

40V N And P-Channel Enhancement Mode MOSFET

Description

The PECN4614 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

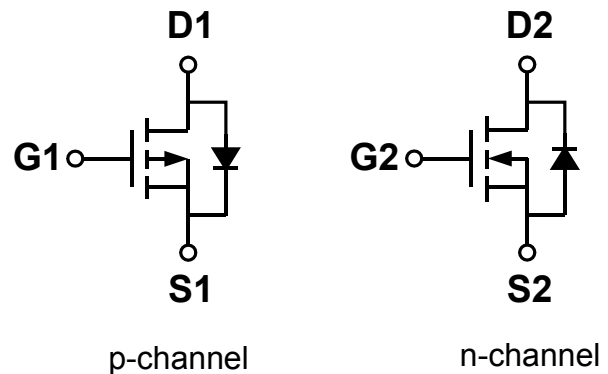
General Features

- ◆ **N-channel:**
 - $V_{DS} = 40V, I_D = 8A$
 - $R_{DS(ON)} = 16.5m\Omega$ (typical) @ $V_{GS} = 10V$
 - $R_{DS(ON)} = 19.5m\Omega$ (typical) @ $V_{GS} = 4.5V$
- ◆ **P-Channel:**
 - $V_{DS} = -40V, I_D = -6A$
 - $R_{DS(ON)} = 28m\Omega$ (typical) @ $V_{GS} = -10V$
 - $R_{DS(ON)} = 38m\Omega$ (typical) @ $V_{GS} = -4.5V$
- ◆ Excellent gate charge x $R_{DS(ON)}$ product(FOM)
- ◆ Very low on-resistance $R_{DS(ON)}$
- ◆ 150 °C operating temperature
- ◆ Pb-free lead plating
- ◆ 100% UIS tested

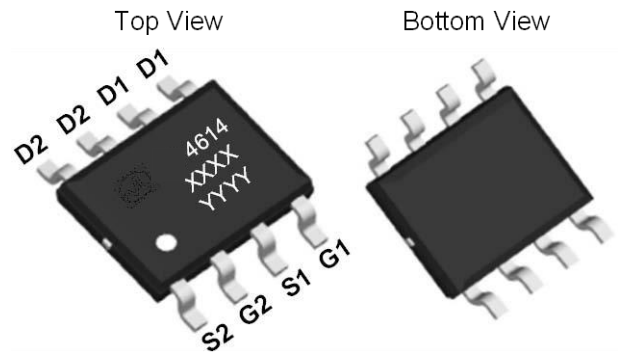
Application

- ◆ DC/DC Converter *100% UIS TESTED!*
- ◆ Ideal for high-frequency switching and synchronous rectification *100% ΔV_{ds} TESTED!*

Schematic diagram



Marking and pin assignment



Note: XXXX is the date code, YYYYY is the Quality Code.



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN4614S R-G	-55°C to +150°C	SOP-8	4000

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit		Unit
		N	P	
Drain-source voltage	V_{DS}	40	-40	V
Gate-source voltage	V_{GS}	±20	±20	V
Maximum power dissipation	P_D	2.0	2.0	W
Operating junction Temperature range	T_j	-55—150	-55—150	°C

Drain Current-Continuous (Silicon Limited)	T _A =25°C	I _D	8	-6	A
	T _A =75°C		6.5	-5	
Pulsed Drain Current (Package Limited)		I _{DM}	32	-24	A
Avalanche Current ^C		I _{AS} , I _{AR}	16	20	A
Avalanche energy L=0.1mH ^C		E _{AS} , E _{AR}	12	25	mJ
Power Dissipation ^B	T _A =25°C	P _D	2	2	W
	T _A =75°C		1.3	1.3	
Junction and Storage Temperature Range		T _J , T _{STG}	-55—150		°C

Thermal Characteristics

Parameter		Symbol	Device	Typ	Max	Unit
Maximum Junction-to-Ambient ^A	≤ 10s	R _{θJA}	n-ch	48	62.5	°C/W
Maximum Junction-to-Ambient ^A	Steady-State		n-ch	74	110	
Maximum Junction-to-Lead ^B	Steady-State	R _{θJC}	n-ch	35	50	
Maximum Junction-to-Ambient ^A	≤ 10s	R _{θJA}	p-ch	48	62.5	
Maximum Junction-to-Ambient ^A	Steady-State		p-ch	74	110	
Maximum Junction-to-Lead ^B	Steady-State	R _{θJC}	p-ch	35	50	

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 impedance from junction to lead R_{qJL} and lead to ambient.

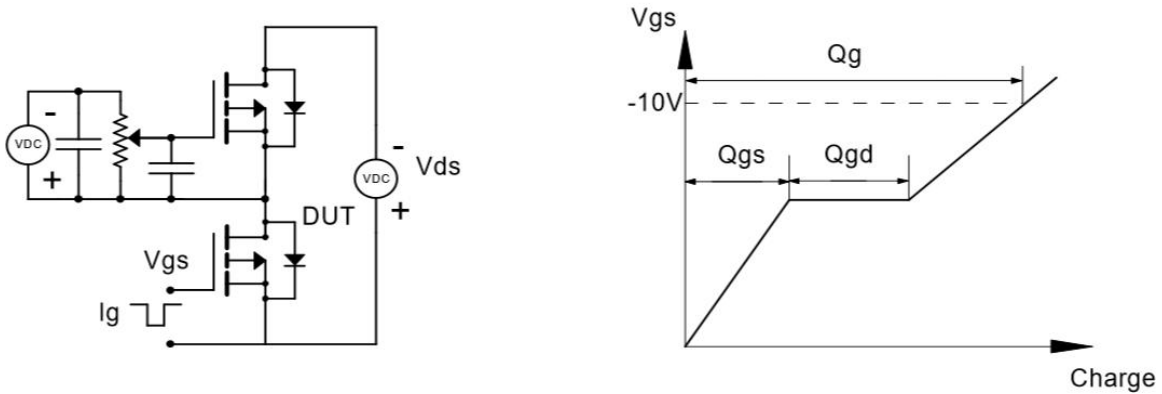
N-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
Gate-body leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.35	2.0	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =8A	-	16.5	20	mΩ
		V _{GS} =4.5V, I _D =6A	-	19.5	23	
Forward transconductance	gfs	V _{DS} =5V, I _D =8A	-	15	-	S
Dynamic Characteristics						
IPECNut capacitance	C _{ISS}	V _{DS} =20V, V _{GS} =0V f=1.0MHz	-	415	-	pF
Output capacitance	C _{OSS}		-	112	-	
Reverse transfer capacitance	C _{RSS}		-	11	-	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	-	1.1	-	Ω
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DS} =20V V _{GS} =10V R _L =1.8Ω R _{GEN} =3Ω	-	4	-	ns
Rise time	t _r		-	3	-	
Turn-off delay time	t _{D(OFF)}		-	15	-	
Fall time	t _f		-	2	-	
Total gate charge	Q _g	V _{DS} =20V, I _D =8A V _{GS} =10V	-	6.5	-	nC
Gate-source charge	Q _{gs}		-	1.2	-	
Gate-drain charge	Q _{gd}		-	1.1	-	

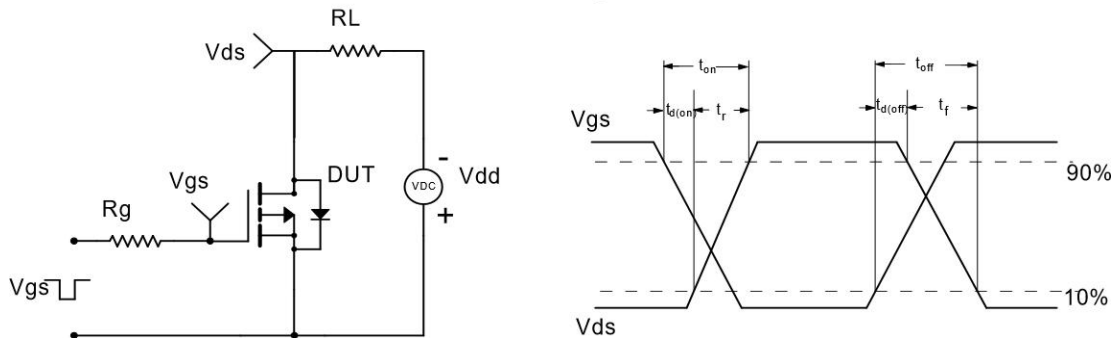
P-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V	-	-	-1	μA
Gate-body leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.35	-2.0	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-6A	-	28	32	mΩ
		V _{GS} =-4.5V, I _D =-5A	-	38	46	
Forward transconductance	gfs	V _{DS} =-5V, I _D =-6A	-	18	-	S
Dynamic Characteristics						
IPECNut capacitance	C _{ISS}	V _{DS} =-20V, V _{GS} =0V f=1.0MHz	-	1040	-	pF
Output capacitance	C _{OSS}		-	180	-	
Reverse transfer capacitance	C _{RSS}		-	125	-	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	-	4	-	Ω
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DS} =-20V V _{GS} =-10V R _L =2.3Ω R _{GEN} =3Ω	-	10	-	ns
Rise time	t _r		-	5.5	-	
Turn-off delay time	t _{D(OFF)}		-	3.6	-	
Fall time	t _f		-	4.6	-	
Total gate charge	Q _g	V _{DS} =-20V, I _D =-6A V _{GS} =-10V	-	19	-	nC
Gate-source charge	Q _{gs}		-	3.6	-	
Gate-drain charge	Q _{gd}		-	4.6	-	

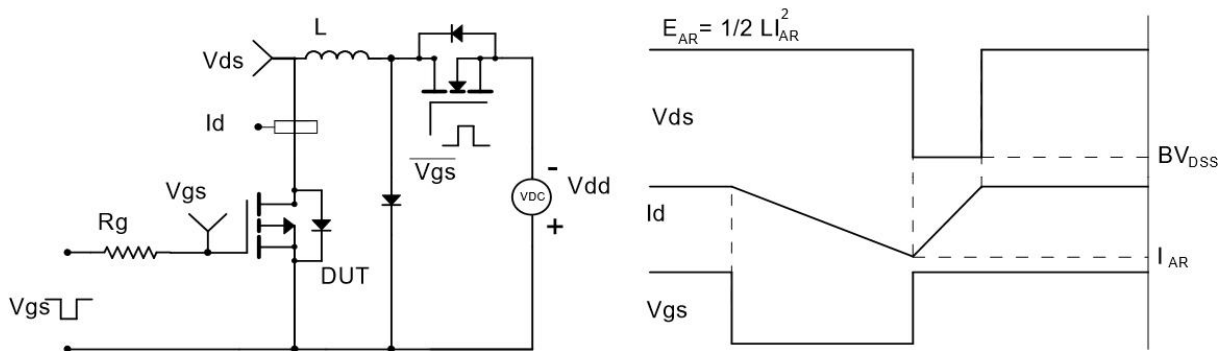
Gate Charge Test Circuit & Waveform



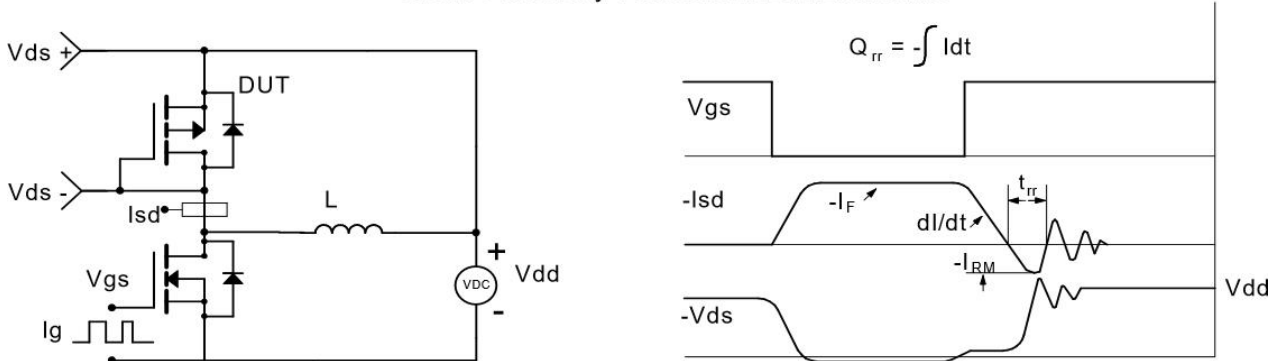
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

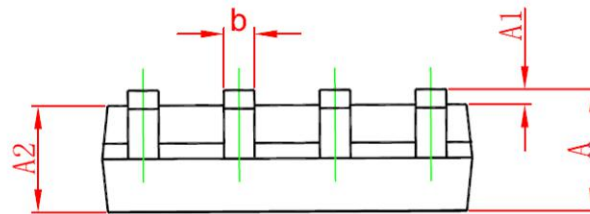
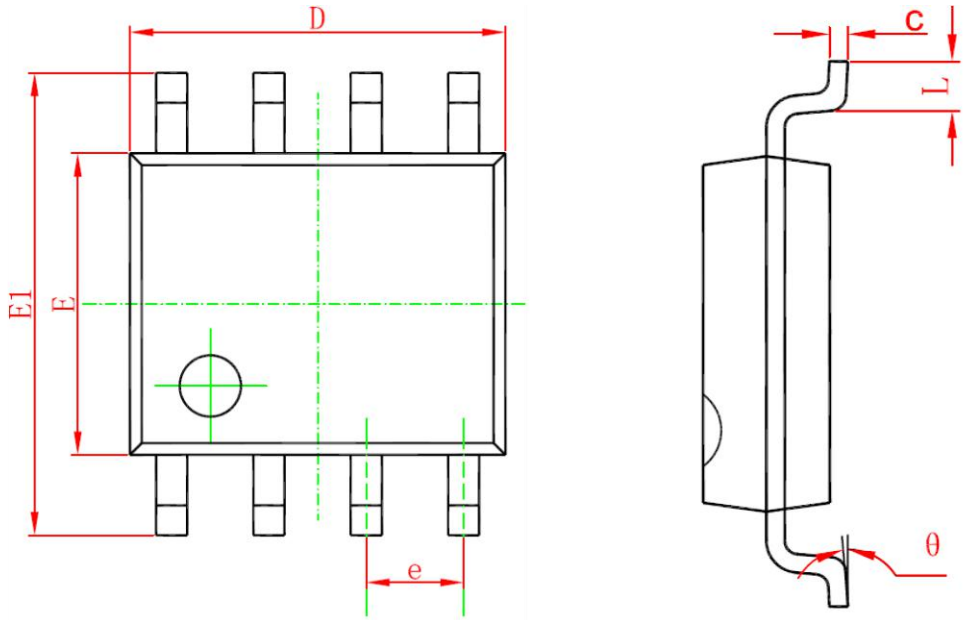


Diode Recovery Test Circuit & Waveforms



Package Information

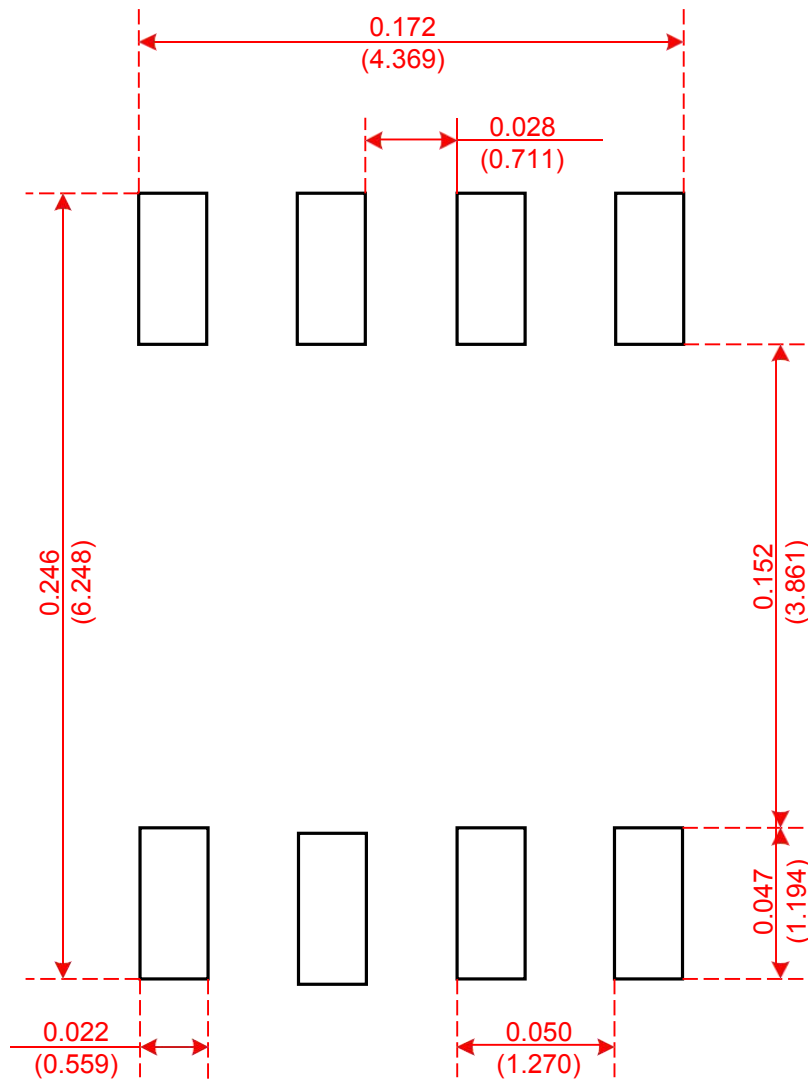
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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	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

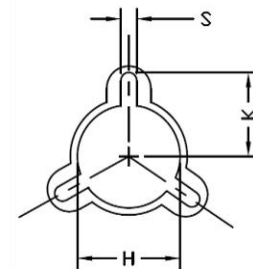
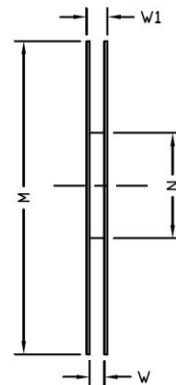
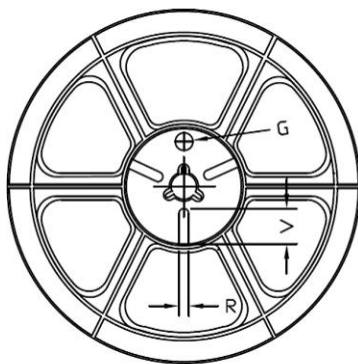
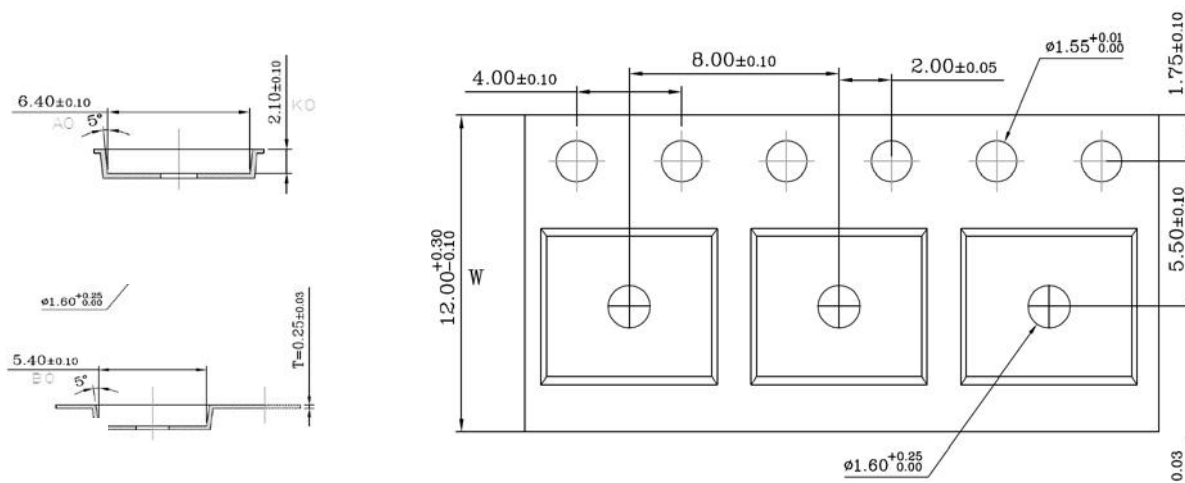
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Recommended Minimum Pads
Dimensions in Inches/(mm)

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

