

20V N-Channel Enhancement Mode MOSFET

Description

The PECN2040D3 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

- ◆ $V_{DS} = 20V$ $I_D = 40A$
 $R_{DS(ON)}(Typ.) = 4.5m\Omega$ @ $V_{GS} = 4.5V$
 $R_{DS(ON)}(Typ.) = 5.9m\Omega$ @ $V_{GS} = 2.5V$
- ◆ High density cell design for ultra low R_{dson}
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high E_{AS}
- ◆ Excellent package for good heat dissipation
- ◆ Special process technology for high ESD capability
- ◆ 100% UIS tested

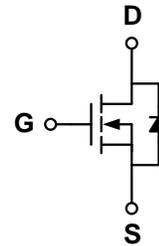
Application

- ◆ Automotive applications
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply

Package

- ◆ PDFN3.3*3.3-8L *100% UIS TESTED!*
100% ΔV_{ds} TESTED!

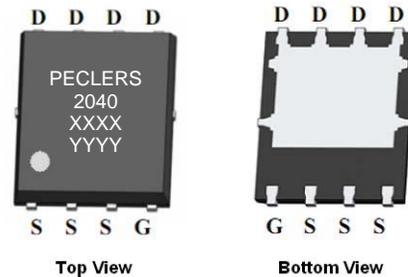
Schematic diagram



Marking and pin assignment

PDFN3.3*3.3-8L

(Top View)



PECLERS 2040—Product Name
 XXXX—Wafer Lot No.
 YYYY—Quality Code PE



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN2040D3	-55°C to +150°C	PDFN3.3*3.3-8L	5000

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

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	TC=25°C	40
		TC=100°C	32
Pulsed Drain Current	I_{DP}	160	A
Avalanche energy(L=0.5mH) ^(note1)	E_{AS}	200	mJ
Maximum power dissipation	P_D	28	W
Operating junction Temperature range	T_j	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	
Static Characteristics							
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	$T_J=25^\circ C$	-	-	1	μA
			$T_J=85^\circ C$	-	-	5	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	± 100	nA	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.75	1.2	V	
Drain-source on-state resistance ¹	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=40A$	-	4.5	5.5	m Ω	
		$V_{GS}=2.5V, I_D=20A$	-	5.9	7		
On Status Drain Current	$I_{D(ON)}$	$V_{DS}=20V, V_{GS}=4.5V$	40	-	-	A	
Diode Characteristics							
Diode Continuous Forward Current	I_S		-	-	12	A	
Reverse Recovery Time	t_{rr}	$I_F=20A, di/dt=20A/us$	-	25	-	ns	
Reverse Recovery Charge	Q_{rr}		-	24	-	nC	
Dynamic Characteristics²							
Input capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=10V, f=1.0MHz$	-	2000	-	pF	
Output capacitance	C_{OSS}		-	500	-		
Reverse transfer capacitance	C_{RSS}		-	200	-		
Turn-on delay time	$t_{D(ON)}$	$V_{GS}=4.5V, V_{DD}=10V, I_D=2A$	-	6.5	-	ns	
Turn-on Rise time	t_r		-	17	-		
Turn-off delay time	$t_{D(OFF)}$		-	29.5	-		
Turn-off Fall time	t_f		-	17	-		
Total gate charge	Q_g	$V_{GS}=4.5V, I_D=20A, V_{DS}=10V$	-	27	-	nC	
Gate-source charge	Q_{gs}		-	6.5	-		
Gate-drain charge	Q_{gd}		-	6.4	-		
Drain-Source Diode Characteristics							
Diode forward voltage	V_{SD}	$I_{SD}=10A, V_{GS}=0V$	-	0.8	1.2	V	

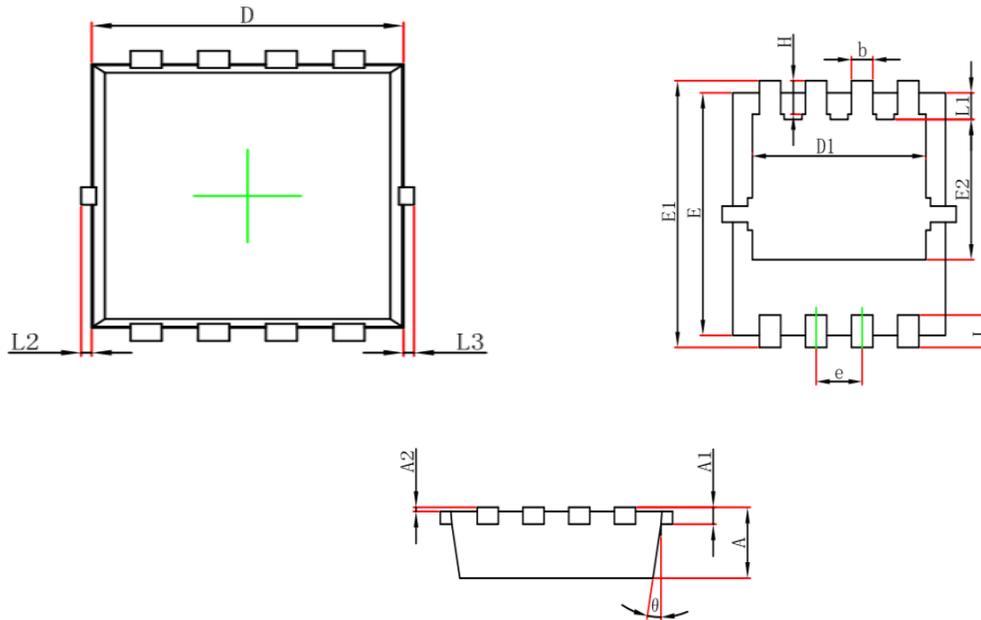
Note: 1: Eas test: VDD=10V, RG=25ohm, L=500uH

2: Pulse test; pulse width $\leq 300ns$, duty cycle $\leq 2\%$.

3: Guaranteed by design, not subject to production testing.

Package Information

- PDFN3.3*3.3-8L



Symbol	Dimensions In Millimeters		Dimensions in inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°