60V N-Channel Enhancement Mode MOSFET

Description

The PECN6009SR uses advanced trench technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.

General Features

- V_{DS} =60V I_D =13A
  $R_{DS(ON)}$(Typ.)=9mΩ @V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=11mΩ @V_{GS}=4.5V
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- 100% UIS tested

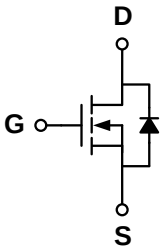
100% UIS TESTED!

100% ΔVds TESTED!

Application

- Synchronus Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive applications

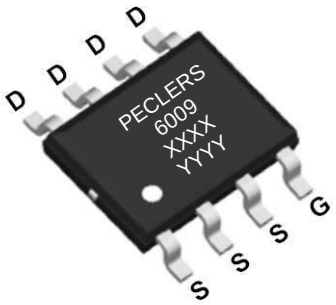
Schematic diagram



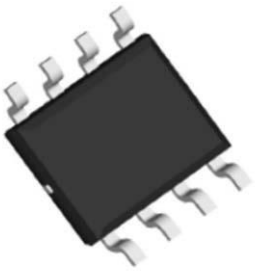
Marking and pin assignment

SOP-8

Top View



Bottom View



XXXX—Date Code

YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN6009SR	-55°C to +150°C	SOP-8	4000

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	TC=25°C	I_D	13	A
	TC=70°C		10	
Pulsed Drain Current		I_{DP}	52	A
Avalanche energy(T_j=25℃ ,V_{DD}=30V,V_G=10V,L=0.3mH,Rg=25Ω)		E_{AS}	45	mJ
Power Dissipation	TC=25°C	P_D	3	W
	TC=70°C		2.1	
Operating junction Temperature range		Tj	-55—150	℃

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	60	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	1.7	2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=13A	-	8.5	11	mΩ
		V_{GS}=4.5V, I_D=10A		10.5	13	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=13A	-	45	-	S
Diode Characteristics						
Diode Forward Voltage	V_{SD}	I_{SD}=1A,V_{GS}=0V	-	0.72	1.2	V
Diode Continuous Forward Current	I_S		-	-	13	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = I_S di/dt = 100A/μs	-	19	-	ns
Reverse Recovery Charge	Q_{rr}		-	60	-	nC
Dynamic Characteristics						
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V,f=1MHz	-	1.2	1.8	Ω
Input capacitance	C_{ISS}	V_{GS}=0V ,V_{DS}=30V f=1.0MHz	-	1100	-	pF
Output capacitance	C_{OSS}		-	310	-	
Reverse transfer capacitance	C_{RSS}		-	25	-	
Turn-on delay time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=30V, R_L=4.7Ω, R_G=3Ω	-	6.6	-	ns
Turn-on Rise time	tr		-	3.4	-	
Turn-off delay time	$t_{D(OFF)}$		-	24	-	
Turn-off Fall time	t_f		-	3	-	
Total gate charge	Q_g	V_{GS}=10V, V_{DS}=30V，I_D=13A	-	15	-	nC
Gate-source charge	Q_{gs}		-	2.6	-	
Gate-drain charge	Q_{gd}		3	3.6	-	

Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient[A]	≤ 10s	$R_{\theta JA}$	33	40	℃/W
Maximum Junction-to-Ambient[A]	Steady-State		59	75	
Maximum Junction-to-Lead[B]	Steady-State	$R_{\theta JC}$	16	24	

A:The value of R qJA is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: The R qJA is the sum of the thermal impedence from junction to lead R qJL and lead to ambient.

Typical Performance Characteristics

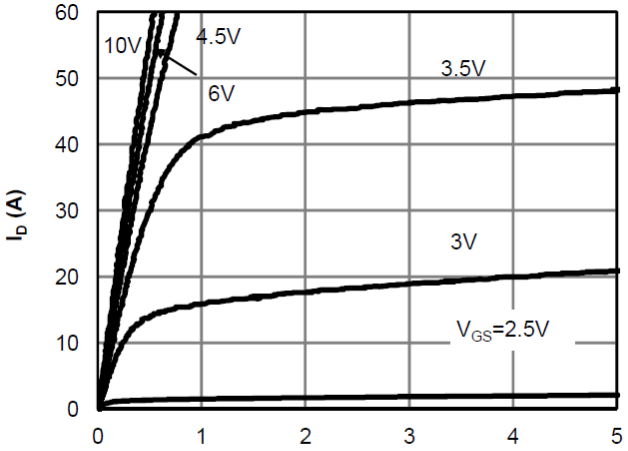


Figure 1: On-Region Characteristics

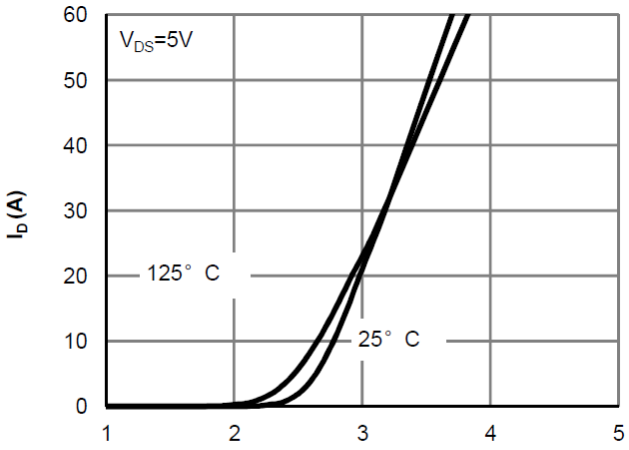


Figure 2: Transfer Characteristics

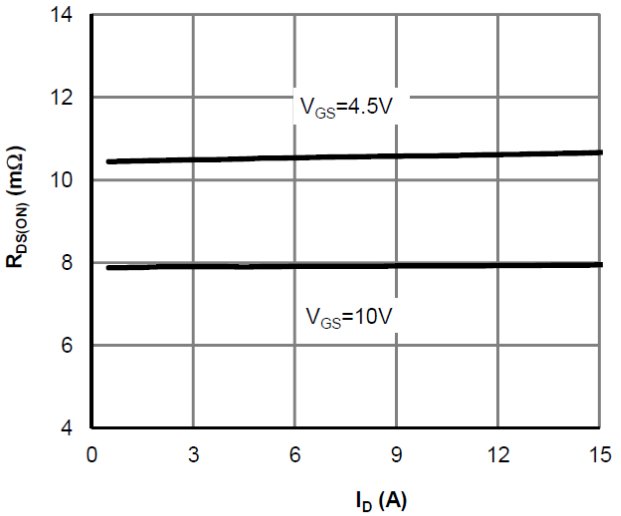


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

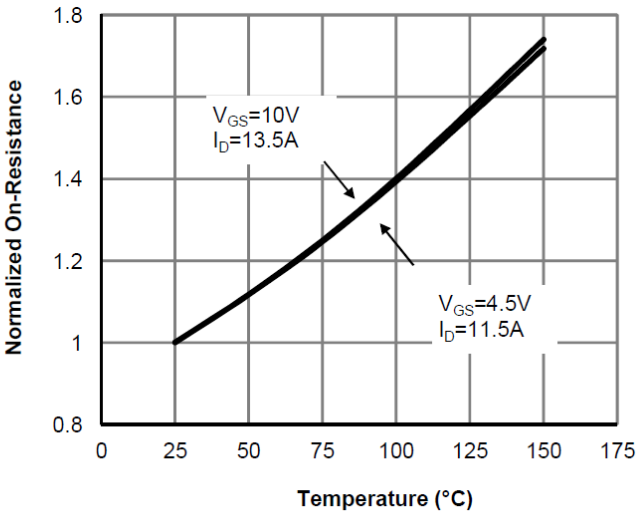


Figure 4: On-Resistance vs. Junction Temperature

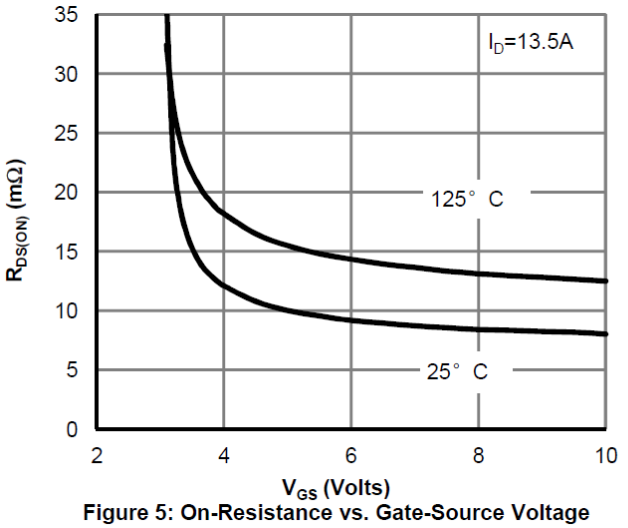


Figure 5: On-Resistance vs. Gate-Source Voltage

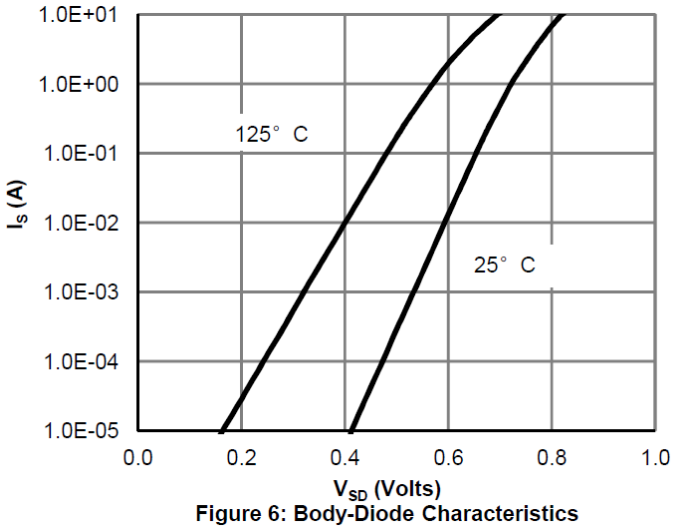


Figure 6: Body-Diode Characteristics

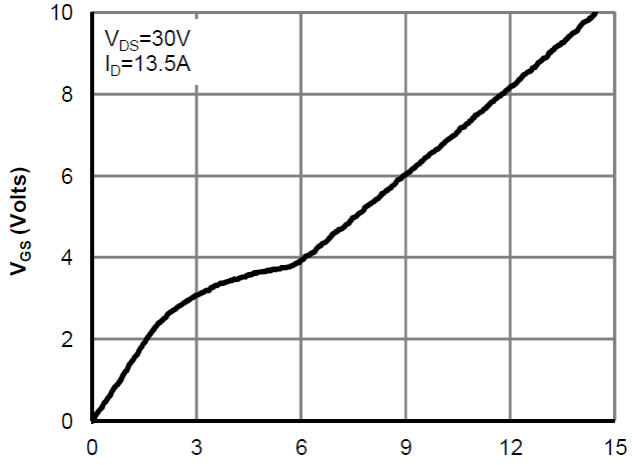


Figure 7: Gate-Charge Characteristics

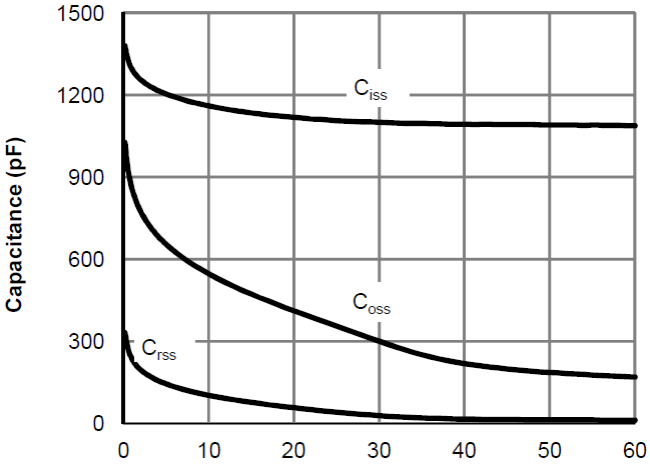


Figure 8: Capacitance Characteristics

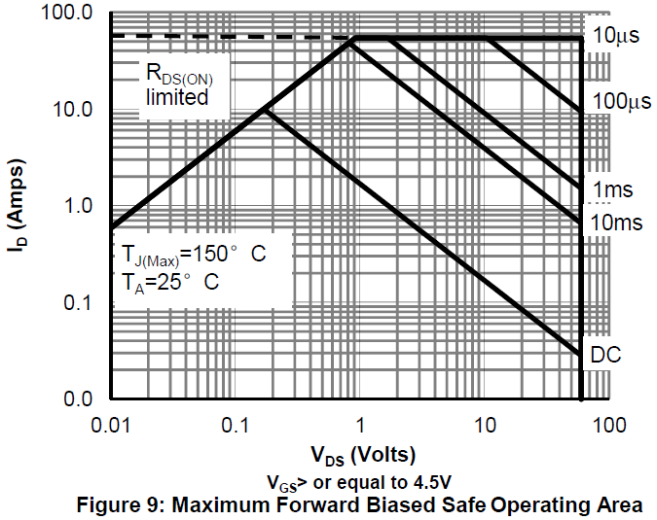


Figure 9: Maximum Forward Biased Safe Operating Area

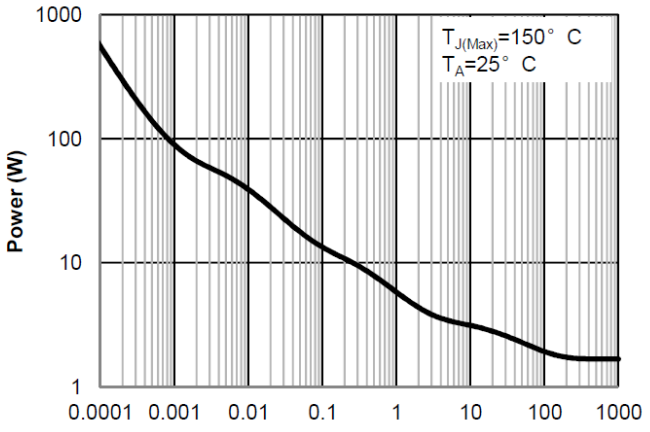


Figure 10: Single Pulse Power Rating Junction-to-Ambient

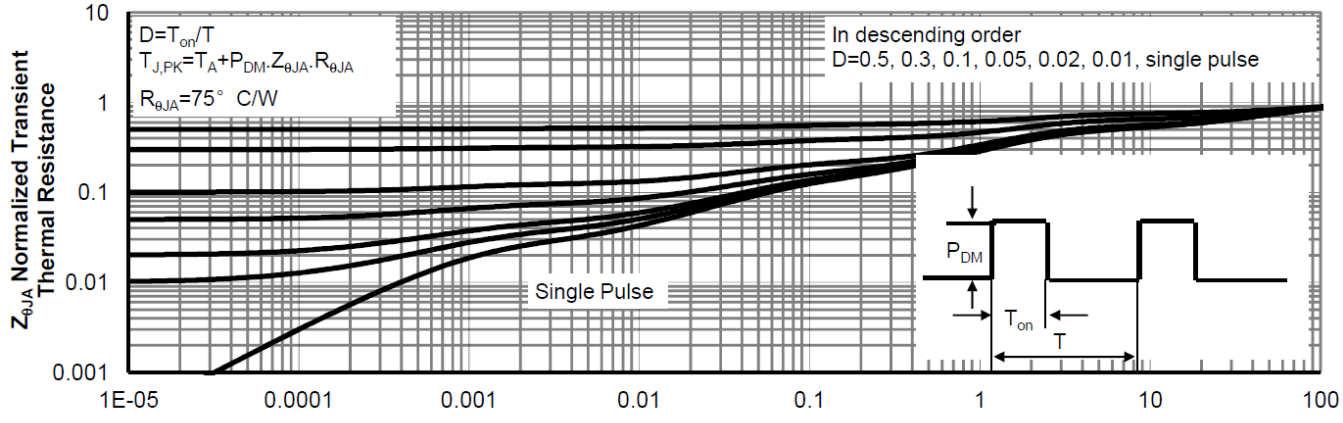
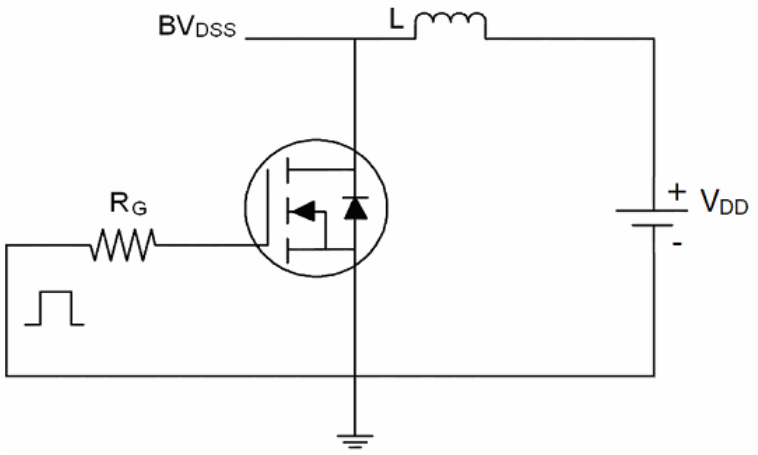


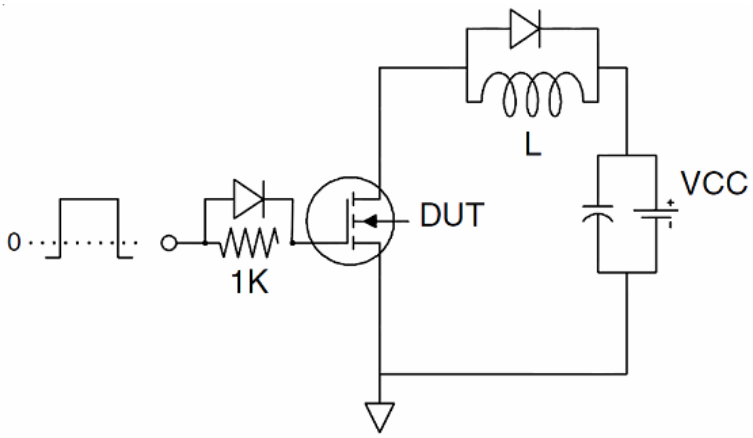
Figure 11: Normalized Maximum Transient Thermal Impedance

Test Circuit：

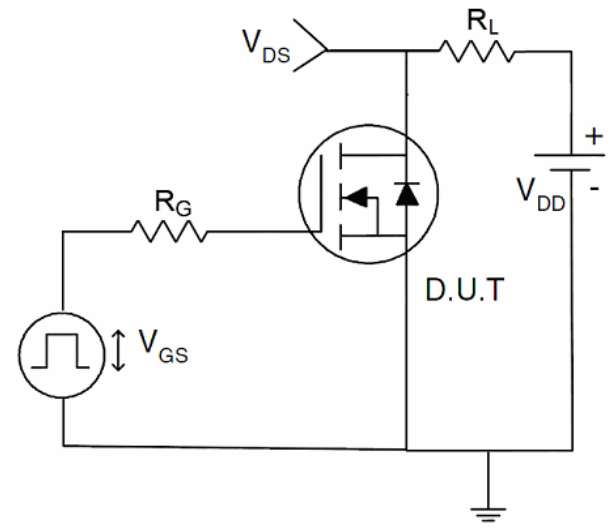
（1）、EAS Test Circuit



（2）、Gate Charge Test Circuit

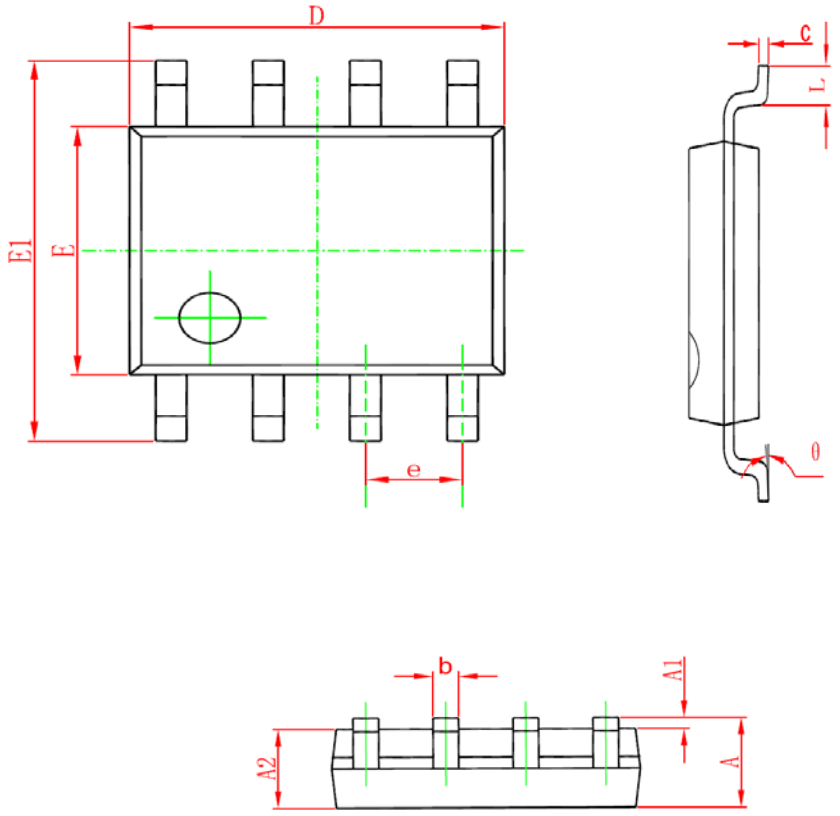


（3）、Switch Time Test Circuit



Package Information

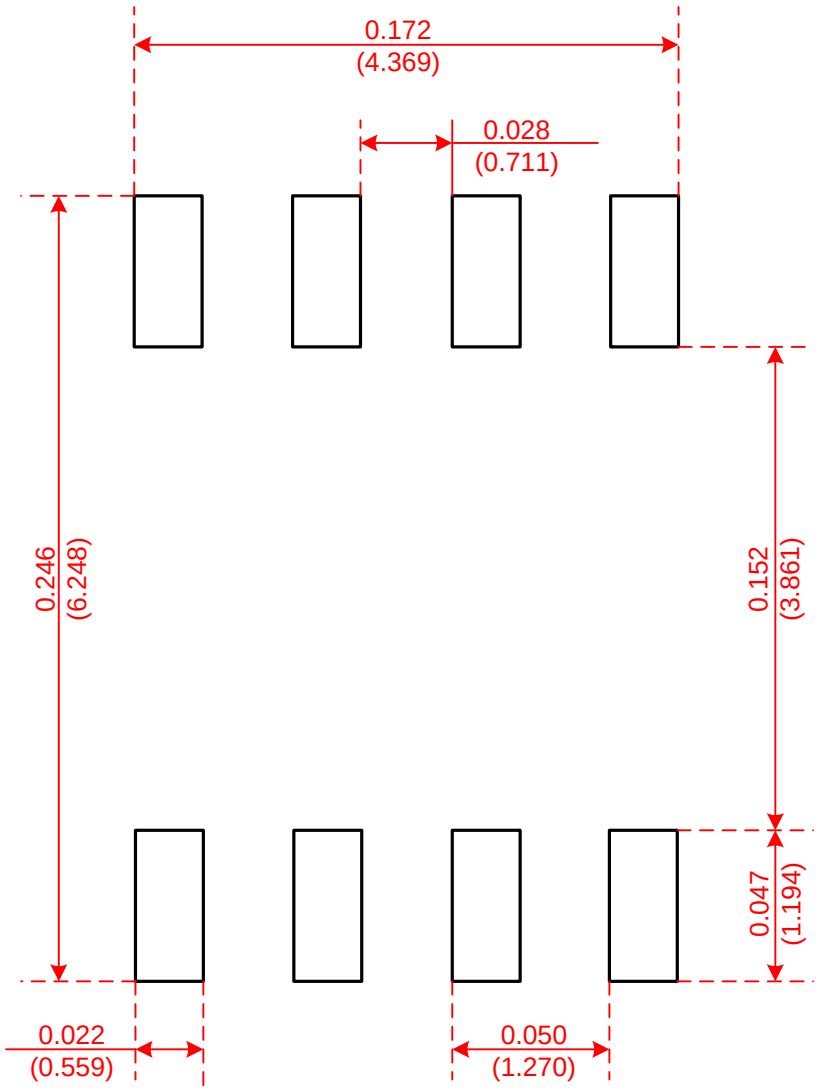
- **SOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Recommended Minimum Pads

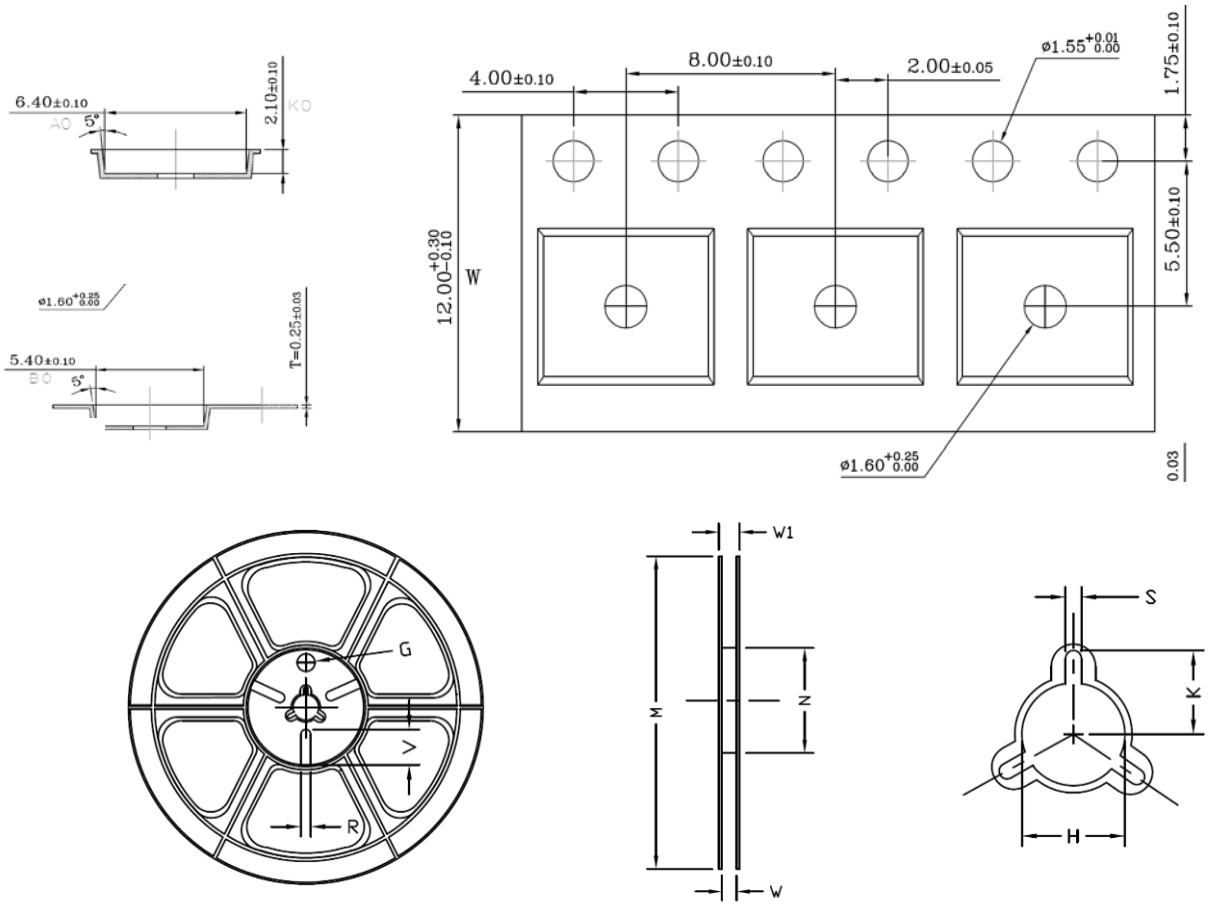
- **SOP-8**



Recommended Minimum Pads
Dimensions in Inches/(mm)

Tape and Reel

- **SOP-8**



Tape Size	Reel Size	M	N	W	W1	H	K	S	G	R	V
12mm	Φ330	Φ330.00 ±0.50	Φ97.00 ±0.30	13.00 ±0.30	17.40 ±1.00	Φ13.00 ±0.5	10.6	2.00 ±0.50	—	—	—

Unit Per Reel:
4000pcs