

TOP252-262 TOPSwitch™-HX Family



Enhanced EcoSmart™, Integrated Off-Line Switcher with Advanced Feature Set and Extended Power Range

Product Highlights

Lower System Cost, Higher Design Flexibility

- Multi-mode operation maximizes efficiency at all loads
- New eSIP-7F and eSIP-7C packages
 - Low thermal impedance junction-to-case (2 °C per watt)
 - Low height is ideal for adapters where space is limited
 - Simple mounting using a clip to aid low cost manufacturing
 - Horizontal eSIP-7F package ideal for ultra low height adapter and monitor applications
- Extended package creepage distance from DRAIN pin to adjacent pin and to heat sink
- No heat sink required up to 35 W using P, G and M packages with universal input voltage and up to 48 W at 230 VAC
- Output overvoltage protection (OVP) is user programmable for latching/non-latching shutdown with fast AC reset
 - Allows both primary and secondary sensing
- Line undervoltage (UV) detection prevents turn-off glitches
- Line overvoltage (OV) shutdown extends line surge limit
- Accurate programmable current limit
- Optimized line feed-forward for line ripple rejection
- 132 kHz frequency (254Y-258Y and all E/L packages) reduces transformer and power supply size
 - Half frequency option for video applications
- Frequency jittering reduces EMI filter cost

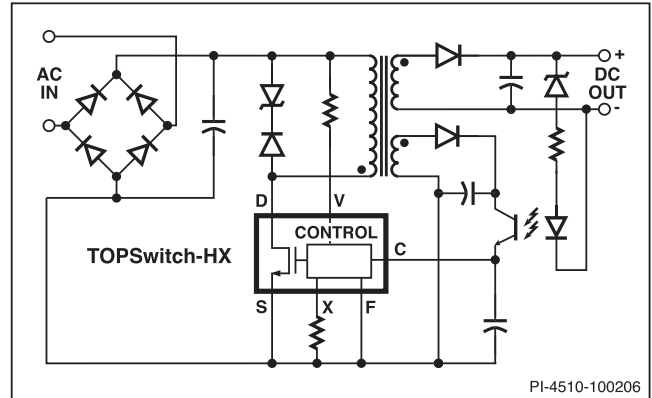


Figure 1. Typical Flyback Application.

- Heat sink is connected to SOURCE for low EMI
- Improved auto-restart delivers <3% of maximum power in short circuit and open loop fault conditions
- Accurate hysteretic thermal shutdown function automatically recovers without requiring a reset
- Fully integrated soft-start for minimum start-up stress
- Extended creepage between DRAIN and all other pins improves field reliability

Output Power Table

Product ⁵	230 VAC ±15% ⁴			85-265 VAC			Product ⁵	230 VAC ±15%		85-265 VAC	
	Adapter ¹	Open Frame ²	Peak ³	Adapter ¹	Open Frame ²	Peak ³		Adapter ¹	Open Frame ²	Adapter ¹	Open Frame ²
TOP252PN/GN	9 W	15 W	21 W	6 W	10 W	13 W	TOP252EN/EG	10 W	21 W	6 W	13 W
TOP252MN			21 W			13 W	TOP253EN/EG	21 W	43 W	13 W	29 W
TOP253PN/GN			15 W			25 W	38 W	9 W	15 W	25 W	TOP254EN/YN/EG
TOP253MN	43 W	29 W		TOP255EN/YN/EG	40 W		81 W			26 W	57 W
TOP254PN/GN	16 W	28 W	47 W	11 W	20 W	30 W	TOP255LN	40 W	81 W	26 W	57 W
TOP254MN			62 W			40 W	TOP256EN/YN/EG	60 W	119 W	40 W	86 W
TOP255PN/GN			19 W			30 W	54 W	13 W	22 W	35 W	TOP256LN
TOP255MN	81 W	52 W		TOP257EN/YN/EG	85 W		157 W			55 W	119 W
TOP256PN/GN	21 W	34 W	63 W	15 W	26 W	40 W	TOP257LN	85 W	105 W	55 W	78 W
TOP256MN			98 W			64 W	TOP258EN/YN/EG	105 W	195 W	70 W	148 W
TOP257PN/GN			25 W			41 W	70 W	19 W	30 W	45 W	TOP258LN
TOP257MN	119 W	78 W		TOP259EN/YN/EG	128 W		238 W			80 W	171 W
TOP258PN/GN	29 W	48 W	77 W	22 W	35 W	50 W	TOP259LN	128 W	162 W	80 W	120 W
TOP258MN			140 W			92 W	TOP260EN/YN/EG	147 W	275 W	93 W	200 W
										TOP260LN	147 W
							TOP261EN/YN/EG	177 W	333 W	118 W	254 W
							TOP261LN	177 W	244 W	118 W	177 W
							TOP262EN ⁶	177 W	333 W	118 W	254 W
							TOP262LN ⁶	177 W	244 W	118 W	177 W

Table 1. Output Power Table. (for notes see page 2).

EcoSmart™ – Energy Efficient

- Energy efficient over entire load range
- No-load consumption
 - Less than 200 mW at 230 VAC
- Standby power for 1 W input
 - >600 mW output at 110 VAC input
 - >500 mW output at 265 VAC input

Description

TOPSwitch-HX cost effectively incorporates a 700 V power MOSFET, high voltage switched current source, PWM control, oscillator, thermal shutdown circuit, fault protection and other control circuitry onto a monolithic device.

Notes for Table 1:

1. Minimum continuous power in a typical non-ventilated enclosed adapter measured at +50 °C ambient. Use of an external heat sink will increase power capability.
2. Minimum continuous power in an open frame design at +50 °C ambient.
3. Peak power capability in any design at +50 °C ambient.
4. 230 VAC or 110/115 VAC with doubler.
5. Packages: P: DIP-8C, G: SMD-8C, M: SDIP-10C, Y: TO-220-7C, E: eSIP-7C, L: eSIP-7F.
See part ordering information.
6. TOP261 and TOP262 have the same current limit set point. In some applications TOP262 may run cooler than TOP261 due to a lower $R_{DS(ON)}$ for the larger device.

Y Package Option for TOP259-261

In order to improve noise-immunity on large TOPSwitch-HX Y package parts, the F pin has been removed (TOP259-261YN are fixed at 66 kHz switching frequency) and replaced with a SIGNAL GROUND (G) pin. This pin acts as a low noise path for the C pin capacitor and the X pin resistor. It is only required for the TOP259-261YN package parts.

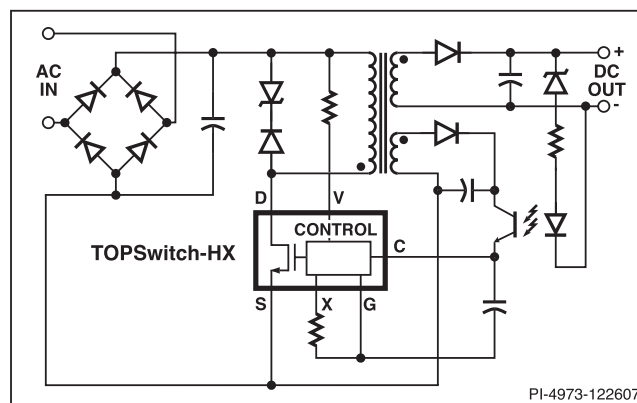


Figure 2. Typical Flyback Application TOP259YN, TOP260YN and TOP261YN.

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TOP252-262

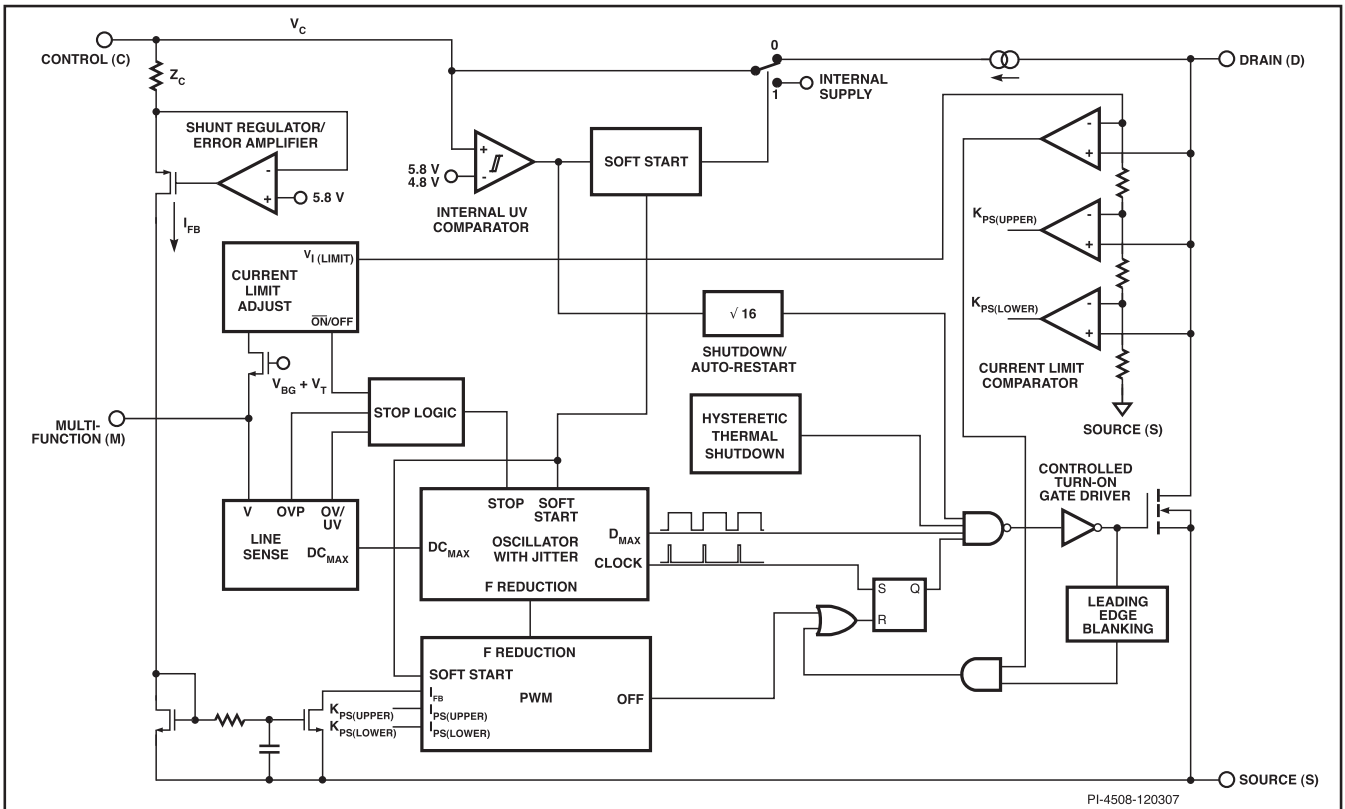


Figure 3a. Functional Block Diagram (P and G Packages).

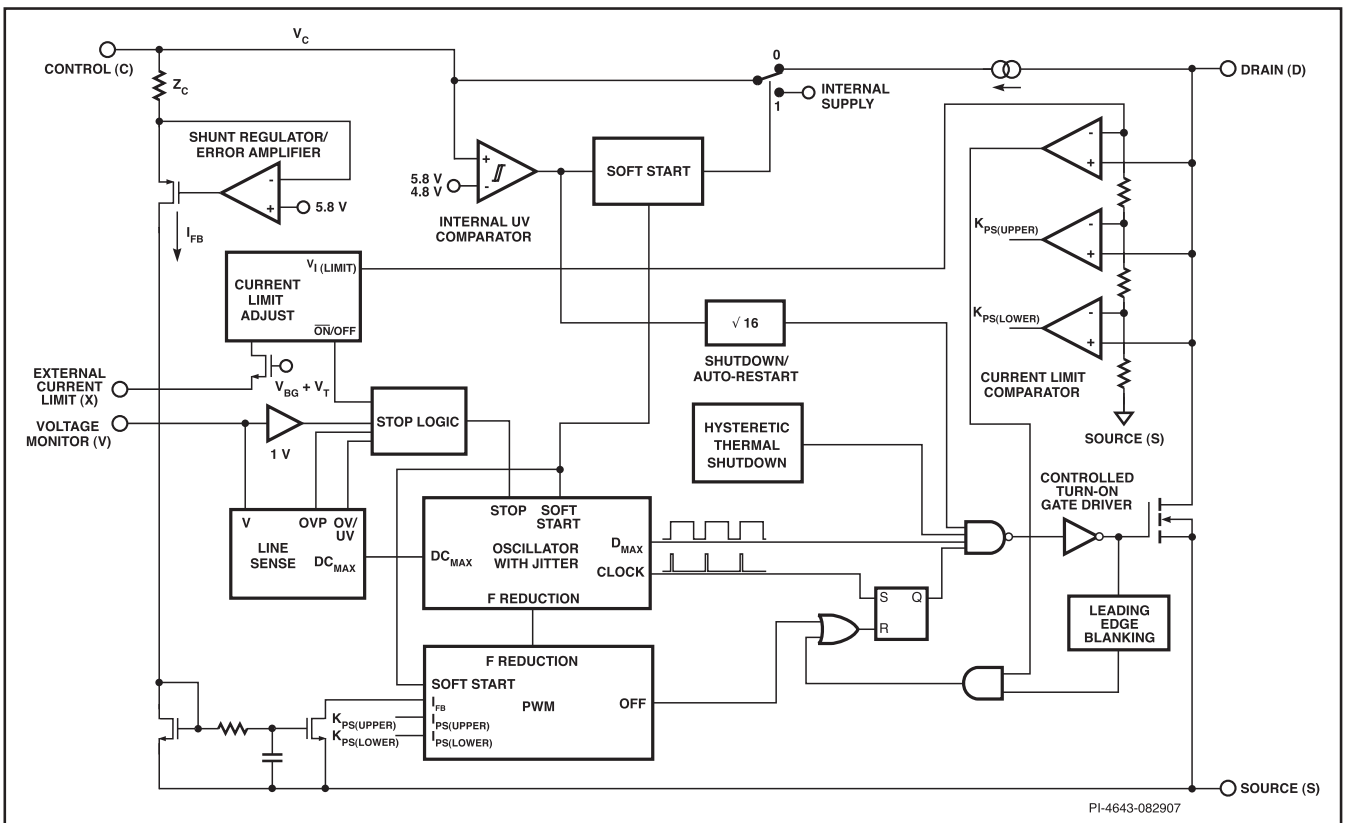


Figure 3b. Functional Block Diagram (M Package).

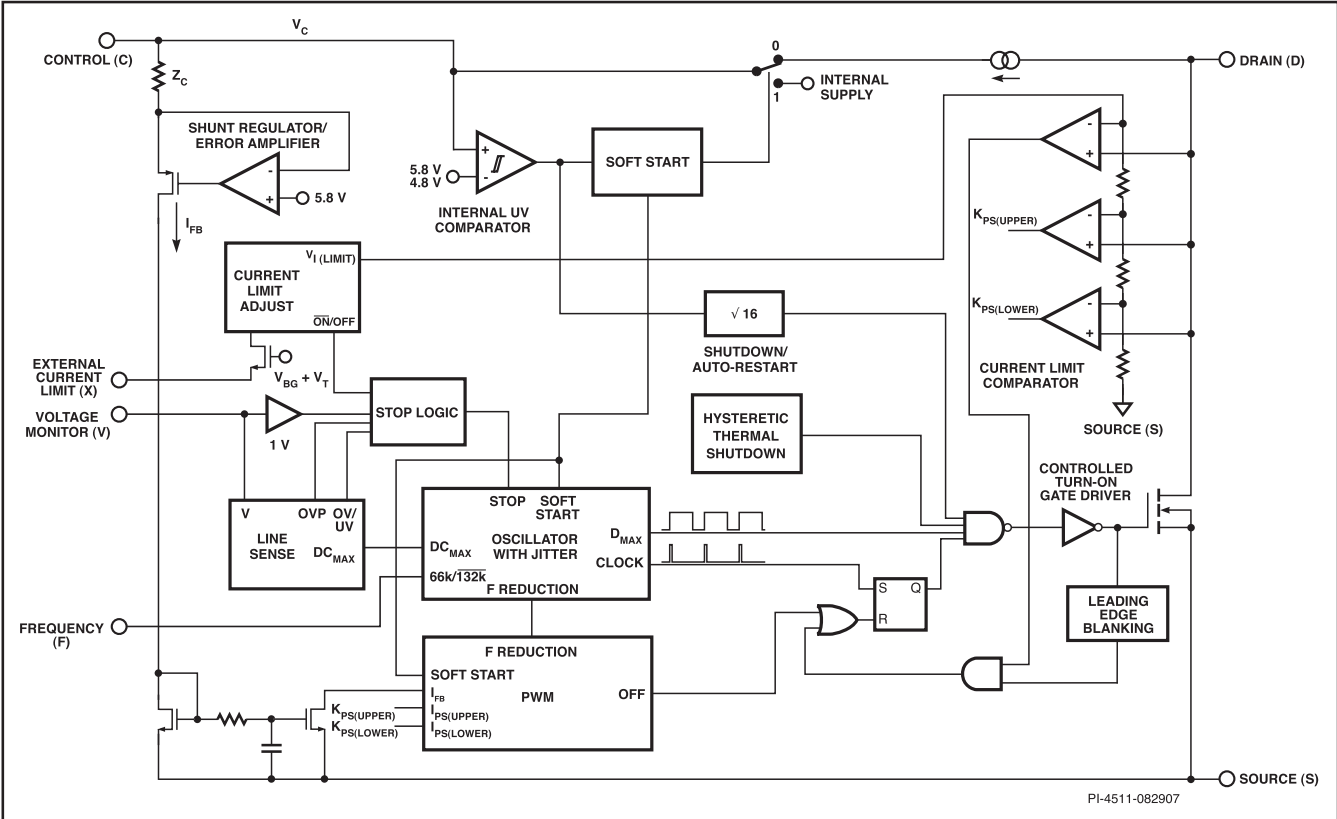


Figure 3c. Functional Block Diagram (TOP254-258 YN Package and all eSIP Packages).

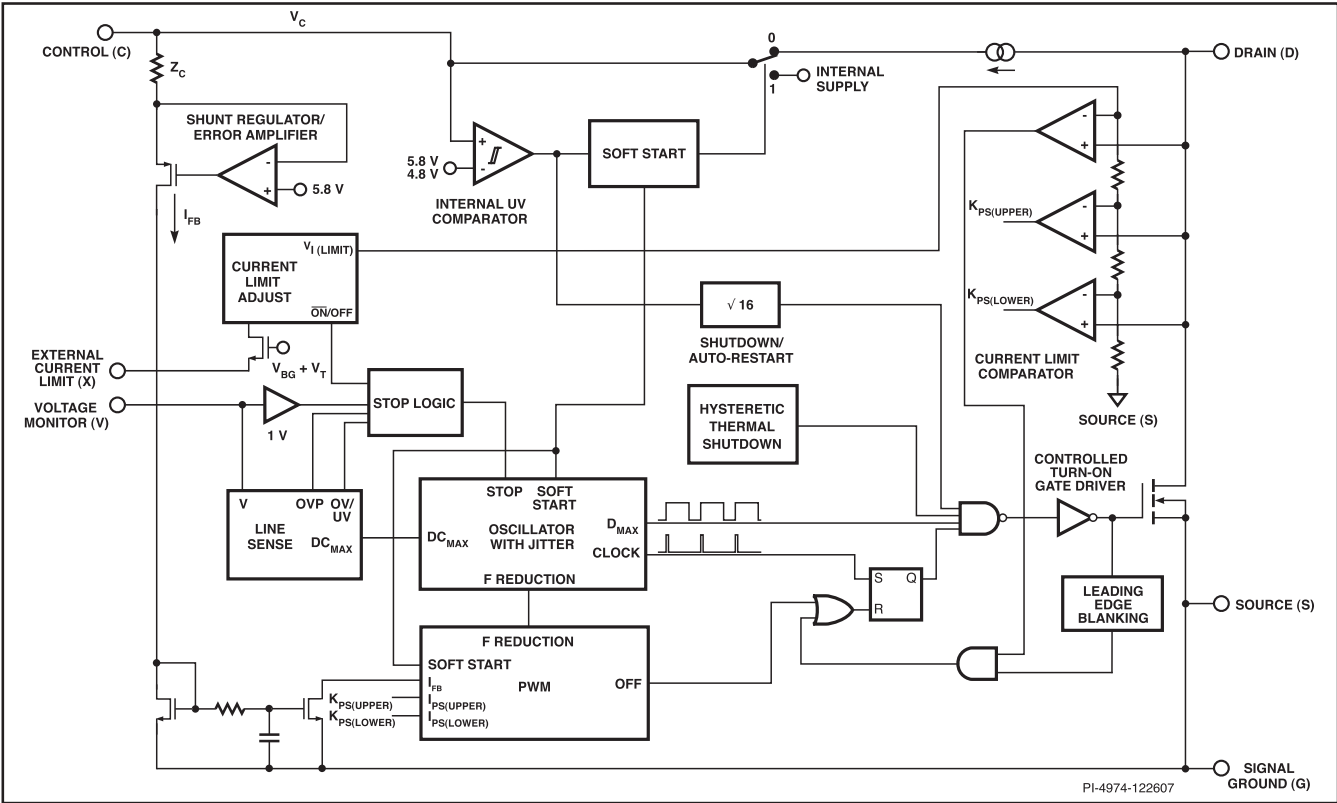


Figure 3d. Functional Block Diagram TOP259YN, TOP260YN, TOP261YN.

Pin Functional Description

DRAIN (D) Pin:

High-voltage power MOSFET DRAIN pin. The internal start-up bias current is drawn from this pin through a switched high-voltage current source. Internal current limit sense point for drain current.

CONTROL (C) Pin:

Error amplifier and feedback current input pin for duty cycle control. Internal shunt regulator connection to provide internal bias current during normal operation. It is also used as the connection point for the supply bypass and auto-restart/compensation capacitor.

EXTERNAL CURRENT LIMIT (X) Pin (Y, M, E and L package):

Input pin for external current limit adjustment and remote ON/OFF. A connection to SOURCE pin disables all functions on this pin.

VOLTAGE MONITOR (V) Pin (Y & M package only):

Input for OV, UV, line feed forward with DC_{MAX} reduction, output overvoltage protection (OVP), remote ON/OFF and device reset. A connection to the SOURCE pin disables all functions on this pin.

MULTI-FUNCTION (M) Pin (P & G packages only):

This pin combines the functions of the VOLTAGE MONITOR (V) and EXTERNAL CURRENT LIMIT (X) pins of the Y package into one pin. Input pin for OV, UV, line feed forward with DC_{MAX}

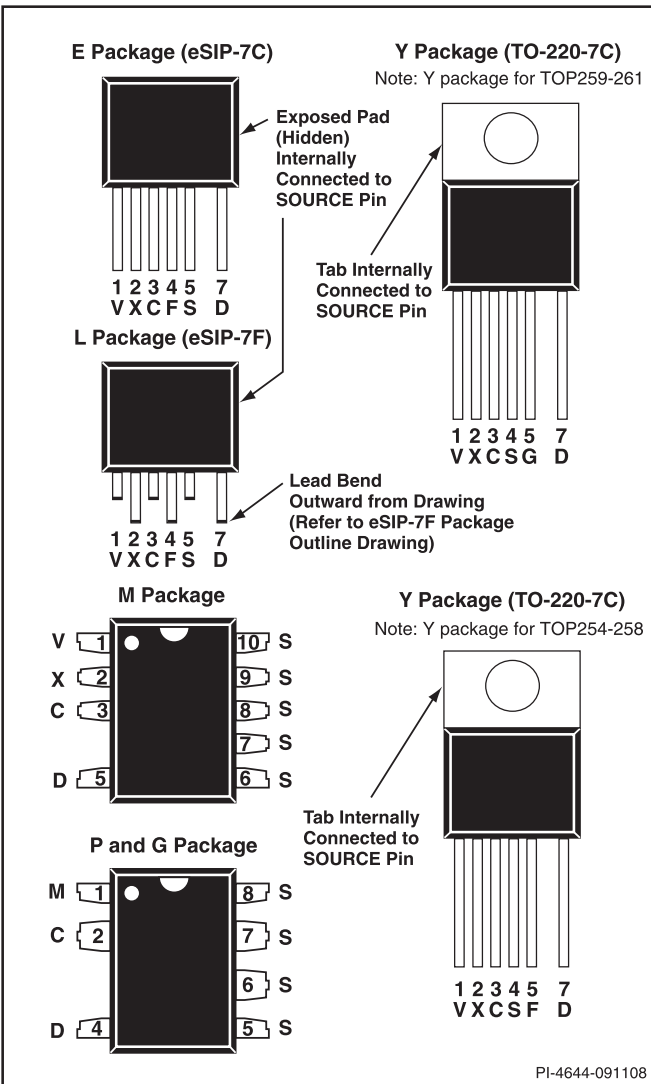


Figure 4. Pin Configuration (Top View).

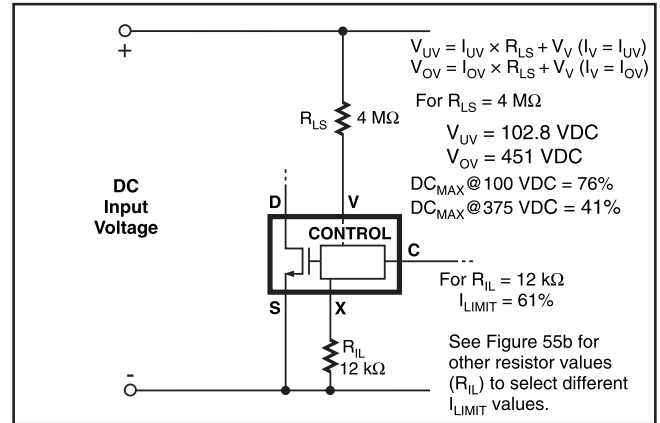


Figure 5. TOP254-258 Y and All M/E/L Package Line Sense and Externally Set Current Limit.

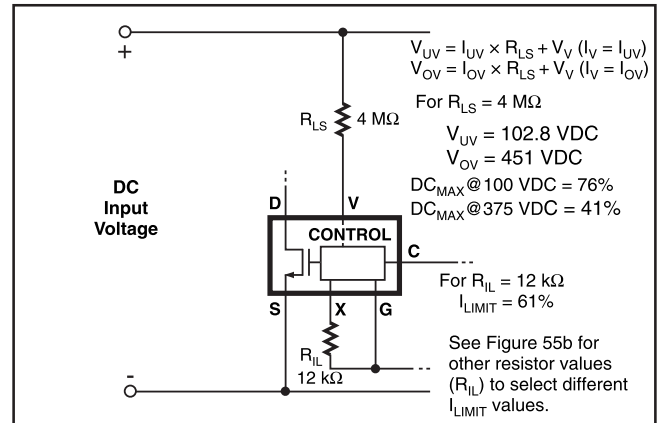


Figure 6. TOP259-261 Y Package Line Sense and External Current Limit.

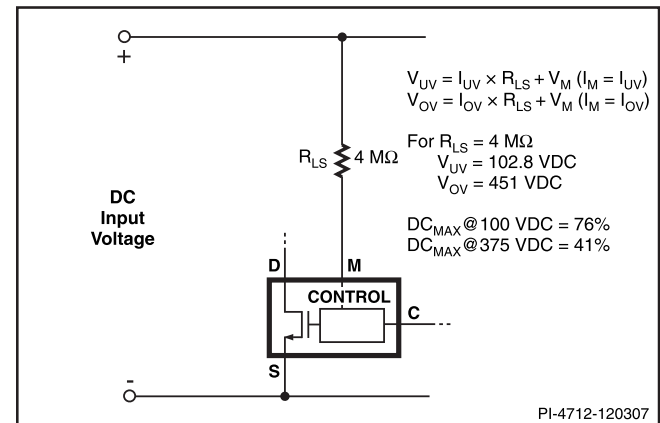


Figure 7. P/G Package Line Sense.