

**Feature**

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

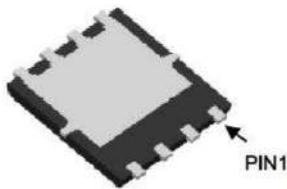
**Product Summary**

$V_{DS}$	20	V
$R_{DS(on),TYP} @ V_{GS}=10V$	1.5	m $\Omega$
$R_{DS(on),TYP} @ V_{GS}=4.5V$	1.8	m $\Omega$
$I_D$	90	A

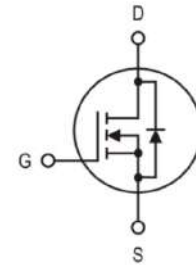
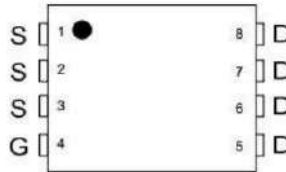
**Application**

- Power Management in Inverter System

top view



PDFN5\*6-8

**Maximum ratings, at  $T_A=25\text{ }^\circ\text{C}$ , unless otherwise specified**

Symbol	Parameter	Rating	Unit
$V_{DS}$	Drain-Source breakdown voltage	20	V
$I_S$	Diode continuous forward current	$T_C=25^\circ\text{C}$ 90	A
$I_D$	Continuous drain current @ $V_{GS}=10V$ ①	$T_C=25^\circ\text{C}$ 90	A
		$T_C=100^\circ\text{C}$ 75	A
$I_{DM}$	Pulse drain current tested	$T_A=25^\circ\text{C}$ 360	A
EAS	Avalanche energy, single pulsed ②	105	mJ
$P_D$	Maximum power dissipation	$T_C=25^\circ\text{C}$ 40	W
$V_{GS}$	Gate-Source voltage	$\pm 20$	V
MSL		Level 3	
$T_{STG}, T_J$	Storage and junction temperature range	-55 to 150	$^\circ\text{C}$

**Thermal Characteristics**

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.9	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	35	$^\circ\text{C/W}$



## Typical Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(T <sub>J</sub> =25°C)	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T <sub>J</sub> =125°C)	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.75	1.1	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance ③	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	--	1.5	2.5	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance ③	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	--	1.8	2.8	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance ③	V <sub>GS</sub> =2.5V, I <sub>D</sub> =20A	--	2.8	4	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		3605		pF
C <sub>oss</sub>	Output Capacitance			490		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			365		pF
R <sub>g</sub>	Gate Resistance	f=1MHz	--	2.4	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =15A, V <sub>GS</sub> =10V	--	36.6	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	6.07	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	13.8	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =10V, I <sub>D</sub> =20A, R <sub>G</sub> =1.5Ω, V <sub>GS</sub> =6V	--	11.2	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	49	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	35	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	7.8	--	nS
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage	I <sub>SD</sub> =2A, V <sub>GS</sub> =0V	--	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>SD</sub> =10A, V <sub>GS</sub> =0V	--	20	--	nS
Q <sub>rr</sub>	Reverse Recovery Charge		di/dt=500A/μs		11.5	

NOTE:

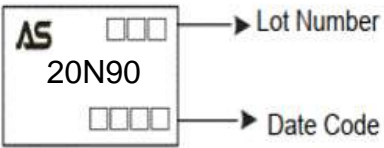
① This characteristics assumes the die are assembled in PDFN5\*6-8 packages. Actual performance may degrade when assembled. Ascend does not guarantee device performance after assembly.

② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.1mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 42A, V<sub>GS</sub> = 6V. Part not recommended for use above this value.

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

### Ordering and Marking Information

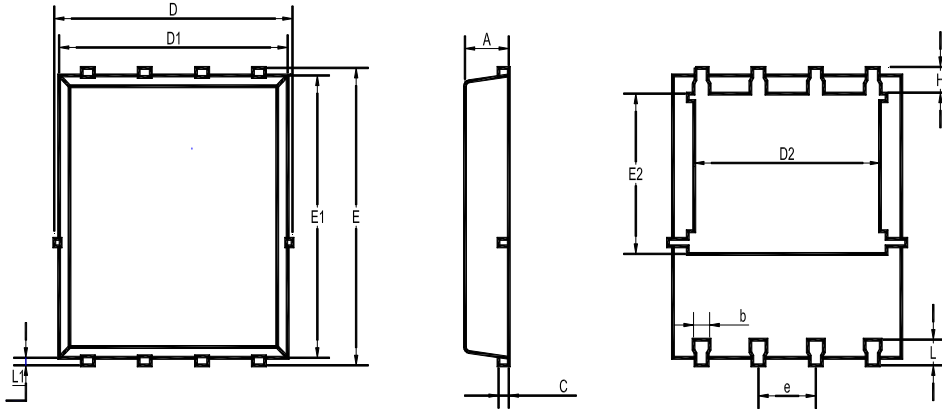
Ordering Device No.	Marking	Package	Packing	Quantity
ASDM20N90Q-R	20N90	PDFN5*6-8	Tape&Reel	4000/Reel

PACKAGE	MARKING
PDFN5*6-8	 <p>The marking diagram shows a rectangular area containing the following information from top to bottom: the 'AS' logo, the part number '20N90', a three-digit Lot Number represented by three squares (□□□), and a four-digit Date Code represented by four squares (□□□□). Arrows point from the Lot Number and Date Code boxes to their respective labels on the right.</p>



### Package Outline Dimensions (Units: mm)

PDFN5\*6-8



UNIT	A	b	C	D	D1	D2	E	E1	E2	e	L	L1	H
mm	1.12	0.51	0.34	5.26	5.1	4.5	6.25	6	3.66	1.37	0.71	0.2	0.71
	0.9	0.33	0.11	4.7	4.7	3.56	5.75	5.6	3.18	1.17	0.35	0.06	0.35

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