

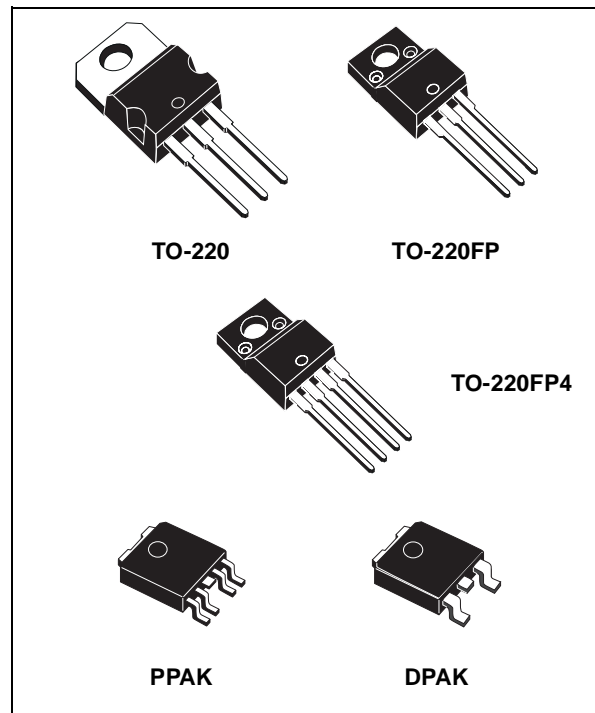


1.5A, VERY LOW DROP VOLTAGE REGULATORS

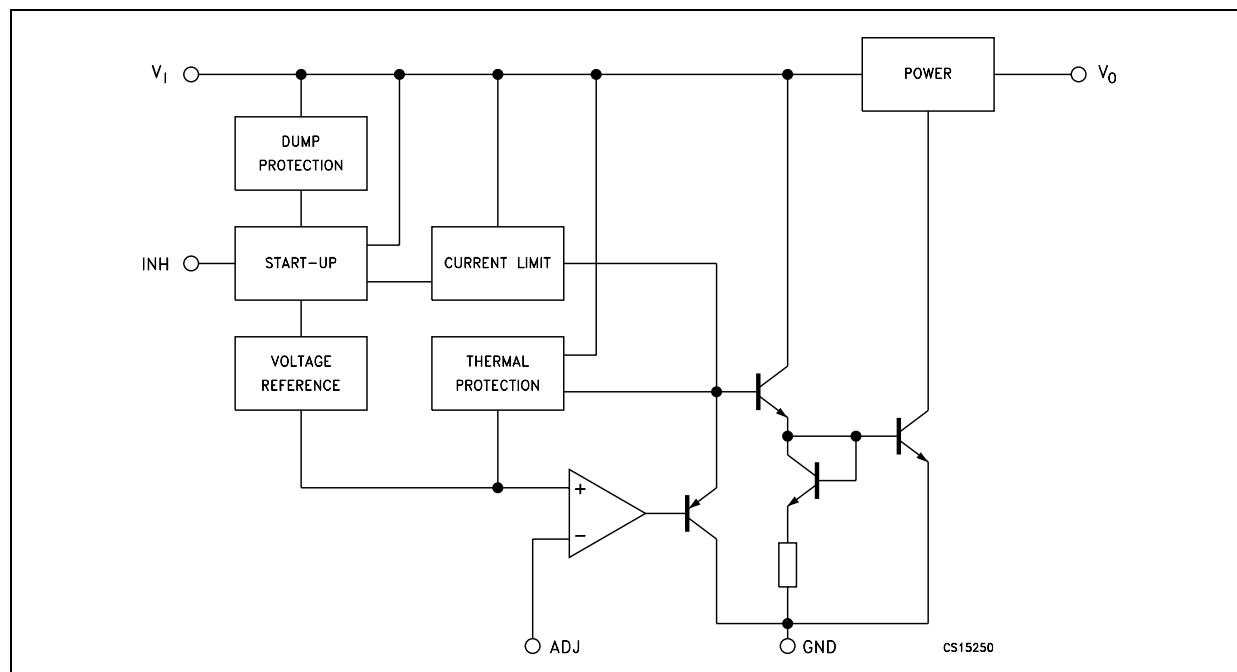
- VERY LOW DROPOUT VOLTAGE (TYP. 0.4 AT 1.5A)
- GUARANTEED OUTPUT CURRENT UP TO 1.5A
- FIXED AND ADJUSTABLE OUTPUT VOLTAGE ($\pm 1\%$ AT 25°C)
- INTERNAL CURRENT AND THERMAL LIMIT
- LOGIC CONTROLLED ELECTRONIC SHUTDOWN AVAILABLE IN PPAK AND TO-220FP4

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.

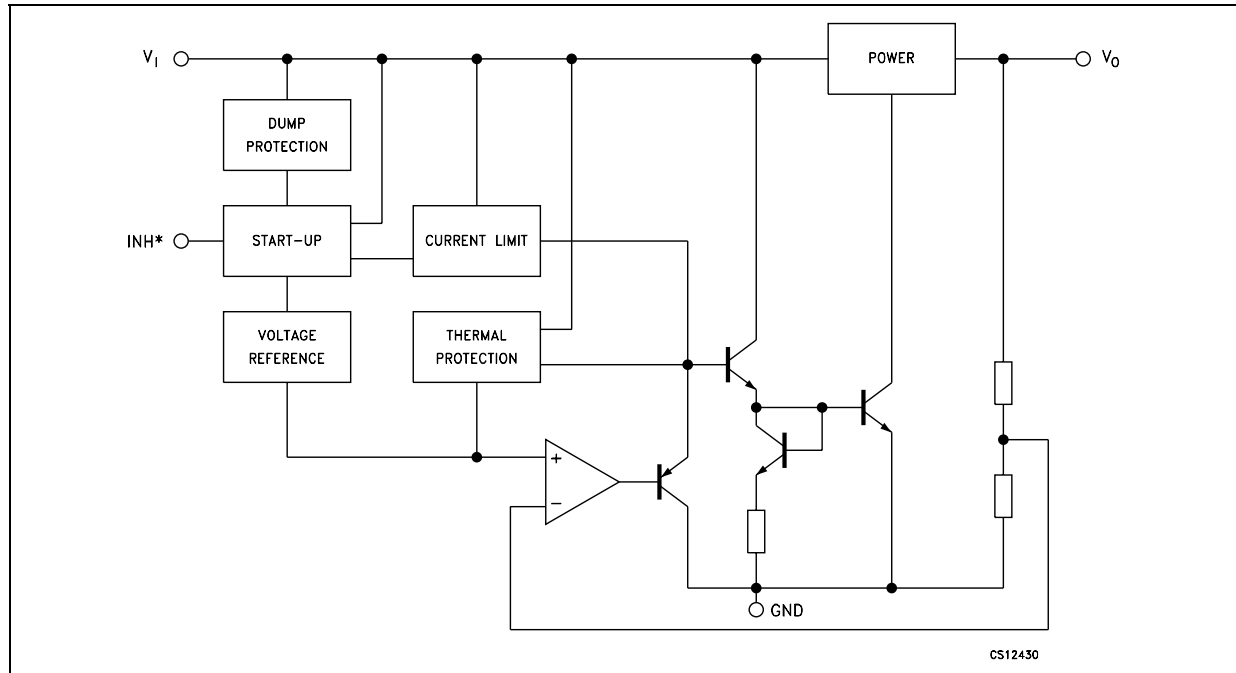


SCHEMATIC DIAGRAM FOR ADJUSTABLE VERSION



LD29150 SERIES

SCHEMATIC DIAGRAM FOR FIXED VERSION



* Only for version with inhibit function.

ORDERING CODES

TO-220	TO-220FP (#)	TO-220FP4 (#)	DPAK (*)	PPAK (*)	OUTPUT VOLTAGE
LD29150V15	LD29150P15	LD29150F4-15	LD29150DT15	LD29150PT15	1.5 V
LD29150V18	LD29150P18	LD29150F4-18	LD29150DT18	LD29150PT18	1.8 V
LD29150V25	LD29150P25	LD29150F4-25	LD29150DT25	LD29150PT25	2.5 V
LD29150V33	LD29150P33	LD29150F4-33	LD29150DT33	LD29150PT33	3.3 V
LD29150V50	LD29150P50	LD29150F4-50	LD29150DT50	LD29150PT50	5.0 V
LD29150V80	LD29150P80	LD29150F4-80	LD29150DT80	LD29150PT80	8.0 V
LD29150V90	LD29150P90	LD29150F4-90	LD29150DT90	LD29150PT90	9.0 V
				LD29150PT	ADJ

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

(#) Available on request.

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

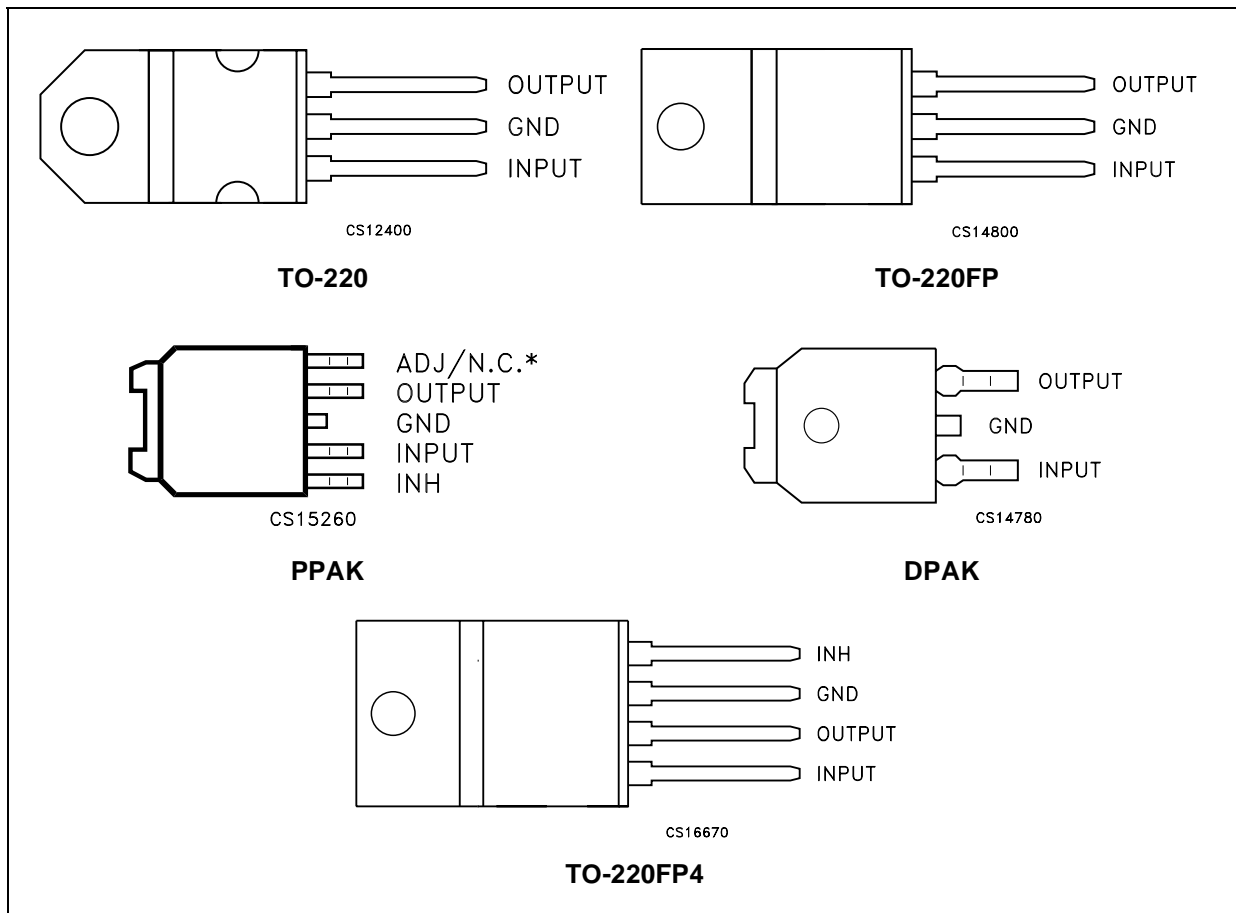
(*) Above 14V the device is automatically in shut-down.

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

THERMAL DATA

Symbol	Parameter	DPAK	PPAK	TO-220	TO-220FP	TO-220FP4	Unit
$R_{thj-case}$	Thermal Resistance Junction-case	8	8	3	4	4	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	100	100	50	60	60	°C/W

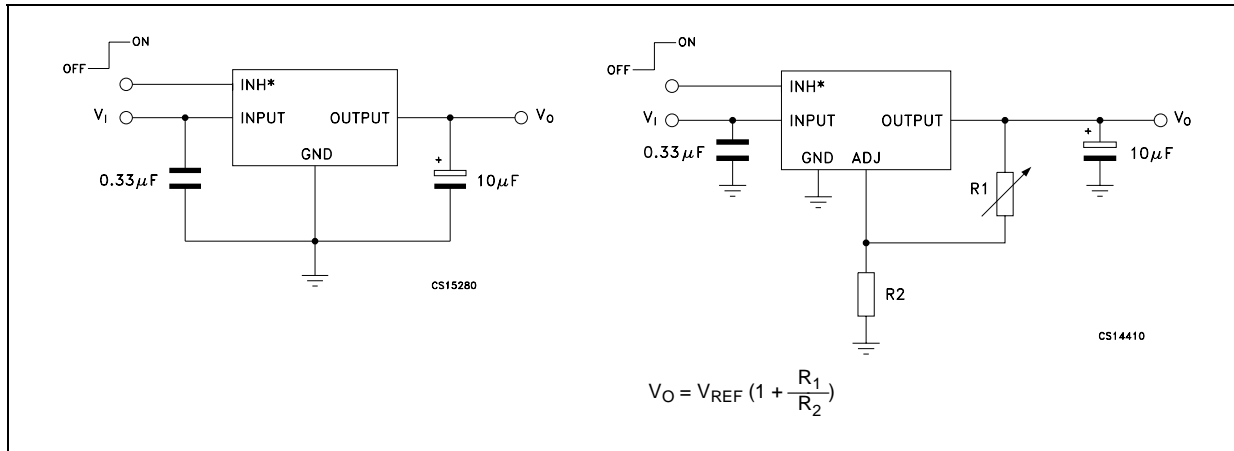
CONNECTION DIAGRAM (top view)



* Not connected for fixed version.

LD29150 SERIES

APPLICATION CIRCUIT



* Only for version with inhibit function.

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 1.5A $T_J = -40$ to 125°C	2.5			V
V_O	Output Voltage	$I_O = 10\text{mA}$ to 1.5A , $V_I = 3$ to 7V $T_J = -40$ to 125°C	1.485	1.5	1.515	V
ΔV_O	Load Regulation	$I_O = 10\text{mA}$ to 1.5A		0.2	1.0	%
ΔV_O	Line Regulation	$V_I = 3$ to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	$f = 120\text{Hz}$, $V_I = 3.5 \pm 1\text{V}$, $I_O = 0.75\text{A}$ (Note 1)	65	75		dB
I_q	Quiescent Current	$I_O = 0.75\text{A}$, $T_J = -40$ to 125°C		15	40	mA
		$I_O = 1.5\text{A}$, $T_J = -40$ to 125°C		30	80	
		$V_I = 13\text{V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to 125°C		130	180	μA
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 2) $T_J = -40$ to 125°C			0.8	V
V_{IH}	Control Input Logic High	ON MODE, (NOTE 2) $T_J = -40$ to 125°C	2			V
I_{INH}	Control Input Current	$T_J = -40$ to 125°C , $V_{INH} = 13\text{V}$		5	10	μA
eN	Output Noise Voltage	$B_P = 10\text{Hz}$ to 100KHz , $I_O = 100\text{mA}$		60		μV_{RMS}

NOTE 1: Guaranteed by design.

NOTE 2: Only for version with Inhibit function.

ELECTRICAL CHARACTERISTICS OF LD29150#18(I_O = 10mA, T_J = 25°C, V_I = 3.8V, V_{INH} = 2V (Note 3), C_I = 330nF, C_O = 10μF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _O	Output Voltage	I _O = 10mA to 1.5A, V _I = 3 to 7.3V T _J = -40 to 125°C	1.782	1.8	1.818	V
			1.764		1.836	
ΔV _O	Load Regulation	I _O = 10mA to 1.5A		0.2	1.0	%
ΔV _O	Line Regulation	V _I = 3 to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	f = 120 Hz, V _I = 3.8 ± 1V, I _O = 0.75A (Note 1)	62	72		dB
V _{DROP}	Dropout Voltage	I _O = 250mA, T _J = -40 to 125°C (Note 2)		0.1		V
		I _O = 0.75A, T _J = -40 to 125°C (Note 2)		0.2		
		I _O = 1.5A, T _J = -40 to 125°C (Note 2)		0.4	0.7	
I _q	Quiescent Current	I _O = 0.75A, T _J = -40 to 125°C		15	40	mA
		I _O = 1.5A, T _J = -40 to 125°C		30	80	
		V _I = 13V, V _{INH} = GND T _J = -40 to 125°C		130	180	μA
I _{sc}	Short Circuit Current	V _I - V _O = 5.5V		2.2		A
V _{IL}	Control Input Logic Low	OFF MODE, (NOTE 3) T _J = -40 to 125°C			0.8	V
V _{IH}	Control Input Logic High	ON MODE, (NOTE 3) T _J = -40 to 125°C	2			V
I _{INH}	Control Input Current	T _J = -40 to 125°C V _{INH} = 13V		5	10	μA
eN	Output Noise Voltage	B _P = 10Hz to 100KHz I _O = 100mA		72		μV _{RMS}

NOTE 1: Guaranteed by design.

NOTE 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+1V applied to V_I.

NOTE 3: Only for version with Inhibit function.

ELECTRICAL CHARACTERISTICS OF LD29150#25(I_O = 10mA, T_J = 25°C, V_I = 4.5V, V_{INH} = 2V (Note 3), C_I = 330nF, C_O = 10μF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _O	Output Voltage	I _O = 10mA to 1.5A, V _I = 3.5 to 8V T _J = -40 to 125°C	2.475	2.5	2.525	V
			2.45		2.55	
ΔV _O	Load Regulation	I _O = 10mA to 1.5A		0.2	1.0	%
ΔV _O	Line Regulation	V _I = 3.5 to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	f = 120 Hz, V _I = 4.5 ± 1V, I _O = 0.75A (Note 1)	55	70		dB
V _{DROP}	Dropout Voltage	I _O = 250mA, T _J = -40 to 125°C (Note 2)		0.1		V
		I _O = 0.75A, T _J = -40 to 125°C (Note 2)		0.2		
		I _O = 1.5A, T _J = -40 to 125°C (Note 2)		0.4	0.7	
I _q	Quiescent Current	I _O = 0.75A, T _J = -40 to 125°C		15	40	mA
		I _O = 1.5A, T _J = -40 to 125°C		30	80	
		V _I = 13V, V _{INH} = GND T _J = -40 to 125°C		130	180	μA
I _{sc}	Short Circuit Current	V _I - V _O = 5.5V		2.2		A
V _{IL}	Control Input Logic Low	OFF MODE, (NOTE 3) T _J = -40 to 125°C			0.8	V
V _{IH}	Control Input Logic High	ON MODE, (NOTE 3) T _J = -40 to 125°C	2			V
I _{INH}	Control Input Current	T _J = -40 to 125°C V _{INH} = 13V		5	10	μA
eN	Output Noise Voltage	B _P = 10Hz to 100KHz I _O = 100mA		100		μV _{RMS}

NOTE 1: Guaranteed by design.

NOTE 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+1V applied to V_I.

NOTE 3: Only for version with Inhibit function.

LD29150 SERIES

ELECTRICAL CHARACTERISTICS OF LD29150#33

($I_O = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $V_I = 5.3\text{V}$, $V_{INH} = 2\text{V}$ (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 1.5A , $V_I = 4.3$ to 8.8V $T_J = -40$ to 125°C	3.267	3.3	3.333	V
			3.234		3.366	
ΔV_O	Load Regulation	$I_O = 10\text{mA}$ to 1.5A		0.2	1.0	%
ΔV_O	Line Regulation	$V_I = 4.3$ to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	$f = 120\text{Hz}$, $V_I = 5.3 \pm 1\text{V}$, $I_O = 0.75\text{A}$ (Note 1)	52	67		dB
V_{DROPP}	Dropout Voltage	$I_O = 250\text{mA}$, $T_J = -40$ to 125°C (Note 2)		0.1		V
		$I_O = 0.75\text{A}$, $T_J = -40$ to 125°C (Note 2)		0.2		
		$I_O = 1.5\text{A}$, $T_J = -40$ to 125°C (Note 2)		0.4	0.7	
I_q	Quiescent Current	$I_O = 0.75\text{A}$, $T_J = -40$ to 125°C		15	40	mA
		$I_O = 1.5\text{A}$, $T_J = -40$ to 125°C		30	80	
		$V_I = 13\text{V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to 125°C		130	180	μA
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°C			0.8	V
V_{IH}	Control Input Logic High	ON MODE, (NOTE 3) $T_J = -40$ to 125°C	2			V
I_{INH}	Control Input Current	$T_J = -40$ to 125°C $V_{INH} = 13\text{V}$		5	10	μA
eN	Output Noise Voltage	$B_P = 10\text{Hz}$ to 100KHz $I_O = 100\text{mA}$		132		μV_{RMS}

NOTE 1: Guaranteed by design.

NOTE 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 .

NOTE 3: Only for version with Inhibit function.

ELECTRICAL CHARACTERISTICS OF LD29150#50

($I_O = 10\text{mA}$, $T_J = 25^\circ\text{C}$, $V_I = 7\text{V}$, $V_{INH} = 2\text{V}$ (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 1.5A , $V_I = 6$ to 10.5V $T_J = -40$ to 125°C	4.95	5	5.05	V
			4.9		5.1	
ΔV_O	Load Regulation	$I_O = 10\text{mA}$ to 1.5A		0.2	1.0	%
ΔV_O	Line Regulation	$V_I = 6$ to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	$f = 120\text{Hz}$, $V_I = 7 \pm 1\text{V}$, $I_O = 0.75\text{A}$ (Note 1)	49	64		dB
V_{DROPP}	Dropout Voltage	$I_O = 250\text{mA}$, $T_J = -40$ to 125°C (Note 2)		0.1		V
		$I_O = 0.75\text{A}$, $T_J = -40$ to 125°C (Note 2)		0.2		
		$I_O = 1.5\text{A}$, $T_J = -40$ to 125°C (Note 2)		0.4	0.7	
I_q	Quiescent Current	$I_O = 0.75\text{A}$, $T_J = -40$ to 125°C		15	40	mA
		$I_O = 1.5\text{A}$, $T_J = -40$ to 125°C		30	80	
		$V_I = 13\text{V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to 125°C		130	180	μA
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°C			0.8	V
V_{IH}	Control Input Logic High	ON MODE, (NOTE 3) $T_J = -40$ to 125°C	2			V
I_{INH}	Control Input Current	$T_J = -40$ to 125°C $V_{INH} = 13\text{V}$		5	10	μA
eN	Output Noise Voltage	$B_P = 10\text{Hz}$ to 100KHz $I_O = 100\text{mA}$		200		μV_{RMS}

NOTE 1: Guaranteed by design.

NOTE 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 .

NOTE 3: Only for version with Inhibit function.

ELECTRICAL CHARACTERISTICS OF LD29150#80(I_O = 10mA, T_J = 25°C, V_I = 10V, V_{INH} = 2V (Note 3), C_I = 330nF, C_O = 10μF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _O	Output Voltage	I _O = 10mA to 1.5A, V _I = 9 to 13V T _J = -40 to 125°C	7.92	8	8.08	V
			7.84		8.16	
ΔV _O	Load Regulation	I _O = 10mA to 1.5A		0.2	1.0	%
ΔV _O	Line Regulation	V _I = 9 to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	f = 120 Hz, V _I = 9 ± 1V, I _O = 0.75A (Note 1)	45	59		dB
V _{DROP}	Dropout Voltage	I _O = 250mA, T _J = -40 to 125°C (Note 2)		0.1		V
		I _O = 0.75A, T _J = -40 to 125°C (Note 2)		0.2		
		I _O = 1.5A, T _J = -40 to 125°C (Note 2)		0.4	0.7	
I _q	Quiescent Current	I _O = 0.75A, T _J = -40 to 125°C		15	40	mA
		I _O = 1.5A, T _J = -40 to 125°C		30	80	
		V _I = 13V, V _{INH} = GND T _J = -40 to 125°C		130	180	μA
I _{sc}	Short Circuit Current	V _I - V _O = 5.5V		2.2		A
V _{IL}	Control Input Logic Low	OFF MODE, (NOTE 3) T _J = -40 to 125°C			0.8	V
V _{IH}	Control Input Logic High	ON MODE, (NOTE 3) T _J = -40 to 125°C	2			V
I _{INH}	Control Input Current	T _J = -40 to 125°C V _{INH} = 13V		5	10	μA
eN	Output Noise Voltage	B _P = 10Hz to 100KHz I _O = 100mA		320		μV _{RMS}

NOTE 1: Guaranteed by design.

NOTE 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+1V applied to V_I.

NOTE 3: Only for version with Inhibit function.

ELECTRICAL CHARACTERISTICS OF LD29150#90(I_O = 10mA, T_J = 25°C, V_I = 11V, V_{INH} = 2V (Note 3), C_I = 330nF, C_O = 10μF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _O	Output Voltage	I _O = 10mA to 1.5A, V _I = 10 to 13V T _J = -40 to 125°C	8.91	9	9.09	V
			8.82		9.18	
ΔV _O	Load Regulation	I _O = 10mA to 1.5A		0.2	1.0	%
ΔV _O	Line Regulation	V _I = 10 to 13V		0.06	0.5	%
SVR	Supply Voltage Rejection	f = 120 Hz, V _I = 11 ± 1V, I _O = 0.75A (Note 1)	45	58		dB
V _{DROP}	Dropout Voltage	I _O = 250mA, T _J = -40 to 125°C (Note 2)		0.1		V
		I _O = 0.75A, T _J = -40 to 125°C (Note 2)		0.2		
		I _O = 1.5A, T _J = -40 to 125°C (Note 2)		0.4	0.7	
I _q	Quiescent Current	I _O = 0.75A, T _J = -40 to 125°C		15	40	mA
		I _O = 1.5A, T _J = -40 to 125°C		30	80	
		V _I = 13V, V _{INH} = GND T _J = -40 to 125°C		130	180	μA
I _{sc}	Short Circuit Current	V _I - V _O = 5.5V		2.2		A
V _{IL}	Control Input Logic Low	OFF MODE, (NOTE 3) T _J = -40 to 125°C			0.8	V
V _{IH}	Control Input Logic High	ON MODE, (NOTE 3) T _J = -40 to 125°C	2			V
I _{INH}	Control Input Current	T _J = -40 to 125°C V _{INH} = 13V		5	10	μA
eN	Output Noise Voltage	B _P = 10Hz to 100KHz I _O = 100mA		360		μV _{RMS}

NOTE 1: Guaranteed by design.

NOTE 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+1V applied to V_I.

NOTE 3: Only for version with Inhibit function.

LD29150 SERIES

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 1.5A $T_J = -40$ to 125°C	2.5			V
ΔV_O	Load Regulation	$I_O = 10\text{mA}$ to 1.5A		0.2	1.0	%
ΔV_O	Line Regulation	$V_I = 2.5\text{V}$ to 13V $I_O = 10\text{mA}$		0.06	0.5	%
V_{REF}	Reference Voltage	$I_O = 10\text{mA}$ to 1.5A , $V_I = 2.5$ to 4.5V $T_J = -40$ to 125°C (Note 2)	-1% -2%	1.23	+1% +2%	V
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°C		15	40	mA
		$I_O = 1.5\text{A}$, $T_J = -40$ to 125°C		30	80	
		$V_I = 13\text{V}$, $V_{INH} = \text{GND}$ $T_J = -40$ to 125°C		130	180	μA
I_{ADJ}	Adjust Pin Current	$T_J = -40$ to 125°C (Note 1)			1	μA
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°C			0.8	V
V_{IH}	Control Input Logic High	ON MODE, (NOTE 3) $T_J = -40$ to 125°C	2			V
I_{INH}	Control Input Current	$T_J = -40$ to 125°C $V_{INH} = 13\text{V}$		5	10	μA
eN	Output Noise Voltage	$B_P = 10\text{Hz}$ to 100KHz $I_O = 100\text{mA}$		50		μV_{RMS}

NOTE 1: Guaranteed by design.

NOTE 2: reference Voltage is measured between output and GND pin, with ADJ PIN tied to V_{OUT} .

NOTE 3: Only for version with Inhibit function.

TYPICAL CHARACTERISTICS

Figure 1 : Output Voltage vs Temperature

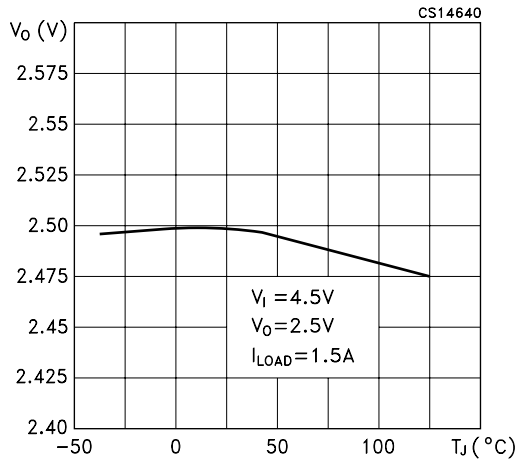


Figure 2 : Reference Voltage vs Temperature

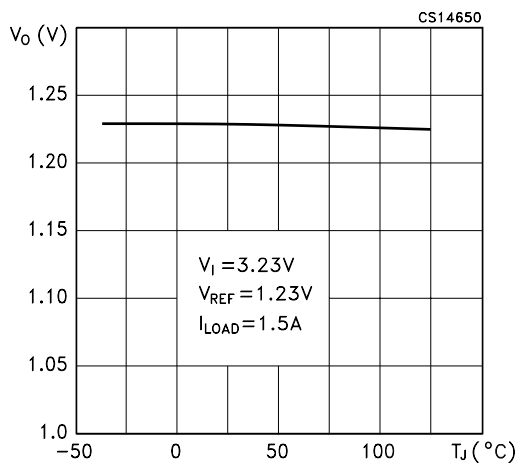


Figure 3 : Dropout Voltage vs Temperature

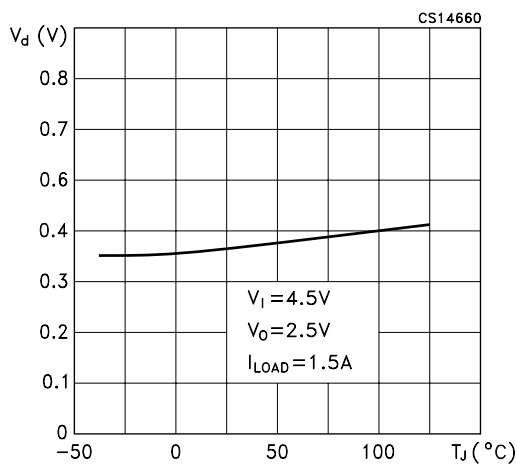


Figure 4 : Dropout Voltage vs Output Current

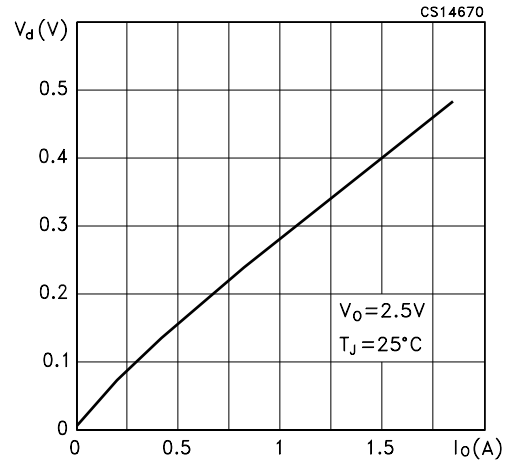


Figure 5 : Quiescent Current vs Output Current

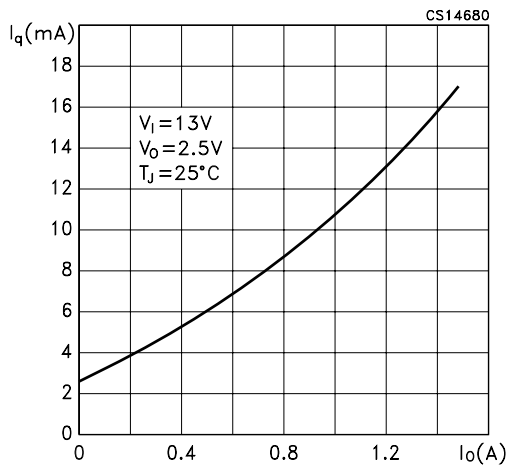


Figure 6 : Quiescent Current vs Output Current

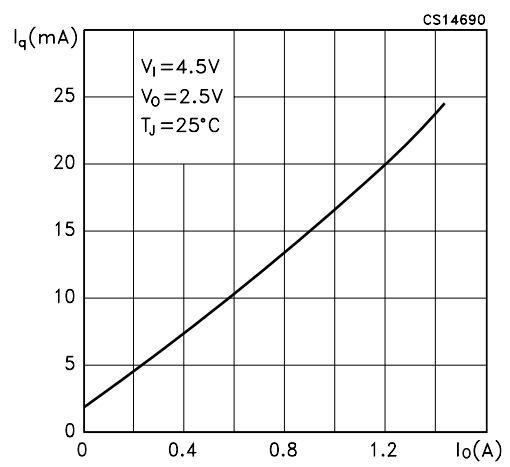


Figure 7 : Quiescent Current vs Supply Voltage

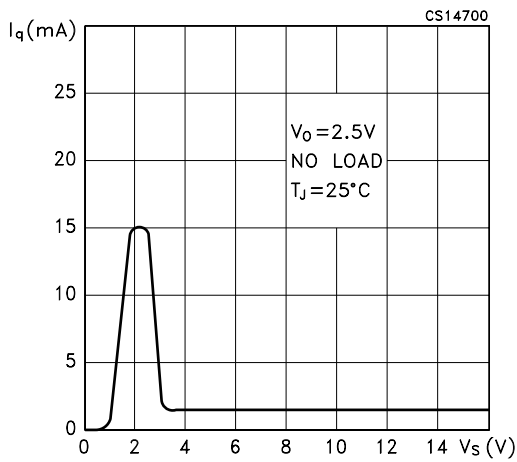


Figure 8 : Quiescent Current vs Temperature

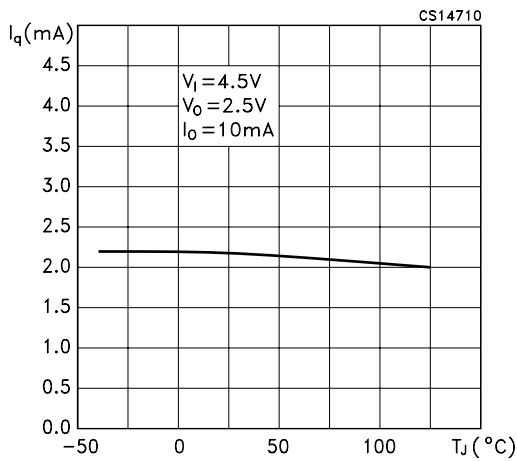


Figure 9 : Quiescent Current vs Temperature

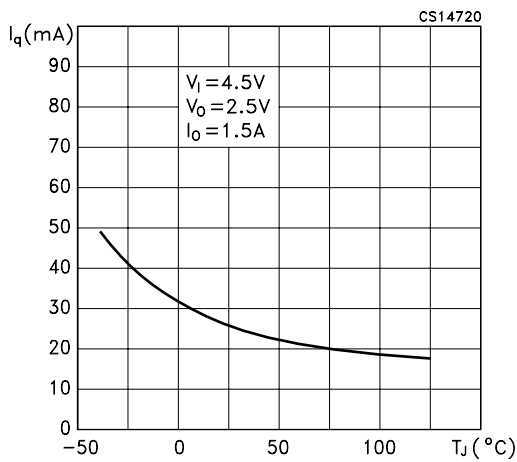


Figure 10 : Short Circuit Current vs Temperature

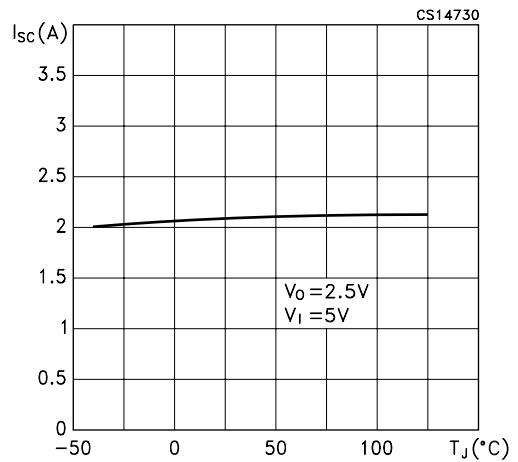


Figure 11 : Adjust Pin Current vs Temperature

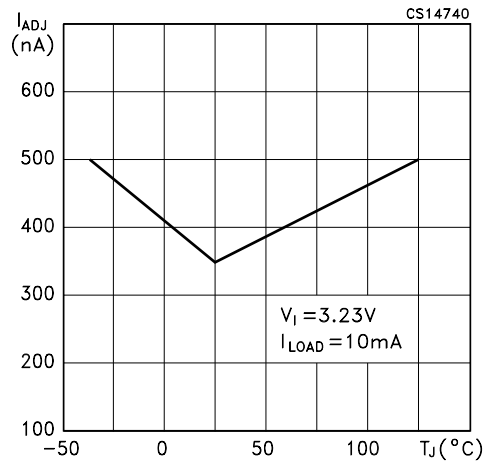


Figure 12 : Supply Voltage Rejection vs Temperature

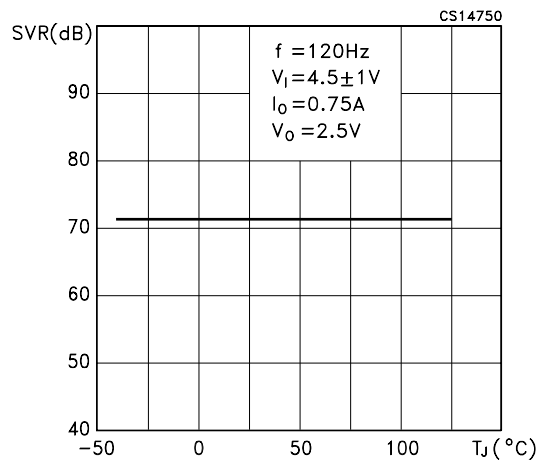


Figure 13 : Output Voltage vs Input Voltage

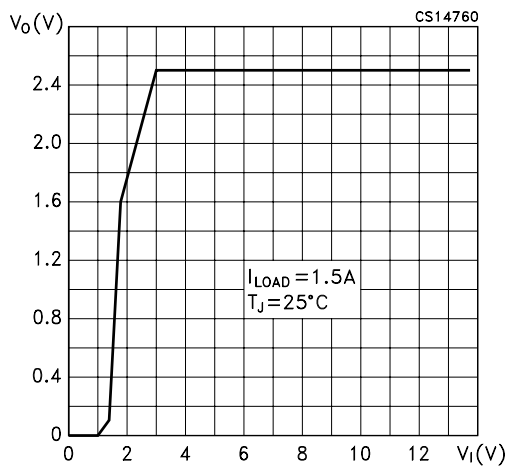


Figure 15 : Line Transient

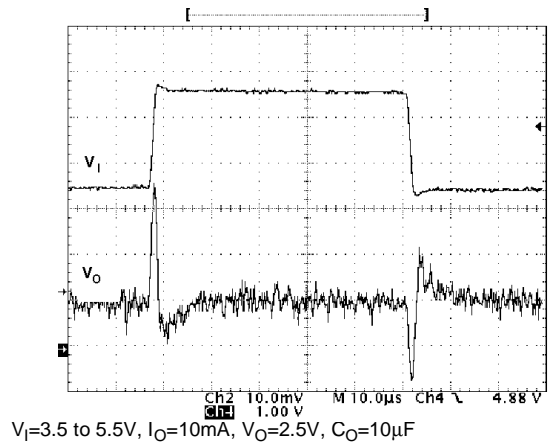


Figure 14 : Stability vs C_O

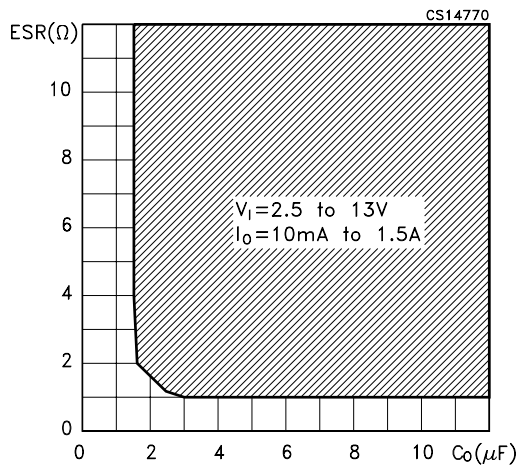
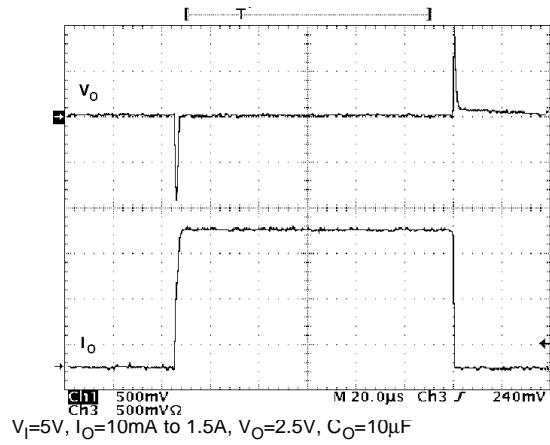
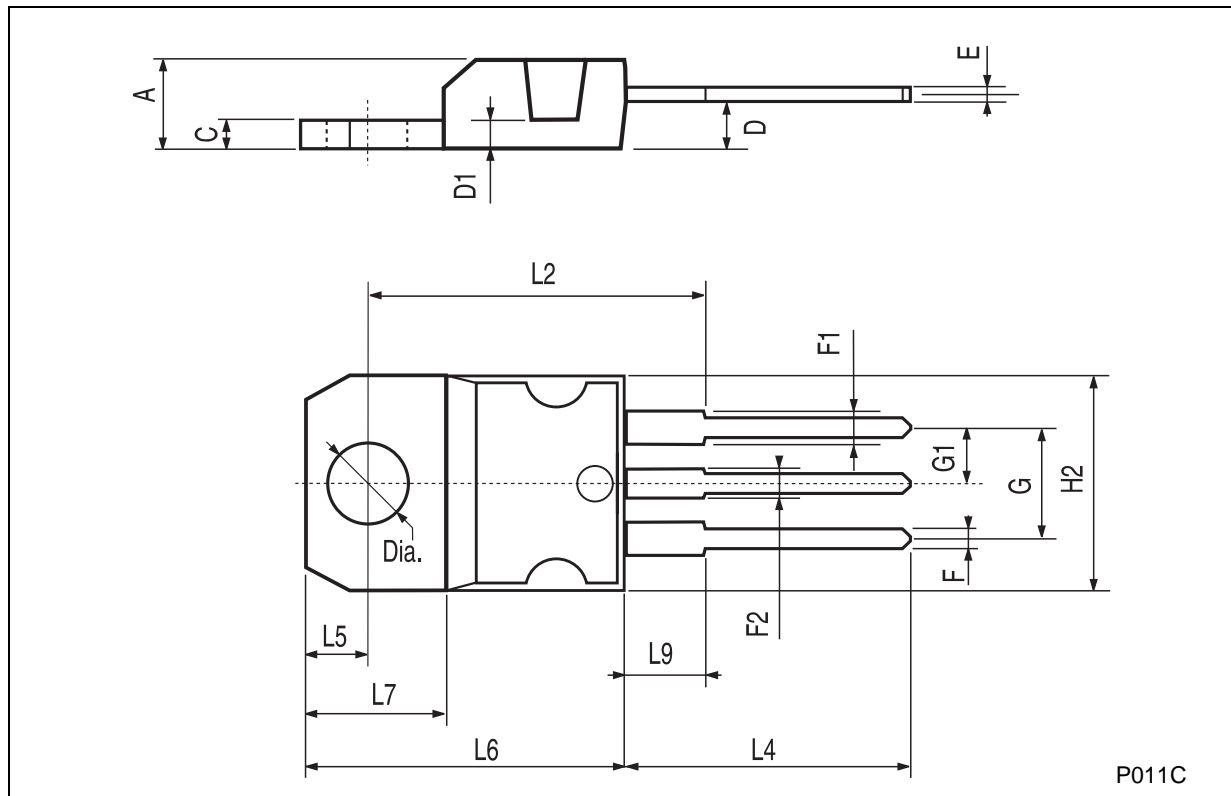


Figure 16 : Load Transient



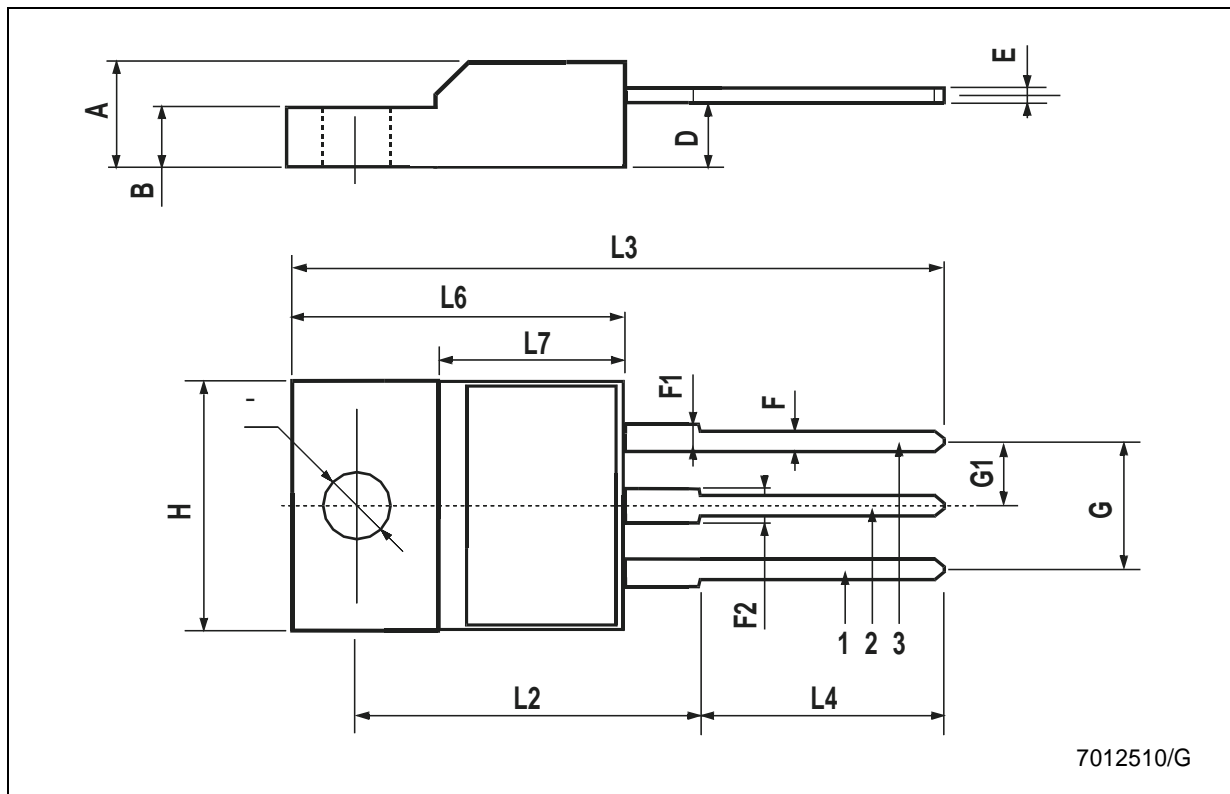
TO-220 MECHANICAL DATA

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



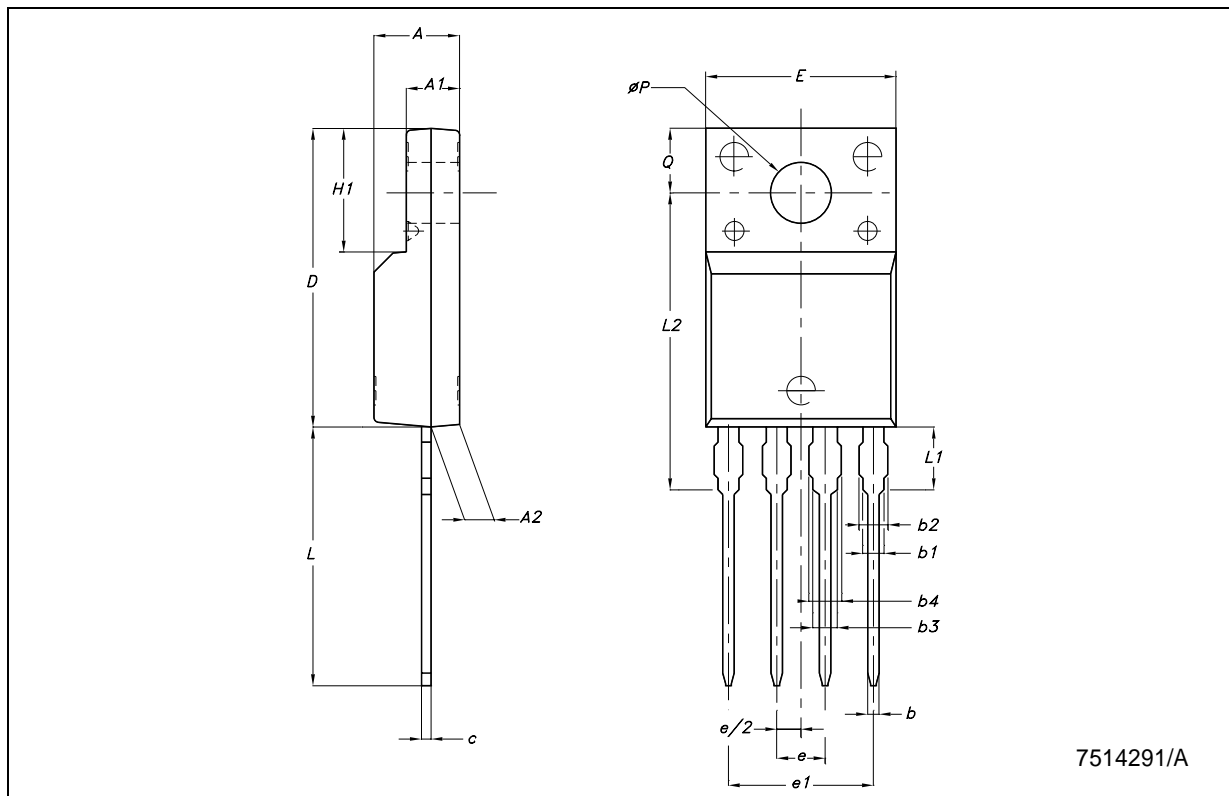
TO-220FP MECHANICAL DATA

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
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



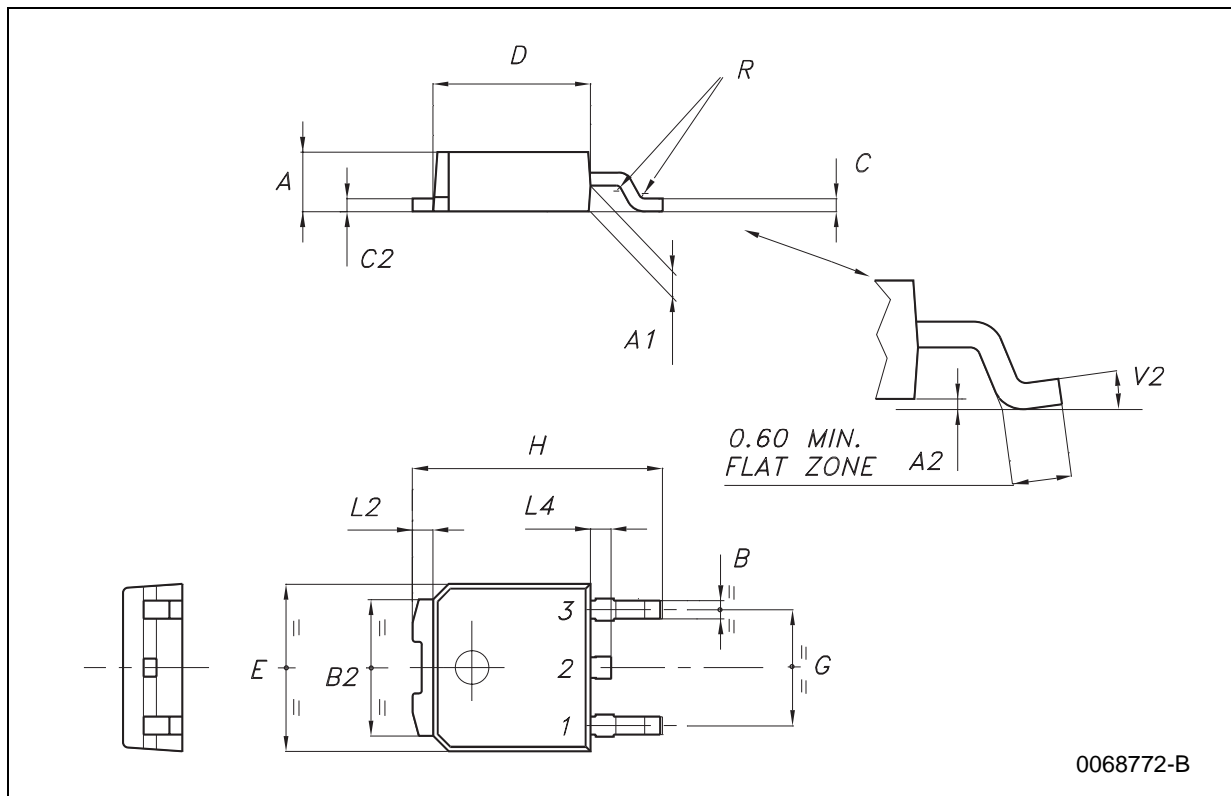
TO-220FP4 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.30		4.70	0.169		0.185
A1	2.60		3.00	0.102		0.118
A2	1.30	1.50	1.70	0.051	0.059	0.067
b	0.50		0.70	0.020		0.028
b1	1.05			0.041		
b2			1.30			0.051
b3	1.25			0.049		
b4			1.50			0.059
c	0.45	0.50	0.60	0.018	0.020	0.024
D	15.50		15.90	0.610		0.626
E	9.80		10.20	0.386		0.402
e	2.29	2.54	2.79	0.090	0.100	0.110
e1		7.62			0.300	
H1	6.30		6.70	0.248		0.264
L		13.60			0.535	
L1		3.30			0.130	
L2	15.40		15.80	0.606		0.622
φP	3		3.40	0.118		0.134
Q	3.3		3.5	0.130		0.138



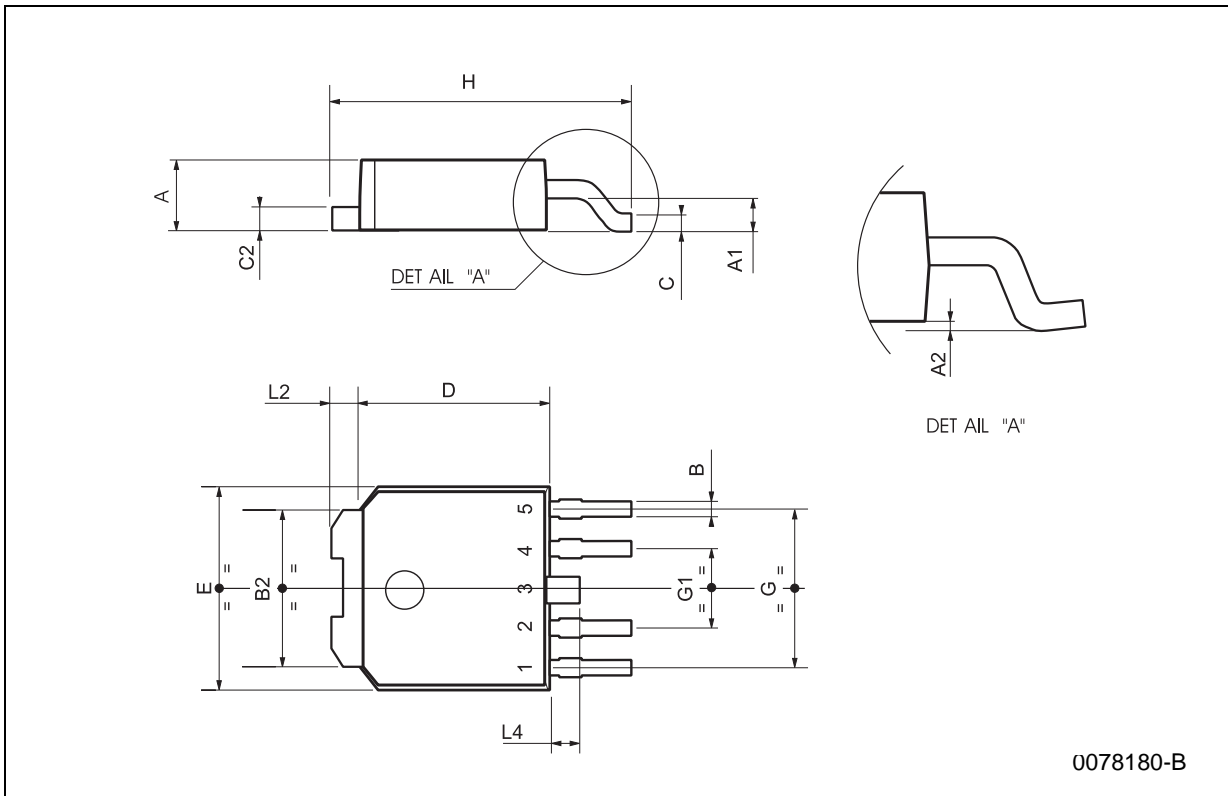
DPAK MECHANICAL DATA

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
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L2		0.8			0.031	
L4	0.6		1	0.023		0.039



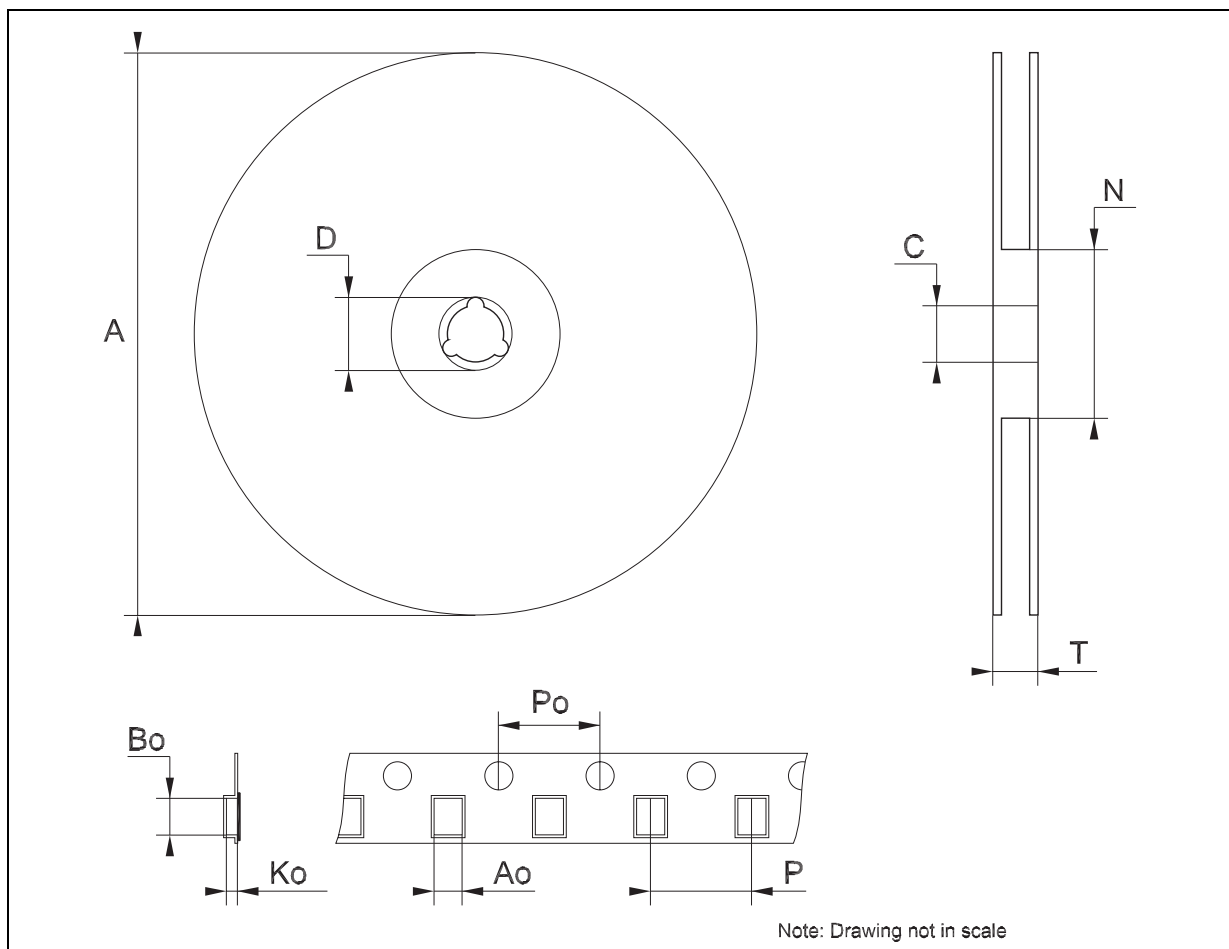
PPAK MECHANICAL DATA

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
E	6.4		6.6	0.252		0.260
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			0.031	
L4	0.6		1	0.023		0.039



Tape & Reel DPAK-PPAK 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	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



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