

Preliminary Specifications Subject to Change without Notice

DESCRIPTION

JW7728H6D is a synchronous rectifier for Flyback converters. It integrates a 60V power MOSFET that can replace Schottky diode for high efficiency. It turns on the internal MOSFET if the $V_{SW} < -140\text{mV}$ and turns it off before the current from GND to SW is lower than zero.

Company's Logo is Protected, "JW" and "JOULWATT" are Registered Trademarks of JoulWatt technology Co., Ltd.

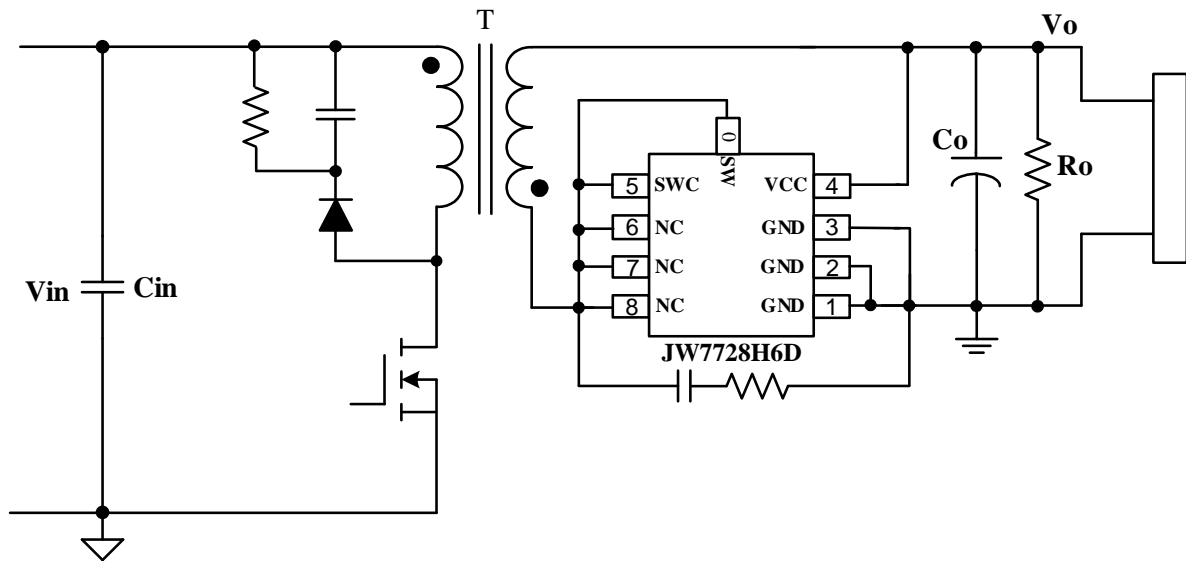
FEATURES

- Supports DCM and Quasi-Resonant Flyback Converter
- Integrated 8mΩ 60V Power MOSFET
- Supports Low-side Rectification
- No Need External Power Supply

APPLICATIONS

- Flyback Converters
- Adaptors

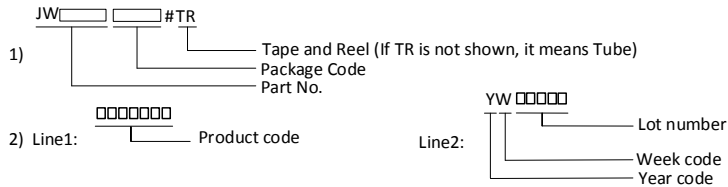
TYPICAL APPLICATION



ORDER INFORMATION

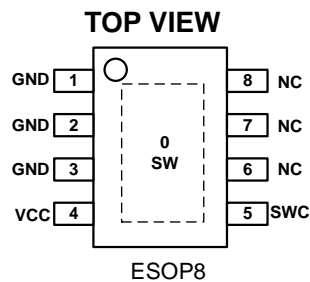
DEVICE ¹⁾	PACKAGE	TOP MARKING ²⁾	ENVIRONMENTAL ³⁾
JW7728H6DESOP#TR	ESOP-8	7728H6D YW□□□□□	Green

Notes:



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

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATING¹⁾

SW PIN	60V
SWC PIN	-1 to 60V
VCC PIN	20V
Junction Temperature ^{2) 3)}	150°C
Lead Temperature	260°C
Storage Temperature	-65°C to 150°C
Continuous Power Dissipation(T _A =+25°C) ⁴⁾ ESOP-8	2.5W

RECOMMENDED OPERATING CONDITIONS

VCC PIN.....	3.3V to 15V
SWC PIN.....	-1V to 54V
Operation Junction Temperature.....	-40°C to 125°C

THERMAL PERFORMANCE⁵⁾

	θ_{JA}	θ_{JC}
ESOP8	50	10°C/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 $P_D(\text{MAX}) = (T_J(\text{MAX}) - T_A) / \theta_{JA}$.
- 5) Measured on JESD51-7, 4-layer PCB.

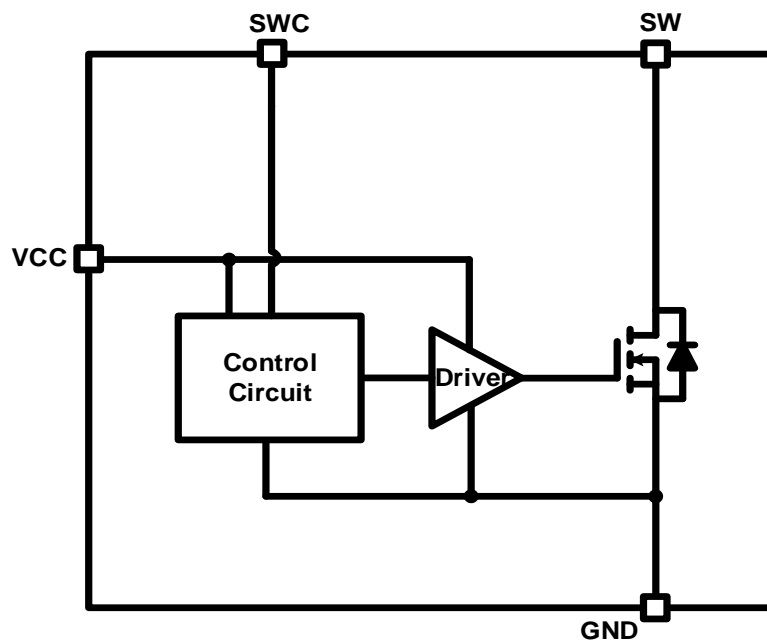
ELECTRICAL CHARACTERISTICS

<i>TA = 25°C, unless otherwise stated</i>						
<i>Advance Information, not production data, subject to change without notice.</i>						
Item	Symbol	Condition	Min.	Typ.	Max.	Units
VCC Section						
VCC Startup Voltage	V _{CC_Startup}	VCC Rising		3.0		V
VCC UVLO	V _{CC_UVLO}	VCC Falling		2.7		V
Quiescent Current	I _q	VCC=4.5V		30		uA
SWC Section						
SW Regulation Voltage	V _{MOS_REG}			-45		mV
Gate Turn On Threshold	V _{MOS_ON}			-140		mV
Gate Turn Off Threshold	V _{MOS_OFF}			-3		mV
GT Turn On Propagation Delay ⁶⁾	T _{DON_PRO}			20	30	ns
GT turn Off Propagation Delay ⁶⁾	T _{DOFF_PRO}			15	20	ns
GT Minimum On Time	T _{MIN-ON}			0.55		us
GT Minimum Off Time	T _{MIN-OFF}			2.5		us
SW Section						
Internal MOSFET Breakdown Voltage	V _{(BR)DSS}	I _{sw} =250uA	60			V
Internal MOSFET R _{dson}	R _{dson}	VGS=10V, I _{sw} =1A		8	10.5	mΩ
		VGS=4.5V, I _{sw} =1A		10.5	14	mΩ
Maximum Peak Current ⁶⁾	I _{peak}			35		A
Drain Current-continuous ⁶⁾	I _D			20		A

PIN DESCRIPTION

Pin No. ESOP8	Name	Description
0	SW	Internal Power MOSFET Drain
1、 2、 3	GND	Ground
4	VCC	Power Supply
5	SWC	Sense The Drain Of Power MOSFET
6、 7、 8	NC	No Connection

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

Operation

JW7728H6D is a synchronous rectifier controller which combined with external MOSFET can replace the Schottky Barrier Diode. It supports all operations, such as DCM, CrCM, (Quasi-Resonant) and CCM when adopted in Flyback converter.

Startup

During the startup period, when the VCC is directly charged by the output voltage (Vo) of the Flyback converter.

Once the VCC voltage exceeds $V_{CC_Startup}$, the JW7728H6D exits the UVLO. If VCC is lower than V_{CC_UVLO} , the internal MOSFET is turned off. The current flows though body diode before the VCC reaches to the startup voltage $V_{cc_startup}$.

Under-Voltage Lockout (UVLO)

When the VCC is below UVLO threshold, the internal MOSFET is turned off and pulled low internally. Once the VCC exceeds the startup voltage $V_{cc_startup}$, the parts is activated again.

Turn On Phase

When the synchronous MOSFET is conducting, current flows through the body diode of MOSFET, which generates a negative voltage V_{SW} across it. When V_{SW} is lower than V_{MOS_ON} , the part will pull the internal gate high to turn on the synchronous MOSFET after turn on delay time T_{DON_PRO} .

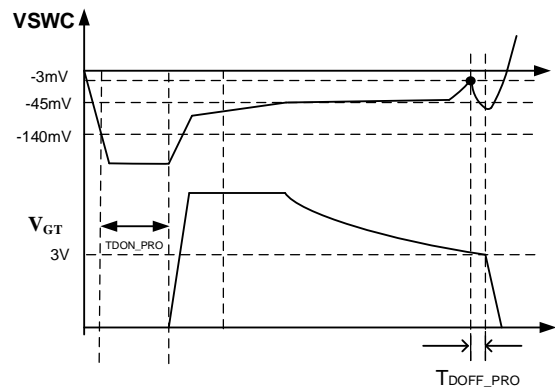


Figure-1 Turn on delay and turn off delay

Minimum On Time (MOT)

When the synchronous MOSFET is turn on, there is a minimum on time for the SR. The VSWC voltage may have a parasitic ring when the synchronous MOSFET turns on. So, a minimum on time (T_{MIN-ON}) is very important to avoid the MOSFET turn off threshold is false triggered.

Conducting Phase

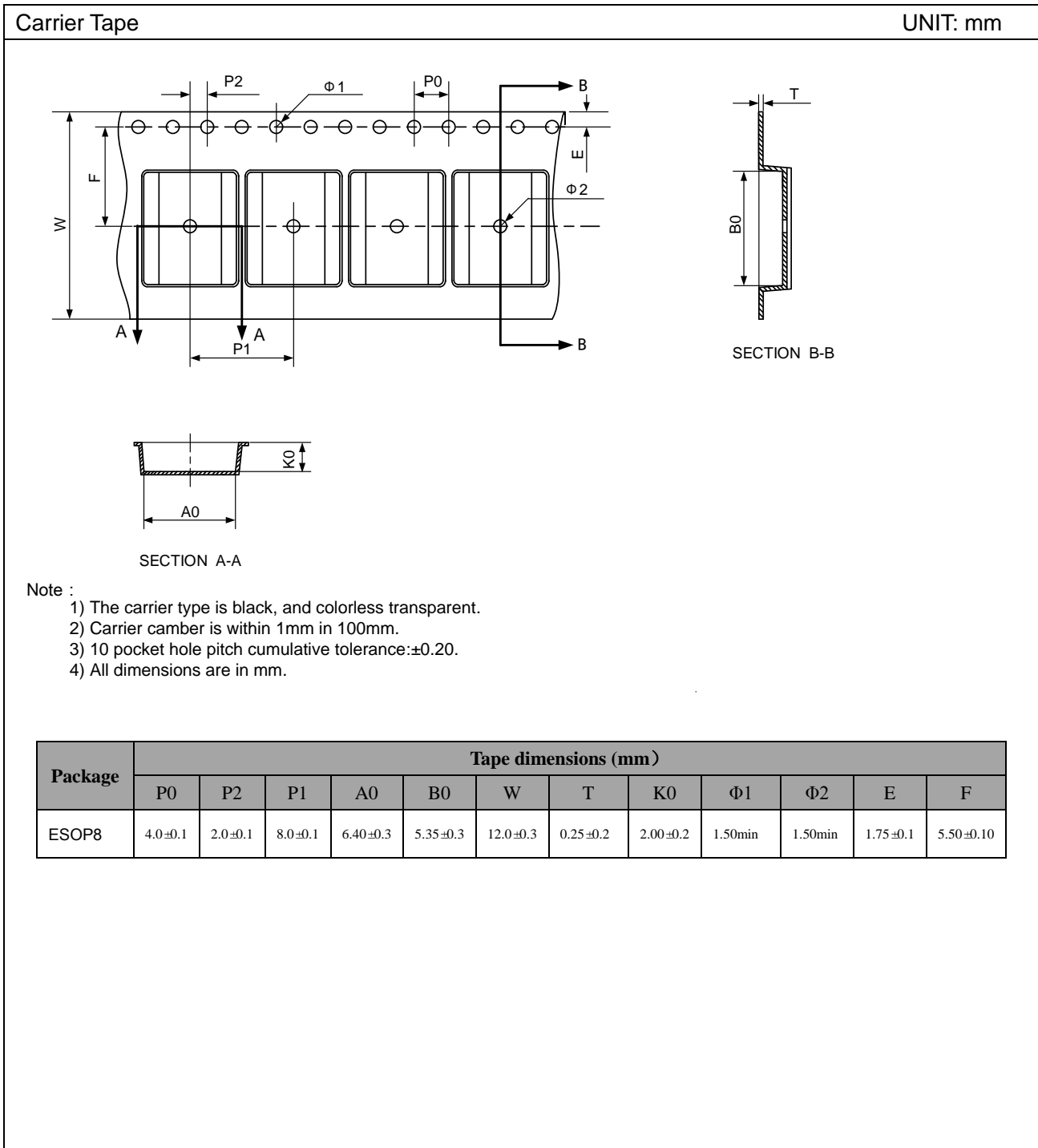
When the synchronous MOSFET is turned on, the drain source voltage VSWC it is determined by its on resistance and the current through it. The part adjusts the gate voltage and regulates the VSWC to the internal threshold (V_{MOS_REG}) after the synchronous MOSFET turn on. When the VSWC is lower than V_{MOS_REG} , the gate keeps its maximum voltage. And the synchronous MOSFET is fully on.

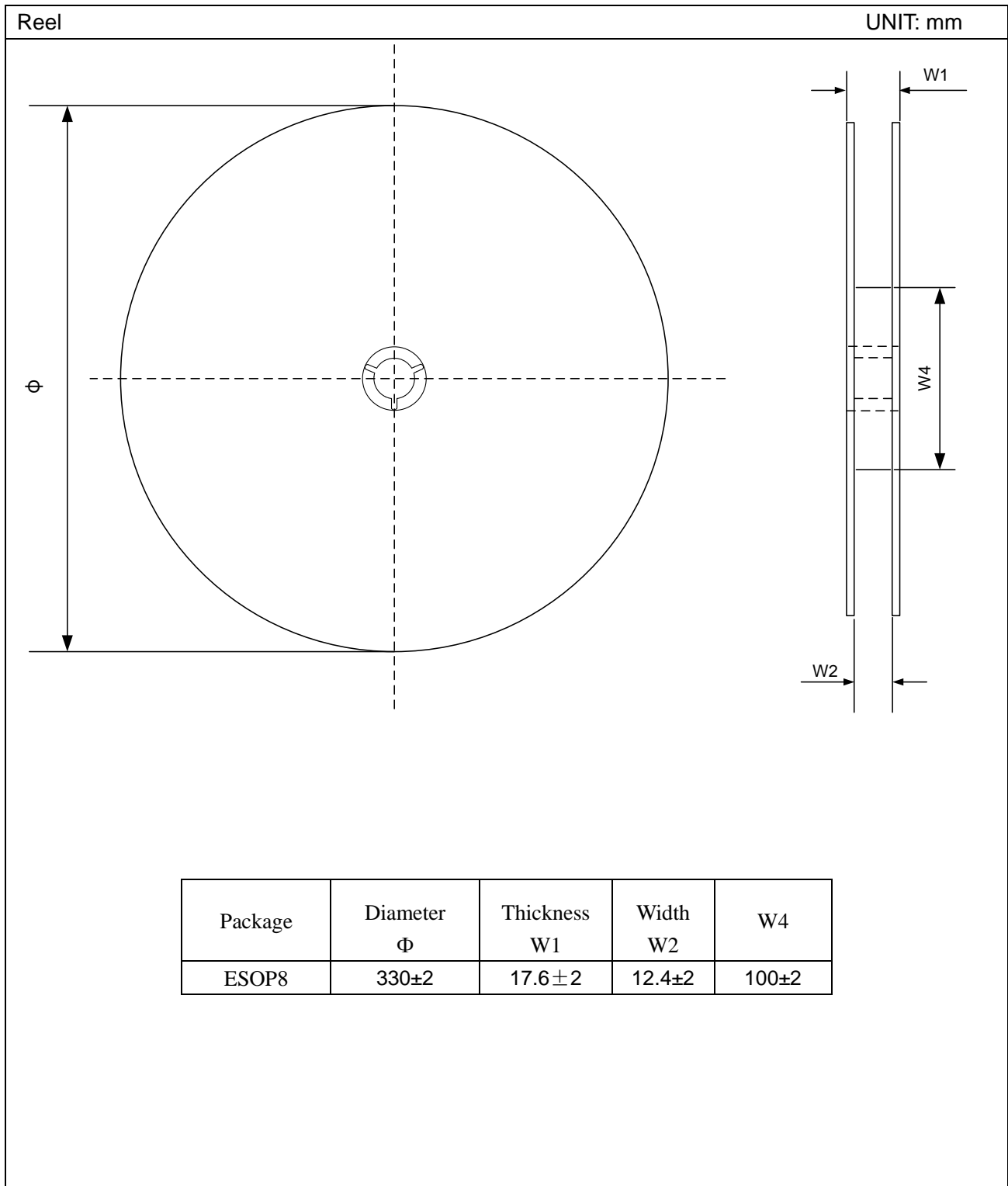
The VSWC rises when the current follow through the MOSFET decreases. The gate voltage will be decreased to increase its on resistance and regulate the Vsw around V_{MOS_REG} .

Turn Off Phase

After synchronous MOSFET conducting, once the voltage V_{SWC} touches the MOSFET turn off threshold (V_{MOS_OFF}), the gate is pulled to low after a turn off delay time T_{DOFF_PRO} . A blanking time ($T_{MIN-OFF}$) is necessary to avoid error trigger.

TAPE AND REEL INFORMATION





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

Sprocket Holes

Sprocket Quadrants

Package Type	Pin1 Quadrant
ESOP8	1

IMPORTANT NOTICE

- Joulwatt Technology Co.,Ltd reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein.
- Any unauthorized redistribution or copy of this document for any purpose is strictly forbidden.
- Joulwatt Technology Co.,Ltd does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
- JOULWATT TECHNOLOGY CO.,LTD PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION AND OTHER RESOURCES, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

Copyright © 2023 JoulWatt

All rights are reserved by Joulwatt Technology Co.,Ltd

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Switching Voltage Regulators](#) category:

Click to view products by [JoulWatt](#) manufacturer:

Other Similar products are found below :

[FAN53610AUC33X](#) [FAN53611AUC123X](#) [EN6310QA](#) [160215](#) [R3](#) [KE177614](#) [FAN53611AUC12X](#) [MAX809TTR](#) [NCV891234MW50R2G](#)
[AST1S31PUR](#) [NCP81203PMNTXG](#) [NCP81208MNTXG](#) [PCA9412AUKZ](#) [NCP81109GMNTXG](#) [NCP3235MNTXG](#) [NCP81109JMNTXG](#)
[NCP81241MNTXG](#) [NTE7223](#) [NTE7222](#) [NTE7224](#) [L6986FTR](#) [MPQ4481GU-AEC1-P](#) [MP8756GD-P](#) [MPQ2171GJ-P](#) [MPQ2171GJ-AEC1-P](#)
[NJW4153U2-A-TE2](#) [MP2171GJ-P](#) [MP28160GC-Z](#) [MPM3509GQVE-AEC1-P](#) [XDPE132G5CG000XUMA1](#) [LM60440AQRPKRQ1](#)
[MP5461GC-P](#) [IW673-20](#) [NCV896530MWATXG](#) [MPQ4409GQBE-AEC1-P](#) [S-19903DA-A8T1U7](#) [S-19903CA-A6T8U7](#) [S-19903CA-](#)
[S8T1U7](#) [S-19902BA-A6T8U7](#) [S-19902CA-A6T8U7](#) [S-19902AA-A6T8U7](#) [S-19903AA-A6T8U7](#) [S-19902AA-S8T1U7](#) [S-19902BA-A8T1U7](#)
[AU8310](#) [LMR23615QDRRRQ1](#) [LMR33630APAQRNXRQ1](#) [LMR33630APCQRNXRQ1](#) [LMR36503R5RPER](#) [LMR36503RFRPER](#)