

5-V Low-Drop Voltage Regulator

ILE4260-2

ILE 4260 is a 5-V low-drop fixed-voltage regulator in P-TO220-5 package. The maximum input voltage is 42 V (65 V \leq 400 ms). The device can produce an output current of more than 500 mA. It is shortcircuit-proof and incorporates temperature protection that disables the circuit at unpermissibly high temperatures.

Due to the wide temperature range of -40 to 150 °C, the ILE 4260 is also suitable for use in automotive applications.

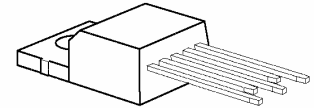
The IC regulates an input voltage V_I in the range $6 < V_I < 35$ V to $V_{Qnominal} = 5.0$ V. A reset signal is generated for an output voltage of $V_Q < 4.75$ V. The reset delay can be set externally with a capacitor. If the output current is reduced below 10 mA, the regulator switches internally to standby and the reset generator is turned off.

The standby current drops to max. 700 μ A.

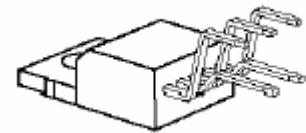
Features

- Low-drop voltage
- Very low quiescent current
- Low starting current consumption
- Integrated temperature protection
- Protection against reverse polarity
- Input voltage up to 42 V
- Overvoltage protection up to 65 V (\leq 400 ms)
- Short-circuit proof
- Suited for automotive electronics
- Wide temperature range

ILE4260S-2



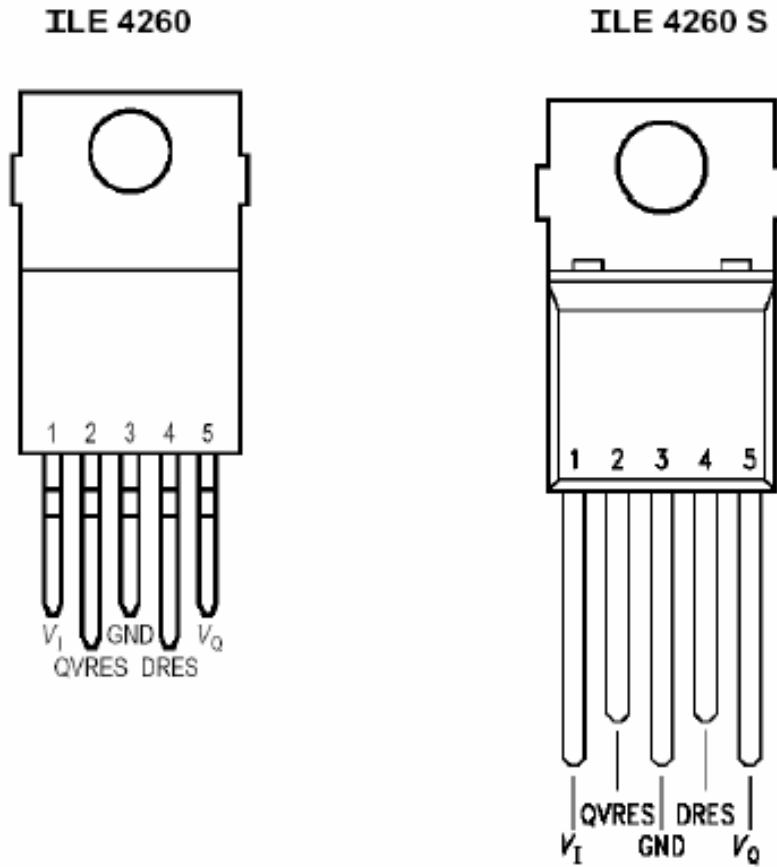
ILE4260-2



ILE 4260S-2 P-TO220-5-2
 ILE 4260-2 P-TO220-5-1

$T_A = -40^\circ \div 125^\circ$ C for all packages

Pin Configuration
(top view)



Pin Definitions and Functions (ILE 4260 and ILE 4260 S)

Pin No.	Symbol	Function
1	V_I	Input ; block directly to ground at the IC by a 470-nF capacitor
2	QVRES	Reset output ; open collector output controlled by the reset delay
3	GND	Ground
4	DRES	Reset delay ; wired to ground with a capacitor
5	V_Q	5-V output voltage ; block to ground with a 22- μ F capacitor

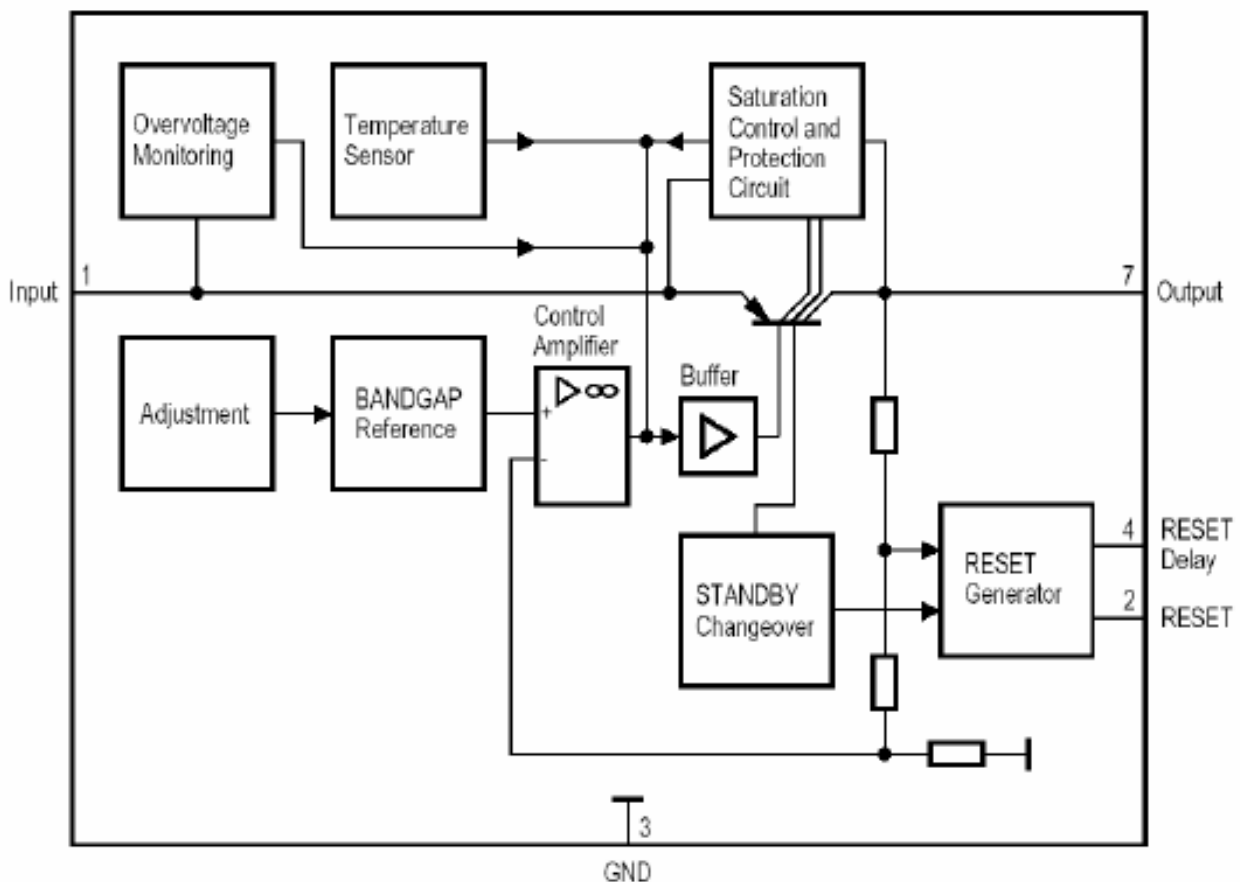
Circuit Description

The control amplifier compares a reference voltage, which is kept highly accurate by resistance adjustment, to a voltage that is proportional to the output voltage and drives the base of the series transistor via a buffer. Saturation control as a function of the load current prevents any over-saturation of the power element. If the output voltage goes below 96% of its typical value, an external capacitor is discharged on pin 4 by the reset generator. If the voltage on the capacitor reaches the lower threshold V_{ST} , a reset signal is issued on pin 2 and not cancelled again until the upper threshold V_{DT} is exceeded. For an output current of less than $I_{QN\ off} = 10\text{ mA}$ the standby changeover turns off the reset generator. The latter is turned on again when the output current increases, the output voltage drops below 4.2 V or the delay capacitor is discharged by external measures.

The IC also incorporates a number of internal circuits for protection against:

- Overload
- Overvoltage
- Overtemperature
- Reverse polarity

Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit	Remarks
		min	max		
Input (Pin 1)					
Input voltage	V_I	- 42	42	V	-
	V_I	-	65	V	$t \leq 400$ ms
Input current	I_I	-	1.6	A	-
Reset Output (Pin 2)					
Voltage	V_R	-0.3	42	V	-
Current	I_R	-	-	-	internally limited
Ground (Pin 3)					
Current	I_{GND}	-0.5	-	A	-
Reset Delay (Pin 4)					
Voltage	V_D	- 0.3	42	V	-
Current	I_D	-	-	-	internally limited
Output (Pin 5)					
Differential voltage	$V_I - V_Q$	- 5.25	V_I	V	-
Current	I_Q	-	1.4	A	-
Temperature					
Storage temperature	T_{stg}	- 50	150	°C	-
Operating Range					
Input voltage	V_I	-	32	V	1)
Junction temperature	T_j	- 40	165	°C	-
Thermal Resistances					
Junction ambient	R_{thja}	-	65	K/W	-
Junction case	R_{thjc}	-	3	K/W	-

1) See diagram "Output Current versus Input Voltage"

Characteristics

$V_I = 13.5\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; (unless otherwise specified)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Normal Operation						
Output voltage	V_Q	4.75	5.0	5.25	V	$25\text{ mA} \leq I_Q \leq 500\text{ mA}$ $6\text{ V} \leq V_I \leq 28\text{ V}$ $-40\text{ }^\circ\text{C} \leq T_j \leq 125\text{ }^\circ\text{C}$
Short -circuit current	I_{SC}	500	1000	–	mA	$V_I = 17\text{ V to } 28\text{ V}$; $V_Q = 0\text{ V}$
Current consumption $I_q = I_I - I_Q$	I_q	–	8.5	10	mA ₁₎	$6\text{ V} \leq V_I \leq 28\text{ V}$ $I_Q = 150\text{ mA}$
Current consumption $I_q = I_I - I_Q$	I_q	–	50	65	mA ₁₎	$6\text{ V} \leq V_I \leq 28\text{ V}$ $I_Q = 500\text{ mA}$
Current consumption $I_q = I_I - I_Q$	I_q	–	–	80	mA ₁₎	$V_I \leq 6\text{ V}$ $I_Q = 500\text{ mA}$
Drop voltage	V_{DR}	–	0.35	0.5	V	$V_I = 4.5\text{ V}$; $I_Q = 0.5\text{ A}$
Drop voltage	V_{DR}	–	0.2	0.3	V	$V_I = 4.5\text{ V}$; $I_Q = 0.15\text{ A}$
Load regulation	ΔV_Q	–	15	35	mV	$25\text{ mA} \leq I_Q \leq 500\text{ mA}$
Supply-voltage regulation	ΔV_Q	–	15	50	mV	$V_I \leq 6\text{ V to } 28\text{ V}$; $I_Q = 100\text{ mA}$
Supply-voltage regulation	ΔV_Q	–	5	25	mV	$V_I \leq 6\text{ V to } 16\text{ V}$; $I_Q = 100\text{ mA}$
Ripple rejection	SVR	–	54	–	dB	$f = 100\text{ Hz}$; $V_r = 0.5\text{ V}_{pp}$
Temperature drift of output voltage ₁₎	α_{VQ}	–	2×10^{-4}	–	1/°C	–
Standby Operation						
Quiescent current; $I_q = I_I - I_Q$	I_q	–	500	700	μA	$10\text{ V} \leq V_I \leq 16\text{ V}$; $I_Q = 0\text{ mA}$
Quiescent current; $I_q = I_I - I_Q$	I_q	–	750	850	μA	$10\text{ V} \leq V_I \leq 16\text{ V}$; $I_Q = 5\text{ mA}$

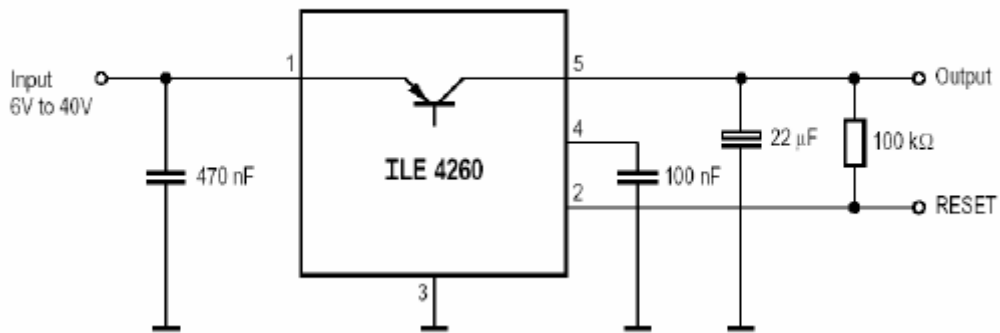
Characteristics (cont'd)

$V_I = 13.5\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; (unless otherwise specified)

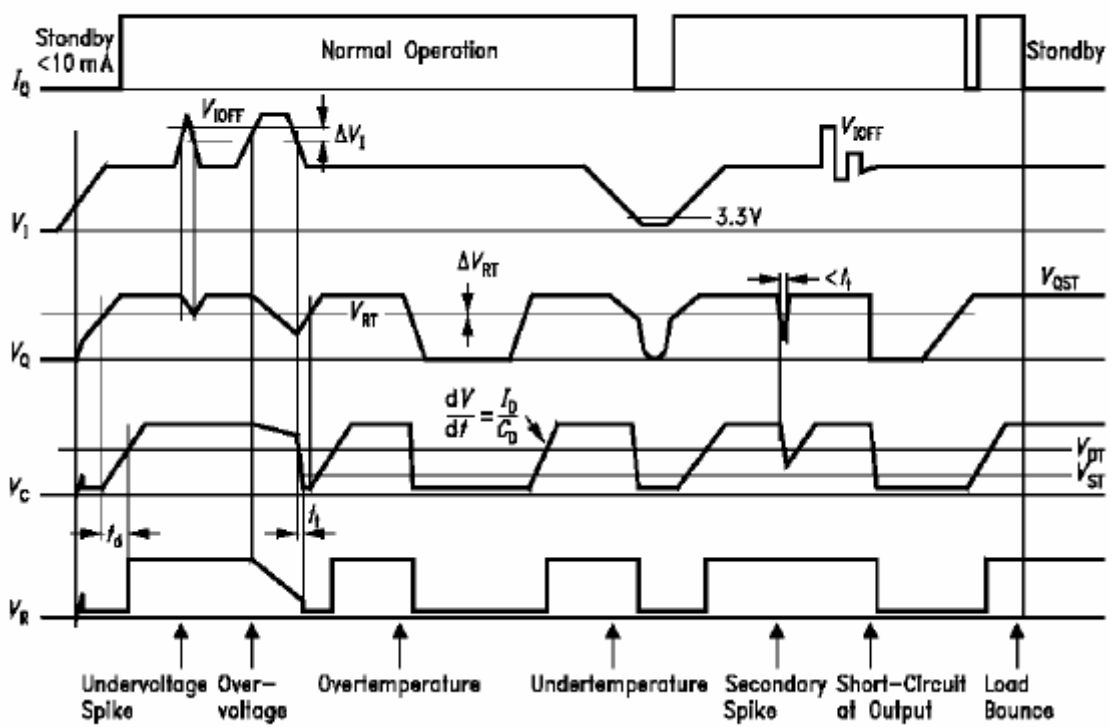
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Standby Off/Normal On						
Current consumption	I_{QSOFF}	–	1.0	1.2	mA	see test diagram
Current consumption	I_{QNON}	–	1.7	2.2	mA	see test diagram
Normal Off/Standby On						
Current consumption	I_{QNOFF}	–	1.55	2.00	mA	see test diagram
Current consumption	I_{QSON}	–	850	1050	μA	see test diagram
Switching threshold	I_{QNOFF}	7.5	10	12.5	mA	see test diagram
Switching hysteresis	ΔI_Q	2.25	3	4	mA	see test diagram
Reset Generator						
Switching threshold	V_{RT}	94	96	97	%	in % of V_Q ; $I_Q > 500\text{ mA}$; $V_I = 6\text{ V}$
Saturation voltage	V_R	–	0.25	0.40	V	$I_R = 3\text{ mA}$; $V_I = 4.5\text{ V}$
Reverse current	I_R	–	–	1	μA	$V_R = 5\text{ V}$
Charge current	I_D	7	10	13	μA	–
Switching threshold	V_{ST}	0.9	1.1	1.3	V	–
Delay switching threshold	V_{DT}	2.15	2.50	2.75	V	–
Delay time	t_D	–	25	–	ms	$C_D = 100\text{ nF}$
Delay time	t_t	–	5	–	μs	$C_D = 100\text{ nF}$
General Data						
Turn-Off voltage	V_{IOFF}	40	43	45	V	$I_Q < 1\text{ mA}$
Turn-Off hysteresis	ΔV_I	–	3.0	–	V	–
Leakage current	I_{QS}	–	500	–	μA	$V_Q = 0\text{ V}$; $V_I = 45\text{ V}$
Reverse output current	I_{QR}	–	–	1.5	mA	$V_Q = 5\text{ V}$; $V_I = \text{open}$

1) See diagram

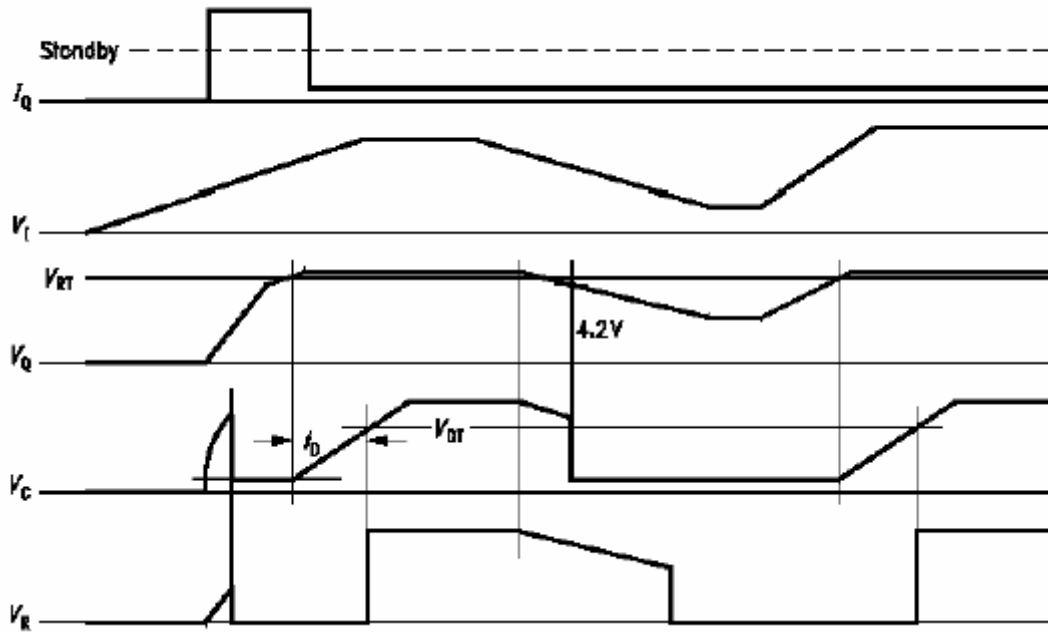
Application Circuit



Time Response

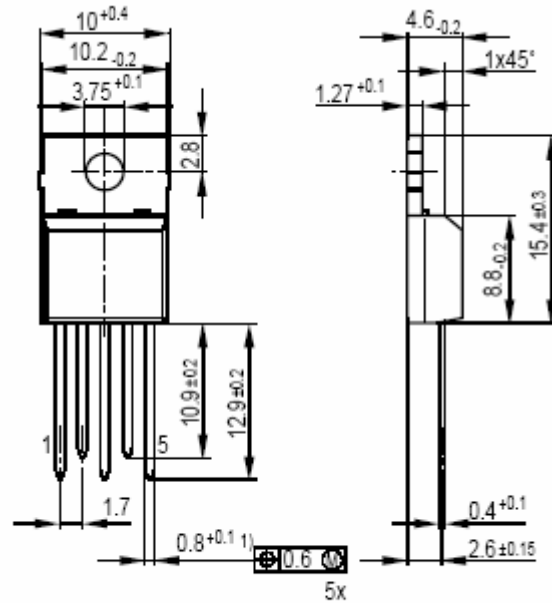


Time Response in Standby Condition



Package Dimensions

P-TO220-5-2



- 1) $1_{-0.15}$ at dam bar (max 1.8 from body)
- 1) $1_{-0.15}$ im Dichtstegbereich (max 1.8 vom Körper)

P-TO220-5-1

