DESCRIPTION

JW77054C is a synchronous rectifier for Flyback converters. It integrates a 40V power MOSFET that can replace Schottky diode for high efficiency. It turns on the internal MOSFET if the V_{SW}<-400mV and turns it off before the current from GND to SW is lower than zero.

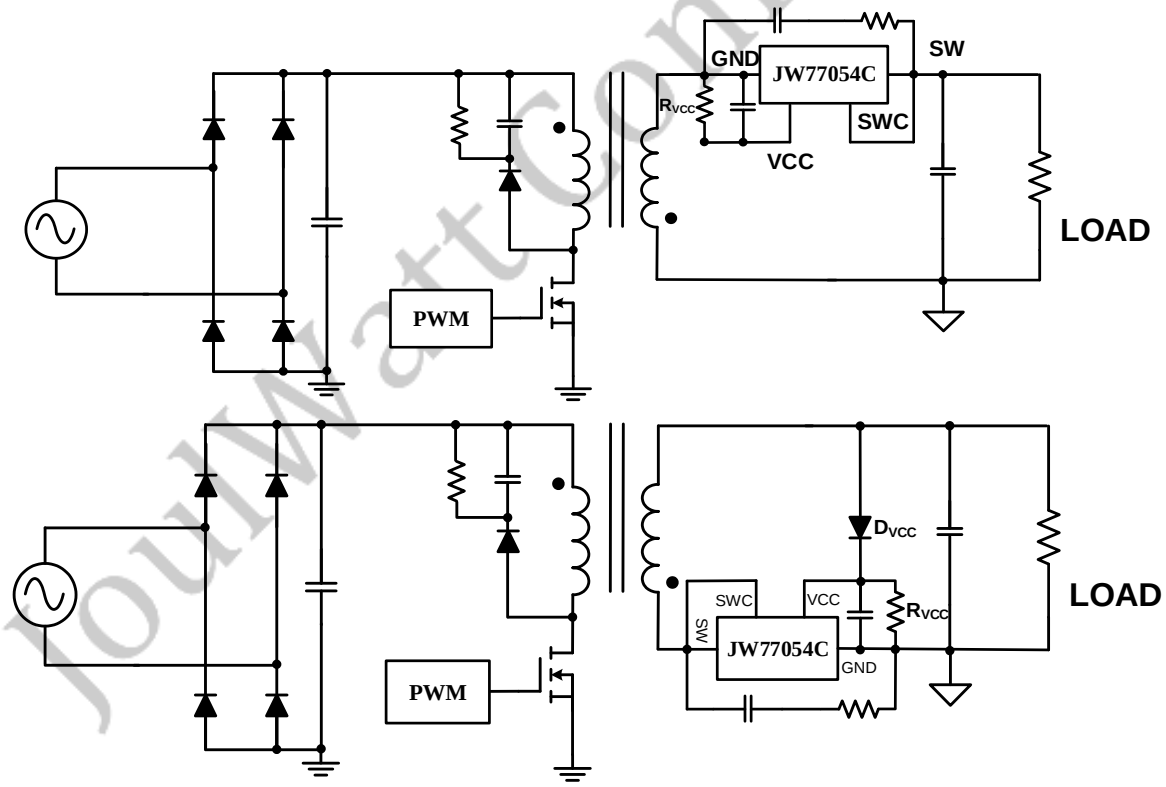
FEATURES

- Supports DCM and Quasi-Resonant Flyback converter
- Integrated 16mΩ 40V Power MOSFET
- Supports High-side and Low-side Rectification
- No need external power supply

APPLICATIONS

- Flyback converters
- Adaptors

TYPICAL APPLICATION



Note 1: R_{VCC} is recommended in case IC is damaged in CCM.
Note 2: D_{VCC} is recommended if VCC voltage is too low in light load.

ORDER INFORMATION

DEVICE1)	PACKAGE	TOP MARKING2)	ENVIRONMENTAL3)
JW77054CESOP#TR	ESOP-8	J77054B YW□□□□□	Green

Notes:

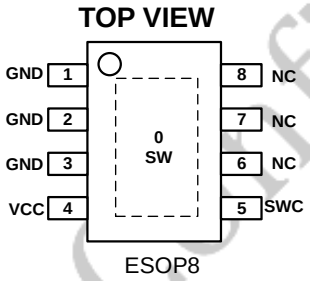
1) JW□□□□#TR
- Tape and Reel (If TR is not shown, it means Tube)
- Package Code
- Part No.

2) Line1: J □□□□□□
- Product code
- JoulWatt LOGO

Line2: YW □□□□□
- Lot number
- Week code
- Year code

3) All JoulWatt products are packaged with Pb-free and Halogen-free materials and compliant to RoHS standards.

PIN CONFIGURATION



ESOP8

ABSOLUTE MAXIMUM RATING[1)]

SW PIN 40V
SWC PIN .....-1 to 40V
VCC PIN 10V
Junction Temperature[2) 3)].....150ºC
Lead Temperature 260ºC
Storage Temperature.....-65ºC to150ºC
Continuous Power Dissipation(T_A=+25℃)[4)] ESOP-8.....2.5W

RECOMMENDED OPERATING CONDITIONS

VCC PIN.....4V to 9V
Operation Junction Temp. ..... -40ºC to 125ºC

THERMAL PERFORMANCE[5)]

	θ_{JA}	θ_{Jc}
ESOP8	50	10ºC/W

Note：

1) Exceeding these ratings may damage the device. These stress rating do not imply function operation of the device at any other conditions beyond those indicated under RECOMMENDED OPERATING CONDITIONS.

2) Continuous operation over the specified absolute maximum operating junction temperature may damage the device.

3) The device is not guaranteed to function outside of its operating conditions.

4) The maximum allowable continuous power dissipation at any ambient temperature is calculated by $P_D(MAX)=(T_J(MAX)-T_A)/\theta_{JA}$.

5) Measured on JESD51-7, 4-layer PCB.

ELECTRICAL CHARACTERISTICS

TA = 25ºC, unless otherwise stated.

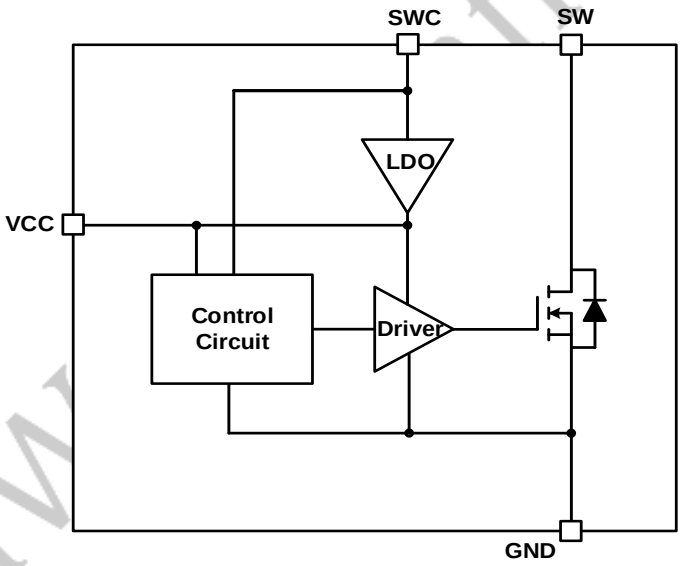
Advance Information, not production data, subject to change without notice.

Item	Symbol	Condition	Min.	Typ.	Max.	Units
VCC Section						
VCC Operation Voltage	V_{CC}	SW=30V, VCC=0.1uF	7.4	7.75	8.1	V
VCC Start up Voltage	$V_{CC\_STAR\ UP}$		3.6	3.8	4	V
VCC UVLO	V_{CC_UVLO}		3.5	3.65	3.8	V
Quiescent Current	I_Q	V_{CC}=6.5V, C_{VCC}=0.1uF	70	85	100	uA
SWC Section						
Internal MOSFET Turn on Threshold	V_{MOS_ON}			-0.4		V
Internal MOSFET Turn on Delay	T_{DON}			24		nS
Internal MOSFET Turn off Delay	T_{DOFF}			10		nS
Internal MOSFET Turn on Minimum Time[6)]	T_{ON_MIN}			1		uS
Internal MOSFET Turn off Minimum Time[6)]	T_{OFF_MIN}		2.5	3.5		uS
SW Section						
Internal MOSFET Breakdown Voltage	$V_{(BR)DSS}$	VCC=9V, I_{SW}=250uA	40			V
Internal MOSFET R_{dson}	R_{dson}	VCC=10V, Isw=1A		16		mΩ
Maximum Peak Current	I_{peak}			25		A
Drain Current-continuous	I_D			9		A

PIN DESCRIPTION

Pin No. SOP	Name	Description
0	SW	Internal Power MOSFET Drain
1、2、3	GND	Ground
4	VCC	Power supply, Bypass a capacitor between VCC and GND
5	SWC	Sense the Drain of Power MOSFET and Charge to VCC
6、7、8	NC	NC

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

Operation

JW77054C is a synchronous rectifier, it can replace the Schottky to improve the efficiency in Flyback converters. It supports operation in DCM and Quasi-Resonant Flyback converters.
It can power itself through the internal LDO during the turn-off period, a 0.1uF capacitor is needed between VCC and GND.

Turn-on Blanking Time

The control circuitry contains a blanking function. When the internal MOSFET is turned on, it at least last for some time, the turn on blanking time is about 1uS. During the turn on blanking period, the turn off threshold is not totally blanked, but changes the threshold current. This assures that the internal MOSFET can always be turned off even during the blanking period.

Under-Voltage Lockout (UVLO)

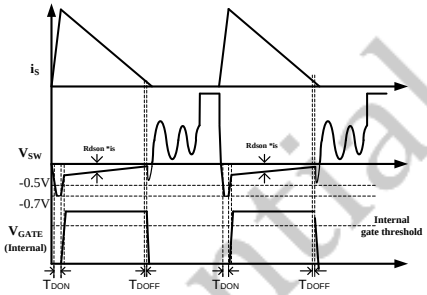
When the VCC is below UVLO threshold, the internal MOSFET is turned off and never turned on before the VCC exceeds the startup voltage.

Turn On Phase

The switch current first flows through the body diode of integrate MOSFET, which generates a negative V_{SW}. When the V_{SW} is higher than 0.7V and then V_{SW} is lower than V_{MOS_ON}, it turns on the integrate MOSFET after 24ns delay.

Turn Off Phase

The JW77054C senses the current of the internal MOSFET I_{SW}, before I_{SW} is lower than Internal MOS turn off threshold, the driver voltage of the switch is pulled down to zero after 10ns delay.



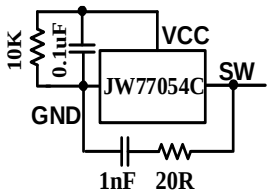
Turn on and turn off delay

Startup

During the startup period, when the VCC is lower than startup voltage, the internal MOSFET is turned off. The current flows though body diode until the VCC exceeds the startup voltage.

RC Snubber Circuit

In some applications (output short circuit protection), the inductor current may go into slight CCM condition. To avoid the voltage spike across the synchronous rectifier, we suggest RC snubber should be placed between SW and GND, and a resistor should be paralleled with VCC capacitor.



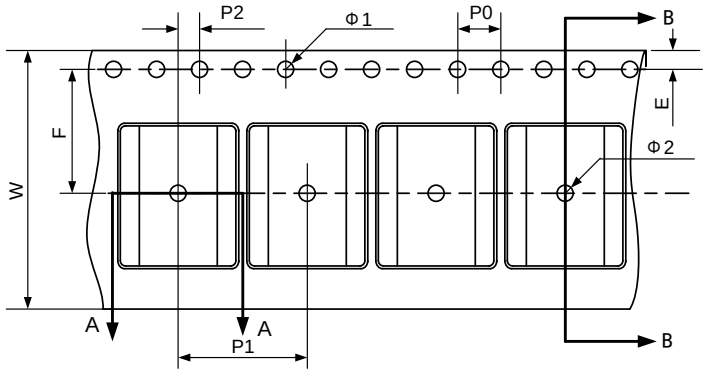
RC Snubber circuit

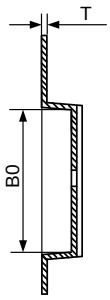
PCB Layout Guidelines

1. The VCC pin must be locally bypassed with a capacitor.

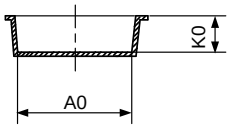
TAPE AND REEL INFORMATION

Carrier Tape UNIT: mm





SECTION B-B



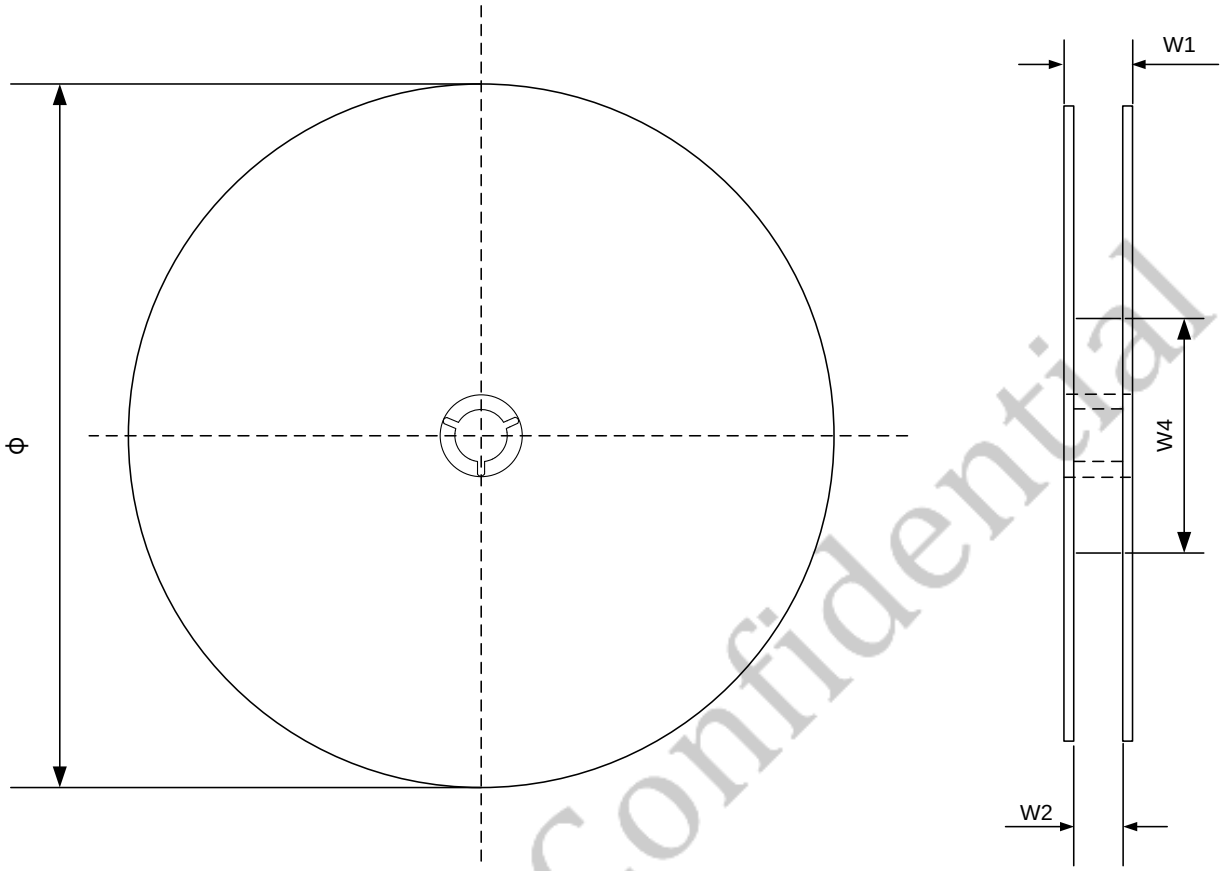
SECTION A-A

Note :

1) The carrier type is black, and colorless transparent.
2) Carrier camber is within 1mm in 100mm.
3) 10 pocket hole pitch cumulative tolerance:±0.20.
4) All dimensions are in mm.

Package	Tape dimensions (mm)											
	P0	P2	P1	A0	B0	W	T	K0	Φ1	Φ2	E	F
ESOP8	4.0±0.1	2.0±0.1	8.0±0.1	6.40±0.3	5.35±0.3	12.0±0.3	0.25±0.2	2.00±0.2	1.50min	1.50min	1.75±0.1	5.50±0.10

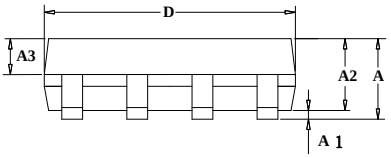
Reel UNIT: mm

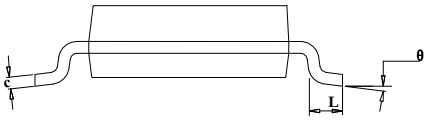


Package	Diameter Φ	Thickness W1	Width W2	W4
ESOP8	330±2	17.6±2	12.4±2	100±2

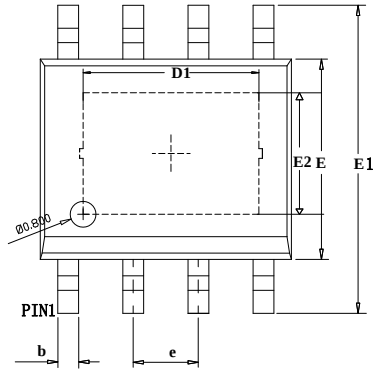
PACKAGE OUTLINE

ESOP8 UNIT: mm



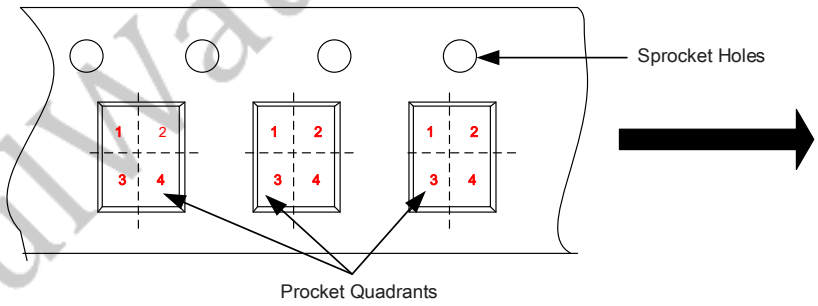


Symbol	MILLIMETER		
	MIN	NOM	MAX
A	1.30	1.50	1.70
A1	0.10	0.15	0.20
A2	1.35	1.42	1.55
A3	0.66	0.67	0.68
c	0.170	0.203	0.250
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.60	0.75
b	0.33	0.40	0.51
D	4.80	4.90	5.00
e	1.27BSC		
θ	1°	3°	5°



L/F Szie (mil)	Symbol	MILLIMETER		
		MIN	NOM	MAX
90*90	D1	2.034	2.184	2.334
	E2	2.034	2.184	2.334
95*130	D1	2.953	3.103	3.253
	E2	2.063	2.213	2.363

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPAE



Package Type	Pin1 Quadrant
ESOP8	1

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