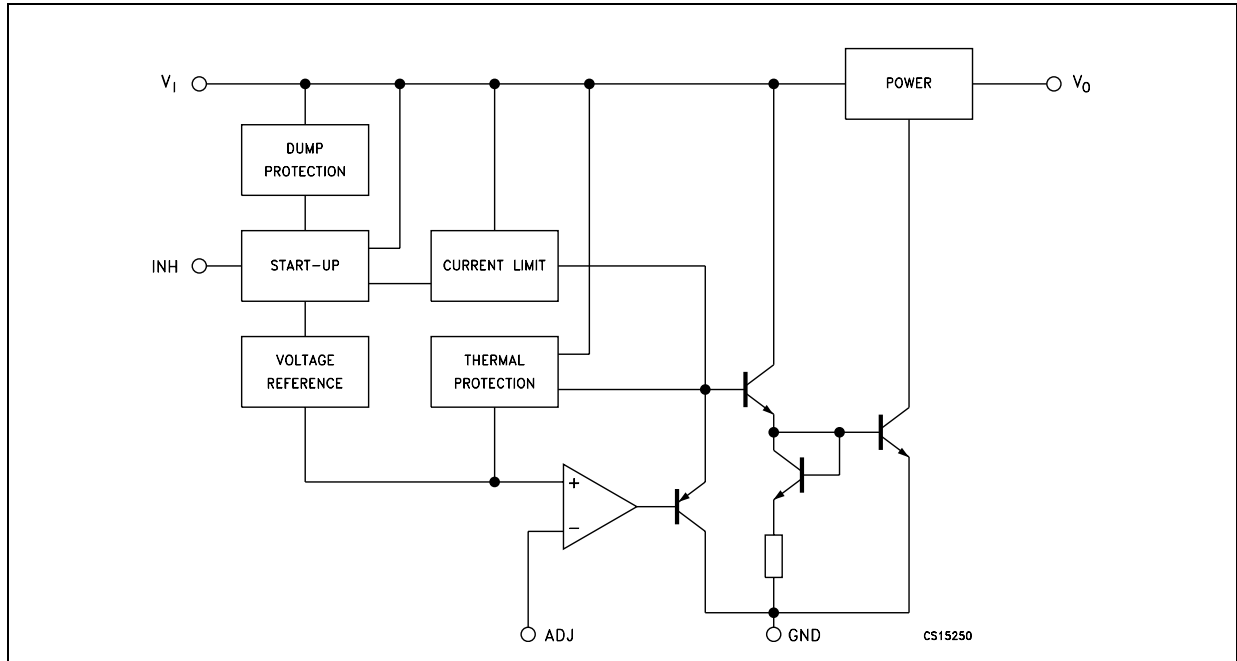
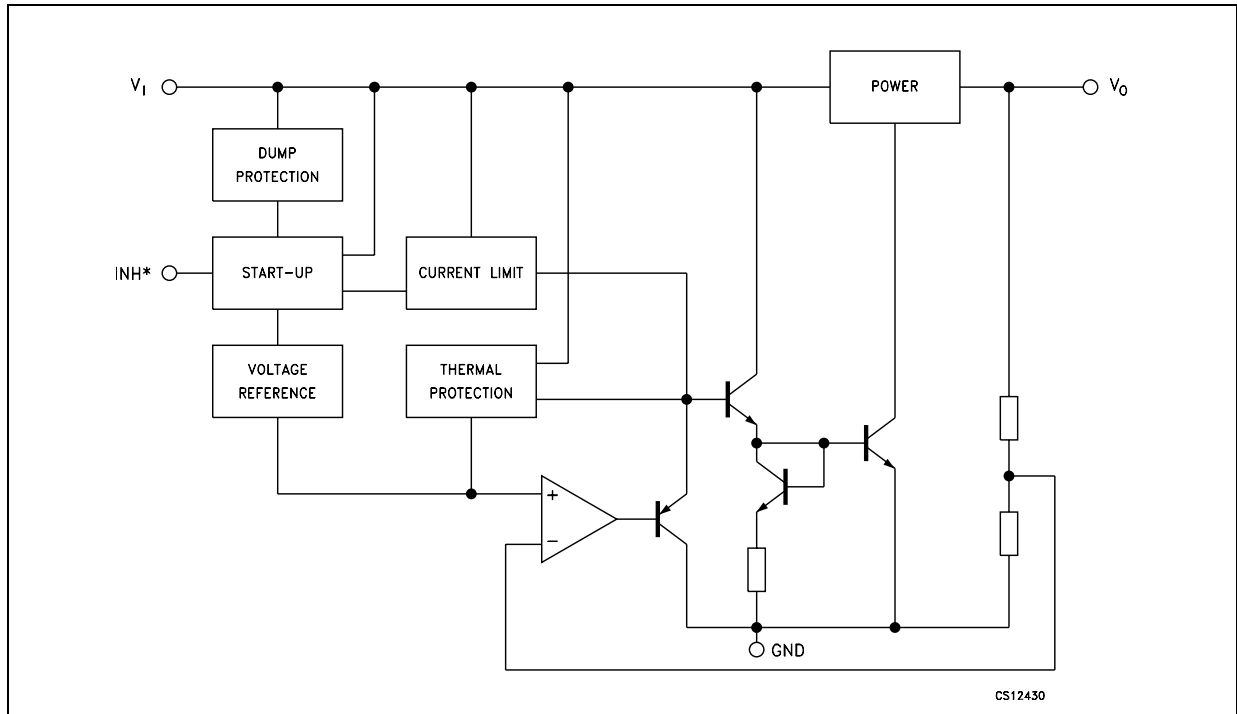


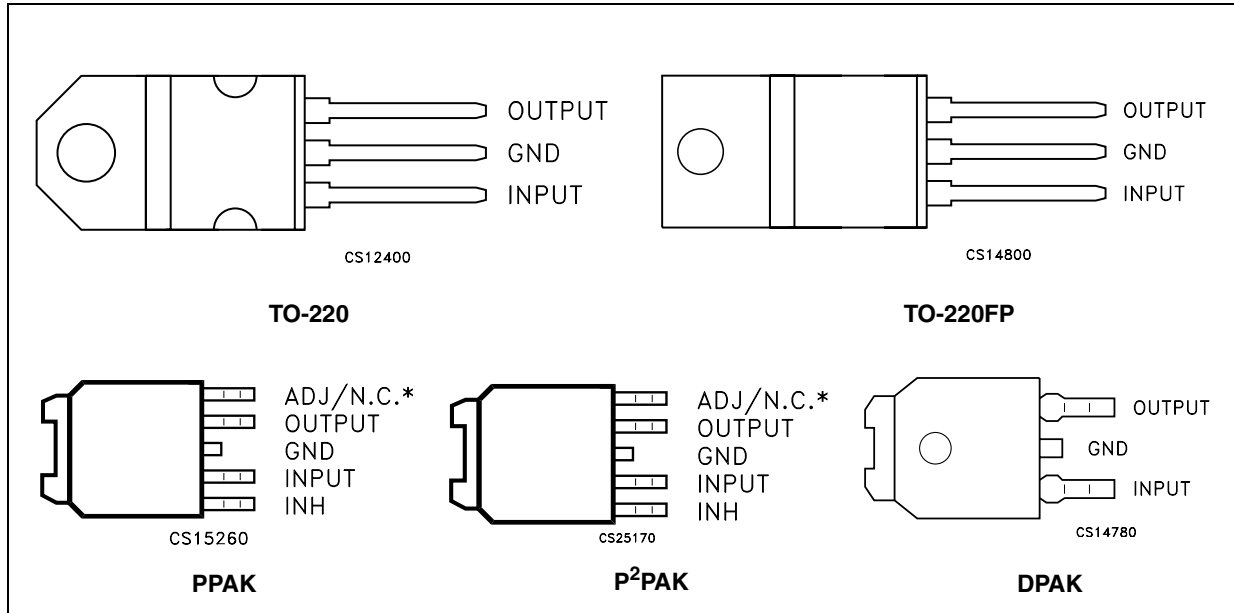
Figure 2. Schematic diagram for fixed version



\* Only for version with inhibit function.

## 2 Pin configuration

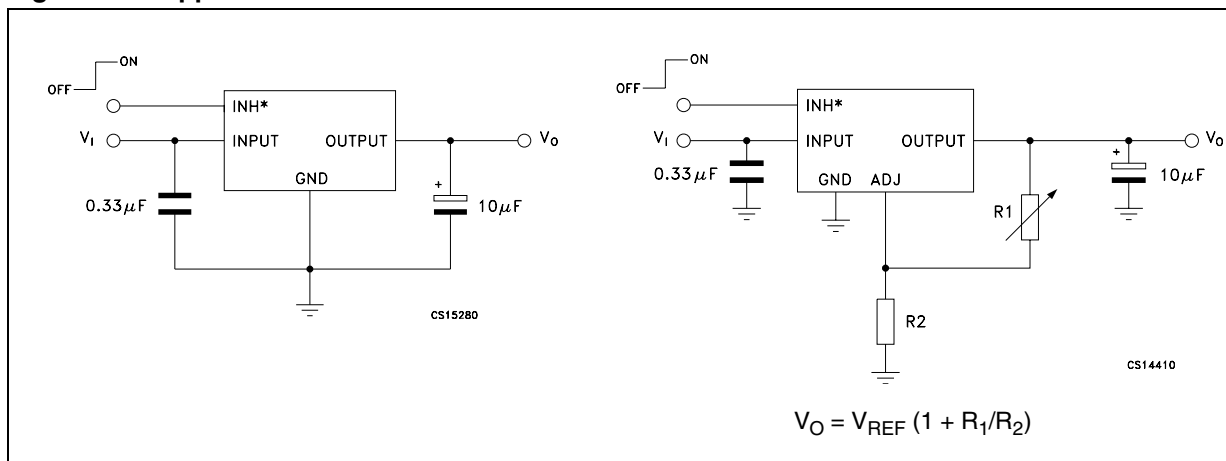
Figure 3. Pin connections (top view)



\* Not connected for fixed version.

### 3 Typical application

Figure 4. Application circuit



\* Only for version with inhibit function.

## 4 Maximum ratings

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_I$	DC Input voltage	30 <sup>(1)</sup>	V
$V_O$	DC output voltage	-0.3 to 20	V
$V_{INH}$	Inhibit input voltage	-0.3 to 20	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

1. Above 14V the device is automatically in shut-down.

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

**Table 2. Thermal data**

Symbol	Parameter	DPAK	PPAK	P <sup>2</sup> PAK	TO-220	TO-220FP	Unit
$R_{thJA}$	Thermal resistance junction-ambient	100	100	60	50	60	°C/W
$R_{thJC}$	Thermal resistance junction-case	8	8	3	3	4	°C/W

## 5 Electrical characteristics

**Table 3. Electrical characteristics of LD29150#15**  
( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 3.5\text{V}$ ,  $V_{INH} = 2\text{V}$  (*Note 2*),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_I$	Minimum operating input voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$	2.5			V
$V_O$	Output voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 3$ to $7\text{V}$ $T_J = -40$ to $125^\circ\text{C}$	1.485 1.47	1.5	1.515 1.53	V
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 3$ to $13\text{V}$		0.06	0.5	%
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $V_I = 3.5 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ ( <i>Note: 1</i> )	65	75		dB
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{sc}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{IL}$	Control input logic low	OFF MODE, ( <i>Note 2</i> ), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	ON MODE, ( <i>Note 2</i> ), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{INH}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{KHz}$ , $I_O = 100\text{mA}$		60		$\mu\text{V}_{\text{RMS}}$
$T_{SHDN}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.  
2 Only for version with Inhibit function.

**Table 4. Electrical characteristics of LD29150#18**

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 3.8\text{V}$ ,  $V_{\text{INH}} = 2\text{V}$  (*Note 3*),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 3$ to $7.3\text{V}$ $T_J = -40$ to $125^\circ\text{C}$	1.782	1.8	1.818	V
			1.764		1.836	
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 3$ to $13\text{V}$		0.06	0.5	%
SVR	Supply voltage rejection	$f = 120\text{Hz}$ , $V_I = 3.8 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ ( <i>Note 1</i> )	62	72		dB
$V_{\text{DROPP}}$	Dropout voltage	$I_O = 250\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.1		V
		$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.2		
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.4	0.7	
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{\text{INH}} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{\text{IL}}$	Control input logic low	OFF MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{\text{IH}}$	Control input logic high	ON MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{\text{INH}}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{\text{INH}} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{kHz}$ , $I_O = 100\text{mA}$		72		$\mu\text{V}_{\text{RMS}}$
$T_{\text{SHDN}}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

3 Only for version with Inhibit function.



**Table 5. Electrical characteristics of LD29150#25**

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 4.5\text{V}$ ,  $V_{INH} = 2\text{V}$  (*Note 3*),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 3.5$ to $8\text{V}$ $T_J = -40$ to $125^\circ\text{C}$	2.475	2.5	2.525	V
			2.45		2.55	
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 3.5$ to $13\text{V}$		0.06	0.5	%
SVR	Supply voltage rejection	$f = 120\text{Hz}$ , $V_I = 4.5 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ ( <i>Note 1</i> )	55	70		dB
$V_{DROPP}$	Dropout voltage	$I_O = 250\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.1		V
		$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.2		
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.4	0.7	
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{sc}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{IL}$	Control input logic low	OFF MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	ON MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{INH}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{kHz}$ , $I_O = 100\text{mA}$		100		$\mu\text{V}_{\text{RMS}}$
$T_{SHDN}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

3 Only for version with Inhibit function.

**Table 6. Electrical characteristics of LD29150#33**

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 5.3\text{V}$ ,  $V_{\text{INH}} = 2\text{V}$  (*Note 3*),  $C_1 = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 4.3$ to $8.8\text{V}$ $T_J = -40$ to $125^\circ\text{C}$	3.267	3.3	3.333	V
			3.234		3.366	
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 4.3$ to $13\text{V}$		0.06	0.5	%
SVR	Supply voltage rejection	$f = 120\text{Hz}$ , $V_I = 5.3 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ ( <i>Note 1</i> )	52	67		dB
$V_{\text{DROPP}}$	Dropout voltage	$I_O = 250\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.1		V
		$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.2		
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.4	0.7	
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{\text{INH}} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{\text{IL}}$	Control input logic low	OFF MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{\text{IH}}$	Control input logic high	ON MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{\text{INH}}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{\text{INH}} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{kHz}$ , $I_O = 100\text{mA}$		132		$\mu\text{V}_{\text{RMS}}$
$T_{\text{SHDN}}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

3 Only for version with Inhibit function.

**Table 7. Electrical characteristics of LD29150#50**

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 7\text{V}$ ,  $V_{\text{INH}} = 2\text{V}$  (*Note 3*),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 6$ to $10.5\text{V}$ $T_J = -40$ to $125^\circ\text{C}$	4.95	5	5.05	V
			4.9		5.1	
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 6$ to $13\text{V}$		0.06	0.5	%
SVR	Supply voltage rejection	$f = 120\text{Hz}$ , $V_I = 7 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ ( <i>Note: 1</i> )	49	64		dB
$V_{\text{DROPP}}$	Dropout voltage	$I_O = 250\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.1		V
		$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.2		
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.4	0.7	
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{\text{INH}} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{\text{IL}}$	Control input logic low	OFF MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{\text{IH}}$	Control input logic high	ON MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{\text{INH}}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{\text{INH}} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{kHz}$ , $I_O = 100\text{mA}$		200		$\mu\text{V}_{\text{RMS}}$
$T_{\text{SHDN}}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

3 Only for version with Inhibit function.

**Table 8. Electrical characteristics of LD29150#80**

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 10\text{V}$ ,  $V_{INH} = 2\text{V}$  (*Note 3*),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 9$ to $13\text{V}$ $T_J = -40$ to $125^\circ\text{C}$	7.92	8	8.08	V
			7.84		8.16	
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 9$ to $13\text{V}$		0.06	0.5	%
SVR	Supply voltage rejection	$f = 120\text{Hz}$ , $V_I = 9 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ ( <i>Note 1</i> )	45	59		dB
$V_{DROPP}$	Dropout voltage	$I_O = 250\text{mA}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.1		V
		$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.2		
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$ ( <i>Note 2</i> )		0.4	0.7	
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{sc}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{IL}$	Control input logic low	OFF MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	ON MODE, ( <i>Note 3</i> ), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{INH}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{kHz}$ , $I_O = 100\text{mA}$		320		$\mu\text{V}_{\text{RMS}}$
$T_{SHDN}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with  $V_O + 1\text{V}$  applied to  $V_I$ .

3 Only for version with Inhibit function.

**Table 9. Electrical characteristics of LD29150#ADJ**

( $I_O = 10\text{mA}$ ,  $T_J = 25^\circ\text{C}$ ,  $V_I = 3.23\text{V}$ ,  $V_{INH} = 2\text{V}$  (Note 3),  $C_I = 330\text{nF}$ ,  $C_O = 10\mu\text{F}$  adjust pin tied to output pin)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_I$	Minimum operating input voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$	2.5			V
$\Delta V_O$	Load regulation	$I_O = 10\text{mA}$ to $1.5\text{A}$		0.2	1.0	%
$\Delta V_O$	Line regulation	$V_I = 2.5\text{V}$ to $13\text{V}$ , $I_O = 10\text{mA}$		0.06	0.5	%
$V_{REF}$	Reference voltage	$I_O = 10\text{mA}$ to $1.5\text{A}$ , $V_I = 2.5$ to $4.5\text{V}$ $T_J = -40$ to $125^\circ\text{C}$ (Note 2)	-1%	1.23	+1%	V
			-2%		+2%	
SVR	Supply voltage rejection	$f = 120\text{Hz}$ , $V_I = 3.23 \pm 1\text{V}$ , $I_O = 0.75\text{A}$ (Note 1)	45	75		dB
$I_q$	Quiescent current	$I_O = 0.75\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		15	40	mA
		$I_O = 1.5\text{A}$ , $T_J = -40$ to $125^\circ\text{C}$		30	80	
		$V_I = 13\text{V}$ , $V_{INH} = \text{GND}$ , $T_J = -40$ to $125^\circ\text{C}$		130	180	$\mu\text{A}$
$I_{ADJ}$	Adjust pin current	$T_J = -40$ to $125^\circ\text{C}$ (Note 1)			1	$\mu\text{A}$
$I_{sc}$	Short circuit current	$V_I - V_O = 5.5\text{V}$		2.2		A
$V_{IL}$	Control input logic low	OFF MODE, (Note 3), $T_J = -40$ to $125^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	ON MODE, (Note 3), $T_J = -40$ to $125^\circ\text{C}$	2			V
$I_{INH}$	Control input current	$T_J = -40$ to $125^\circ\text{C}$ , $V_{INH} = 13\text{V}$		5	10	$\mu\text{A}$
eN	Output noise voltage	$B_P = 10\text{Hz}$ to $100\text{KHz}$ , $I_O = 100\text{mA}$		50		$\mu\text{V}_{RMS}$
$T_{SHDN}$	Thermal shutdown			150		$^\circ\text{C}$

Note: 1 Guaranteed by design.

2 Reference voltage is measured between output and GND pin, with ADJ PIN tied to  $V_{OUT}$ .

3 Only for version with Inhibit function.

# 6 Typical characteristics

Figure 5. Output voltage vs temperature

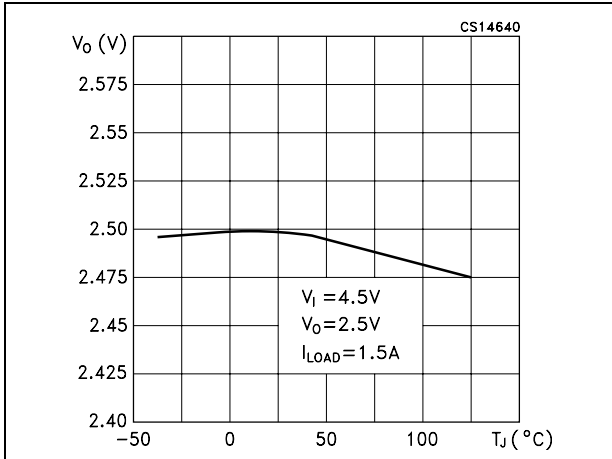


Figure 6. Reference voltage vs temperature

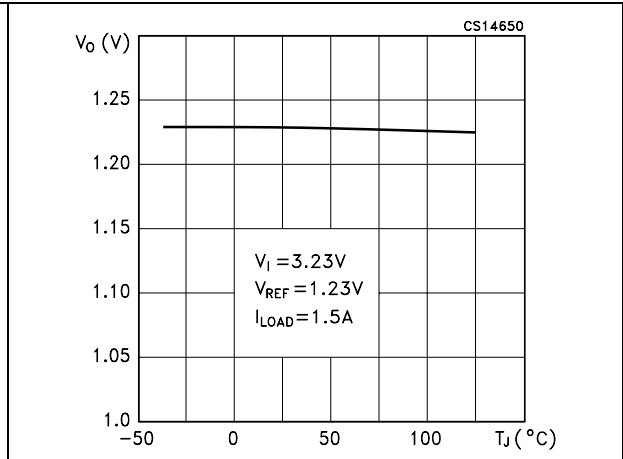


Figure 7. Dropout voltage vs temperature

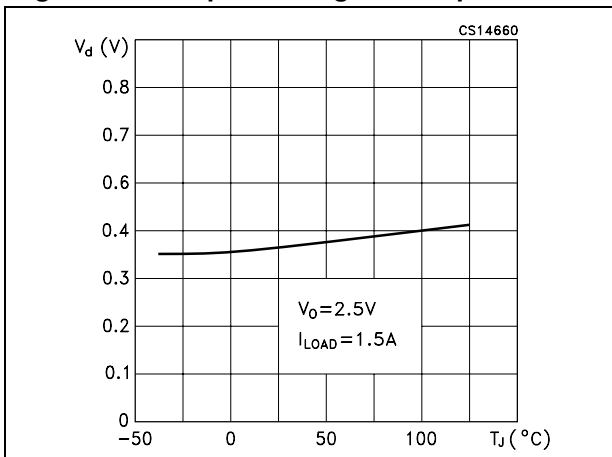


Figure 8. Dropout voltage vs output current

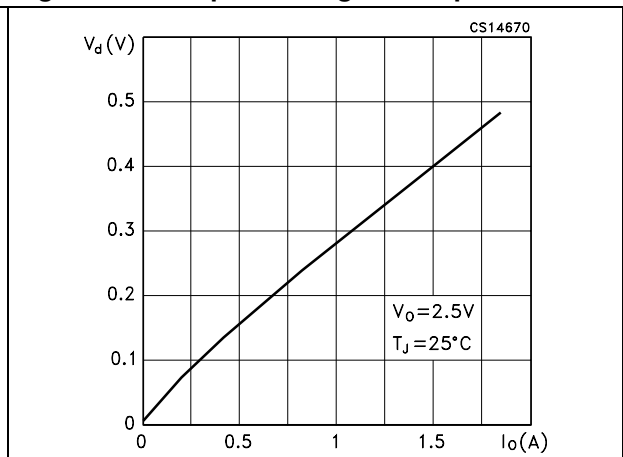


Figure 9. Quiescent current vs output current

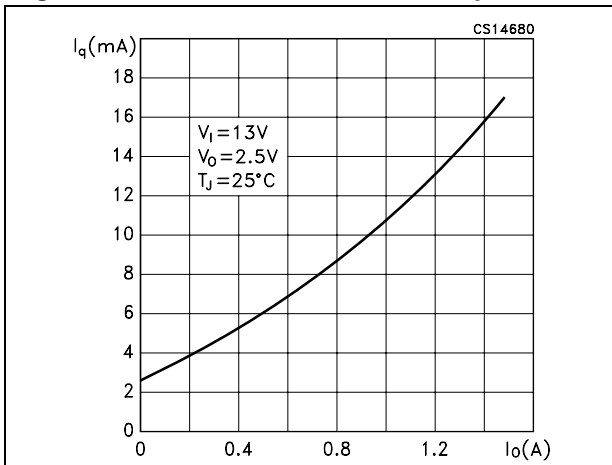


Figure 10. Quiescent current vs output current

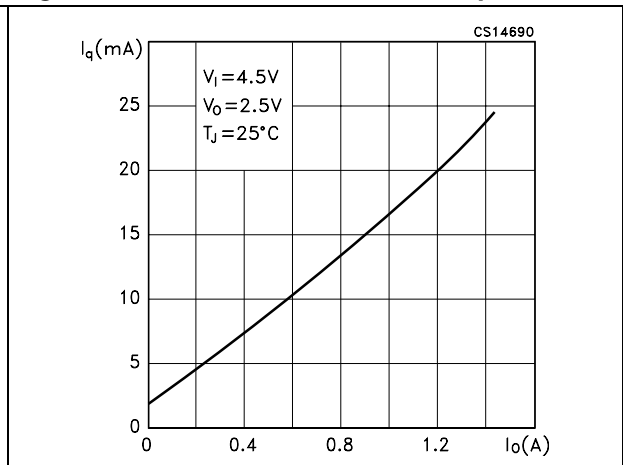


Figure 11. Quiescent current vs supply voltage

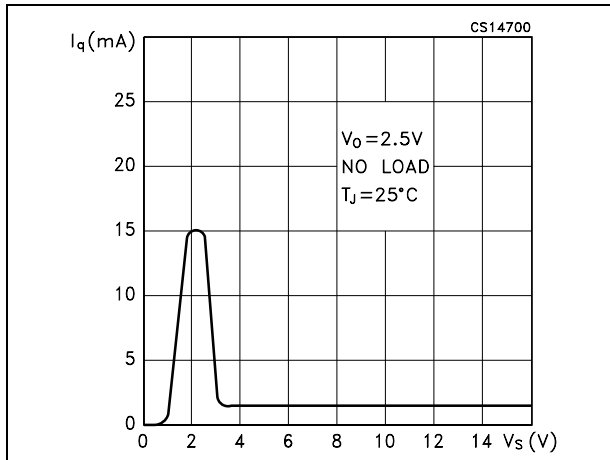


Figure 12. Quiescent current vs temperature

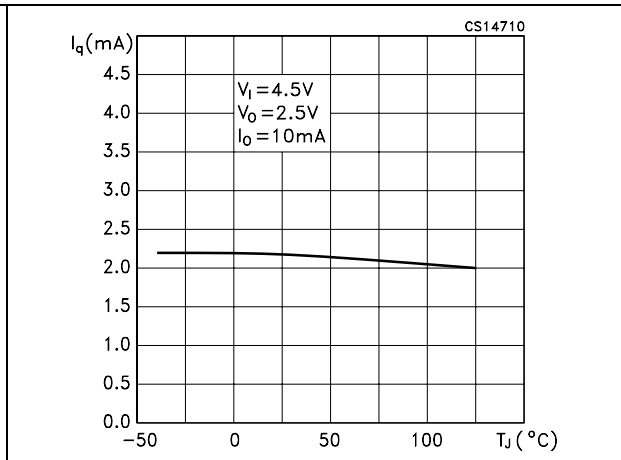


Figure 13. Quiescent current vs temperature

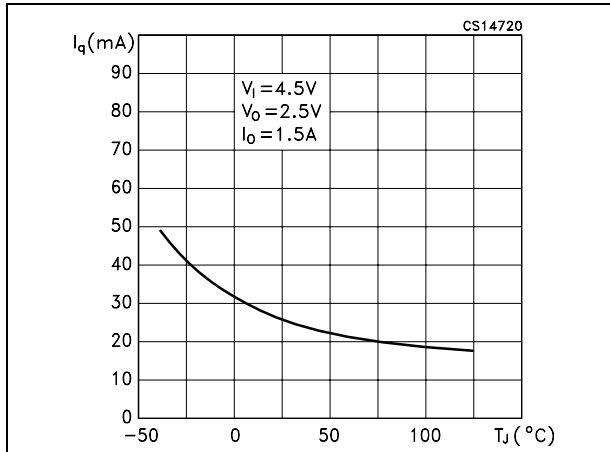


Figure 14. Short circuit current vs temperature

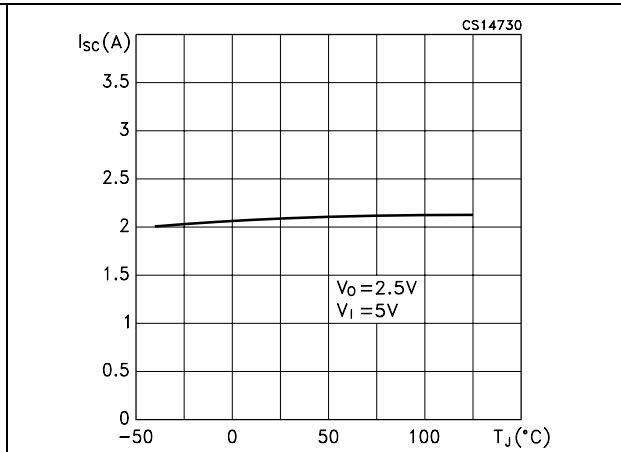


Figure 15. Adjust pin current vs temperature

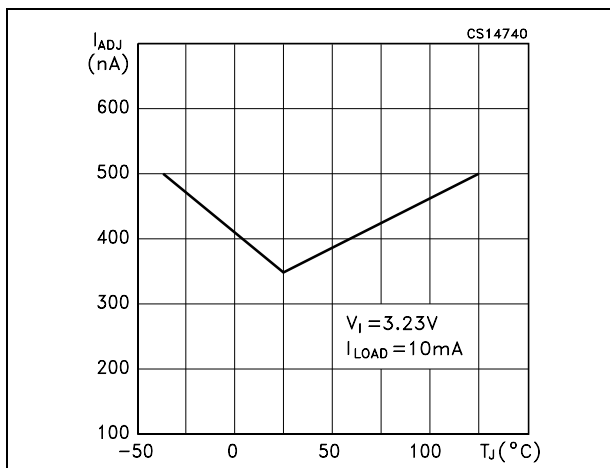


Figure 16. Supply voltage rejection vs temperature

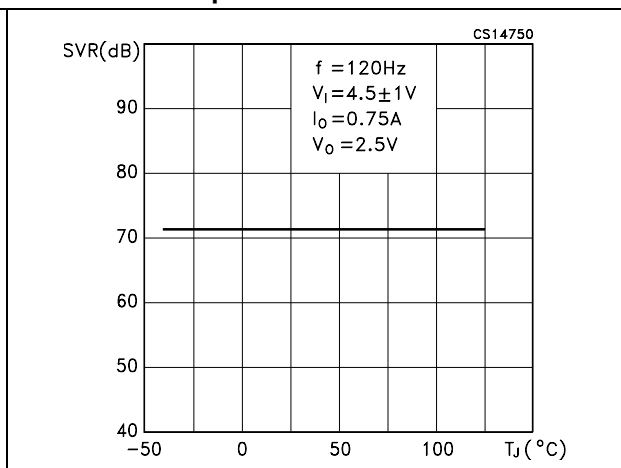


Figure 17. Output voltage vs input voltage

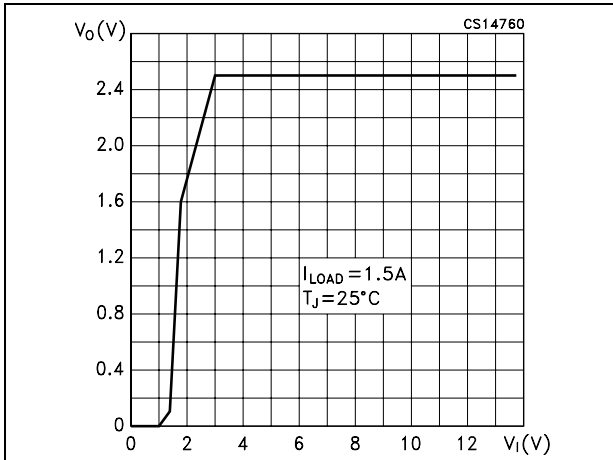


Figure 18. Stability vs Co

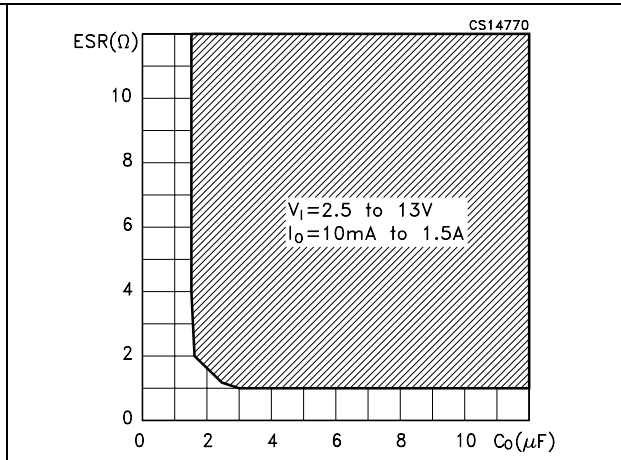


Figure 19. Line transient

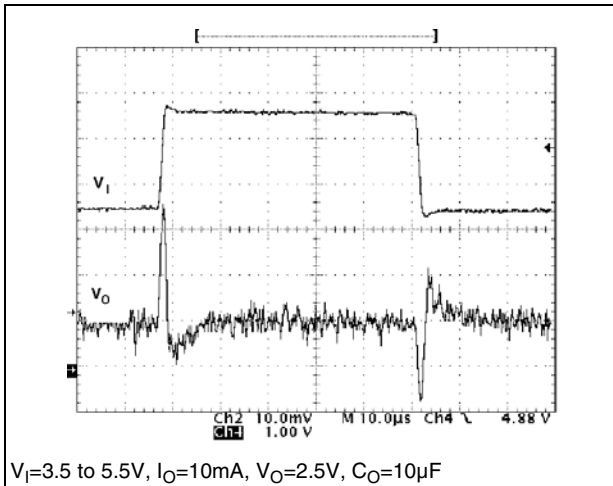


Figure 20. Load transient

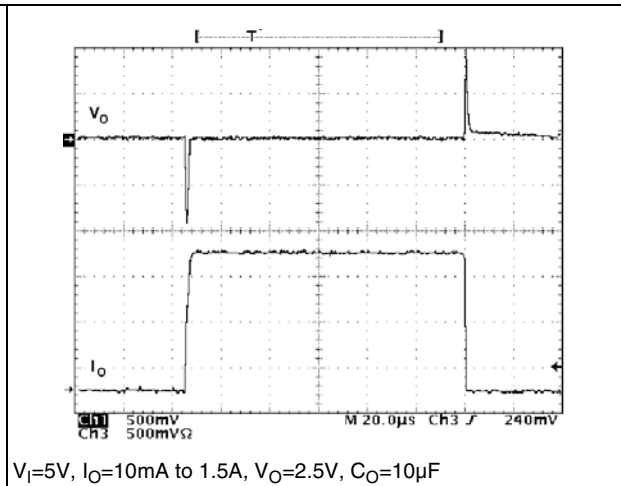


Figure 21. Start-up time 10mA

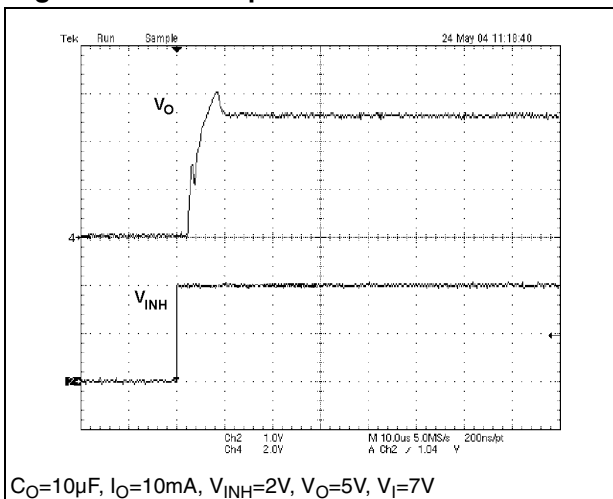
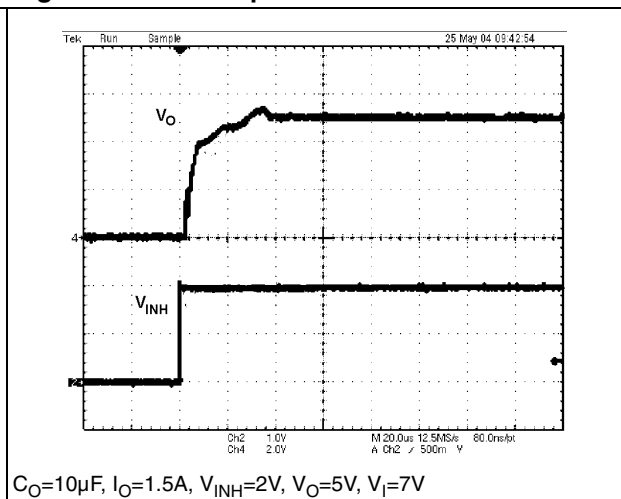


Figure 22. Start-up time 1.5A



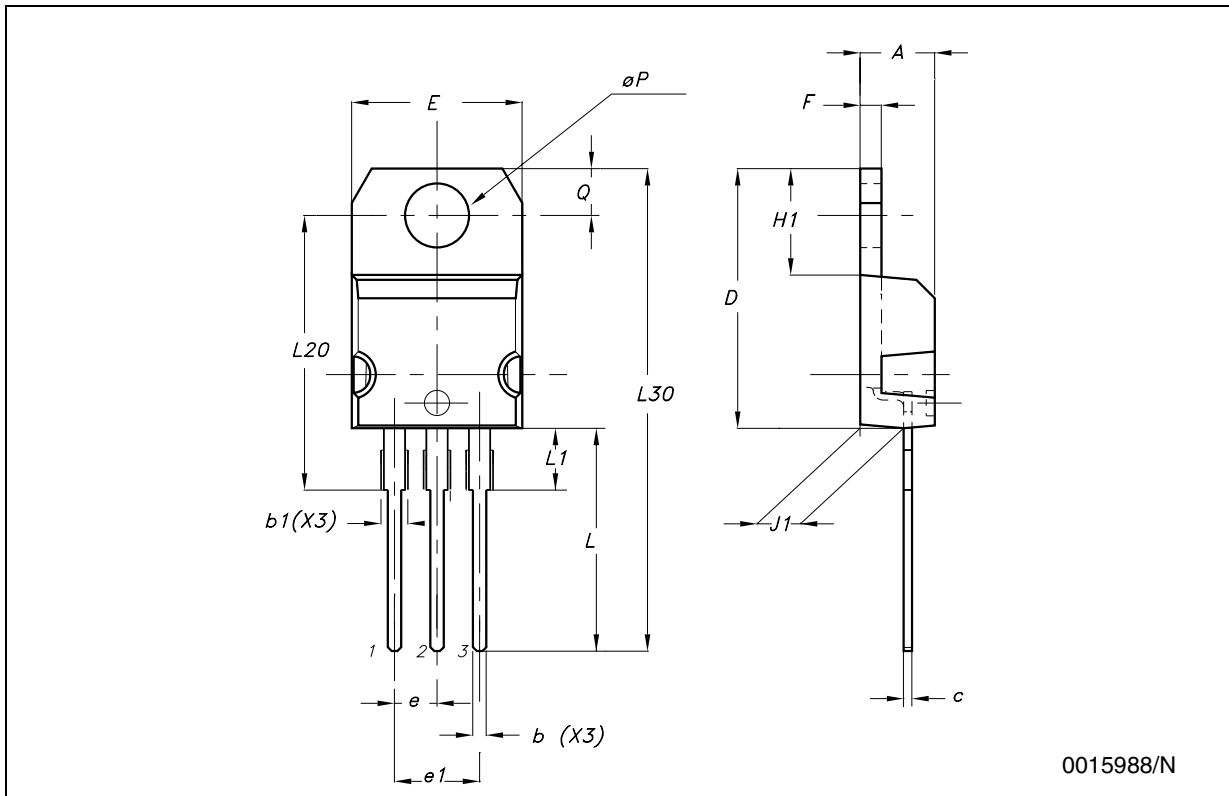


## 7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

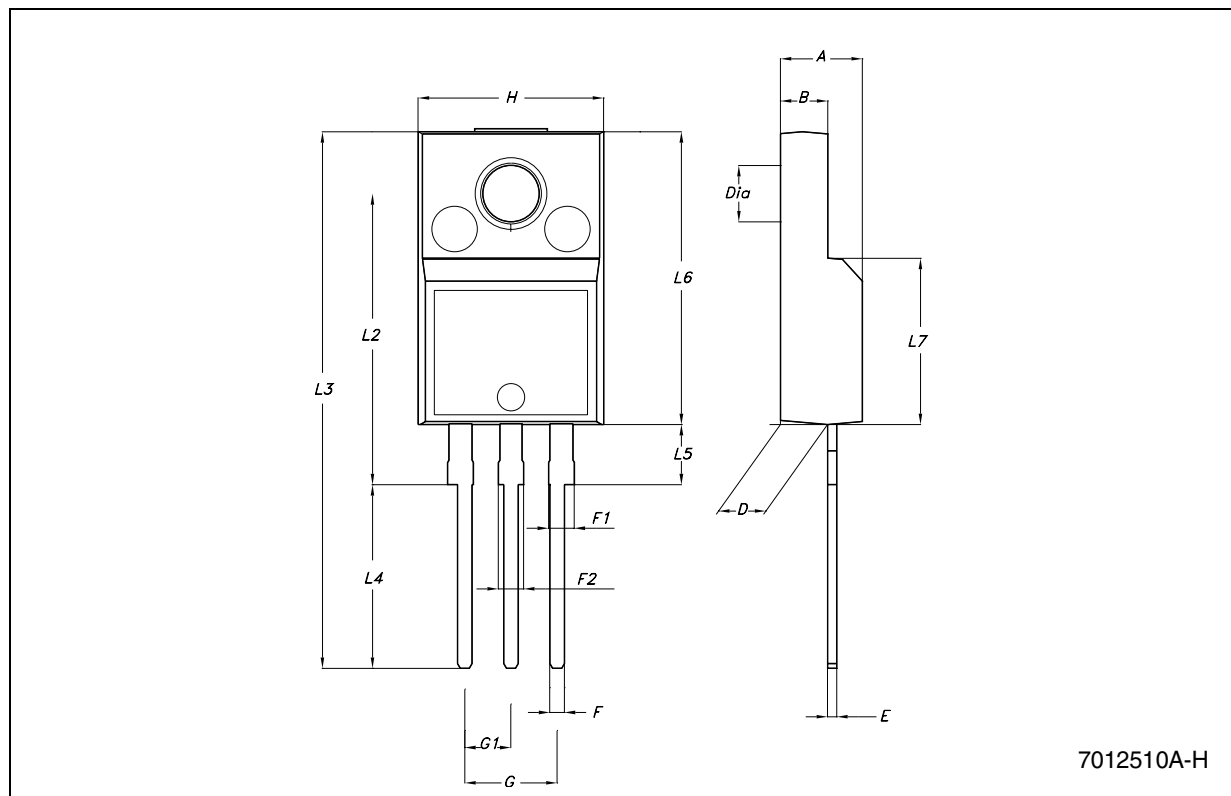
**TO-220 (A TYPE) MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.067
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.600		0.620
E	10.0		10.40	0.393		0.409
e	2.4		2.7	0.094		0.106
e1	4.95		5.15	0.194		0.203
F	1.23		1.32	0.048		0.051
H1	6.2		6.6	0.244		0.260
J1	2.40		2.72	0.094		0.107
L	13.0		14.0	0.511		0.551
L1	3.5		3.93	0.137		0.154
L20		16.4			0.645	
L30		28.9			1.138	
φP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



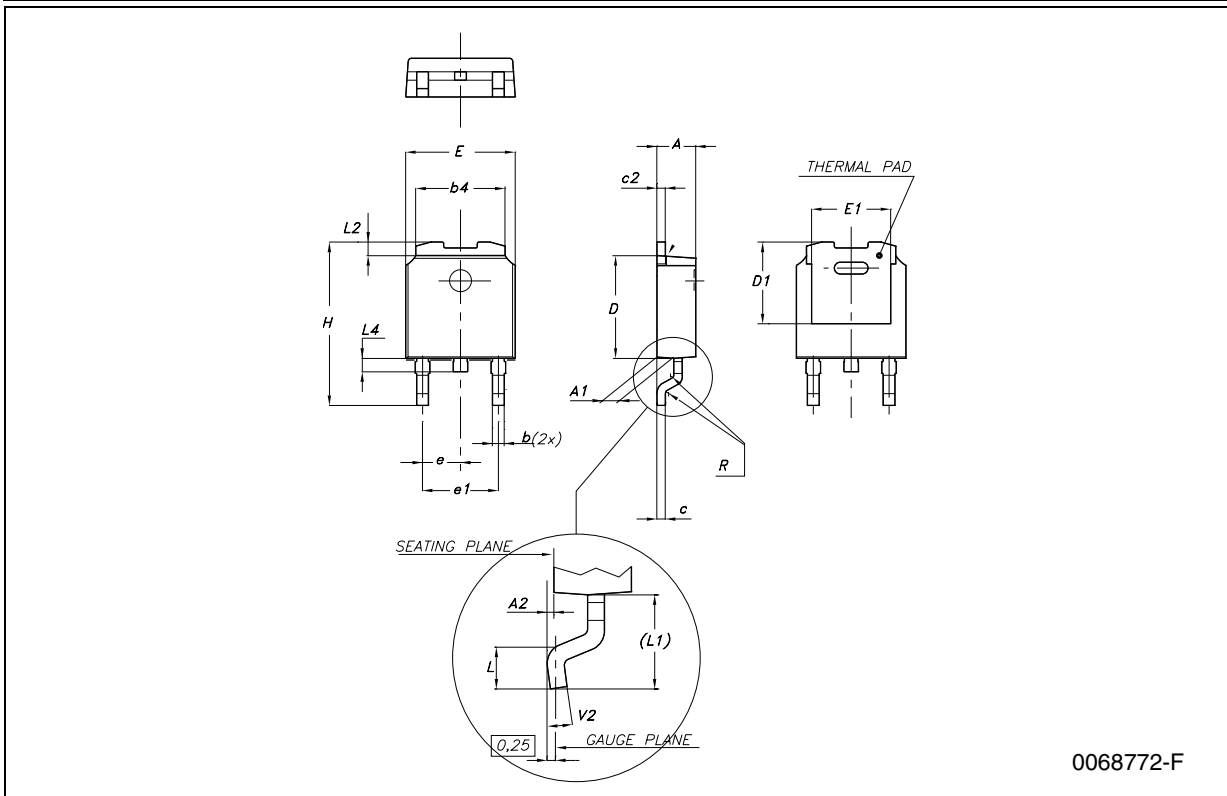
<b>TO-220FP MECHANICAL DATA</b>
---------------------------------

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.70	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.50	0.045		0.059
F2	1.15		1.50	0.045		0.059
G	4.95		5.2	0.194		0.204
G1	2.4		2.7	0.094		0.106
H	10.0		10.40	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L5	2.9		3.6	0.114		0.142
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
DIA.	3		3.2	0.118		0.126



**DPAK MECHANICAL DATA**

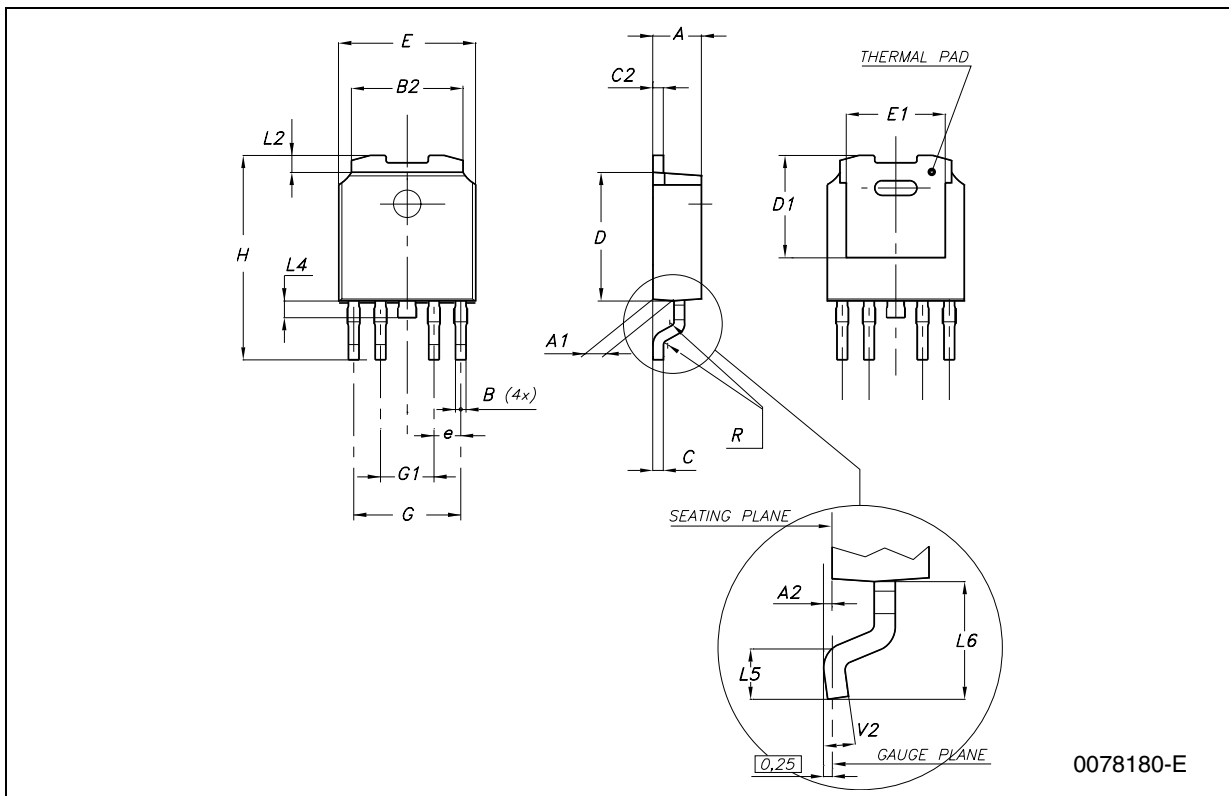
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
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
R		0.2			0.008	
V2	0°		8°	0°		8°



0068772-F

**PPAK MECHANICAL DATA**

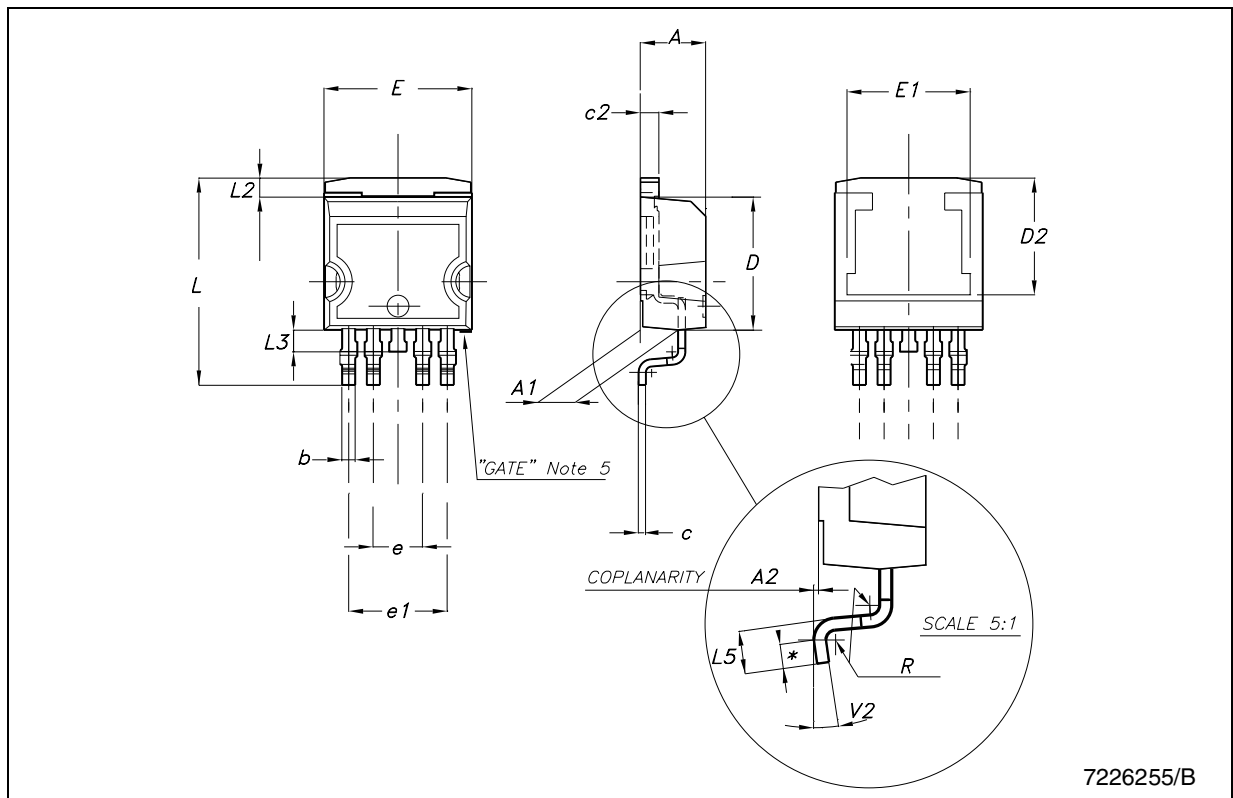
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.4		0.6	0.015		0.023
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.201	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		1.27			0.050	
G	4.9		5.25	0.193		0.206
G1	2.38		2.7	0.093		0.106
H	9.35		10.1	0.368		0.397
L2		0.8	1		0.031	0.039
L4	0.6		1	0.023		0.039
L5	1			0.039		
L6		2.8			0.110	



0078180-E

**P<sup>2</sup>PAK MECHANICAL DATA**

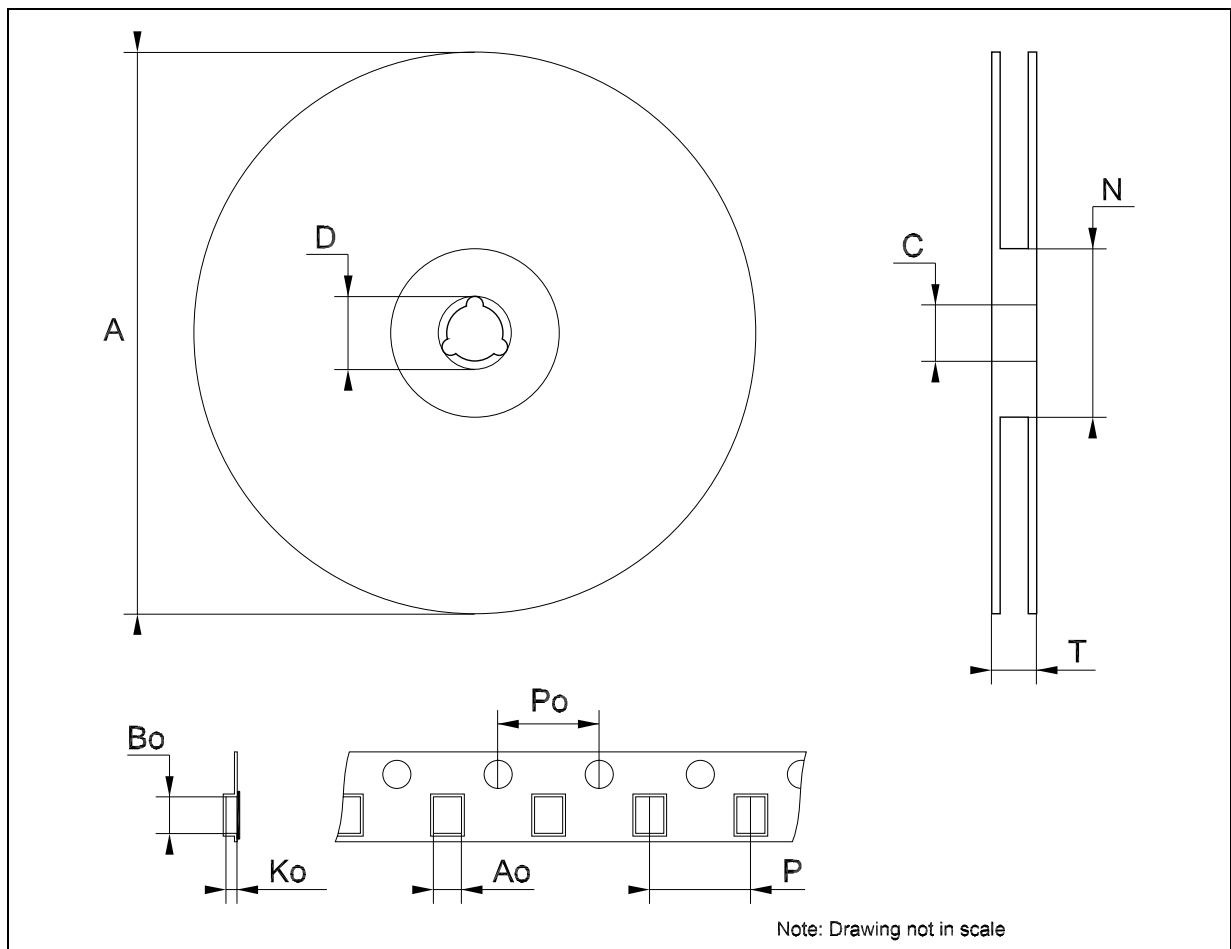
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.30		4.80	0.169		0.188
A1	2.40		2.80	0.094		0.110
A2	0.03		0.23	0.001		0.009
b	0.80		1.05	0.031		0.041
c	0.45		0.60	0.017		0.023
c2	1.17		1.37	0.046		0.053
D	8.95		9.35	0.352		0.368
D2		8			0.315	
E	10.00		10.40	0.393		0.409
E1		8.5			0.334	0.409
e	3.20		3.60	0.126		0.142
e1	6.60		7.00	0.260		0.275
L	13.70		14.50	0.539		0.571
L2	1.25		1.40	0.049		0.055
L3	0.90		1.70	0.035		0.067
L5	1.55		2.40	0.061		0.094
R		0.40			0.016	
V2	0°		8°	0°		8°



7226255/B

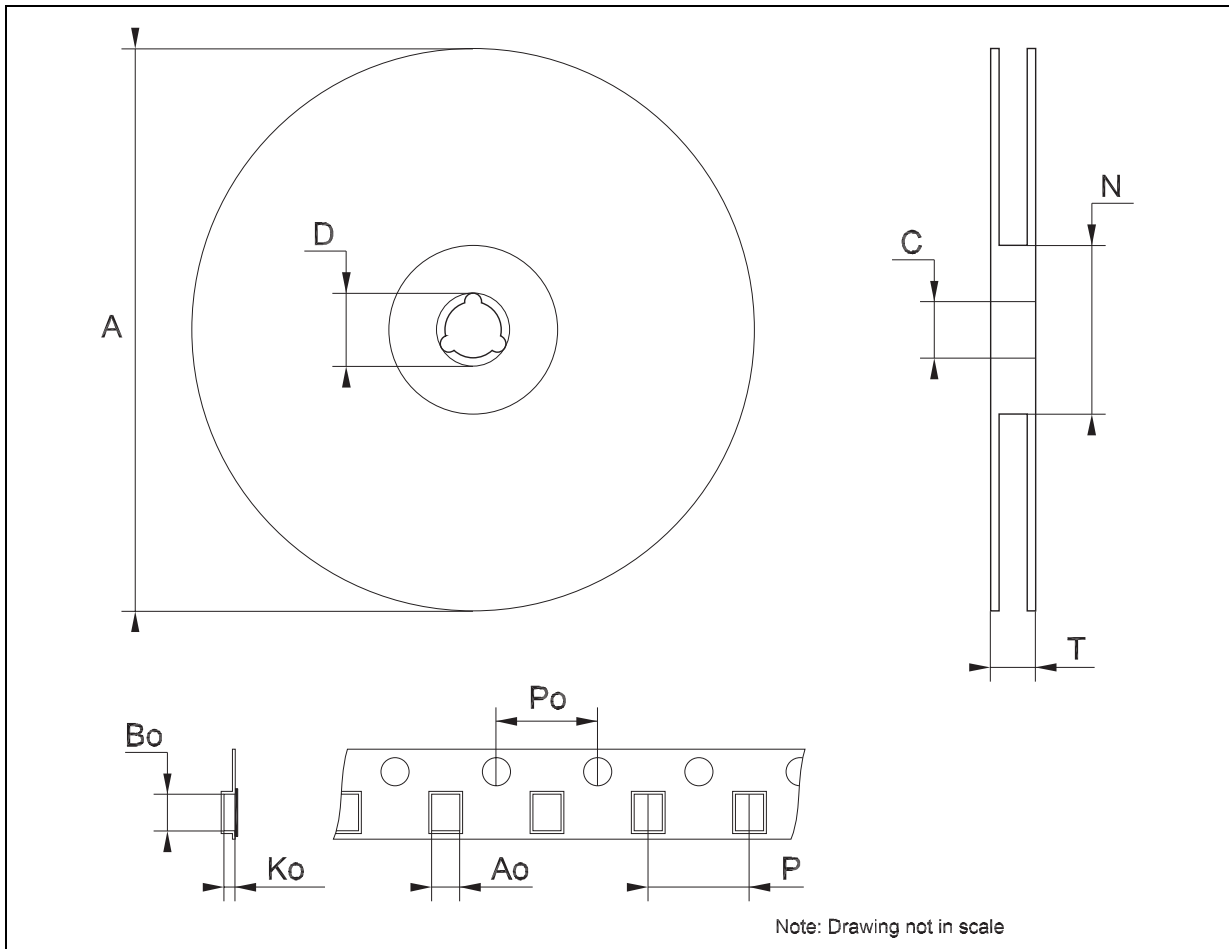
**Tape & Reel DPAK-PPAK MECHANICAL DATA**

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





## 8 Revision history

**Table 10. Revision history**

Date	Revision	Changes
17-Jun-2004	5	Add figures 20 and 21, PPAK, TO-220 and TO-220FP mechanical data updated.
19-Jul-2004	6	Remove Package TO-220FP4.
08-Nov-2004	7	Mistake Figure 7.
21-Mar-2005	8	Add $V_O$ and $V_{INH}$ on Table 2.
21-Oct-2005	9	Order Codes Has Been Updated.
17-Oct-2006	10	Add new package P <sup>2</sup> PAK.
13-Nov-2006	11	Add row $T_{SHDN}$ on tables of the electrical characteristics.

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