

Features

- 700V GaN enhancement-mode transistor
- Normally-off design
- No Qrr (reverse recovery charge)
- Low Qg (gate charge), low Qoss (output charge)
- Integrated ESD protection

Applications

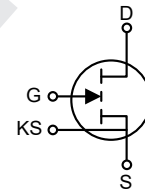
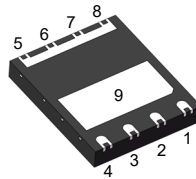
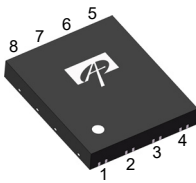
- PFC and PWM stages (LLC, FSFB, TTF) of Server, Telecom, Industrial, UPS, and Solar Inverters

Product Summary at $T_J = 25^\circ\text{C}$

$V_{DS, \max}$	700V
$R_{DS(on), \max} @ V_{GS} = 6V$	140m Ω
$Q_{g, \text{typ}} @ V_{DS} = 400V$	3.5nC
$I_{D, \text{pulse}}$	32A
$Q_{oss} @ V_{DS} = 400V$	33nC
$Q_{rr} @ V_{DS} = 400V$	0nC



Pin Configuration



Pin Information

Gate	Drain	Kelvin Source	Source
4	5, 6, 7, 8	3	1, 2, 9

Ordering Information

Ordering Part Number	Package Type	Form	Shipping Quantity
AONS140V70GA1	DFN5x6	Tape and Reel	1500

Contact local sales office for full product datasheet.

Absolute Maximum Ratings

($T_J = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter		AONS140V70GA1	Units
$V_{DS, \max}$	Drain Source Voltage	$V_{GS} = 0V$, $T_J = -55^\circ\text{C}$ to 150°C	700	V
$V_{DS, \text{trans}}$	Drain Source Voltage Transient ⁽¹⁾	$V_{GS} = 0V$	800	
$V_{DS, \text{pulse}}$	Drain Source Voltage Pulsed ⁽²⁾	$T_C = 25^\circ\text{C}$, total time < 10 hours $T_C = 125^\circ\text{C}$, total time < 1 hour	750	
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	17	A
$I_{D, \text{pulse}}$	Pulsed Drain Current ⁽³⁾	$T_C = 25^\circ\text{C}$, $V_{GS} = 6V$, $t_{\text{pulse}} = 10\mu\text{s}$	32	
		$T_C = 125^\circ\text{C}$, $V_{GS} = 6V$, $t_{\text{pulse}} = 10\mu\text{s}$	18	

Absolute Maximum Ratings

($T_J = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	AONS140V70GA1	Units
V_{GS}	Gate Source Voltage, Continuous $T_J = -55^\circ\text{C}$ to 150°C	-6 to 7	V
$V_{GS, \text{pulse}}$	Gate Source Voltage, Pulsed $T_J = -55^\circ\text{C}$ to 150°C , $t_{\text{pulse}} = 50\text{ns}$, $f = 100\text{kHz}$, open drain	-20 to 10	V
P_{tot}	Power Dissipation ⁽⁴⁾ $T_C = 25^\circ\text{C}$	113	W
$T_{j, \text{stg}}$	Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ	Max	Note	Units
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient ⁽⁵⁾	69			$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	1.1			$^\circ\text{C/W}$
T_{sold}	Maximum Reflow Soldering Temperature	260		MSL3	$^\circ\text{C}$

Electrical Characteristics

($T_J = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 12.2\text{mA}$	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	1.2 1.7	1.7 2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 700\text{V}$, $V_{GS} = 0\text{V}$	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	0.6 7	25	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = 6\text{V}$, $V_{DS} = 0\text{V}$, $T_J = 25^\circ\text{C}$		70		μA
$R_{DS(on)}$	Drain-Source On-State-Resistance	$V_{GS} = 6\text{V}$, $I_D = 3.9\text{A}$	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	106 230	90	$\text{m}\Omega$
DYNAMIC						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$, $V_{DS} = 400\text{V}$, $f = 100\text{kHz}$		125		pF
C_{oss}	Output Capacitance			41		
C_{rss}	Reverse Transfer Capacitance			0.4		
$C_{o(er)}$	Effective Output Capacitance Energy Related ⁽⁶⁾	$V_{GS} = 0\text{V}$, $V_{DS} = 0$ to 400V		58		pF
$C_{o(tr)}$	Effective Output Capacitance Time Related ⁽⁷⁾			82		
R_G	Gate Resistance	$f = 5\text{MHz}$, open drain		5		Ω
SWITCHING						
Q_g	Gate Charge	$V_{GS} = 0$ to 6V , $V_{DS} = 400\text{V}$, $I_D = 3.9\text{A}$		3.5		nC
Q_{gs}	Gate Source Charge			0.3		
Q_{gd}	Gate Drain Charge			1.2		
V_{plat}	Gate Plateau Voltage	$V_{DS} = 400\text{V}$, $I_D = 3.9\text{A}$		2.1		V
Q_{oss}	Output Charge	$V_{GS} = 0\text{V}$, $V_{DS} = 0$ to 400V		24.5		nC
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 400\text{V}$; $I_D = 8\text{A}$; $L = 318\mu\text{H}$; $V_{GS} = 6\text{V}$; $R_{on} = 10\Omega$; $R_{off} = 2\Omega$;		1.4		ns
$t_{d(off)}$	Turn-Off Delay Time			1.7		
t_r	Rise Time			0		
t_f	Fall Time			0		

Electrical Characteristics (Continued)

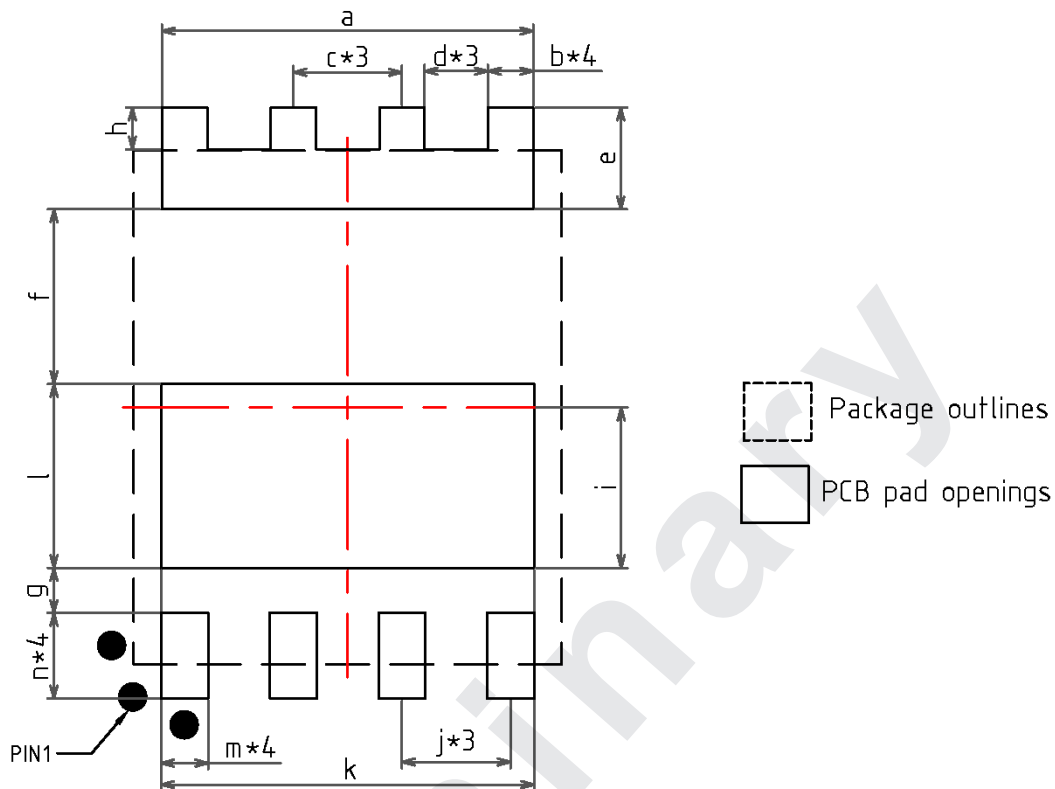
($T_J = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
REVERSE CONDUCTION						
V_{SD}	Source-Drain Reverse Voltage	$V_{GS} = 0\text{V}$, $I_S = 3.9\text{A}$, $T_J = 25^\circ\text{C}$		2.4		V
$I_{S, \text{pulse}}$	Reverse Pulsed Current	$V_{GS} = 6\text{V}$, $t_{\text{pulse}} = 10\mu\text{s}$			32	A
Q_{rr}	Reverse Recovery Charge	$V_R = 400\text{V}$, $I_S = 3.9\text{A}$, $dv/dt = 1\text{kA}/\mu\text{s}$		0		nC
t_{rr}	Reverse Recovery Time			0		ns
I_{rrm}	Peak Reverse Recovery Current			0		A

Notes:

- $V_{DS, \text{transient}}$ is intended for non-repetitive events, $t_{\text{PULSE}} < 200\mu\text{s}$.
- $V_{DS, \text{pulse}}$ is intended for repetitive pulse, $t_{\text{PULSE}} < 100\text{ns}$.
- Limit was extracted from characterization test, not measured during production.
- Power dissipation, and consequently max. current ratings are obtained using max. thermal resistance and max. temperature of 150°C .
- R_{thJA} is determined with the device mounted on one square inch of copper pad, single layer 2oz copper on FR4 board.
- $C_{O(er)}$ is the fixed capacitance that gives the same stored energy as C_{OSS} while VDS is rising from 0 to 400 V.
- $C_{O(tr)}$ is the fixed capacitance that gives the same charging time as C_{OSS} while VDS is rising from 0 to 400 V.

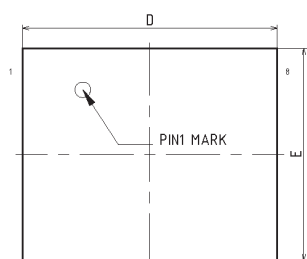
Recommended PCB Footprint



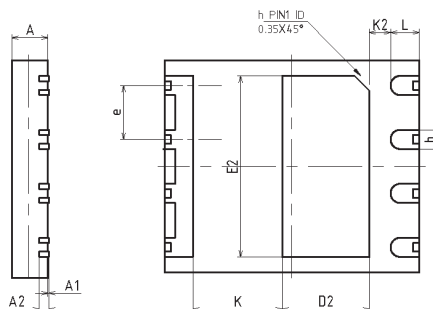
SYMBOL	DIMENSION	SYMBOL	DIMENSION
a	4.340	h	0.490
b	0.530	i	1.875
c	1.270	j	1.270
d	0.740	k	4.360
e	1.190	l	2.150
f	2.040	m	0.550
g	0.525	n	1.000

Notes:
 1) All dimension are in millimeters.
 2) Drawing is not to scale

Package Dimensions, DFN5x6



Top view



Bottom view



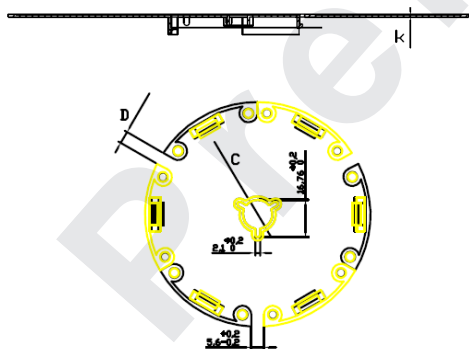
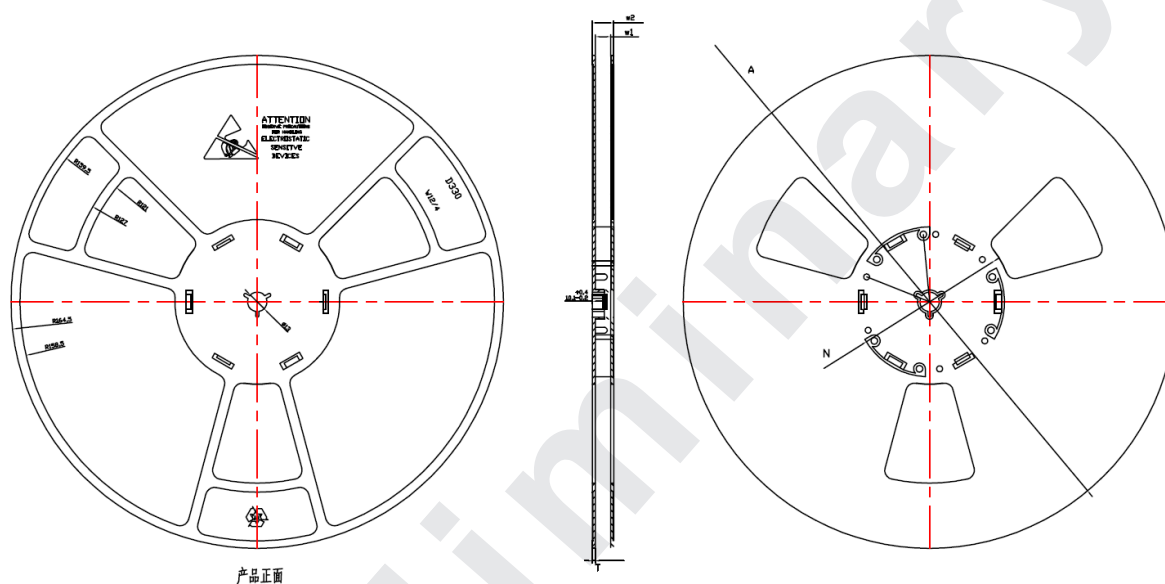
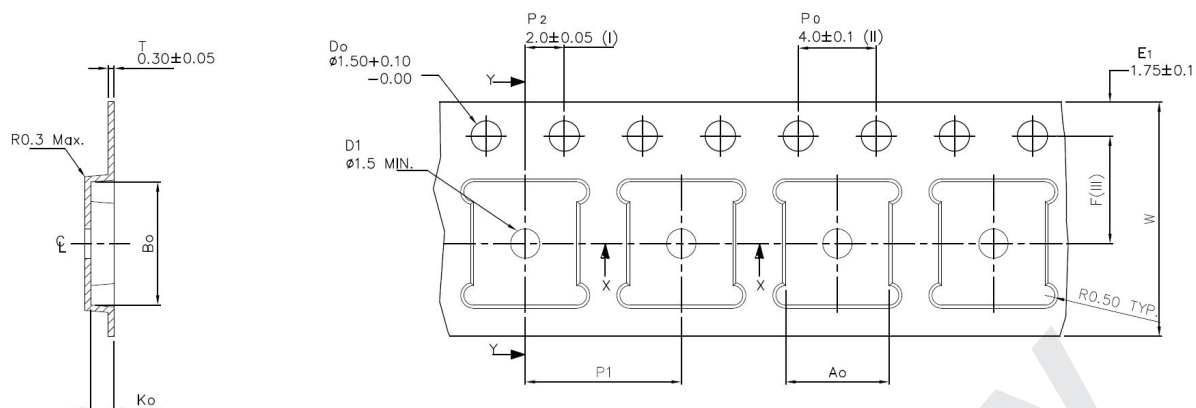
Side view

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.80	0.85	0.90
A1	0.00	0.02	0.05
A2	0.203REF		
b	0.40	0.45	0.50
D	5.90	6.00	6.10
D2	1.95	2.05	2.15
e	1.27		
E	4.90	5.00	5.10
E2	4.16	4.26	4.36
L	0.625	0.675	0.725
K	2.10REF		
K2	0.50REF		
h	0.30	0.35	0.40

Notes:

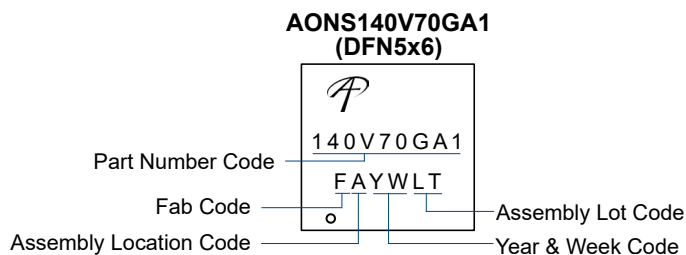
1. Dimension and tolerance conform to ASME Y14.5-2009.
2. All dimensions are in millimeters.
3. Lead coplanarity will be 0.1 millimeters max.
4. Complies with JEDEC MO-229.
5. Drawing is not to scale.
6. Dimensions do not include mold protrusion.
7. Package outline exclusive of metal burr dimensions.

Tape and Reel Dimensions, DFN5x6



SYMBOL	DIMENSION(mm)		
	MIN	NOM	MAX
A_0	5.20	5.30	5.40
B_0	6.20	6.30	6.40
K_0	1.10	1.20	1.30
F	5.45	5.50	5.55
P_1	7.90	8.00	8.10
W	11.70	12.00	12.30
A	328	330	332
N	98	100	102
C	12.90	13.10	13.30
D	5.10	5.60	6.10
w_1	12.40	12.40	14.40
w_2	16.60	16.60	18.60
T	1.95	2.10	2.25
K	1.30	1.40	1.55

Part Marking



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