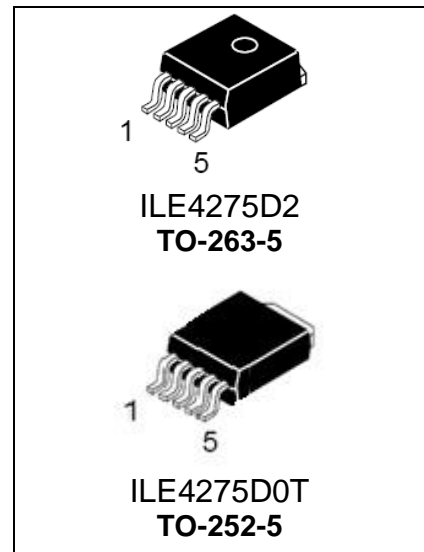


## 5V/400mA Low Drop Voltage

**ILE4275**

ILE4275 is integrated circuits of voltage regulator 5V/400 mA with low-drop voltage. The IC of voltage regulator 5V/400 mA are purposed to supply DC voltage 5V with 2% accuracy at a range of input voltages from 5,6 to 40 V , with drop voltage 0,5V at load current 300 mA. The IC is used in power supply units of electronic devices, including automotive electronics. Maximum input voltage is 45 V. The IC is tolerant to over voltage of both polarities (positive & negative), provide internal current limitation and output voltage thermal shutdown. Reset function is available.

The IC realized in 5-pin plastic packages TO-263-5 and TO-252-5



### ORDERING INFORMATION

Device	Operating Temperature Range	Package	Shipping
ILE4275D2	T <sub>j</sub> = -40° to 150° C	TO-263-5	Tube
ILE4275D2T		TO-263-5	Tape & Reel
ILE4275D0T		TO-252-5	Tape & Reel

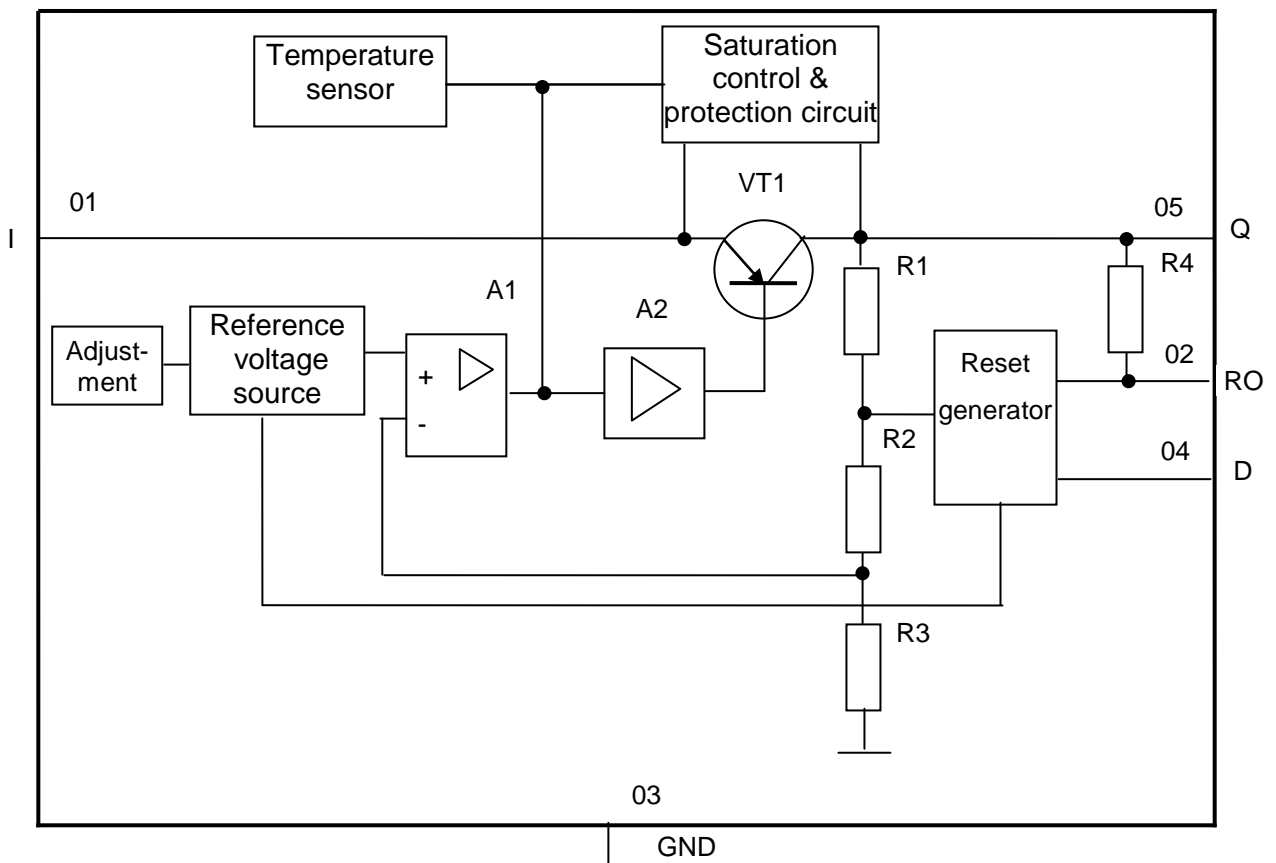
### Features

- High accuracy of the output voltage 5 V ± 2%;
- Low-drop voltage ;
- Built-in overheating protection;
- Reverse polarity proof;
- Low consumption current;
- Input voltage up to 45 V;
- Suitable for use in automotive electronics;
- Wide junction temperature range -40 ... +150°C;
- Reset function.

Table 1. Pins Description

Chip pad number	Package pin number	Symbol	Function
01	01	I	Input
02	02	RO	Reset output
03	03	GND	Common pin (Ground)
04	04	D	Reset delay pin
05, 06	05	Q	Output
07 - 10	-	-	Not bonded (not used)

Block Diagram



A1 – control amplifier;  
 A2 – buffer;  
 R1 – R4 –resistors;  
 VT1 - transistor

Figure 1.

Table 2. Absolute Maximum Ratings

Symbol	Parameter	Min.	Max.	Unit
T <sub>J</sub>	Junction temperature	-40*	150	°C
T <sub>stg</sub>	Storage temperature	-50	150	°C
V <sub>I</sub>	Input voltage	-42	45	V
V <sub>D</sub>	Reset delay pin voltage	-0.3**	7**	V
I <sub>D</sub>	Reset delay pin current	-2	2	mA
V <sub>R</sub>	Reset pin voltage	-0,3**	25**	V
I <sub>RO</sub>	Reset pin current	-5	5	mA
V <sub>Q</sub>	Output voltage	-1,0**	16**	V

\* Ambient temperature is indicated.  
 \*\* Voltage is not applied to input I

\* 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 Rate

Symbol	Parameter	Min.	Max.	Unit
T <sub>J</sub>	Junction temperature	-40*	150	°C
V <sub>I</sub>	Input voltage	5,6	40	V
V <sub>Q</sub>	Output voltage	4,9	5,1	V

Note:  
 Maximum power P<sub>tot</sub>,W, dissipated by IC at ambient temperature T<sub>A</sub>, is calculated by formula:  

$$P_{tot} = (150 - T_A) / R_{th\ j-a} , \quad (1)$$
 150 – maximum permissible operating junction temperature, °C.  
 R<sub>th j-a</sub> - thermal resistance junction ambient (for IC without heat sink), °C /W,  
 for ILE4275 without heat sink R<sub>th ja</sub> is equal 80 °C /W  
 for ILE4275 without heat sink R<sub>th ja</sub> is equal 65 °C /W  
 for IC with heat sink R<sub>th ja</sub> is calculated by formula  

$$R_{th\ j-a} = R_{th\ j-c} + R_{th\ c-a} , \quad (2)$$
 R<sub>th j-c</sub> - thermal resistance junction case, °C /W. R<sub>th jc</sub> = 4 °C/W.  
 Thermal resistance case-ambient R<sub>th c-a</sub> 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 not more T<sub>J</sub> ≤ 150 °C.  
 \* Ambient temperature is indicated.

Table 4. Electric Parameters

( $V_I = 13.5\text{ V}$ ,  $V_{ADJ} > 2.0\text{ V}$ ,  $-40^\circ\text{C} < T_J < 150^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Max.	Unit
$I_q$	Consumption current $I_q = I_I - I_Q$	$I_Q = -1\text{ mA}$ , $T_J = 25^\circ\text{C}$	-	0.2	mA
		$I_Q = -1\text{ mA}$ , $T_J < 85^\circ\text{C}$	-	0.22	
		$I_Q = -250\text{ mA}$	-	10	
		$I_Q = -400\text{ mA}$	-	22	
$I_{Qmax}$	Maximum output current	-	450	-	mA
$V_{dr}$	Drop voltage	$I_Q = -300\text{ mA}$ Note 2	-	0.5	V
$V_Q$	Output voltage	$6\text{ V} \leq V_I \leq 28\text{ V}$ $-5\text{ mA} \leq I_Q \leq -400\text{ mA}$	4.9	5.1	V
		$6\text{ V} \leq V_I \leq 40\text{ V}$ $-5\text{ mA} \leq I_Q \leq -200\text{ mA}$	4.9	5.1	
$\Delta V_{Q(V)}$	Supply (input) voltage regulation of output voltage	$8\text{ V} \leq V_I \leq 32\text{ V}$ $I_Q = -5\text{ mA}$	-15	15	mV
$\Delta V_{Q(I)}$	Load current regulation of output voltage	$-5\text{ mA} \leq I_Q \leq -400\text{ mA}$	-	30	mV
Reset generator parameters					
$V_{RT}$	Reset generator switching threshold voltage	-	4.5	4.8	V
$I_{ROH}$	Reset output leakage current	$V_{ROH} = 5\text{ V}$	-	10	$\mu\text{A}$
$V_{ROL}$	Reset output low level voltage	$R_{ext} \geq 5\text{ k}\Omega$ , $V_Q > 1\text{ V}$	-	0.4	V
$V_{DL}$	RO output switching to low threshold voltage	-	0,2	0.7	V
$V_{DV}$	RO output switching to high threshold voltage	-	1,5	2.2	V
$I_d$	Charge current	$V_D = 1\text{ V}$	3,0	9.0	$\mu\text{A}$
$t_d$	Reset delay time	$C_D = 47\text{ nF}$	10	22	ms
$t_{RR}$	Reset reaction time	$C_D = 47\text{ nF}$	-	2	$\mu\text{s}$
Notes					
1. Measurement of electric parameters is processed with connected input capacities $C_{I1} = 100\text{ }\mu\text{F}$ , $C_{I2} = 100\text{ nF}$ and output capacity $C_Q = 22\text{ }\mu\text{F}$ .					
2. Drop voltage $V_{dr} = V_I - V_Q$ is measured, when the output voltage $V_Q$ has dropped 100mV from the nominal value obtained at $V_I = 13.5\text{ V}$ .					
* Ambient temperature is indicated.					

Table 5. Typical Electric Parameters

( $V_I = 13.5\text{ V}$ ,  $-40^\circ\text{C} < T_J < 150^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Typical Value	Unit
PSRR	Ripple rejection ratio	$f_r = 100\text{ Hz}$ , $I_Q = -100\text{ mA}$ $V_r = 0,5^{**}\text{ V (p - p)}$	60	dB
$dV_Q/dT$	Temperature factor of output voltage	-	0,5	mV/°C

\* Ambient temperature is indicated.

\*\* It is permitted to measure at  $V_{r(p-p)} = 3\text{ V}$ , but for that PSRR norm to be revised

Typical Application Diagram

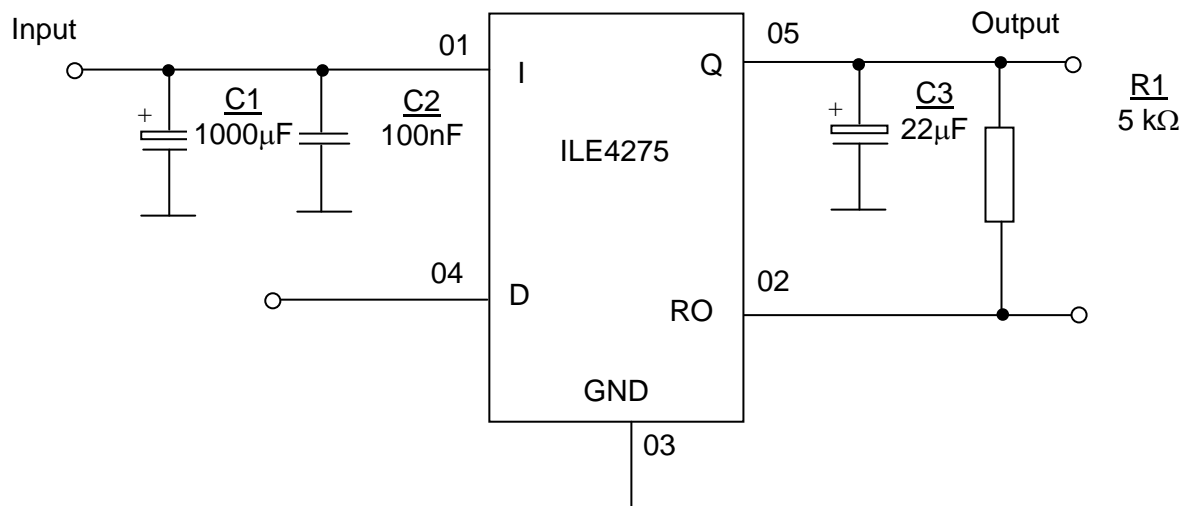


Figure 2.

Operation Timing Diagram

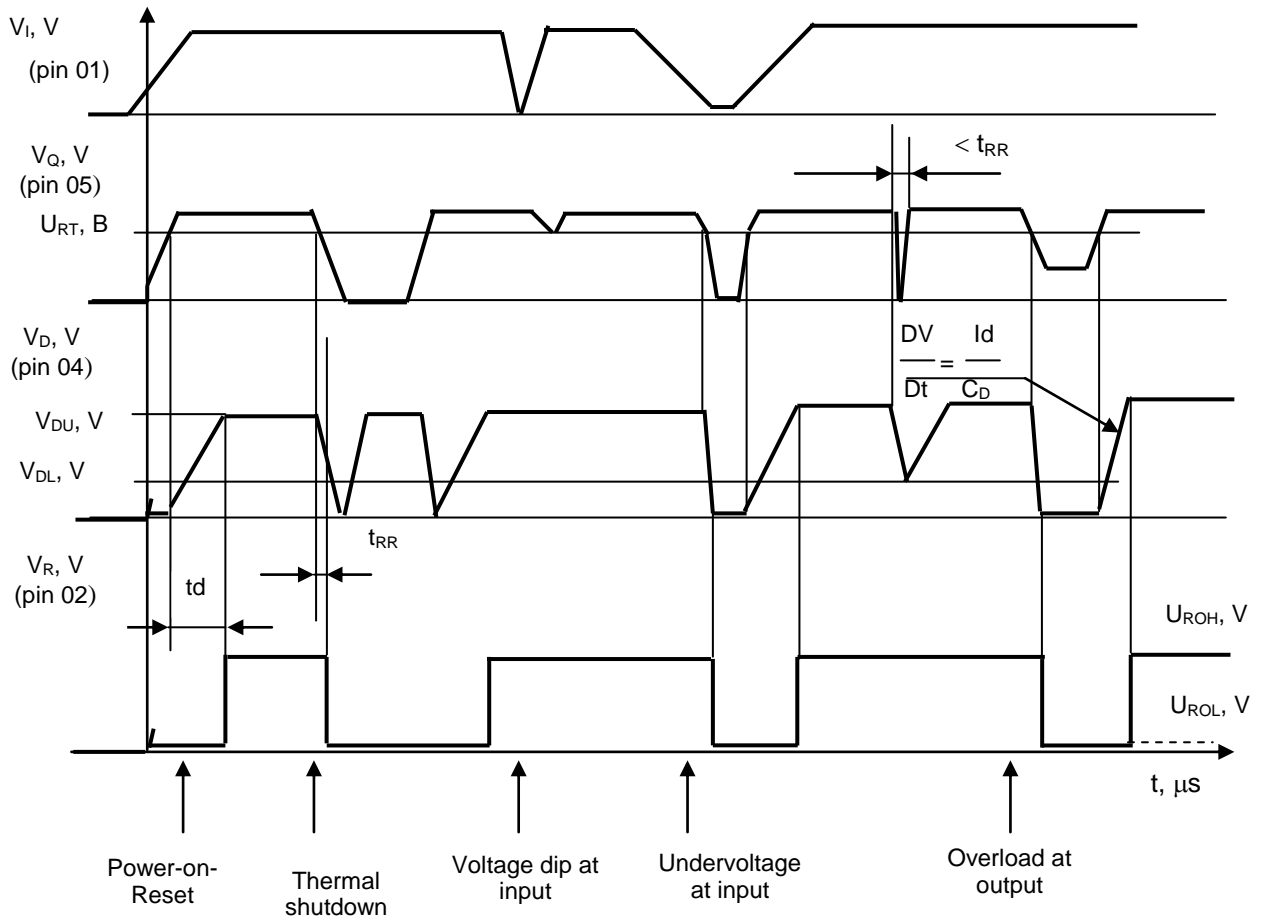
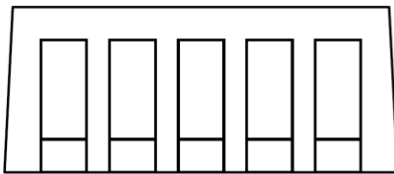
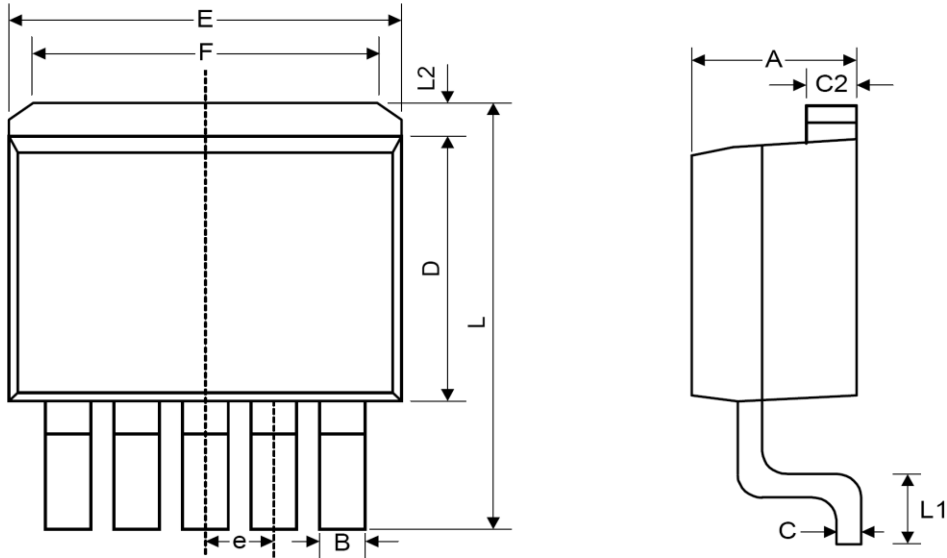


Figure 3.

Package Dimension

TO-263-5



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.07	4.46	4.85	0.160	0.176	0.191
B	0.66	0.84	1.02	0.026	0.033	0.040
C	0.36	0.50	0.64	0.014	0.020	0.025
C2	1.14	1.27	1.40	0.045	0.050	0.055
D	8.65	9.15	9.65	0.341	0.360	0.380
E	9.78	10.16	10.54	0.385	0.400	0.415
e	1.57	1.71	1.85	0.062	0.068	0.073
F	6.60	6.86	7.11	0.260	0.270	0.280
L	14.61	15.24	15.88	0.575	0.600	0.625
L1	2.29	2.54	2.79	0.090	0.100	0.110
L2	-	-	2.92	-	-	0.115

TO-252-5

