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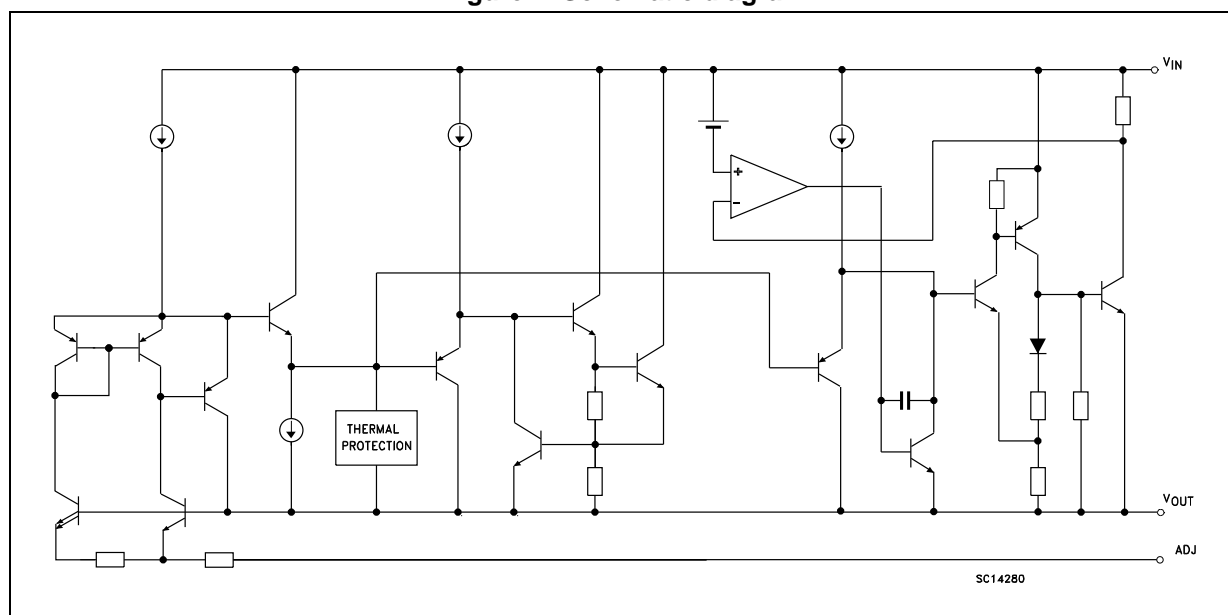
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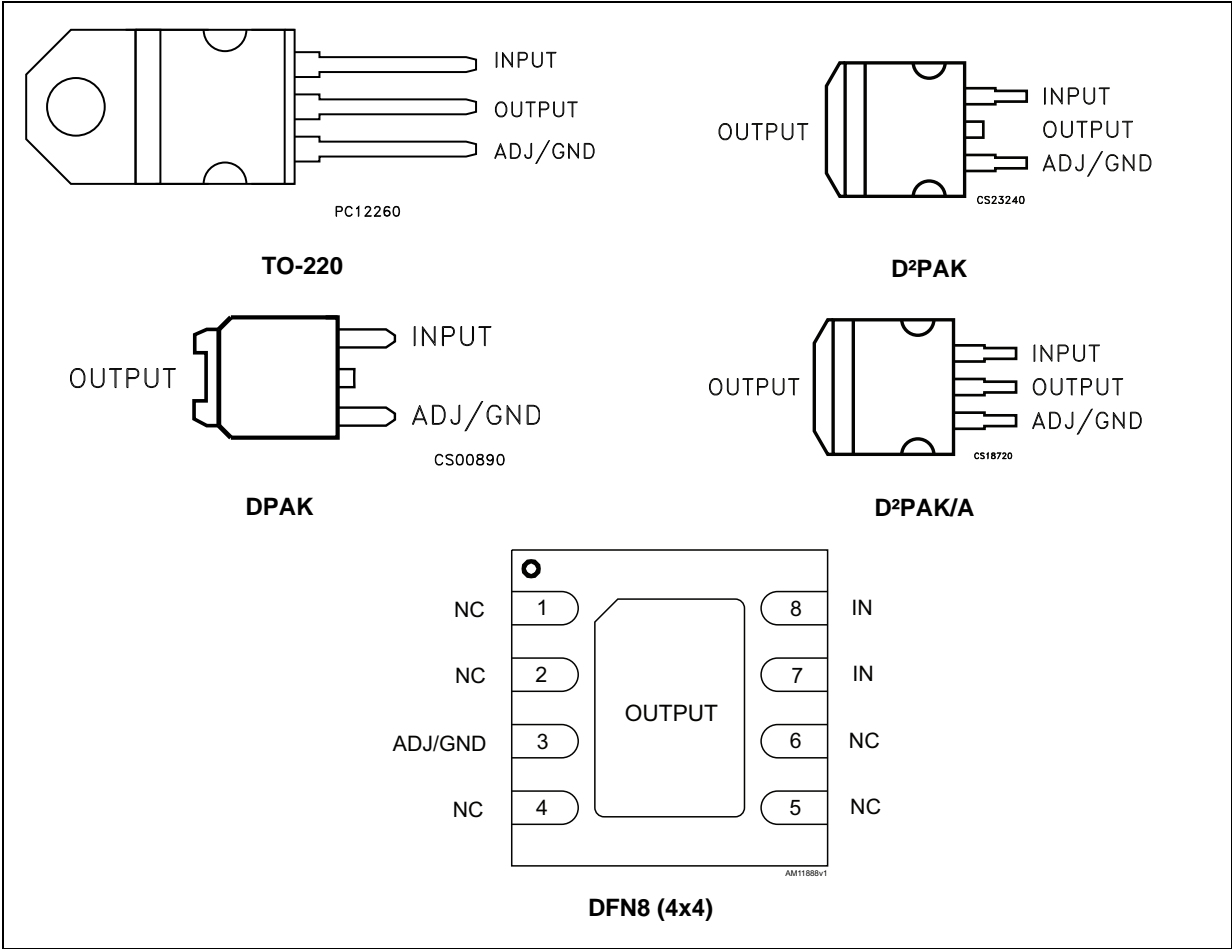
# 1 Diagram

Figure 1. Schematic diagram



## 2 Pin configuration

Figure 2. Pin connections (top view)



*Note:* The TAB is physically connected to the output (this is valid for the TO-220 package too).

### 3 Maximum ratings

**Table 1. 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

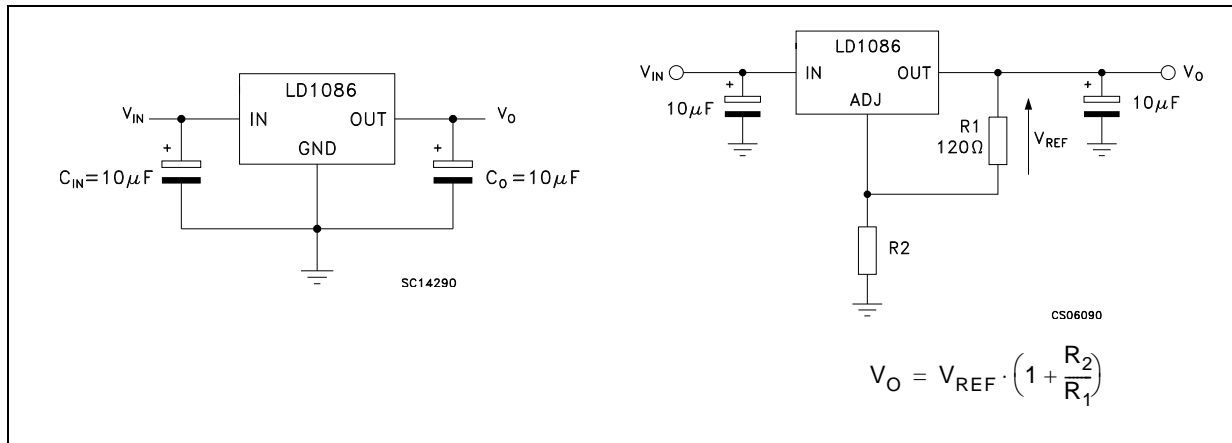
*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.*

**Table 2. Thermal data**

Symbol	Parameter	TO-220	D <sup>2</sup> PAK D <sup>2</sup> PAK/A	DPAK	DFN8	Unit
$R_{thJC}$	Thermal resistance junction-case	5	3	8	1.5	°C/W
$R_{thJA}$	Thermal resistance junction-ambient	50	62.5	100	33	°C/W

## 4 Schematic application

Figure 3. Application circuit



## 5 Electrical characteristics

$V_I = 4.8\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 3. Electrical characteristics of LD1086#18**

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

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



$V_I = 5.5 \text{ V}$ ,  $C_I = C_O = 10 \mu\text{F}$ ,  $T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 4. Electrical characteristics of LD1086#25**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_O$	Output voltage <sup>(1)</sup>	$I_O = 0 \text{ mA}$ , $T_J = 25 \text{ }^\circ\text{C}$	2.475	2.5	2.525	V
		$I_O = 0 \text{ to } 1.5 \text{ A}$ , $V_I = 4.1 \text{ to } 30 \text{ V}$	2.45	2.5	2.55	V
$\Delta V_O$	Line regulation	$I_O = 0 \text{ mA}$ , $V_I = 4.1 \text{ to } 18 \text{ V}$ , $T_J = 25^\circ\text{C}$		0.2	4	mV
		$I_O = 0 \text{ mA}$ , $V_I = 4.1 \text{ to } 18 \text{ V}$		0.4	4	mV
$\Delta V_O$	Load regulation	$I_O = 0 \text{ to } 1.5 \text{ A}$ , $T_J = 25 \text{ }^\circ\text{C}$		0.5	8	mV
		$I_O = 0 \text{ to } 1.5 \text{ A}$		1	16	mV
$V_d$	Dropout voltage	$I_O = 1.5 \text{ A}$		1.3	1.5	V
$I_q$	Quiescent current	$V_I \leq 30 \text{ V}$		5	10	mA
$I_{sc}$	Short circuit current	$V_I - V_O = 5 \text{ V}$	1.5	2		A
		$V_I - V_O = 25 \text{ V}$	0.05	0.2		A
	Thermal regulation	$T_A = 25 \text{ }^\circ\text{C}$ , 30 ms pulse		0.008	0.04	%/W
SVR	Supply voltage rejection	$f = 120 \text{ Hz}$ , $C_O = 25 \mu\text{F}$ , $I_O = 1.5 \text{ A}$ $V_I = 7.5 \pm 3 \text{ V}$	60	81		dB
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25 \text{ }^\circ\text{C}$ , $f = 10 \text{ Hz to } 10 \text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125 \text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

$V_I = 6.3\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 5. Electrical characteristics of LD1086#33**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_O$	Output voltage <sup>(1)</sup>	$I_O = 0\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	3.267	3.3	3.333	V
		$I_O = 0\text{ to }1.5\text{ A}$ , $V_I = 4.9\text{ to }30\text{ V}$	3.234	3.3	3.366	V
$\Delta V_O$	Line regulation	$I_O = 0\text{ mA}$ , $V_I = 4.9\text{ to }18\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$		0.5	6	mV
		$I_O = 0\text{ mA}$ , $V_I = 4.9\text{ to }18\text{ V}$		1	6	mV
$\Delta V_O$	Load regulation	$I_O = 0\text{ to }1.5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$		1	10	mV
		$I_O = 0\text{ to }1.5\text{ A}$		7	25	mV
$V_d$	Dropout voltage	$I_O = 1.5\text{ A}$		1.3	1.5	V
$I_q$	Quiescent current	$V_I \leq 30\text{ V}$		5	10	mA
$I_{sc}$	Short-circuit current	$V_I - V_O = 5\text{ V}$	1.5	2		A
		$V_I - V_O = 25\text{ V}$	0.05	0.2		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.008	0.04	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $I_O = 1.5\text{ A}$ $V_I = 8.3 \pm 3\text{ V}$	60	79		dB
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

$V_I = 8\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 6. Electrical characteristics of LD1086#50**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_O$	Output voltage <sup>(1)</sup>	$I_O = 0\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	4.95	5	5.05	V
		$I_O = 0\text{ to }1.5\text{ A}$ , $V_I = 6.6\text{ to }30\text{ V}$	4.9	5	5.1	V
$\Delta V_O$	Line regulation	$I_O = 0\text{ mA}$ , $V_I = 6.6\text{ to }20\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$		0.5	10	mV
		$I_O = 0\text{ mA}$ , $V_I = 6.6\text{ to }20\text{ V}$		1	10	mV
$\Delta V_O$	Load regulation	$I_O = 0\text{ to }1.5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$		5	20	mV
		$I_O = 0\text{ to }1.5\text{ A}$		10	35	mV
$V_d$	Dropout voltage	$I_O = 1.5\text{ A}$		1.3	1.5	V
$I_q$	Quiescent current	$V_I \leq 30\text{ V}$		5	10	mA
$I_{sc}$	Short circuit current	$V_I - V_O = 5\text{ V}$	1.5	2		A
		$V_I - V_O = 25\text{ V}$	0.05	0.2		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $I_O = 1.5\text{ A}$ $V_I = 10 \pm 3\text{ V}$	60	75		dB
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

$V_I = 15\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 7. Electrical characteristics of LD1086#12**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_O$	Output voltage <sup>(1)</sup>	$I_O = 0\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	11.88	12	12.12	V
		$I_O = 0\text{ to }1.5\text{ A}$ , $V_I = 13.8\text{ to }30\text{ V}$	11.76	12	12.24	V
$\Delta V_O$	Line regulation	$I_O = 0\text{ mA}$ , $V_I = 13.8\text{ to }25\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$		1	25	mV
		$I_O = 0\text{ mA}$ , $V_I = 13.8\text{ to }25\text{ V}$		2	25	mV
$\Delta V_O$	Load regulation	$I_O = 0\text{ to }1.5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$		12	36	mV
		$I_O = 0\text{ to }1.5\text{ A}$		24	72	mV
$V_d$	Dropout voltage	$I_O = 1.5\text{ A}$		1.3	1.5	V
$I_q$	Quiescent current	$V_I \leq 30\text{ V}$		5	10	mA
$I_{sc}$	Short circuit current	$V_I - V_O = 5\text{ V}$	1.5	2		A
		$V_I - V_O = 25\text{ V}$	0.05	0.2		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $I_O = 1.5\text{ A}$ $V_I = 17 \pm 3\text{ V}$	54	66		dB
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

$V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 8. Electrical characteristics of LD1086B#**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{\text{ref}}$	Reference voltage <sup>(1)</sup>	$I_O = 10\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	1.231	1.25	1.269	V
		$I_O = 10\text{ mA}$ to $1.5\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$	1.219	1.25	1.281	V
$\Delta V_O$	Line regulation	$I_O = 10\text{ mA}$ , $V_I = 2.8\text{ to }16.5\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{ mA}$ , $V_I = 2.8\text{ to }16.5\text{ V}$		0.035	0.2	%
$\Delta V_O$	Load regulation	$I_O = 10\text{ mA}$ to $1.5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$		0.1	0.3	%
		$I_O = 0\text{ to }1.5\text{ A}$		0.2	0.4	%
$V_d$	Dropout voltage	$I_O = 1.5\text{ A}$		1.3	1.5	V
$I_{O(\text{min})}$	Minimum load current	$V_I = 30\text{ V}$		3	10	mA
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5\text{ V}$	1.5	2.3		A
		$V_I - V_O = 25\text{ V}$	0.05	0.2		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $C_{\text{ADJ}} = 25\text{ }\mu\text{F}$ , $I_O = 1.5\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$	60	88		dB
$I_{\text{ADJ}}$	Adjust pin current	$V_I = 4.25\text{ V}$ , $I_O = 10\text{ mA}$		40	120	$\mu\text{A}$
$\Delta I_{\text{ADJ}}$	Adjust pin current change <sup>(1)</sup>	$I_O = 10\text{ mA}$ to $1.5\text{ A}$ , $V_I = 2.8\text{ to }16.5\text{ V}$		0.2	5	$\mu\text{A}$
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

$V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 9. Electrical characteristics of LD1086#**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{\text{ref}}$	Reference voltage <sup>(1)</sup>	$I_O = 10\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	1.237	1.25	1.263	V
		$I_O = 10\text{ mA}$ to $1.5\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$	1.225	1.25	1.275	V
$\Delta V_O$	Line regulation	$I_O = 10\text{ mA}$ , $V_I = 2.8\text{ to }16.5\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{ mA}$ , $V_I = 2.8\text{ to }16.5\text{ V}$		0.035	0.2	%
$\Delta V_O$	Load regulation	$I_O = 10\text{ mA}$ to $1.5\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$		0.1	0.3	%
		$I_O = 0\text{ to }1.5\text{ A}$		0.2	0.4	%
$V_d$	Dropout voltage	$I_O = 1.5\text{ A}$		1.3	1.5	V
$I_{O(\text{min})}$	Minimum load current	$V_I = 30\text{ V}$		3	10	mA
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5\text{ V}$	1.5	2.3		A
		$V_I - V_O = 25\text{ V}$	0.05	0.2		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $C_{\text{ADJ}} = 25\text{ }\mu\text{F}$ , $I_O = 1.5\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$	60	88		dB
$I_{\text{ADJ}}$	Adjust pin current	$V_I = 4.25\text{ V}$ , $I_O = 10\text{ mA}$		40	120	$\mu\text{A}$
$\Delta I_{\text{ADJ}}$	Adjust pin current change <sup>(1)</sup>	$I_O = 10\text{ mA}$ to $1.5\text{ A}$ , $V_I = 2.8\text{ to }16.5\text{ V}$		0.2	5	$\mu\text{A}$
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

$V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.

**Table 10. Electrical characteristics of LD1086DTTRY and LD1086VY (Automotive grade)**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{\text{ref}}$	Reference voltage <sup>(1)</sup>	$I_O = 10\text{ mA}$ , $T_A = 25\text{ }^\circ\text{C}$	1.237	1.25	1.263	V
		$I_O = 10\text{ mA to }1.5\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$	1.225	1.25	1.275	V
$\Delta V_O$	Line regulation	$I_O = 10\text{ mA}$ , $V_I = 2.8\text{ to }16.5\text{ V}$		0.035	0.2	%
$\Delta V_O$	Load regulation	$I_O = 0\text{ to }1.5\text{ A}$		0.2	0.4	%
$V_d$	Dropout voltage	$I_O = 1.5\text{ A}$		1.3	1.5	V
$I_{O(\text{min})}$	Minimum load current	$V_I = 30\text{ V}$		3	10	mA
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5\text{ V}$ , $T_A = 25\text{ }^\circ\text{C}$	1.5	2.3		A
		$V_I - V_O = 25\text{ V}$ , $T_A = 25\text{ }^\circ\text{C}$	0.05	0.2		A
	Thermal regulation	$T_A = 25\text{ }^\circ\text{C}$ , 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\text{ }\mu\text{F}$ , $C_{\text{ADJ}} = 25\text{ }\mu\text{F}$ , $I_O = 1.5\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$ , $T_A = 25\text{ }^\circ\text{C}$	60	88		dB
$I_{\text{ADJ}}$	Adjust pin current	$V_I = 4.25\text{ V}$ , $I_O = 10\text{ mA}$		40	120	$\mu\text{A}$
$\Delta I_{\text{ADJ}}$	Adjust pin current change <sup>(1)</sup>	$I_O = 10\text{ mA to }1.5\text{ A}$ , $V_I = 2.8\text{ to }16.5\text{ V}$		0.2	5	$\mu\text{A}$
eN	RMS output noise voltage (% of $V_O$ )	$T_A = 25\text{ }^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_A = 125\text{ }^\circ\text{C}$ , 1000 Hrs		0.5		%

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

# 6 Typical application

Unless otherwise specified  $T_J = 25\text{ }^{\circ}\text{C}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ .

Figure 4. Output voltage vs. temp. ( $V_I = 5\text{ V}$ )

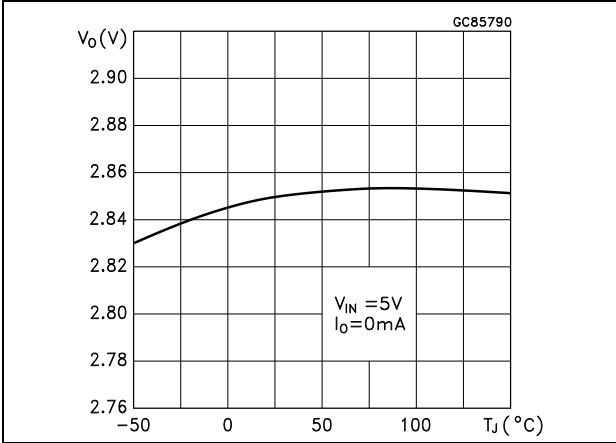


Figure 5. Output voltage vs. temp. ( $V_I = 15\text{ V}$ )

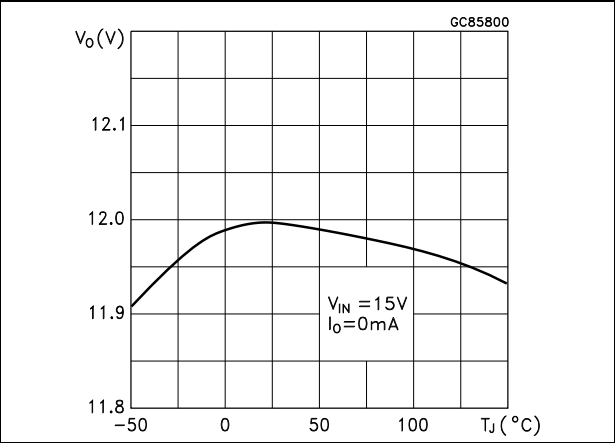


Figure 6. Output voltage vs. temperature ( $V_I = 4.25\text{ V}$ )

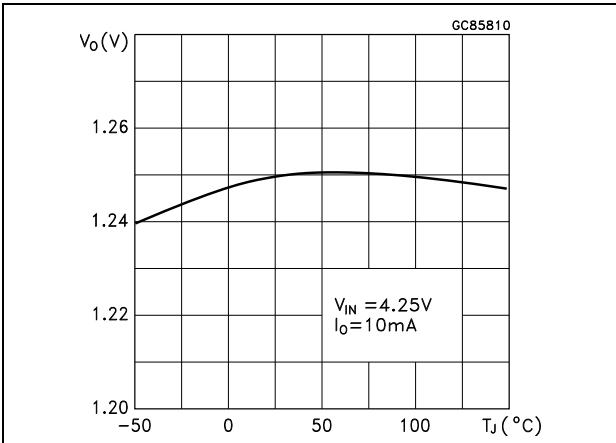


Figure 7. Short circuit current vs. dropout voltage

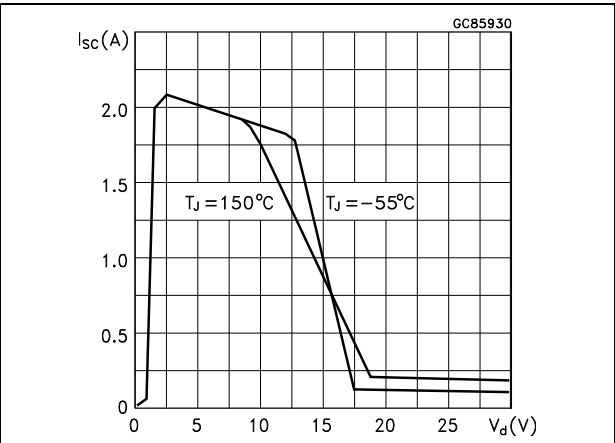




Figure 8. Line regulation vs. temperature

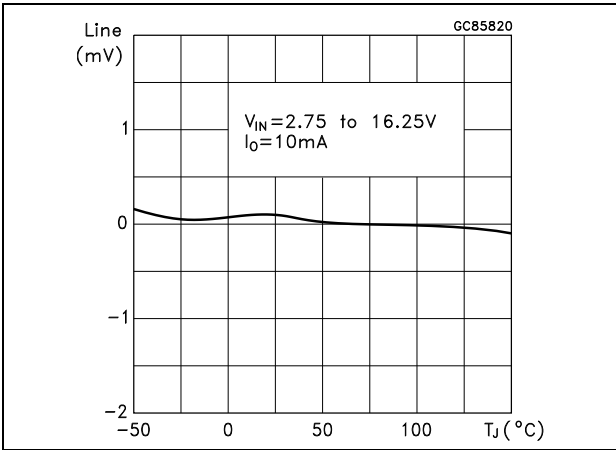


Figure 9. Load regulation vs. temperature

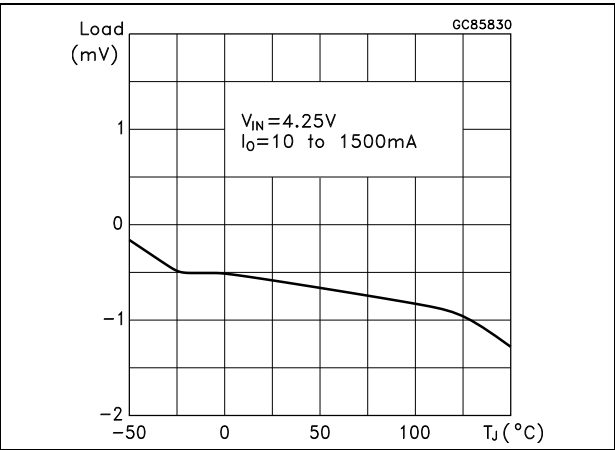


Figure 10. Dropout voltage vs. temperature

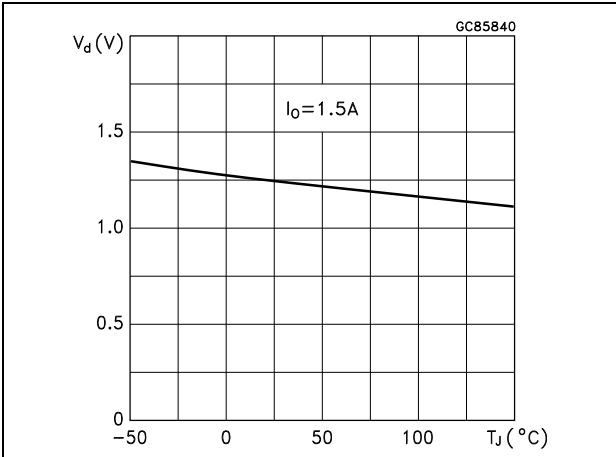


Figure 11. Dropout voltage vs. output current

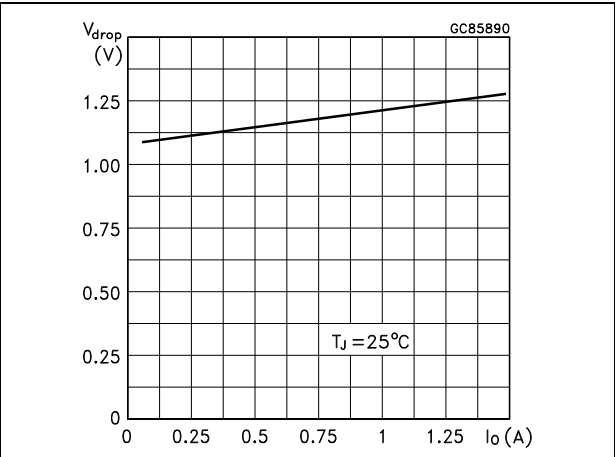


Figure 12. Adjust pin current vs. input voltage

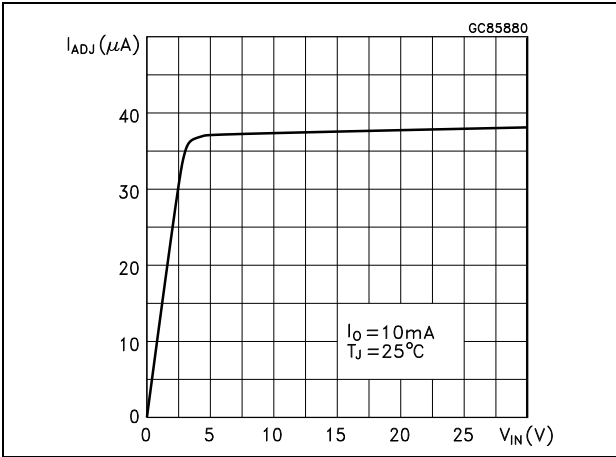


Figure 13. Adjust pin current vs. temperature

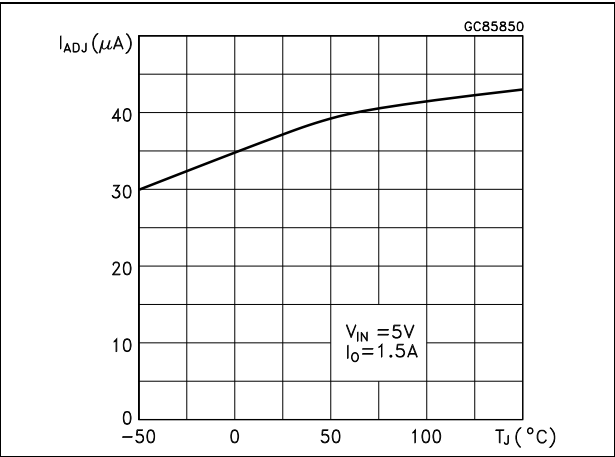


Figure 14. Adjust pin current vs. output current      Figure 15. Quiescent current vs. output current

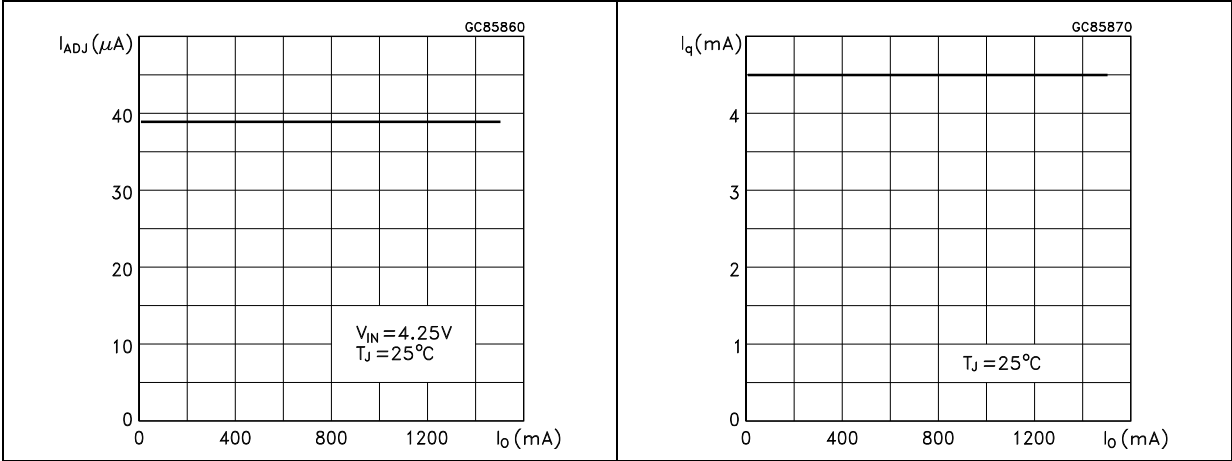


Figure 16. Quiescent current vs. input voltage      Figure 17. Supply voltage rejection vs. output current

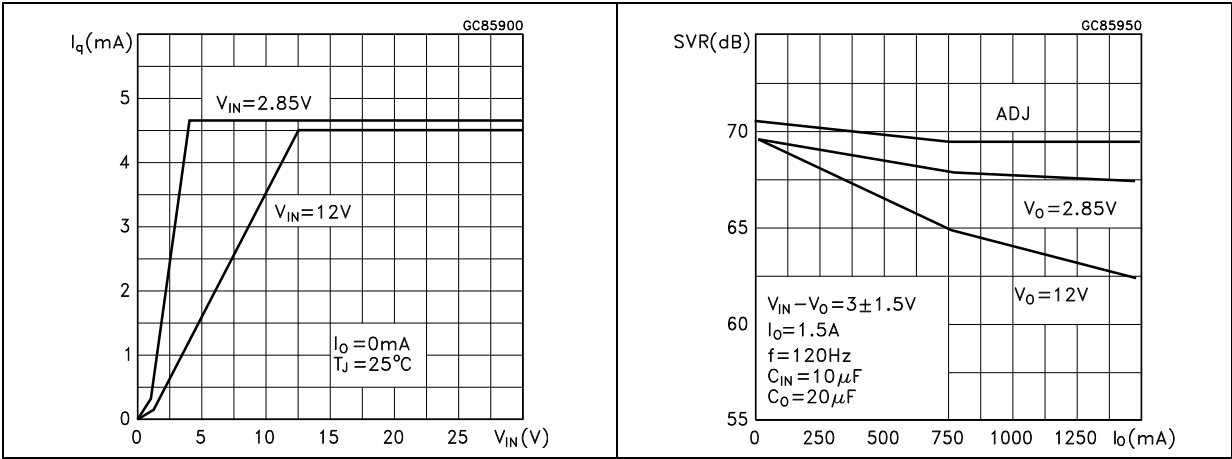


Figure 18. Supply voltage rejection vs. frequency      Figure 19. Supply voltage rejection vs. temperature

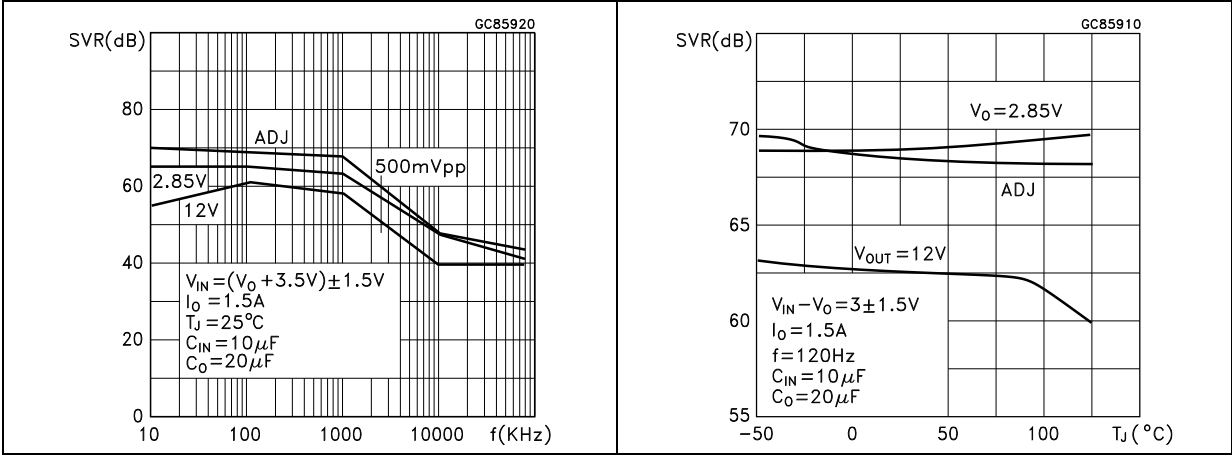


Figure 20. Minimum load current vs. temperature

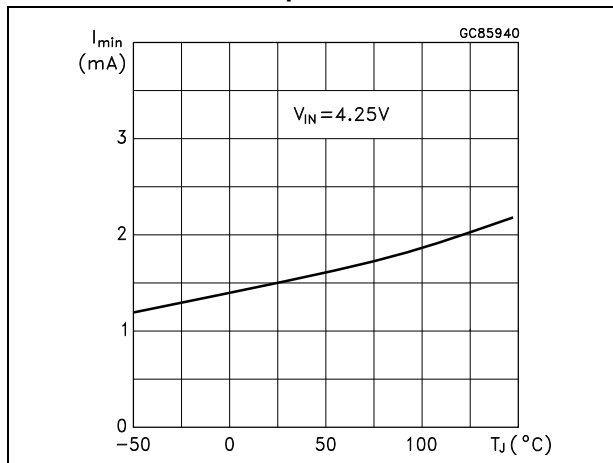


Figure 21. Stability for adjustable

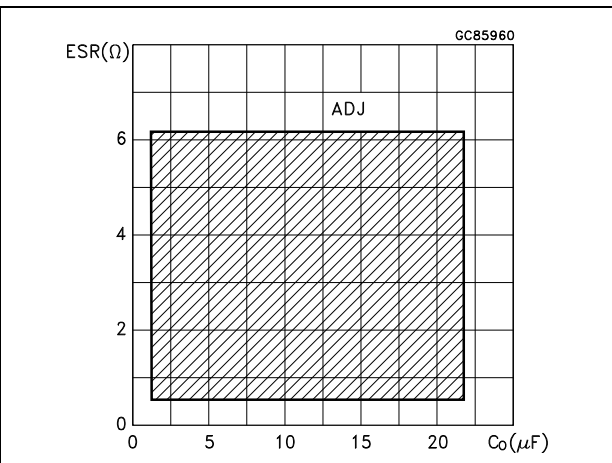


Figure 22. Stability for 2.85 V

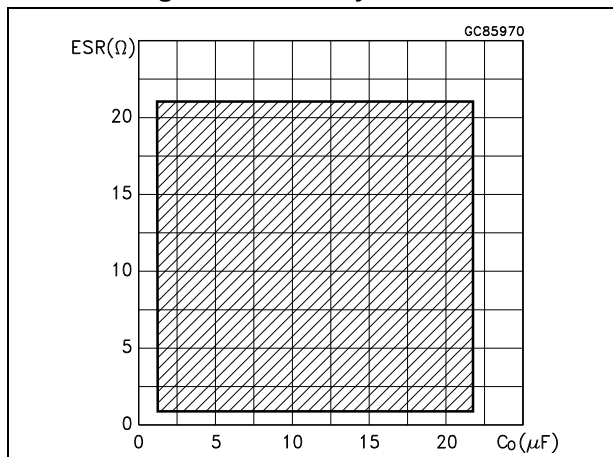


Figure 23. Stability for 12 V

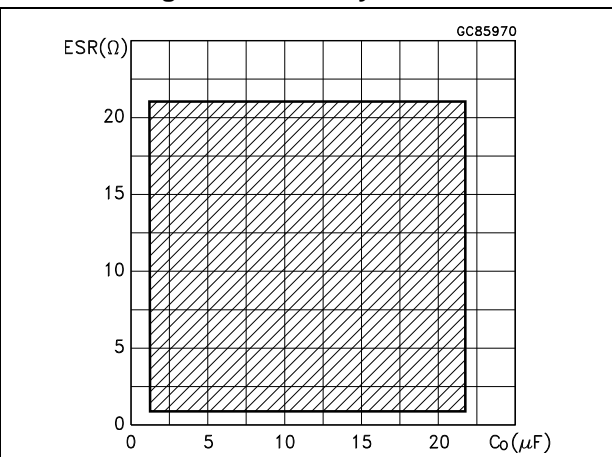
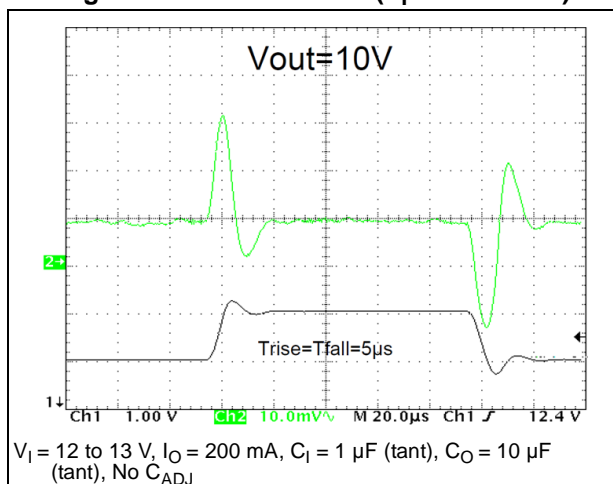
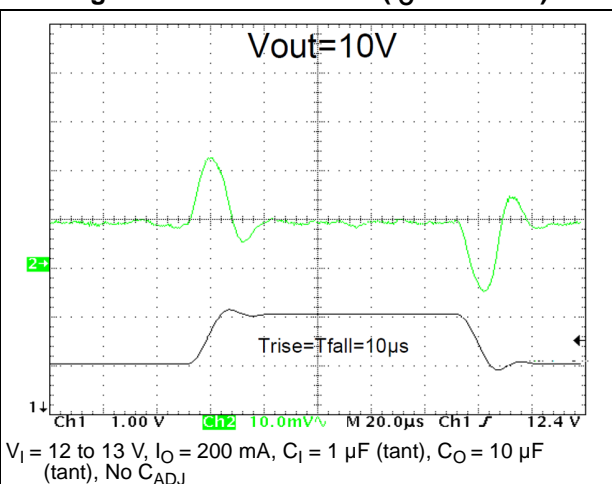
Figure 24. Line transient ( $V_I = 12$  to  $13$  V)Figure 25. Line transient ( $I_O = 200$  mA)

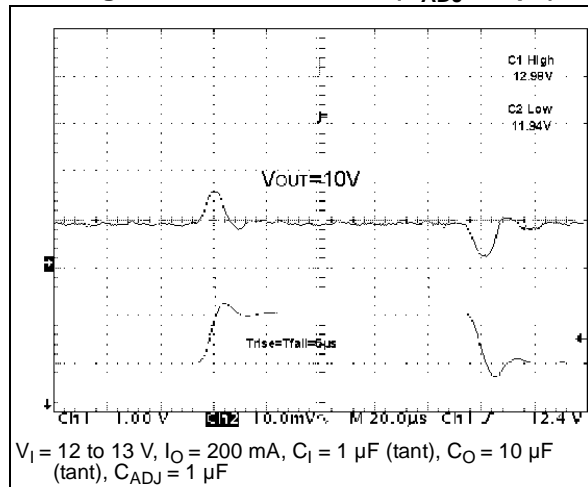
Figure 26. Line transient ( $C_{ADJ} = 1 \mu F$ )

Figure 27. Load transient

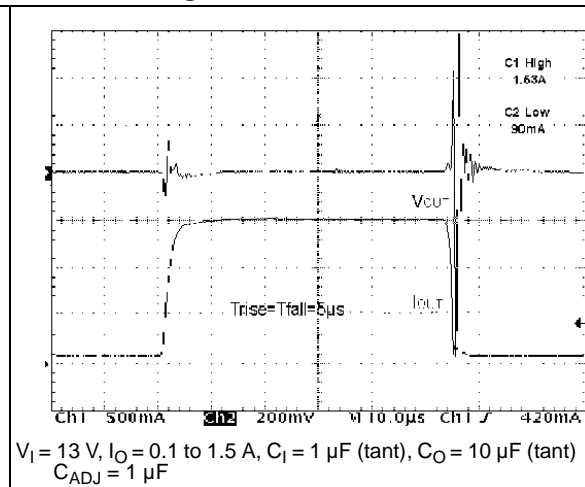
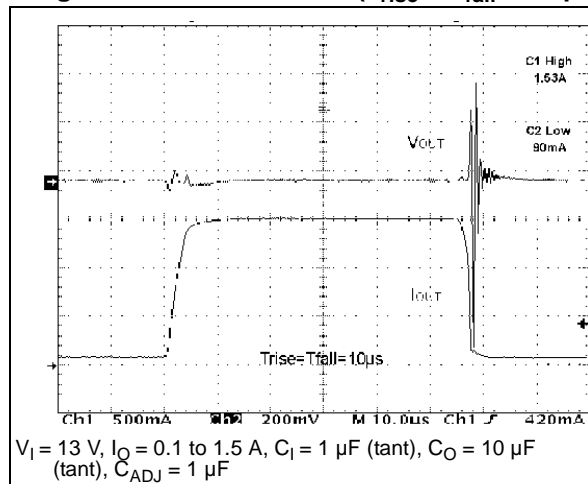
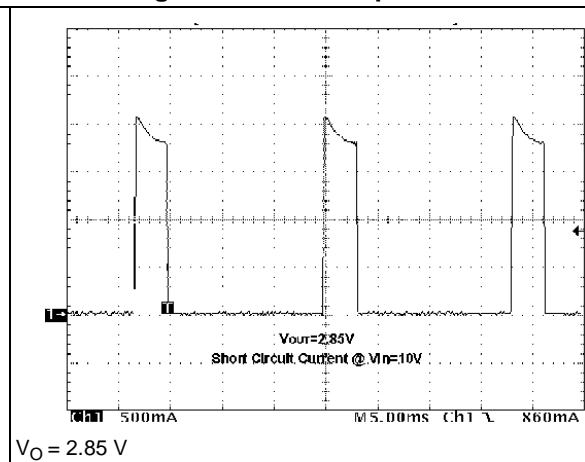
Figure 28. Load transient ( $T_{rise} = T_{fall} = 10 \mu s$ )

Figure 29. Thermal protection



## 7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

## 7.1 TO-220 (STD-ST dual gauge) type A

Figure 30. TO-220 (STD-ST dual gauge) type A drawing

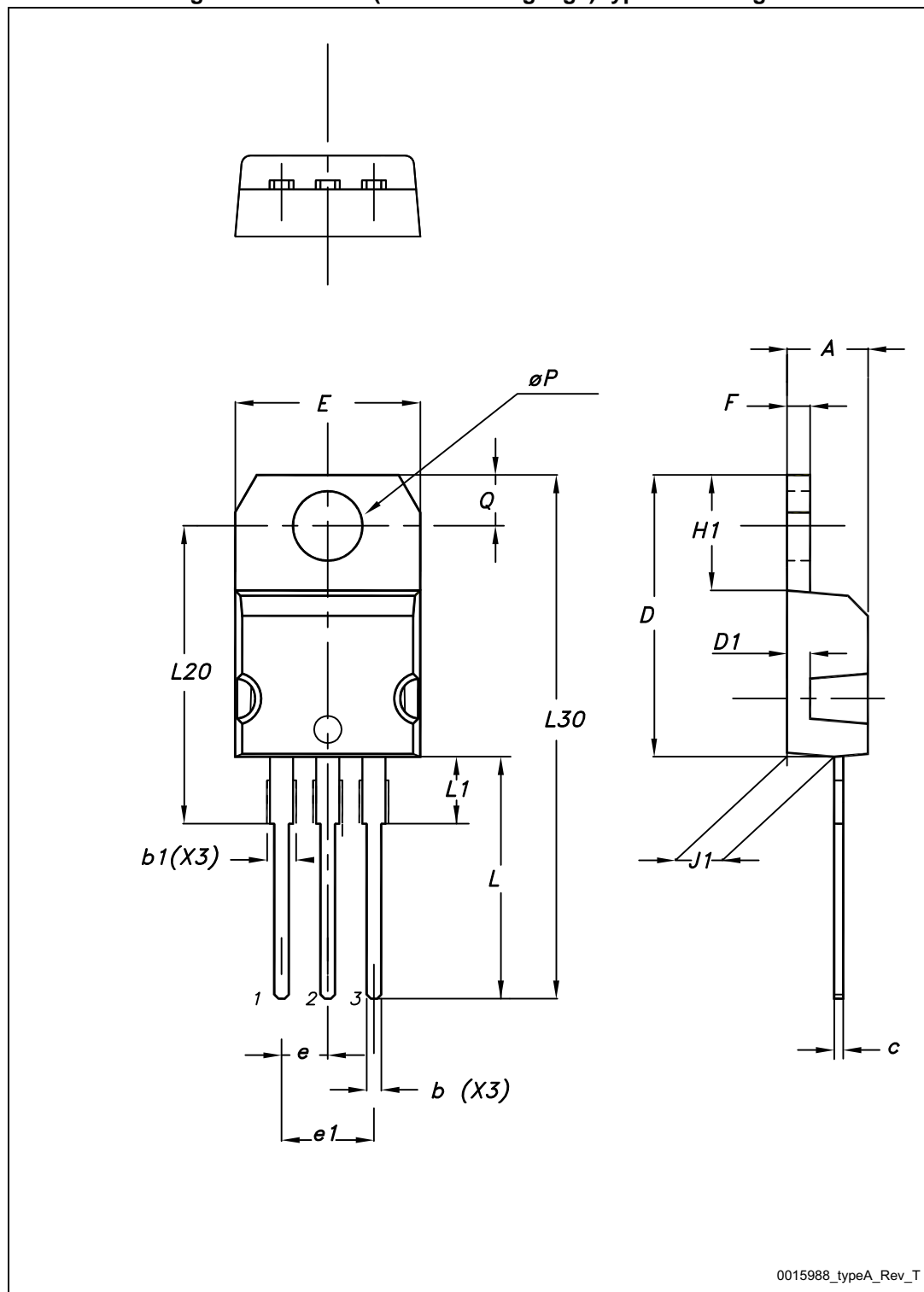


Table 11. TO-220 (STD-ST dual gauge) type A mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
ØP	3.75		3.85
Q	2.65		2.95

## 7.2 TO-220 (STD-ST single gauge)

Figure 31. TO-220 (STD-ST single gauge) drawing

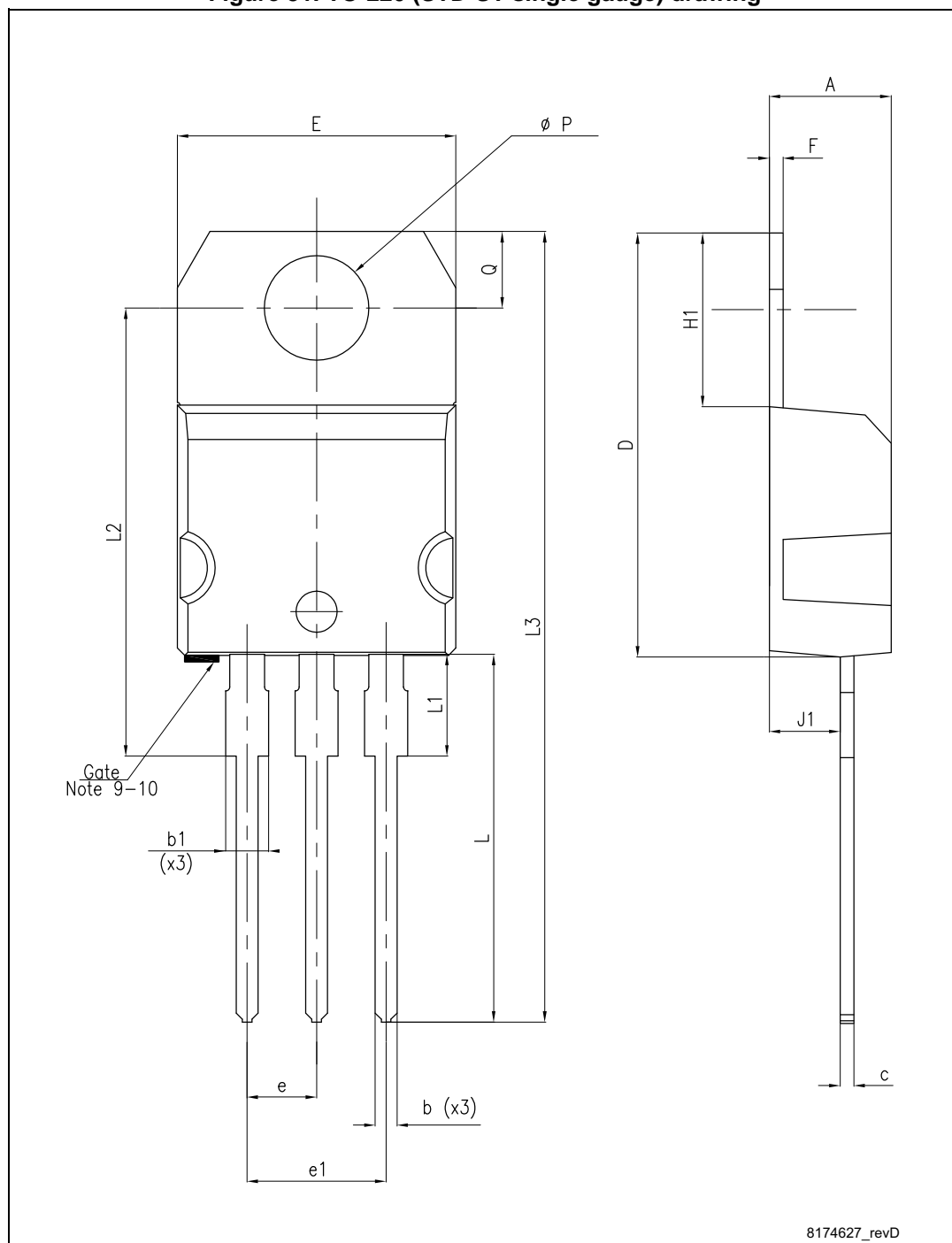




Table 12. TO-220 (STD-ST single gauge) mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	0.51		0.60
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
ØP	3.75		3.85
Q	2.65		2.95

### 7.3 DPAK

Figure 32. DPAK drawing

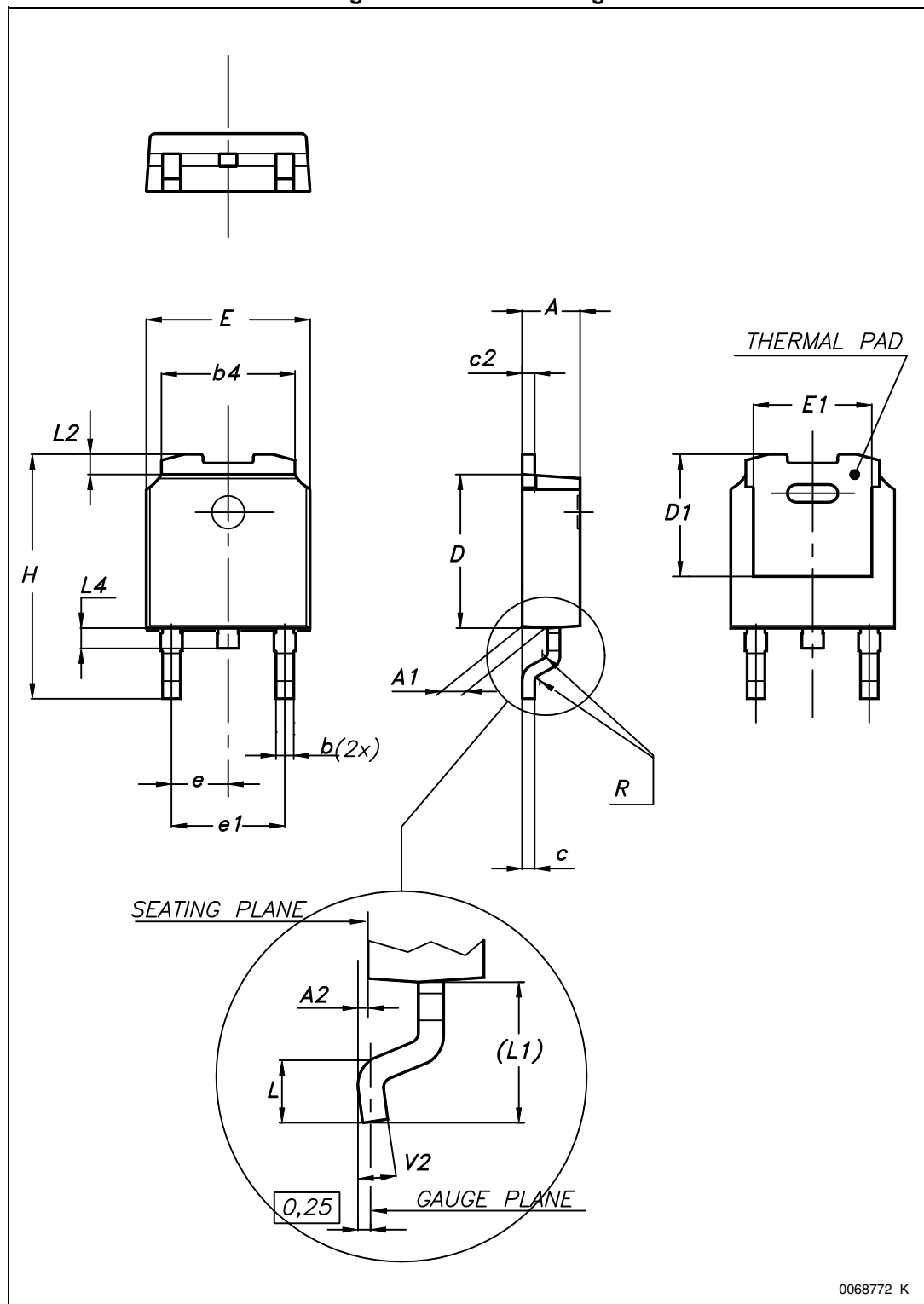
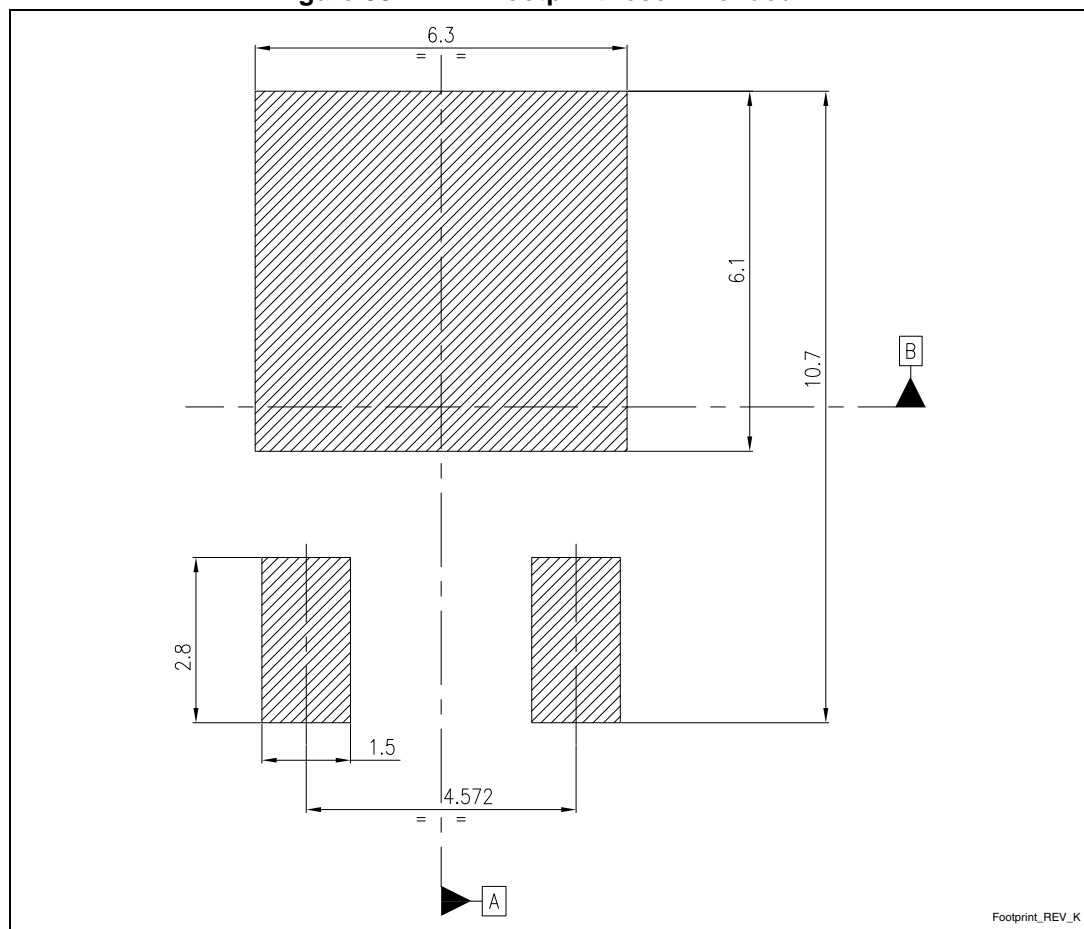


Table 13. DPAK mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1.00		1.50
(L1)		2.80	
L2		0.80	
L4	0.60		1.00
R		0.20	
V2	0°		8°

Figure 33. DPAK footprint recommended<sup>(a)</sup>

a. All dimensions are in millimeters

## 7.4 D<sup>2</sup>PAK (SMD 2L STD-ST) type A

Figure 34. D<sup>2</sup>PAK (SMD 2L STD-ST) type A drawing

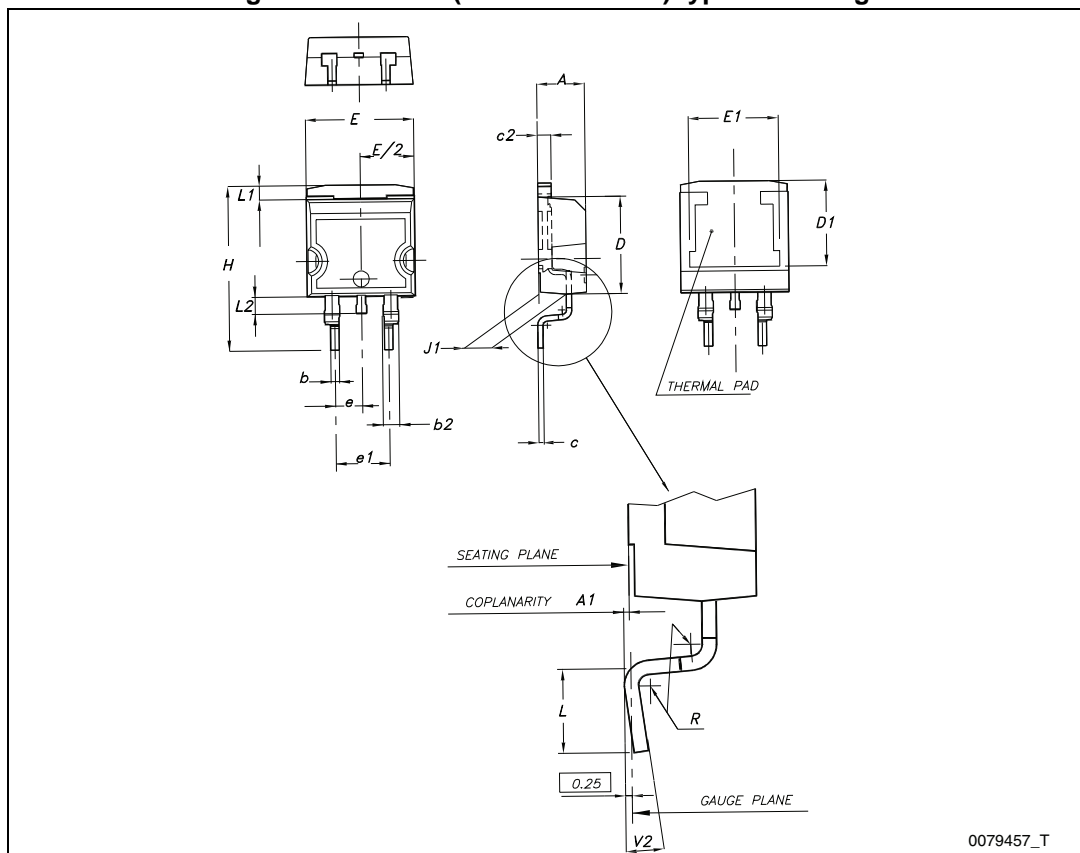
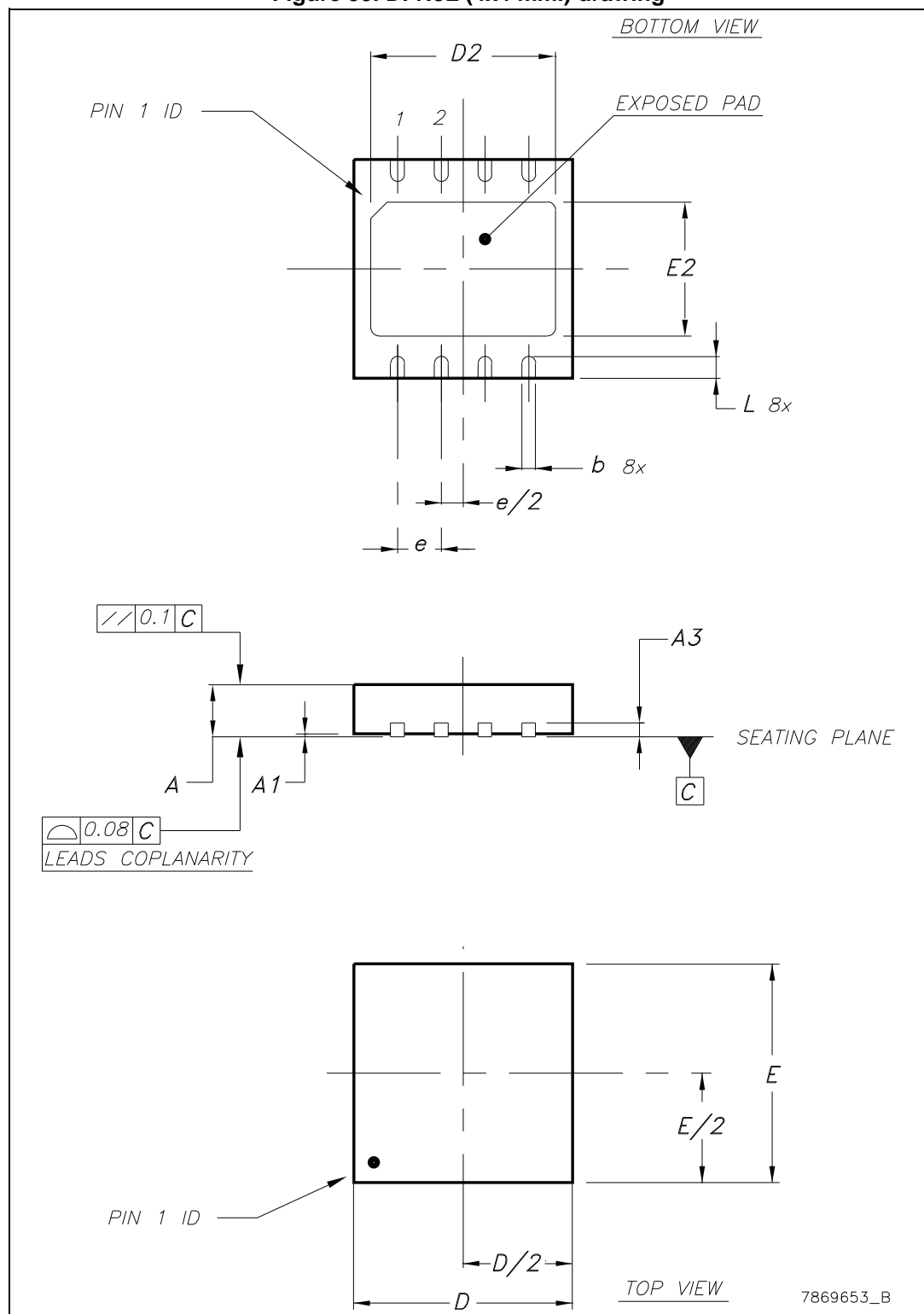


Table 14. D<sup>2</sup>PAK (SMD 2L STD-ST) type A mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b2	1.14		1.70
c	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50		
E	10		10.40
E1	8.50		
e		2.54	
e1	4.88		5.28
H	15		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
L2	1.30		1.75
R		0.4	
V2	0°		8°

## 7.5 DFN8L (4x4 mm.)

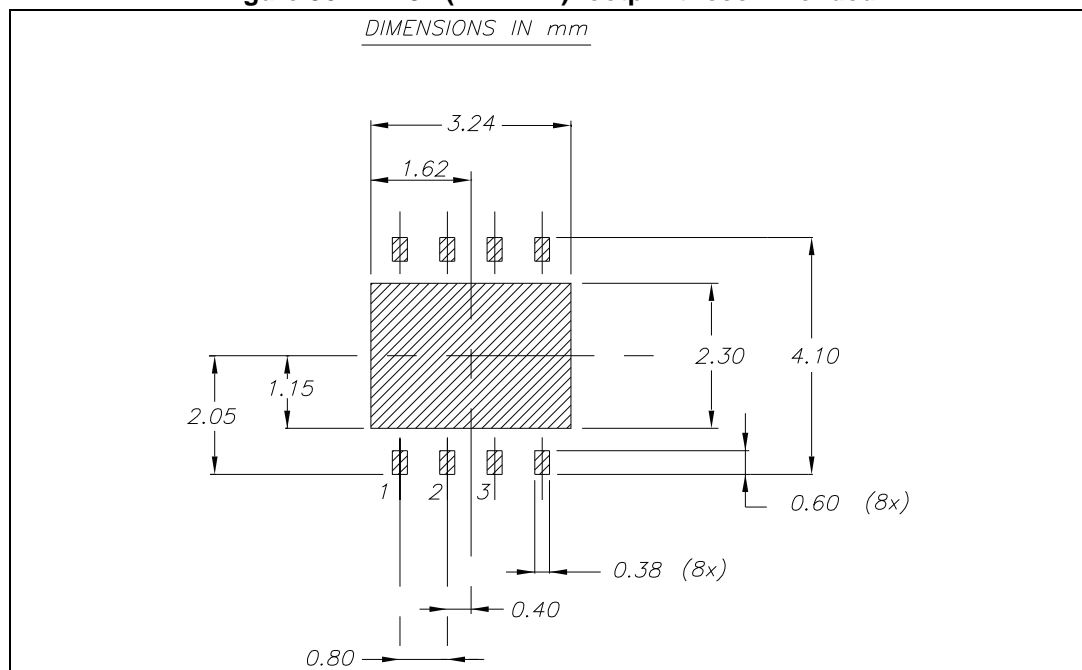
Figure 35. DFN8L (4x4 mm.) drawing



**Table 15. DFN8L (4x4 mm.) mechanical data**

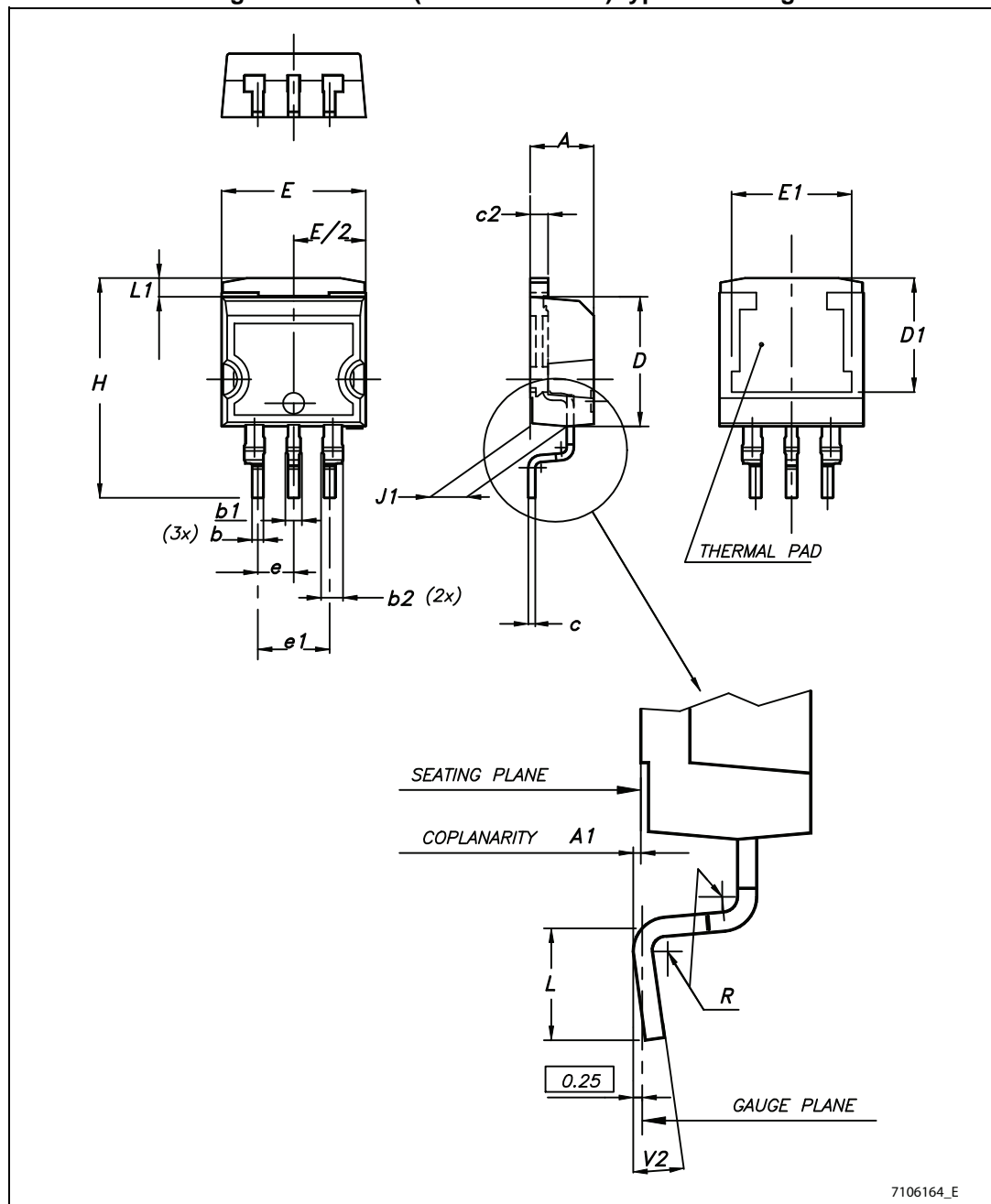
Dim.	mm.		
	Min.	Typ.	Max.
A	0.80	0.90	1
A1	0	0.02	0.05
A3		0,20	
b	0.23	0.30	0.38
D	3.90	4	4.10
D2	2.82	3	3.23
E	3.90	4	4.10
E2	2.05	2.20	2.30
e		0.80	
L	0.40	0.50	0.60

**Figure 36. DFN8L (4x4 mm.) footprint recommended**





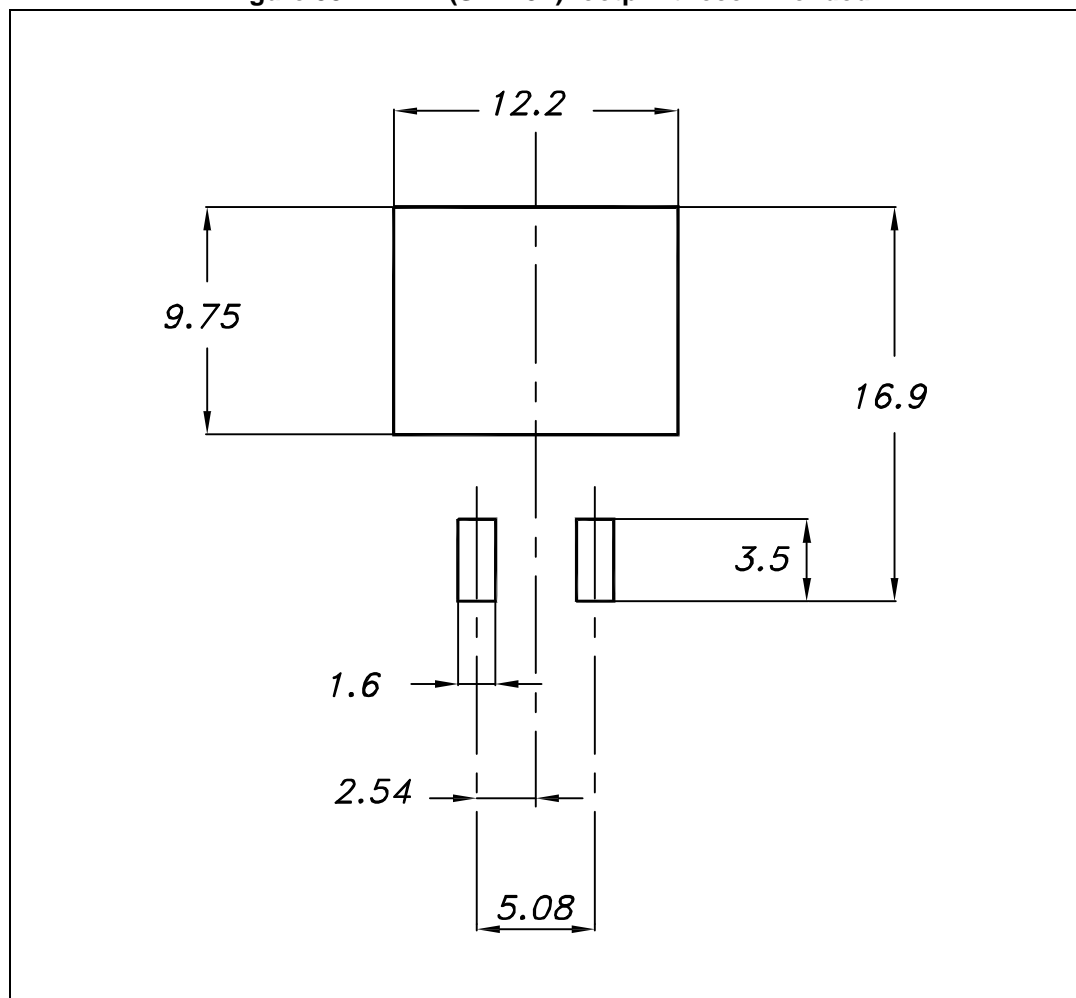
## 7.6 D<sup>2</sup>PAK (SMD 3L STD-ST) type A

Figure 37. D<sup>2</sup>PAK (SMD 3L STD-ST) type A drawing

7106164\_E

Table 16. D<sup>2</sup>PAK (SMD 3L STD-ST) type A mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b1	0.80		1.30
b2	1.14		1.70
c	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50		
E	10		10.40
E1	8.50		
e		2.54	
e1	4.88		5.28
H	15		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
R		0.4	
V2	0°		8°

Figure 38. D<sup>2</sup>PAK (SMD 3L) footprint recommended

## 8 Packaging mechanical data

Figure 39. Tape for DPAK and D<sup>2</sup>PAK

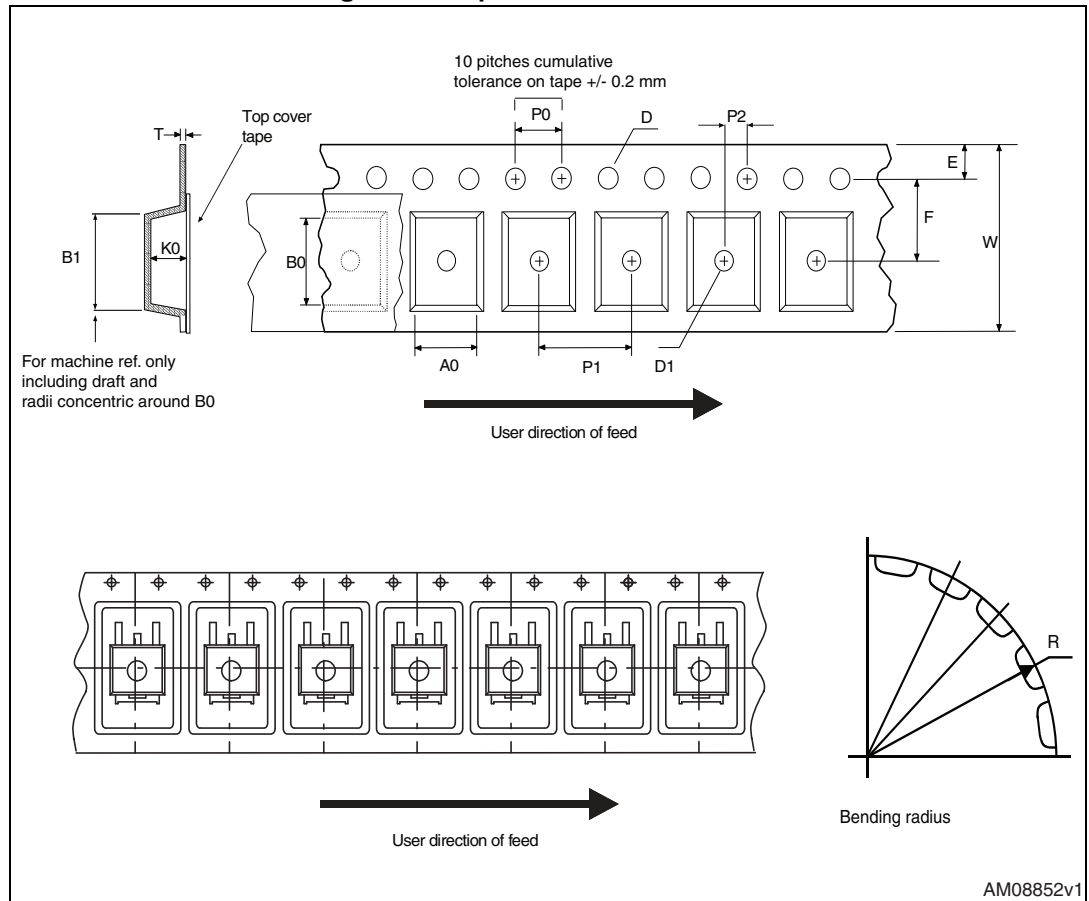
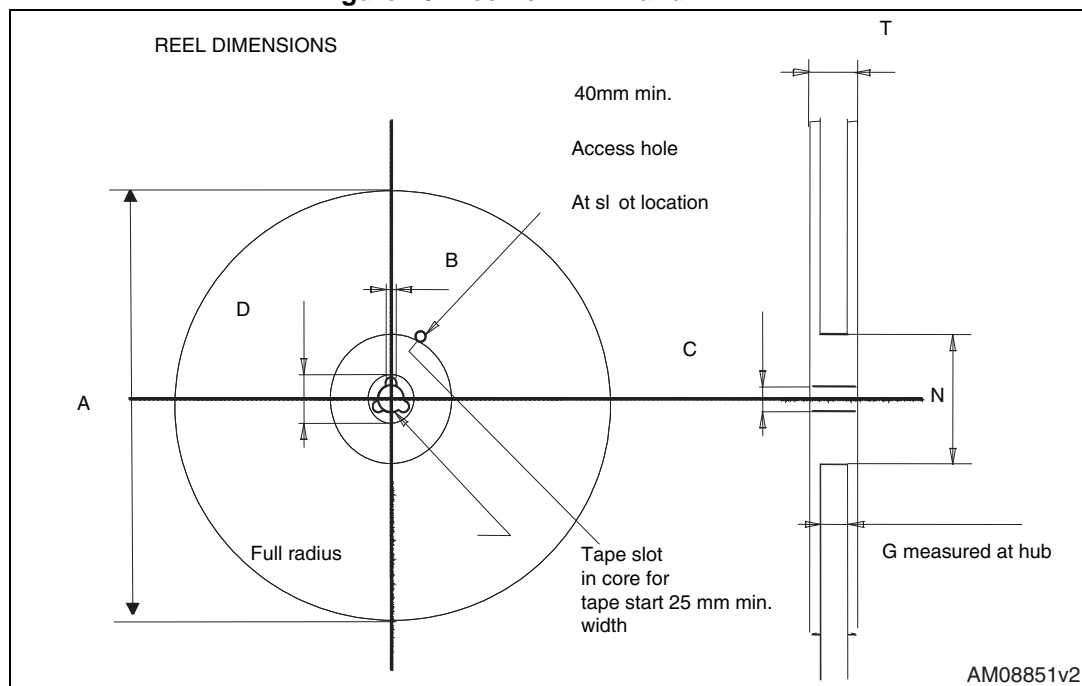


Figure 40. Reel for DPAK and D<sup>2</sup>PAKTable 17. DPAK and D<sup>2</sup>PAK tape and reel mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1	Base qty.		2500
P1	7.9	8.1	Bulk qty.		2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			

Figure 41. DFN8L carrier tape (dimension are in mm.)

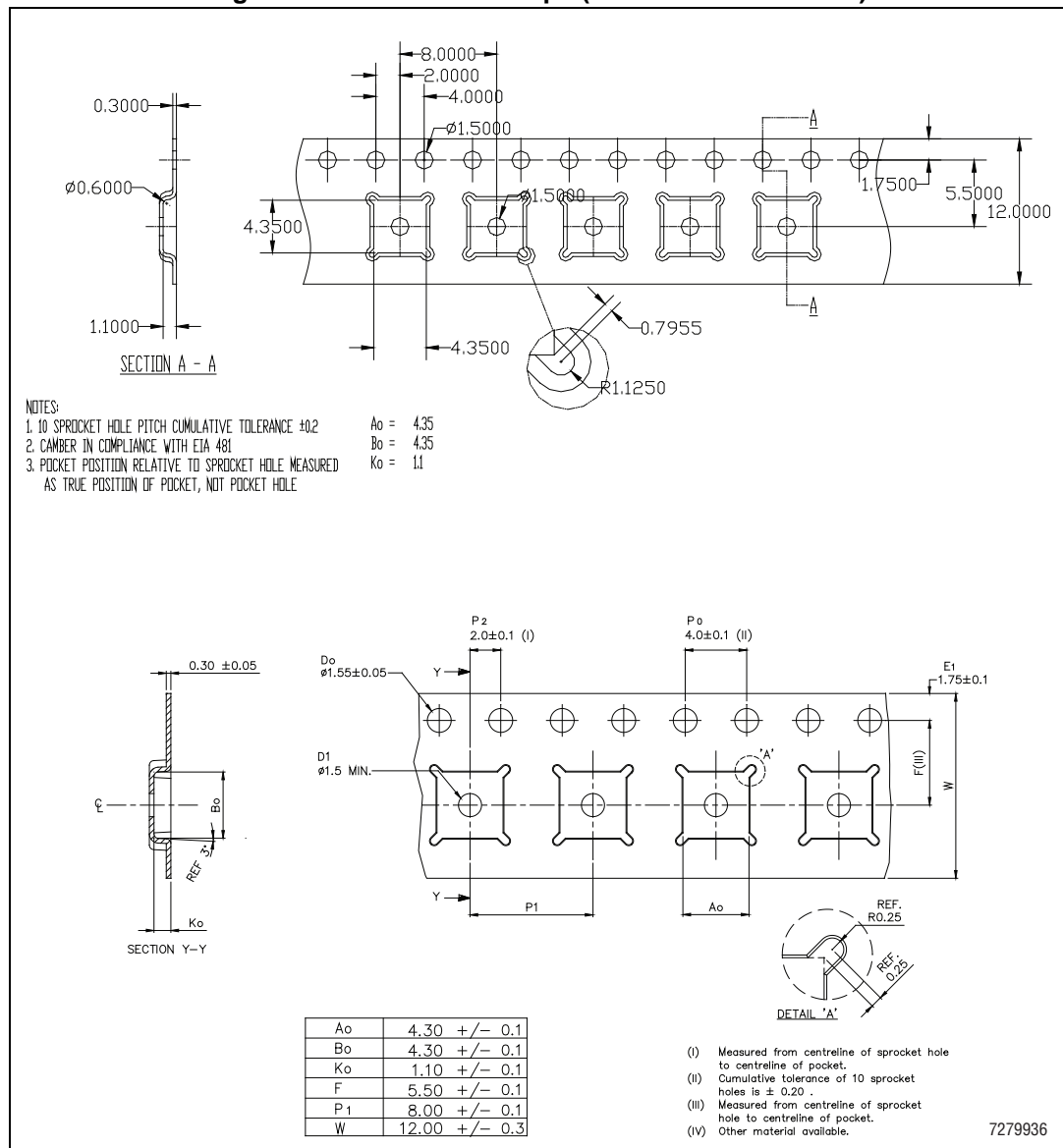
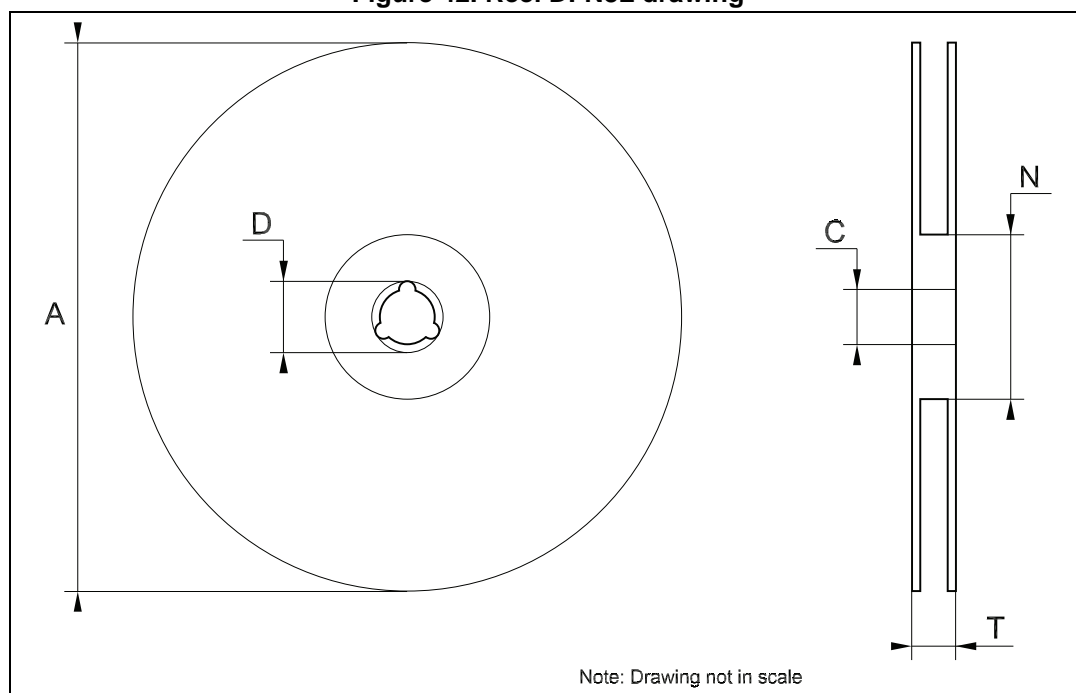


Table 18. Reel DFN8L dimensions

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

Figure 42. Reel DFN8L drawing



## 9 Order codes

Table 19. Order codes

Packages					
TO-220	D <sup>2</sup> PAK	D <sup>2</sup> PAK/A	DPAK	DFN8	Output voltages
LD1086V18	LD1086D2T18TR		LD1086DT18TR		1.8 V
			LD1086DT25TR		2.5 V
LD1086V33	LD1086D2T33TR	LD1086D2M33TR	LD1086DT33TR		3.3 V
	LD1086D2T50TR		LD1086DT50TR		5.0 V
	LD1086D2T12TR				12.0 V
LD1086V	LD1086D2TTR	LD1086D2MTR	LD1086DTTR	LD1086PUR	ADJ
LD1086V-DG <sup>(1)</sup>					ADJ
LD1086VY <sup>(2)</sup>			LD1086DTTRY <sup>(2)</sup>		ADJ
LD1086BV	LD1086BD2TTR	LD1086BD2MTR	LD1086BDTTR		ADJ
LD1086BV-DG <sup>(1)</sup>					ADJ

1. TO-220 Dual Gauge frame.

2. Automotive grade products.



## 10 Revision history

**Table 20. Document revision history**

Date	Revision	Changes
16-May-2006	14	Order codes updated and new template.
19-Jan-2007	15	D <sup>2</sup> PAK mechanical data updated and add footprint data.
05-Apr-2007	16	Order codes updated.
07-Jun-2007	17	Order codes updated.
19-Jul-2007	18	Add note on <a href="#">Figure 2</a> .
03-Dec-2007	19	Modified: <a href="#">Table 19</a> .
31-Jan-2008	20	Added new order codes for Automotive grade products.
18-Feb-2008	21	Modified: <a href="#">Table 19 on page 41</a> .
14-Jul-2008	22	Modified: <a href="#">Table 1 on page 7</a> and <a href="#">Table 19 on page 41</a> .
10-Mar-2010	23	Added: <a href="#">Table 12 on page 26</a> , <a href="#">Figure 30 on page 23</a> , <a href="#">Figure 31 on page 25</a> , <a href="#">Figure 32</a> and <a href="#">Figure 33 on page 29</a> .
15-Nov-2010	24	Modified: $R_{thJC}$ value for TO-220 <a href="#">Table 2 on page 7</a> .
11-Jul-2011	25	Modified: <a href="#">Figure 24</a> , <a href="#">Figure 25 on page 20</a> and <a href="#">Table 19 on page 41</a> .
10-Feb-2012	26	Added: order code LD1086V-DG <a href="#">Table 19 on page 41</a> .
15-Mar-2012	27	Added: new order code LD1086PUR <a href="#">Table 19 on page 41</a> and new package mechanical data DFN8 (4x4 mm) <a href="#">Table 15 on page 33</a> , <a href="#">Figure 35 on page 32</a> , <a href="#">Figure 36 on page 33</a> , <a href="#">Figure 41 on page 39</a> and <a href="#">Figure 42 on page 40</a> .
19-Oct-2012	28	Added: $R_{thJA}$ value for DPAK <a href="#">Table 2 on page 7</a> .
13-Feb-2013	29	Modified: Output voltage in Voltage reference parameter <a href="#">Table 8 on page 14</a> and <a href="#">Table 10 on page 16</a> .
01-Mar-2013	30	Modified: DFN8 (4 x 4) pin configuration <a href="#">Figure 2 on page 6</a> .
17-Jun-2013	31	Added <a href="#">Table 8: Electrical characteristics of LD1086B#</a> and <a href="#">Section 8: Packaging mechanical data</a> . Updated <a href="#">Section 7: Package mechanical data</a> and <a href="#">Table 19: Order codes</a> . Minor text changes.
22-Oct-2013	32	RPN LD1086xx changed to LD1086. Updated the Description in cover page. Cancelled Table 1: Device summary. Updated <a href="#">Figure 2: Pin connections (top view)</a> , <a href="#">Section 5: Electrical characteristics</a> , <a href="#">Section 7: Package mechanical data</a> and <a href="#">Table 19: Order codes</a> . Minor text changes.
18-Dec-2014	33	Updated <a href="#">Table 6.: Electrical characteristics of LD1086#50</a> , <a href="#">Section 7: Package mechanical data</a> and <a href="#">Section 8: Packaging mechanical data</a> . Minor text changes.

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