IC of LOW POWER VOLTAGE REGULATOR 5V/400mA, 8.5V/400mA, 10V/400mA WITH LOW DROP VOLTAGE

(FUNCTIONAL EQUIVALENT OF TLE4274 INFINEON)

ILE4274-XX - are a single-chip integrated circuits of three types of low-power voltage regulator 5V/400mA (ILE4274-5.0), 8.5V/400mA (ILE4274-8.5), 10V/400mA (ILE4274-10) with low-drop voltage realized in a TO-220AB/3 package.

The ICs of low-power voltage regulator 5V/100mA are purposed for supplying of continues (DC) voltages 5V, 8.5V, 10V with drop voltage less than 0.5V at load current 250mA. T he IC is suitable for use in power supply sources of electronic devices and automotive electronics. The ICs are tolerant to over voltage of both polarities (positive & negative), provide internal current limitation and output voltage thermal shutdown.

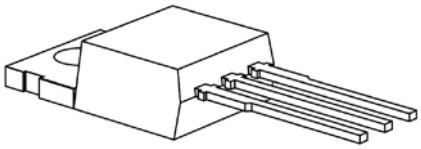


Fig.1 - View of IC in TO220AB/3 package

ORDERING INFORMATION

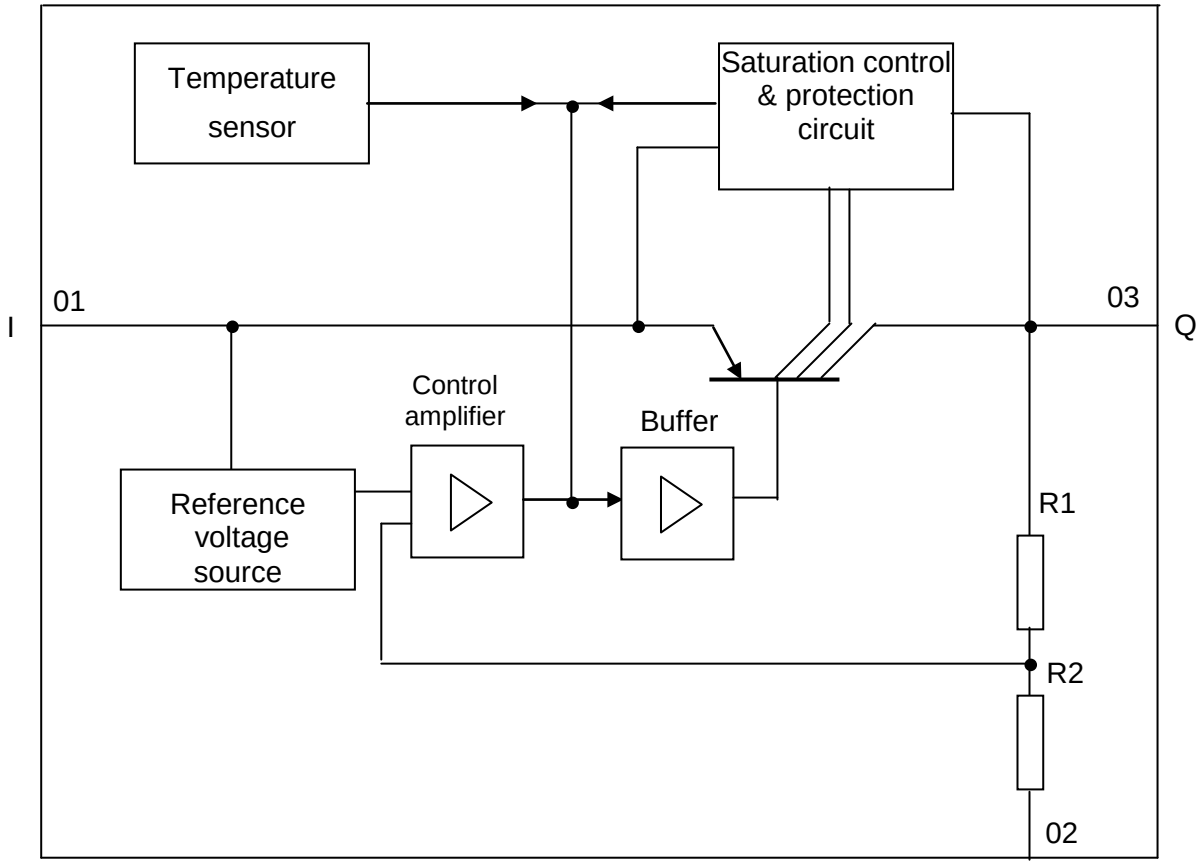
Device	Operating Temperature Range	Package	Shipping
ILE4274-xxKB	T_A = -40° to 150° C	TO 220AB/3	Tube

FEATURES:

- High accuracy of the output voltage ± 4%;
- Low-drop voltage;
- Low consumption current;
- Built in overheating protection;
- Reverse polarity proof;
- Wide temperature range -40 +150 °C;
- Suitable for use in automotive electronics.

Table 1 - Pins description

Package pin number	Symbol	Function
01	I	Input
-	-	Not bonded
02	GND	Common pin (Ground)
03	Q	Output



R1, R2 - resistors

Fig. 2 – Electric block diagram

Table 2 Absolute Maximum Ratings

Symbol	Parameters	Norm		Unit
		min.	max.	
V_I	Input voltage	-42	45	V
V_Q	Output voltage	-1.0	40	V
I_{GND}	GND pin current	-	100	mA
T_{stg}	Storage temperature	-60	150	^oC
T_j	Junction temperature	-60*	150	^oC

Note - Maximum power P_{tot}, W, dissipated by IC at T_A , is calculated by formula:

$$P_{tot} = (150 - T_A) / R_{th\ ja} , (1)$$

150 – maximum permissible operating junction temperature, ^OC;
$R_{th\ ja}$ - thermal resistance junction ambient, ^oC /W, for IC without heat sink $R_{th\ ja}$ is about 65 ^oC/W.
For IC with heat sink $R_{th\ ja}$, W, is calculated by formula

$$R_{th\ ja} = R_{th\ jc} + R_{th\ ca} , \qquad (2)$$

$R_{th\ jc}$ - thermal resistance junction case, ^oC /W. $R_{th\ jc}$ = 4 ^oC/W.
Thermal resistance case-ambient $R_{th\ ca}$ is determined by heat sink design and is selected by IC customer.
Application circuit and heat sink and ambient temperature have to provide junction temperature $T_J \leq 150\ ^OC$.

* Ambient temperature is indicated

** Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Table 3 – Recommended operation modes

Symbol	Parameter	Norm		Unit
		Min.	Max.	
V_I	Input voltage			V
	ILE4274-5.0	5.7	40	
	ILE4274-8.5	9.34	40	
	ILE4274-10	10.9	40	
V_Q	Output voltage			V
	ILE4274-5.0	4.8	5.2	
	ILE4274-8.5	8.16	8.84	
	ILE4274-10	9.6	10.4	
T_j	Junction temperature	-40*	150	^{o}C

* Ambient temperature is indicated

Table 4 – Electric parameters of ILE4274-5.0, ILE4274-8.5, ILE4274-10 (on default V_I = 13.5 V, -40ºC* ≤ T_J ≤ 150ºC)

Symbol	Parameter	Mode of measurement	Norm		Unit
			Min.	Max.	
V_Q	Output voltage	**ILE4274-5.0**			V
		6 V ≤ V_I ≤ 28 V -5 mA ≤ I_Q ≤ -400 mA	4.8	5.2	
		6 V ≤ V_I ≤ 40 V -5 mA ≤ I_Q ≤ -200 mA			
		ILE4274-8.5			
		9.5 V ≤ V_I ≤ 28 V -5 mA ≤ I_Q ≤ -400 mA	8.16	8.84	
		9.5 V ≤ V_I ≤ 40 V -5 mA ≤ I_Q ≤ -200 mA			
		ILE4274-10			
		11 V ≤ V_I ≤ 28 V -5 mA ≤ I_Q ≤ -400 mA	9.6	10.4	
		11 V ≤ V_I ≤ 40 V -5 mA ≤ I_Q ≤ -200 mA			
I_{Qmax}	Maximum output current	V_Q < 0.96 V_{Qnom}**	400	-	mA
I_q	Consumption current	I_Q =-1 mA	-	0.22	mA
		I_Q = -250 mA	-	15	
		I_Q = -400 mA	-	30	
V_{dr}	Drop voltage	I_Q = -250 mA	-	0.5	V
$\Delta V_{Q(I)}$	Load current regulation of output voltage	-5 mA ≤ I_Q ≤ -400 mA	-	1.0	%
$\Delta V_{Q(V)}$	Supply (input) voltage regulation of output voltage	12 V ≤ V_I ≤ 32 V I_Q = -5 mA	-	0.5	%

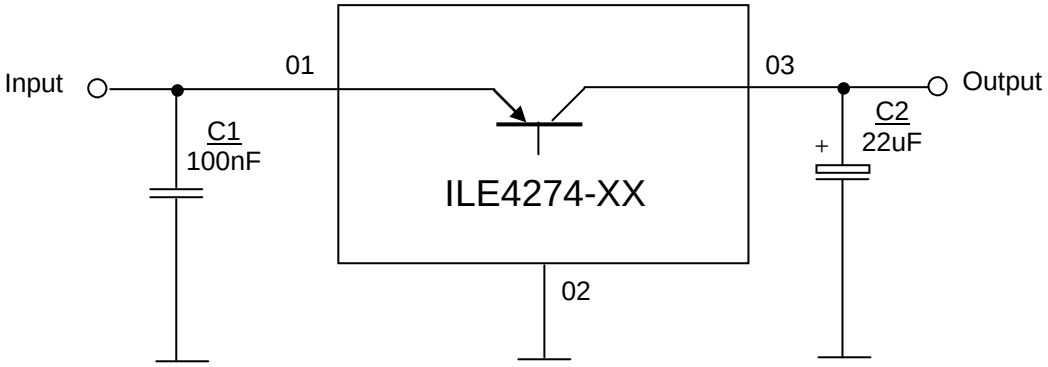
* Ambient temperature is indicated.

** V_{Qnom} – 5.0 V (for IC ILE4274-5.0); 8.5 V (for IC ILE4274-8.5); 10.0 V (for IC ILE4274-10)

Table 5 – Typical electric parameters of ILE4274-5.0, ILE4274-8.5, ILE4274-10 (on default V_I = 13.5 V, -40ºC ≤ T_J ≤ 150ºC)

Symbol	Parameter	Measurement mode	Typical value	Unit
PSRR	Ripple rejection ratio	f_r = 100Hz $V_{r(p-p)}$ = 0.5 V	60	dB
dV_Q/dT	Temperature factor of output voltage	I_Q = -5 mA	0.01	%/ ^oC

* Ambient temperature is indicated.



C1 – capacitor;
C2 – electrolytic capacitor

Fig. 3 – Application diagram

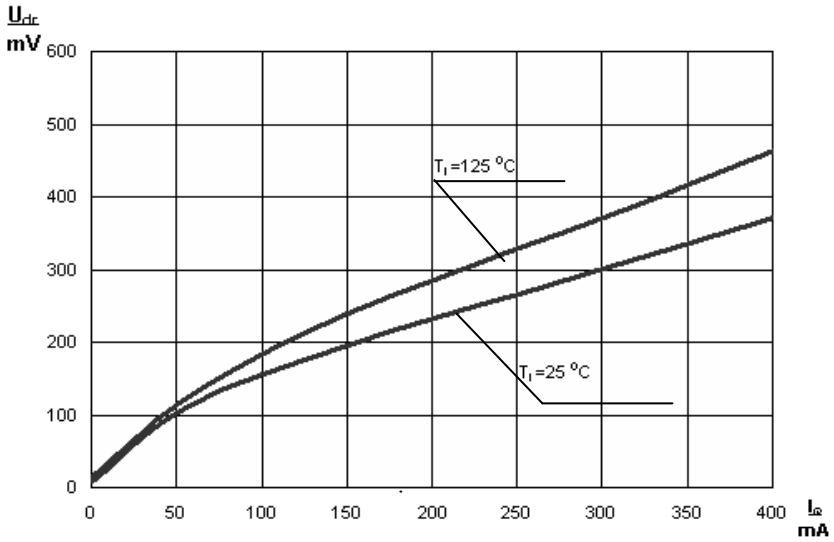


Fig. 4 – ILE4274-5.0 performance feature: drop voltage V_{dr} versus I_Q output current

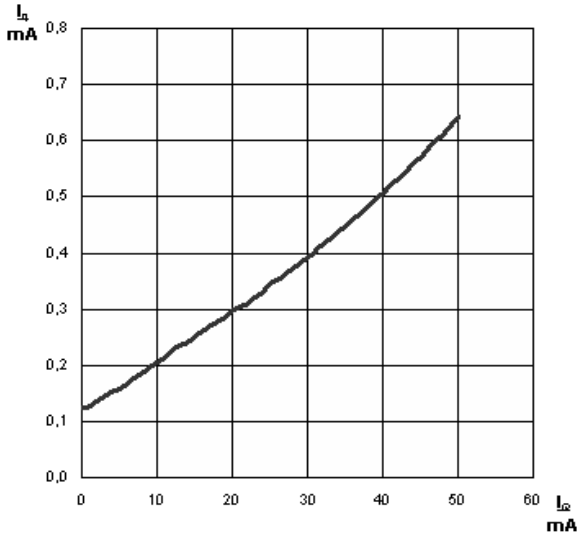


Fig. 5 - ILE4274-5.0 performance feature: consumption current I_q versus output current I_Q at T_j = 25ºC, V_I = 13.5 V

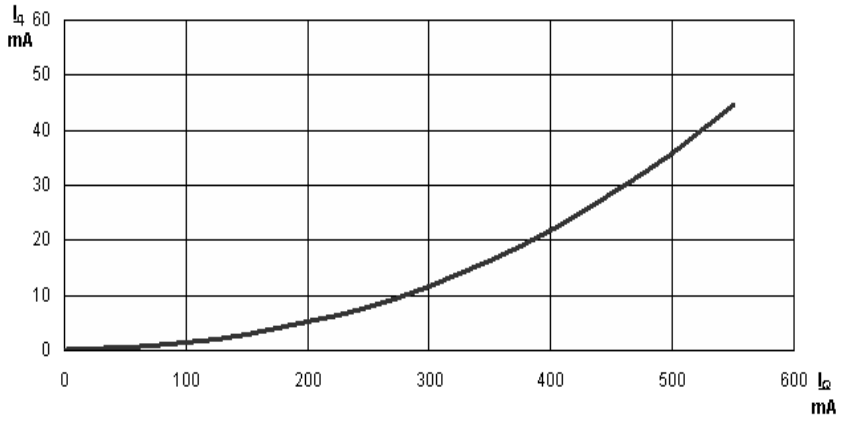


Fig. 6 - ILE4274-5.0 performance feature: consumption current I_q versus output current I_Q at T_j = 25ºC, V_I = 13.5 V

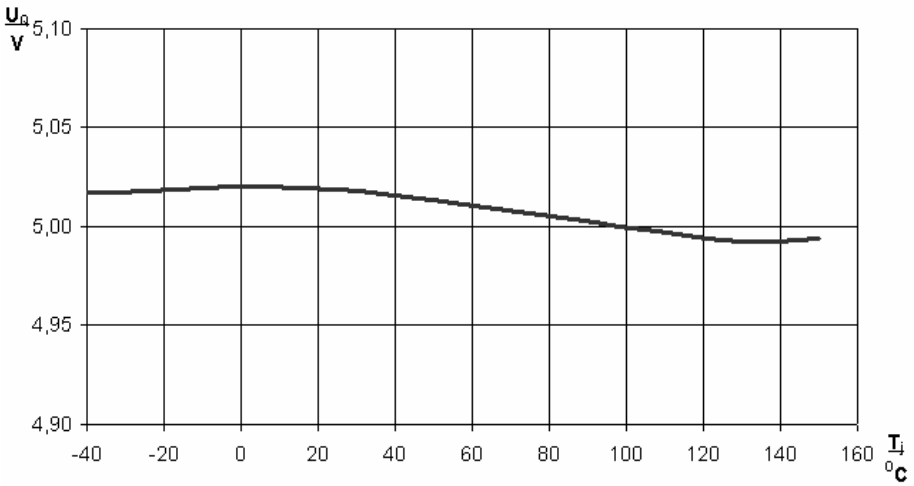


Fig. 7 - ILE4274-5.0 performance feature: output voltage V_Q versus junction temperature T_j at V_I = 13.5 V

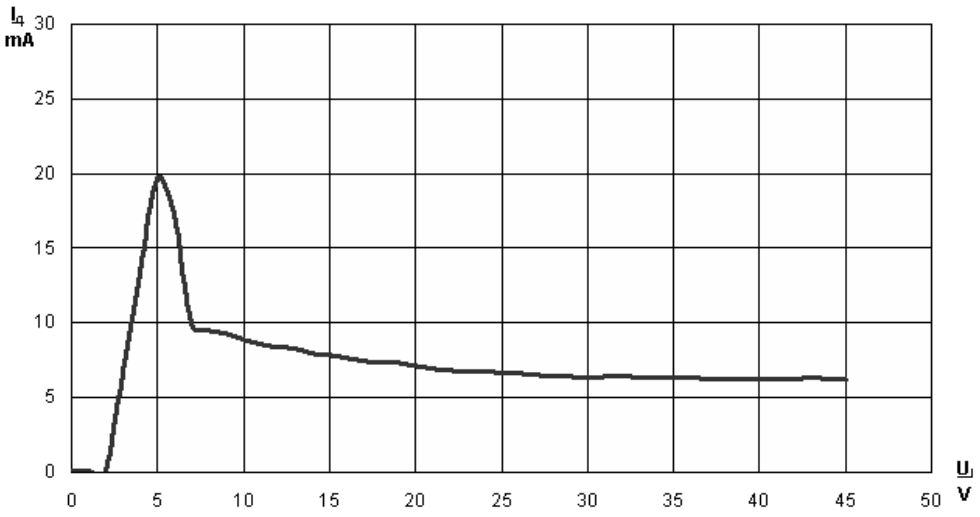


Fig. 8 - ILE4274-5.0 performance feature: consumption current I_q versus input voltage V_I at T_j = 25 °C, R_l = 20 Ω

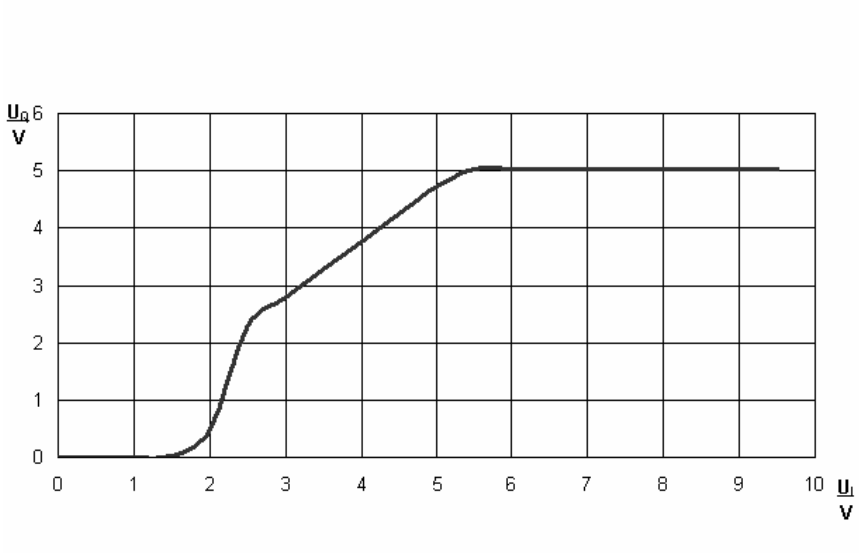


Fig. 9 - ILE4274-5.0 performance feature: output voltage V_Q versus input voltage V_I at T_j = 25 °C, R_l = 20 Ω

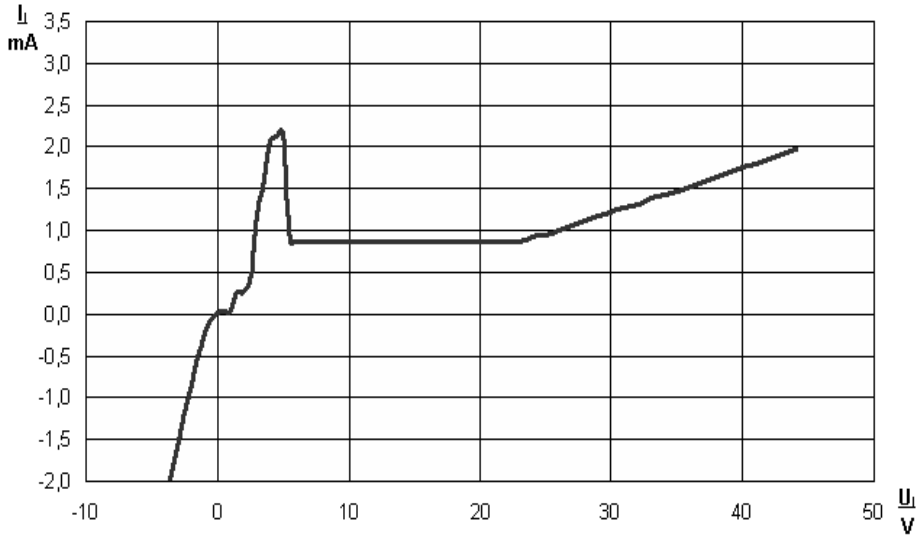


Fig. 10 - ILE4274-5.0 performance feature: input current I_I versus input voltage V_I at T_j = 25°C, R_I = 6.8 kΩ

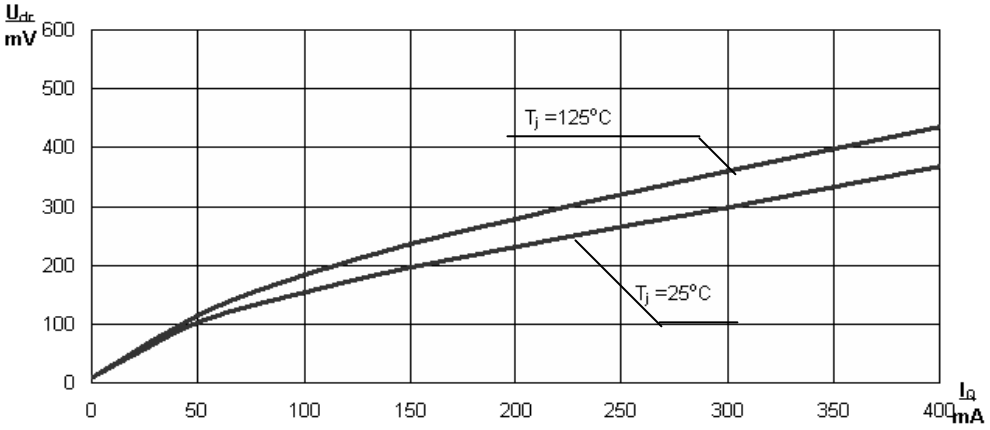


Fig. 11 - ILE4274-8.5 performance feature: drop voltage V_{dr} versus output current I_Q

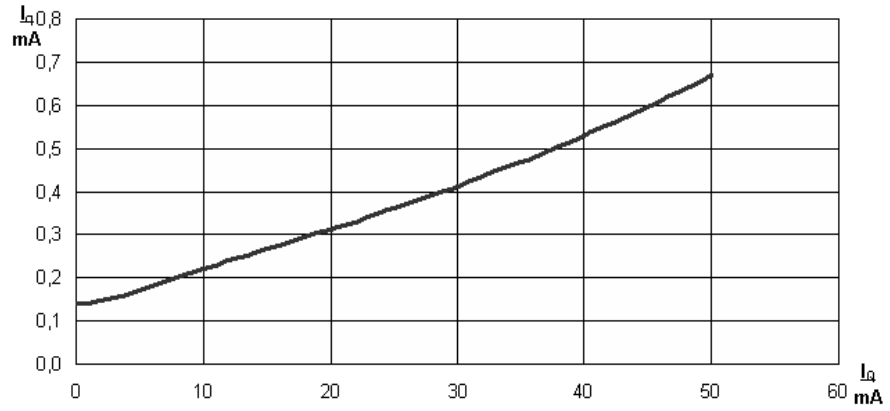


Fig. 12 - ILE4274-8.5 performance feature: consumption current I_q versus output current I_Q at T_j = 25ºC, V_I = 13.5 V

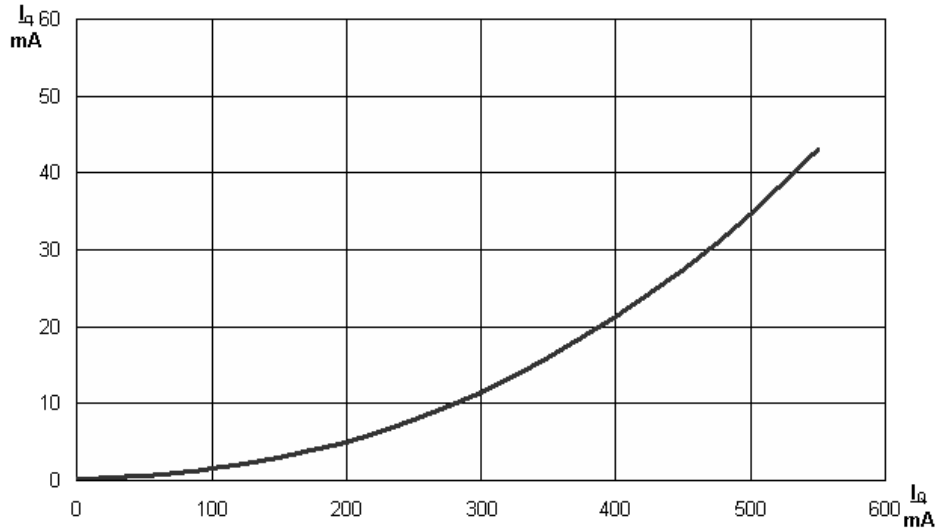


Fig. 13 - ILE4274-8.5 performance feature: consumption current I_q versus output current I_Q at T_j = 25ºC, V_I = 13.5 V

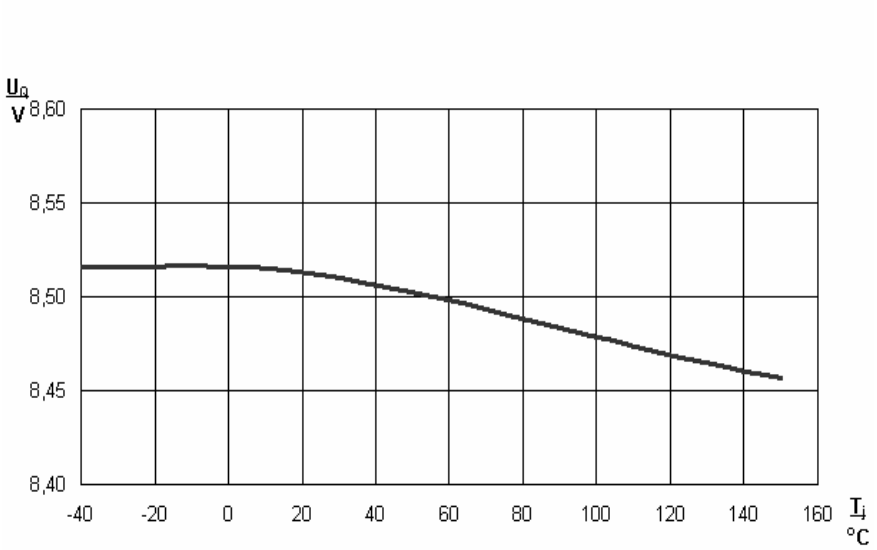


Fig. 14 - ILE4274-8.5 performance feature: output voltage V_Q versus junction temperature T_j at V_I = 13.5 V

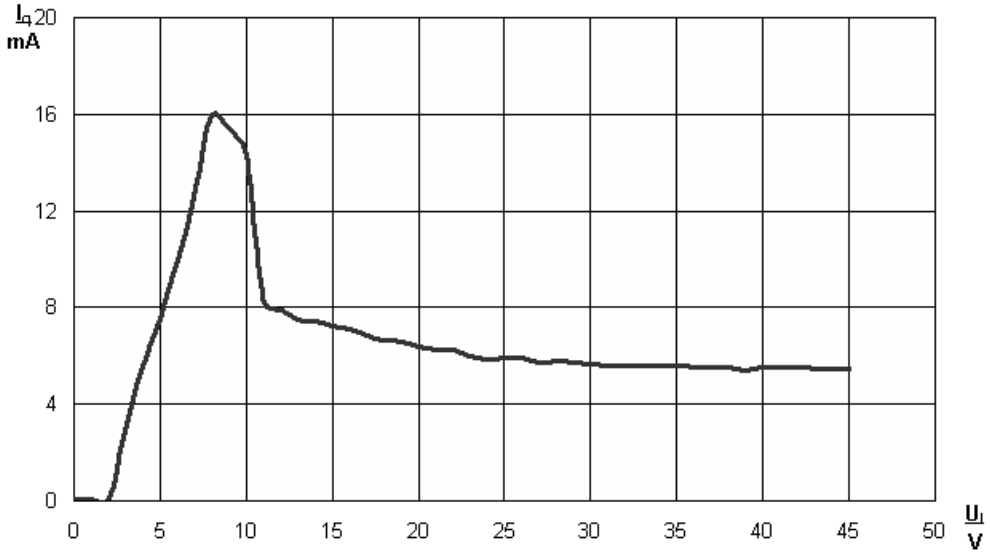


Fig. 15 - ILE4274-8.5 performance feature: consumption current I_q versus input voltage V_I at T_j = 25 °C, R_I = 34 Ω

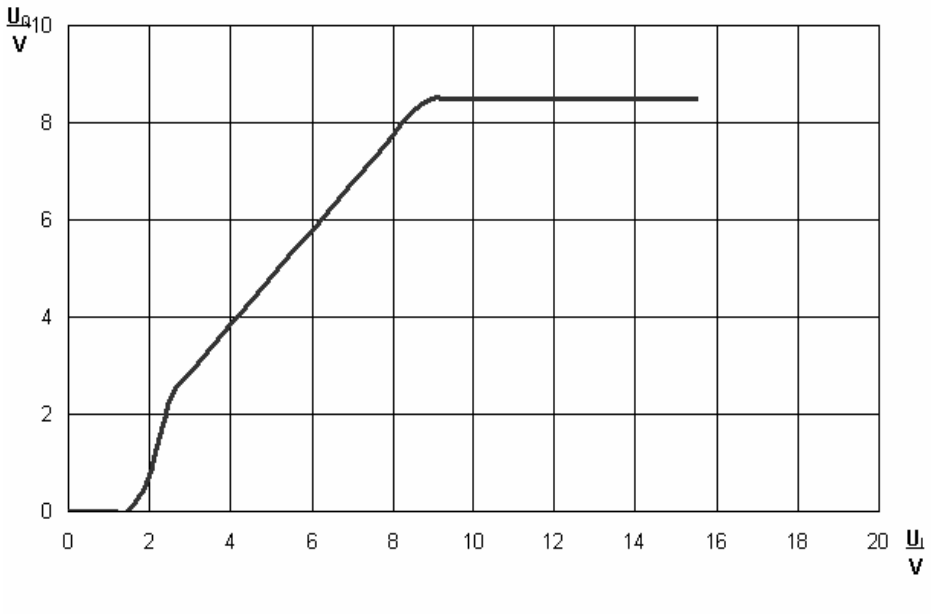


Fig. 16 - ILE4274-8.5 performance feature: output voltage V_Q versus input voltage V_I at T_j = 25 °C, R_l = 34 Ω

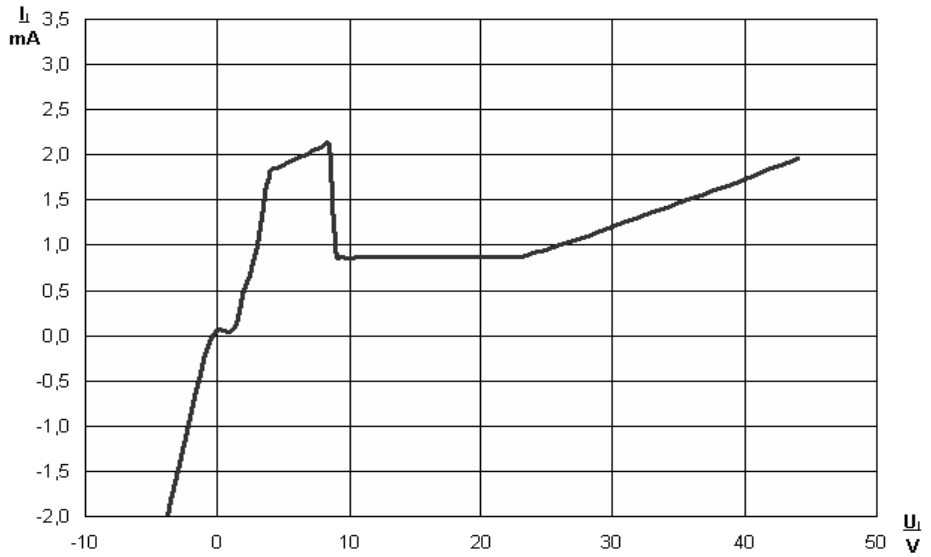


Fig. 17 - ILE4274-8.5 performance feature: input current I_I versus input voltage V_I at T_j = 25°C, R_l = 12 kΩ

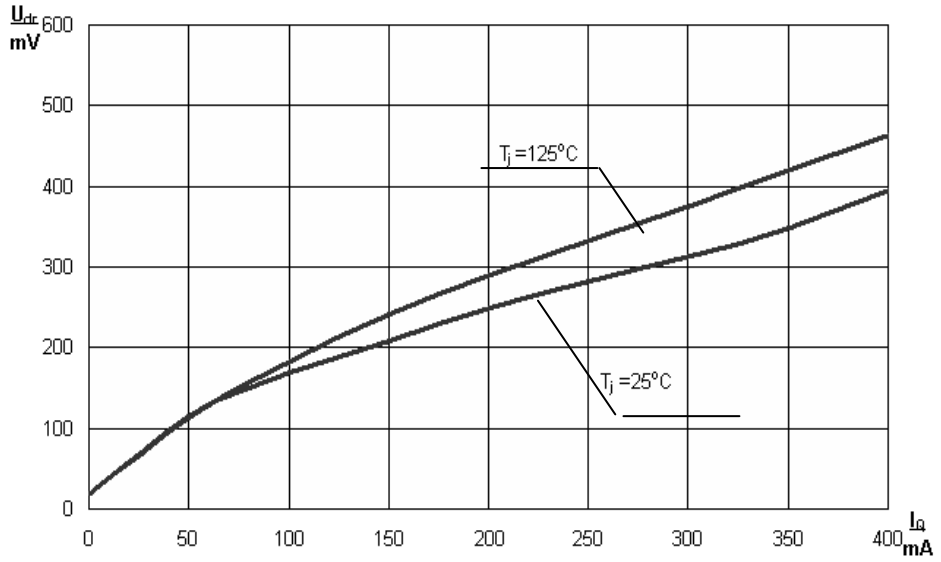


Fig. 18 - ILE4274-10 performance feature: drop voltage V_{dr} versus output current I_Q

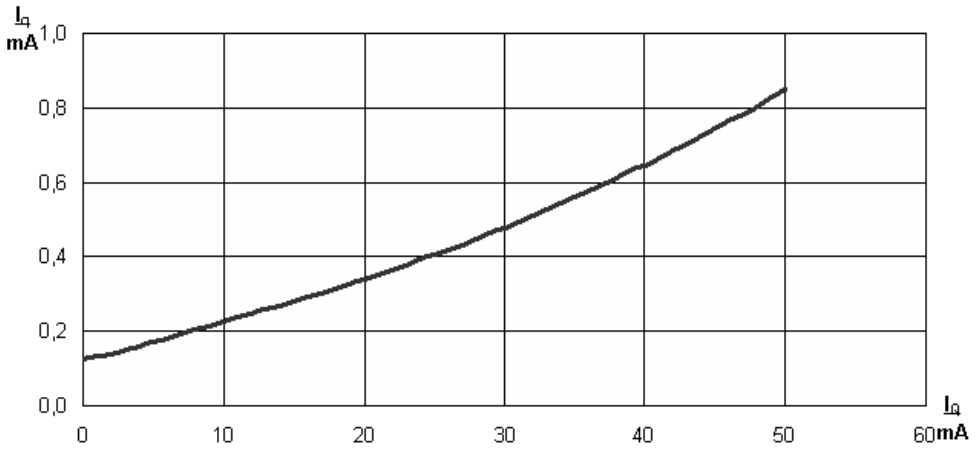


Fig. 19 - ILE4274-10 performance feature: consumption current I_q versus output current I_Q at T_j = 25ºC, V_I = 13.5 V

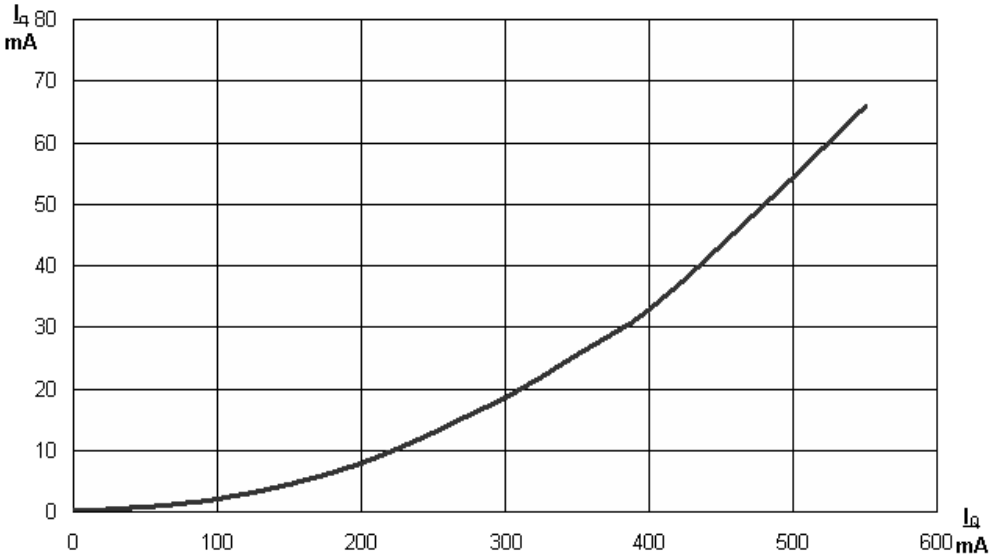


Fig. 20 - ILE4274-10 performance features: consumption current I_q versus output current I_Q at T_j = 25ºC, V_I = 13.5 V

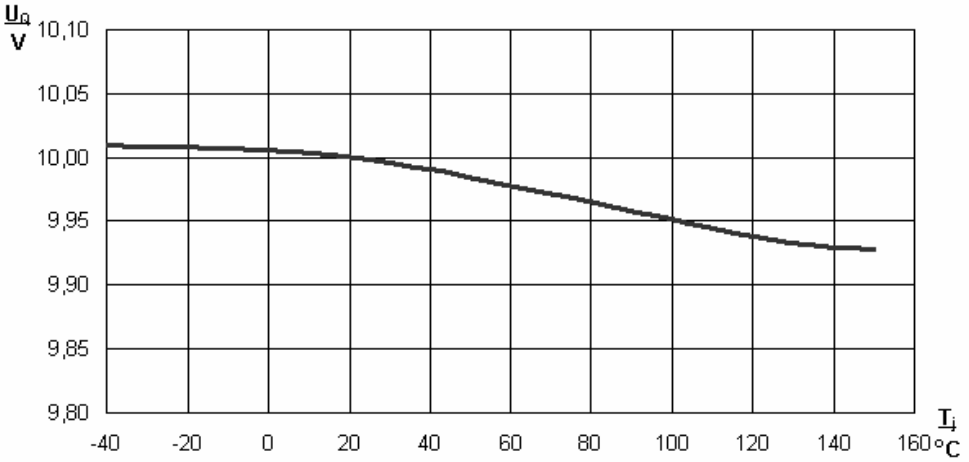


Fig. 21 - ILE4274-10 performance features: output voltage V_Q versus junction temperature T_j at V_I = 13.5 V

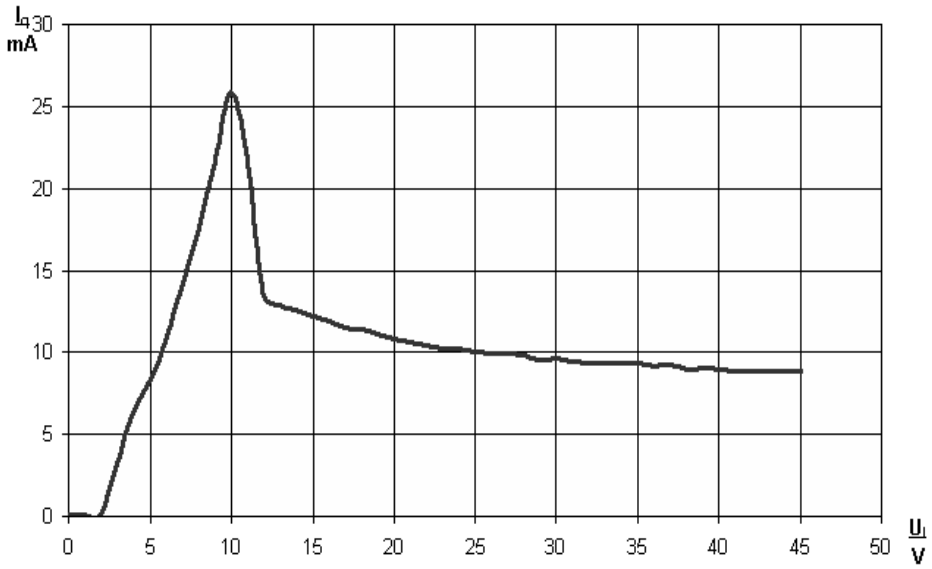


Fig. 22 - ILE4274-10 performance features: consumption current I_q versus input voltage V_I at T_j = 25 °C, R_l = 40 Ω

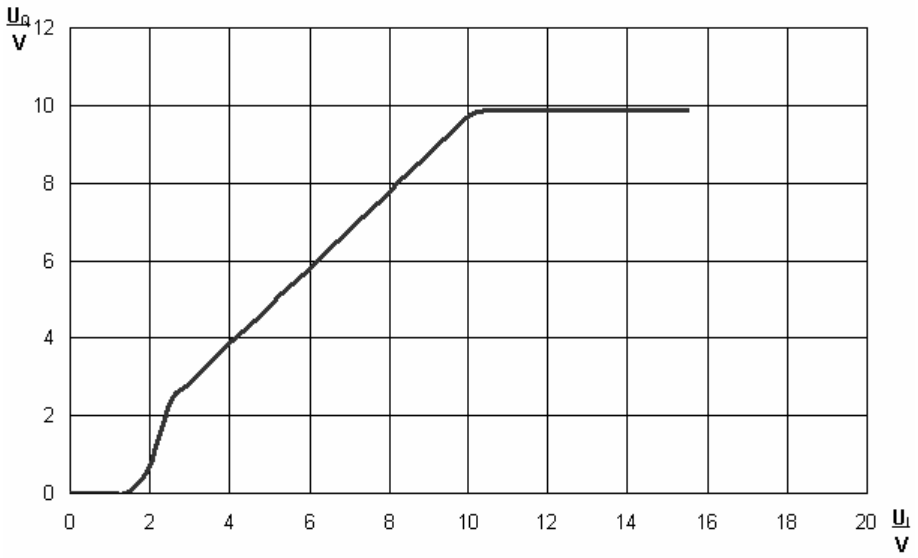


Fig. 23 - ILE4274-10 performance features: output voltage V_Q versus input voltage V_I at T_j = 25 °C, R_l = 40 Ω

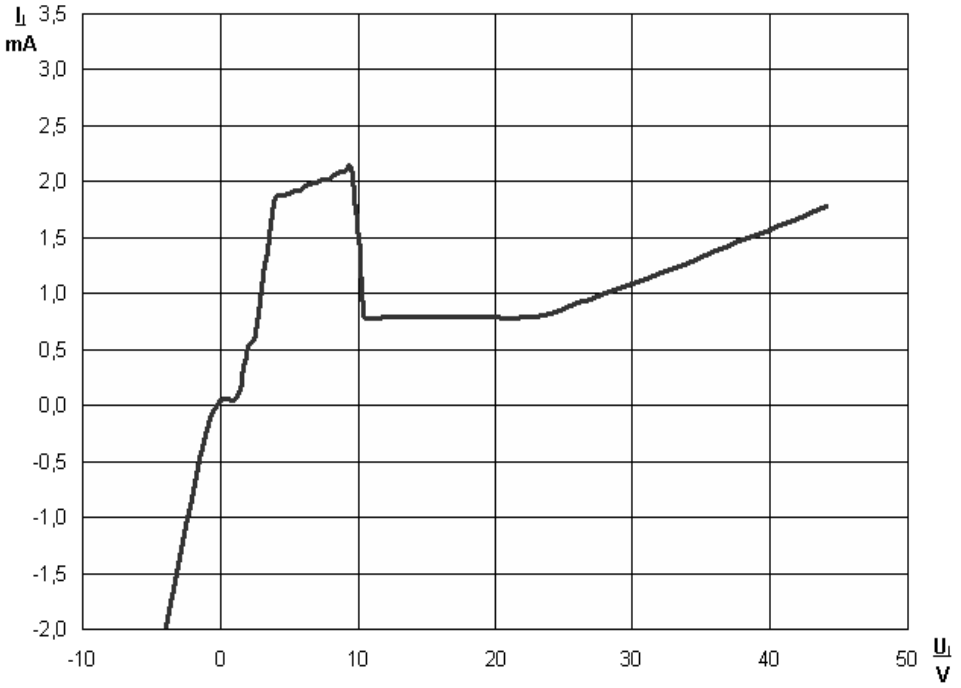


Fig. 24 - ILE4274-10 performance features: input current I_I versus input voltage V_I at T_j = 25°C, R_I = 15 kΩ

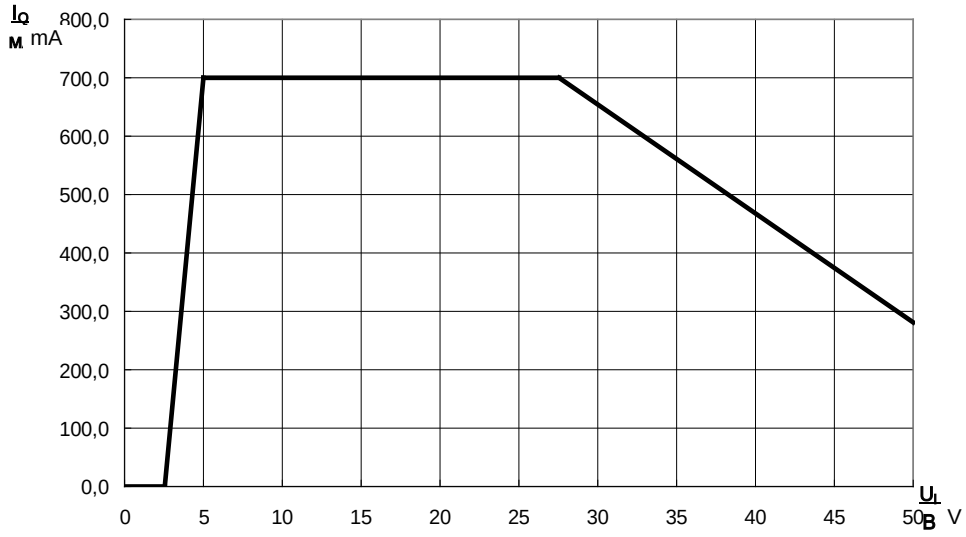


Fig. 25 - ILE4274-5.0, ILE4274-8.5, ILE4274-10 performance feature: output current I_Q versus input voltage V_I at T_j = 25°C , V_Q = 0 V

Package Dimension

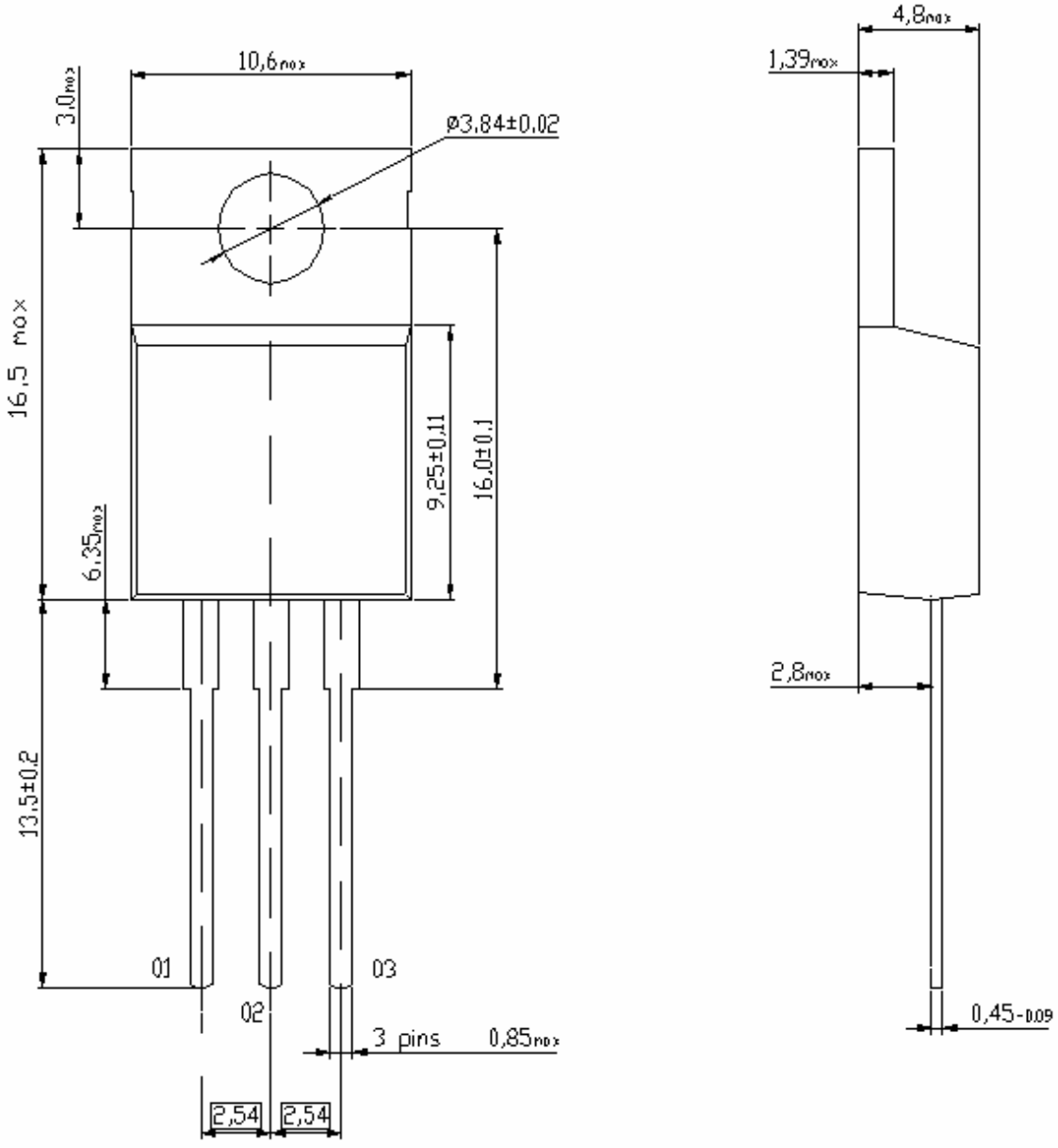


Fig. 26 –TO220AB/3 package outline