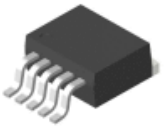
3A, 52kHz, Step-down Switching Regulator LM2576HV

FEATURES

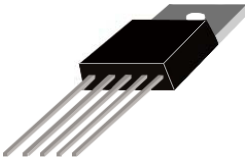
- Step-down Switching Regulator
- Adjustable Version Output Voltage Range, 1.23V to 52V ± 4% Max over Line and Load conditions
- Guaranteed Output Current of 3A
- Fixed Output Voltages : 3.3V, 5.0V, 12V and 15V
- Wide Input Voltage Range 60V
- 52 kHz Fixed Frequency Oscillator
- TTL Shutdown Capability, Low Power Standby Mode
- Requires only 4 External Components
- High Efficiency
- Use Readily Available Standard Inductors
- Available in TO-220, TO-263 and SOP-8PP Packages
- Thermal Shutdown and Current Limit Protection
- Moisture Sensitivity Level 3

SOP-8PP PKG

TO-263 PKG



TO-220 PKG



APPLICATION

- Simple high-efficiency step-down (buck) regulator
- Efficient pre-regulator for linear regulators
- On-card switching regulators
- Positive to negative converter (Buck-Boost)

ORDERING INFORMATION

Device	Package
LM2576HVDP-ADJ	SOP-8PP 8L
LM2576HVDP-X.X	
LM2576HVR-ADJ	TO-263 5L
LM2576HVR-X.X	
LM2576HVT-ADJ	TO-220 5L
LM2576HVT-X.X	

X.X = Output Voltage = 3.3, 5.0, 12, 15

DESCRIPSION

The LM2576HV series of regulators are monolithic integrated circuits that provide all the active functions for a step-down (buck) switching regulator, capable of driving 3A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3V, 5.0V, 12V, 15V and adjustable output versions.

Requiring a minimum number of external components, these regulators are simple to use and include internal frequency compensation and a fixed-frequency oscillator. The LM2576HV series offers a high-efficiency replacement for popular three-terminal linear regulators. It substantially reduces the size of the heat sink, and in some cases no heat sink is required. A standard series of inductors optimized for use with the LM2576HV are available from several different manufacturers. This feature greatly simplifies the design of switch-mode power supplies. Other features include a guaranteed ± 4% tolerance on output voltage within specified input voltages and output load conditions, and ± 10% on the oscillator frequency. External shutdown is included, featuring 50uA (typical) standby current. The output switch includes cycle-by-cycle current limiting, as well as thermal shutdown for full protection under fault conditions.

Absolute Maximum Ratings (Note 1)

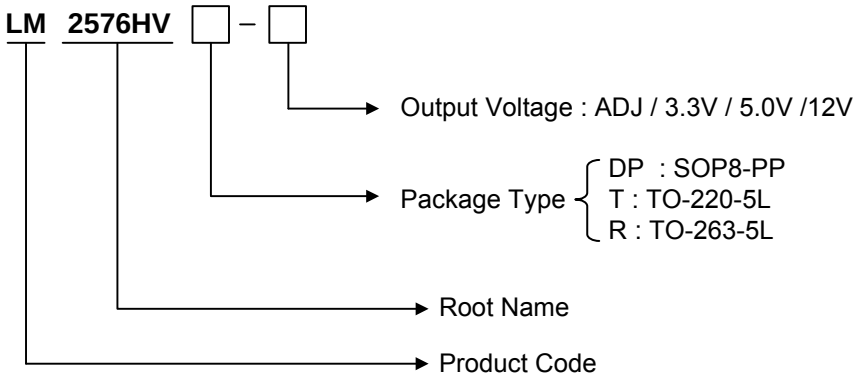
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Input Supply Voltage	V_{IN}	-	63	V
ON/OFF Pin Input Voltage		-0.3	+ V_{IN}	V
Output Voltage to Ground (Steady State)		-0.75		V
Lead Temperature (Soldering, 5 sec)	T_{SOL}		260	℃
Storage Temperature Range	T_{STG}	-65	150	℃
Maximum Junction Temperature Range	T_{JOPR}	-	150	℃

Operating Ratings

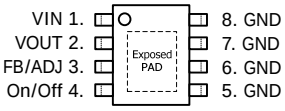
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{IN}	-	60	V
Temperature Range	T_J	-40	125	℃

Ordering Information

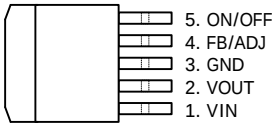
V_{OUT}	Package	Order No.	Description	Supplied As	Status
ADJ	SOP-8PP 8L	LM2576HVDP -ADJ	3A, 52kHz, Adjustable	Reel	Contact us
	TO-263 5L	LM2576HVR -ADJ	3A, 52kHz, Adjustable	Reel	Contact us
	TO-220 5L	LM2576HVT -ADJ	3A, 52kHz, Adjustable	Tube	Contact us
3.3V	SOP-8PP 8L	LM2576HVDP -3.3	3A, 52kHz, Fixed	Reel	Contact us
	TO-263 5L	LM2576HVR -3.3	3A, 52kHz, Fixed	Reel	Contact us
	TO-220 5L	LM2576HVT -3.3	3A, 52kHz, Fixed	Tube	Contact us
5.0V	SOP-8PP 8L	LM2576HVDP -5.0	3A, 52kHz, Fixed	Reel	Contact us
	TO-263 5L	LM2576HVR -5.0	3A, 52kHz, Fixed	Reel	Contact us
	TO-220 5L	LM2576HVT -5.0	3A, 52kHz, Fixed	Tube	Contact us
12V	SOP-8PP 8L	LM2576HVDP -12	3A, 52kHz, Fixed	Reel	Contact us
	TO-263 5L	LM2576HVR -12	3A, 52kHz, Fixed	Reel	Contact us
	TO-220 5L	LM2576HVT -12	3A, 52kHz, Fixed	Tube	Contact us
15V	SOP-8PP 8L	LM2576HVDP -15	3A, 52kHz, Fixed	Reel	Contact us
	TO-263 5L	LM2576HVR -15	3A, 52kHz, Fixed	Reel	Contact us
	TO-220 5L	LM2576HVT -15	3A, 52kHz, Fixed	Tube	Contact us



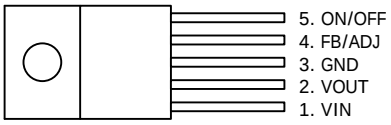
PIN CONFIGURATION



SOP-8PP



TO-263



TO-220

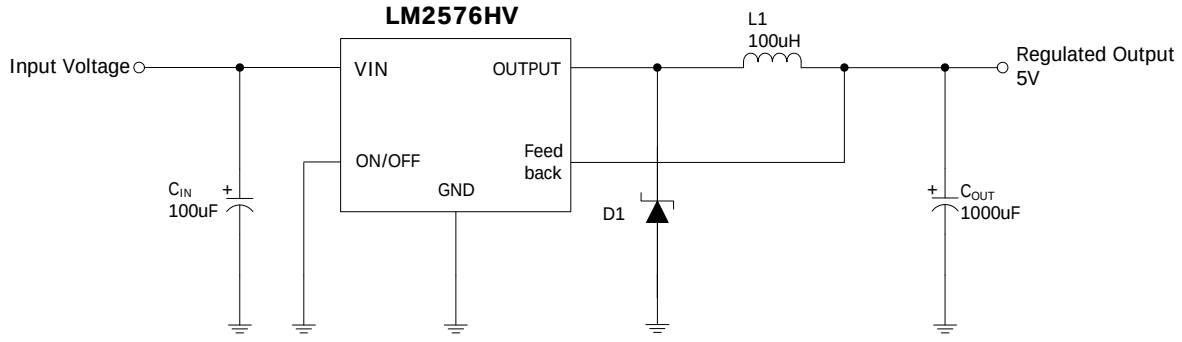
PIN DESCRIPTION

Pin No.	TO-263 / TO-220 5 LEAD		SOP-8PP 8 LEAD	
	Name	Function	Name	Function
1	VIN	Input Supply	VIN	Input Supply
2	VOUT	Output Voltage	VOUT	Output Voltage
3	GND	Ground	FB / ADJ	Output Voltage Feedback or Output Adjust
4	FB / ADJ	Output Voltage Feedback or Output Adjust	ON/OFF	ON/OFF Shutdown
5/ 6/ 7/ 8	ON/OFF	ON/OFF Shutdown	GND	Ground

* Exposed Pad of SOP8-PP package should be externally connected to GND.

TYPICAL APPLICATION

- Fixed Output Voltage Version



ELECTRICAL CHARACTERISTICS

Specifications with standard type face are for T_J = 25℃ and those with boldface type apply over full operating temperature range. Unless otherwise specified, V_{IN} =12V for the 3.3V, 5V, and Adjustable version, V_{IN} =25V for the 12V version, and V_{IN} =30V for the 15V version, I_{LOAD} =500mA.

PARAMETER	SYMBOL	TEST CONDITION (Note 2)		MIN.	TYP.	MAX.	UNIT
SYSTEM PARAMETERS (Note 3)							
Feedback Voltage	V_{FB}	LM2576HV-ADJ	V_{IN} =12V, I_{LOAD} =0.5A	1.217	1.230	1.243	V
			0.5A ≤ I_{LOAD} ≤ 3A , 8V ≤ V_{IN} ≤ 55V	1.193 **1.180**	1.230	1.273 **1.286**	V
Output Voltage	V_O	LM2576HV-3.3	V_{IN} =12V, I_{LOAD} =0.5A	3.234	3.300	3.366	V
			0.5A ≤ I_{LOAD} ≤ 3A , 6V ≤ VI_N ≤ 55V	3.168 **3.135**	3.300	3.450 **3.482**	V
		LM2576HV-5.0	V_{IN} =12V, I_{LOAD} =0.5A	4.900	5.000	5.100	V
			0.5A ≤ I_{LOAD} ≤ 3A , 8V ≤ V_{IN} ≤ 55V	4.800 **4.750**	5.000	5.225 **5.275**	V
		LM2576HV-12	V_{IN} =25V, I_{LOAD} =0.5A	11.76	12.00	12.24	V
			0.5A ≤ I_{LOAD} ≤ 3A , 15V ≤ V_{IN} ≤ 55V	11.52 **11.40**	12.00	12.54 **12.66**	V
		LM2576HV-15	V_{IN} =25V, I_{LOAD} =0.5A	14.70	15.00	15.30	V
			0.5A ≤ I_{LOAD} ≤ 3A , 18V ≤ V_{IN} ≤ 55V	14.40 **14.25**	15.00	15.68 **15.83**	V
Efficiency		LM2576HV-ADJ	V_{IN} =12V, I_{LOAD} =3A, Vo = 5V		77		%
		LM2576HV-3.3	V_{IN} =12V, I_{LOAD} =3A		75		%
		LM2576HV-5.0	V_{IN} =12V, I_{LOAD} =3A		77		%
		LM2576HV-12	V_{IN} =15V, I_{LOAD} =3A		88		%
		LM2576HV-15	V_{IN} =18V, I_{LOAD} =3A		88		%
DEVICE PARAMETERS							
Feedback Bias Current	I_b	V_O = 5V (Adjustable Version Only)			50	100 **500**	nA
Oscillator Frequency	f_O	(Note 8)		47 **42**	52	58 **63**	kHZ
Saturation Voltage	V_{SAT}	I_O = 3A (Note 4)			1.4	1.55 **1.70**	V
Max Duty Cycle(ON)	DC	(Note 5)		93	98		%
Current Limit	I_{CL}	(Note 4, 8)		4.2 **3.5**	5.8	6.9 **7.5**	A

(Continued)

PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Leakage Current	I_L	(Notes 6, 7) Output=0V			7.5		mA
Quiescent Current	I_Q	(Note 6)			5	10	mA
Standby Quiescent Current	I_{STBY}	ON/OFF Pin = 5V (OFF)	V_{IN} = 60V		50	200	uA
$\overline{ON}$/OFF CONTROL							
$\overline{ON}$/OFF Pin Logic Input Level	V_{IH}	V_O = 0V		2.2 **2.4**	1.4		V
	V_{IL}	V_O = Nominal Output Voltage			1.2	1.0 **0.8**	V
$\overline{ON}$/OFF Pin Input Current	I_{IH}	$\overline{ON}$/OFF Pin = 5V (OFF)			12	30	uA
	I_{IL}	$\overline{ON}$/OFF Pin = 0V (ON)			0	10	uA

Note 1. Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics.

Note 2. All limits guaranteed at room temperature (standard type face) and at temperature extremes (bold type face).

Note 3. External components such as the catch diode, inductor, input and output capacitors can affect switching regulator system performance. When the 2576HV is used as shown in the Figure 2 test circuit, system performance will be as shown in system parameters section of Electrical Characteristics.

Note 4. Output pin sourcing current. No diode, inductor or capacitor connected to output.

Note 5. Feedback pin removed from output and connected to 0V.

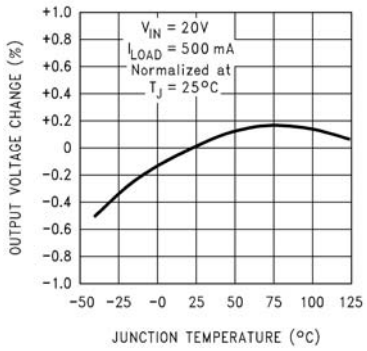
Note 6. Feedback pin removed from output and connected to +12V for the Adjustable, 3.3V, and 5V, versions, and +25V for the 12V and 15V versions, to force the output transistor OFF.

Note 7. V_{IN} =60V.

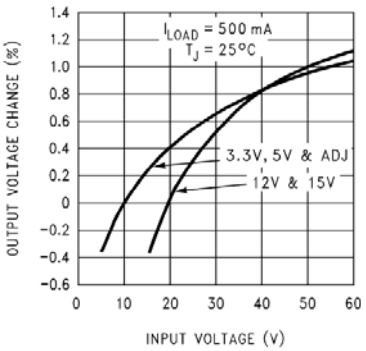
Note 8. The oscillator frequency reduces to approximately 11 kHz in the event of an output short or an overload which causes the regulated output voltage to drop approximately 40% from the nominal output voltage. This self protections feature lowers the average power dissipation of the IC by lowering the minimum duty cycle from 5% down to approximately 2%.

TYPICAL OPERATING CHARACTERISTIC

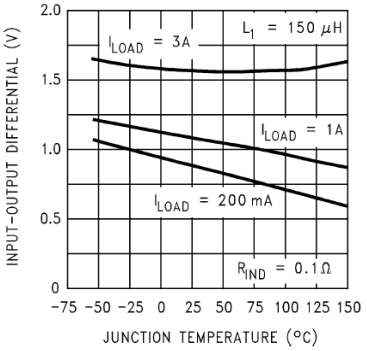
Normalized Output Voltage



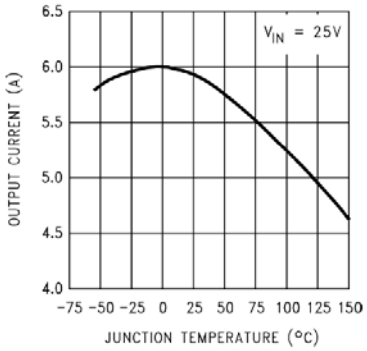
Line Regulation



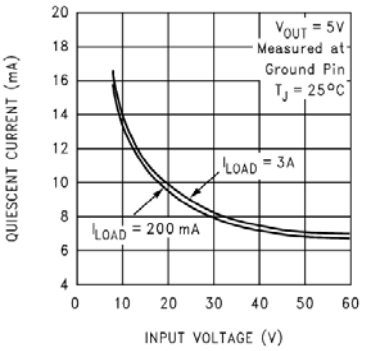
Dropout Voltage



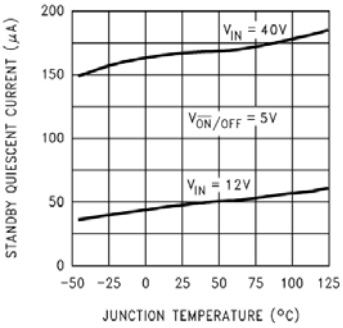
Current Limit



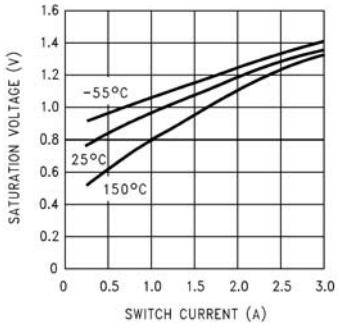
Quiescent Current



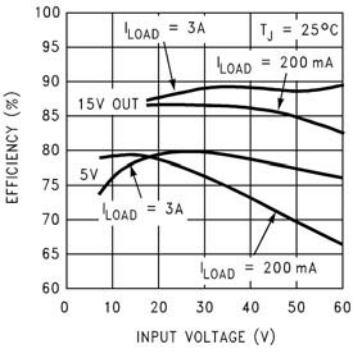
Standby Quiescent Current



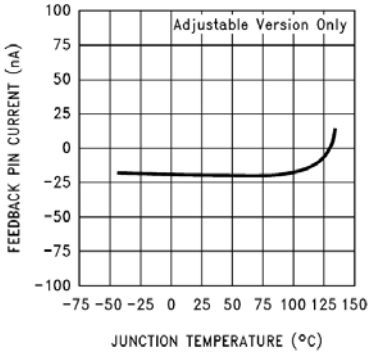
Switch Saturation Voltage



Efficiency



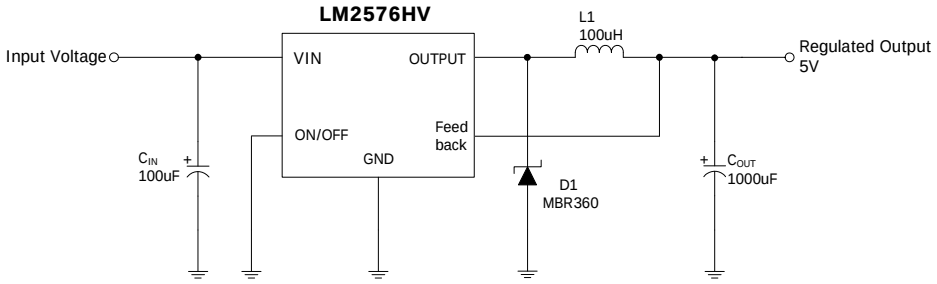
Feedback Pin Current



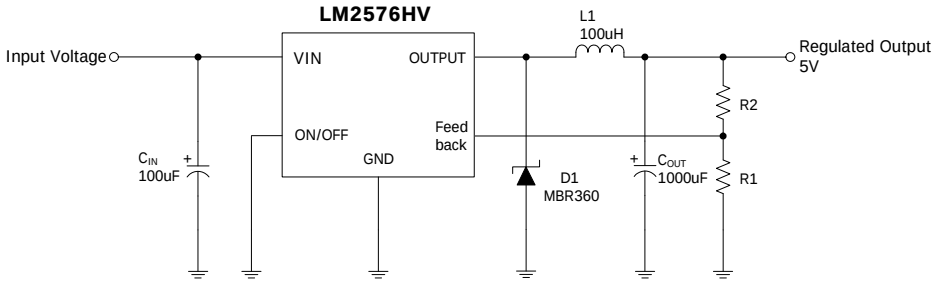
APPLICATION INFORMATION

As in any switching regulator, layout is very important. Rapidly switching currents associated with wiring inductance generate voltage transients which can cause problems. For minimal inductance and ground loops, the length of the leads indicated by heavy lines should be kept as short as possible. Single-point grounding (as indicated) or ground plane construction should be used for best results. When using the Adjustable version, physically locate the programming resistors near the regulator, to keep the sensitive feedback wiring short.

- Fixed Output Voltage Version



- Adjustable Output Voltage Version



* $V_{OUT} = V_{REF}(1+\frac{R2}{R1})$

* $R2 = R1(\frac{V_{OUT}}{V_{REF}} - 1)$

where V_{REF} = 1.23V, R1 between 1KΩ and 5KΩ.

- C_{IN} : 100uF, 75V, Aluminum Electrolytic
- C_{OUT} : 1000uF, 25V, Aluminum Electrolytic
- D1 - Schottky, MBR360
- L1 : 100uH, Pulse Eng. PE-92108
- R1 : 2K, 0.1%
- R2 : 6.12K, 0.1%

REVISION NOTICE

The description in this datasheet can be revised without any notice to describe its electrical characteristics properly.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Isolated DC/DC Converters ***category:***

Click to view products by HTC Korea ***manufacturer:***

Other Similar products are found below :

ESM6D044440C05AAQ FMD15.24G PSL486-7LR PSR152.5-7IR Q48T30020-NBB0 AVO240-48S12B-6L AVO250-48S28B-6L NAN-0505 HW-L16D JAHW100Y1 217-1617-001 22827 SPB05C-12 SQ24S15033-PS0S 18952 19-130041 CE-1003 CE-1004 GQ2541-7R PSE1000DCDC-12V RDS180245 MAU228 419-2065-201 449-2075-101 TME 0303S TME 0505S TME 1205S TME 1212S TME 2405S TME 2412S V300C24C150BG 419-2062-200 419-2063-401 419-2067-101 419-2067-501 419-2068-001 DCG40-5G DFC15U48D15 449-2067-000 XGS-0512 XGS-1205 XGS-1212 XGS-2412 XGS-2415 XKS-1215 033456 NCT1000N040R050B SPB05B-15 SPB05C-15 TME 0509S