ALPHA & OMEGA SEMICONDUCTOR

AOFQ028V10GA1

100V GaN Enhancement-mode Power Transistor

Features

- GaN-on Silicon E-mode HEMT technology
- Very low gate charge
- Ultra low On-resistance
- Very small footprint

Applications

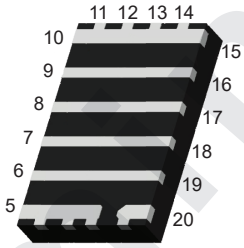
- High frequency DC/DC converter
- BMS protection
- RF envelope tracking
- PC charger and mobile power bank
- Motor driver

Product Summary at T_J = 25°C

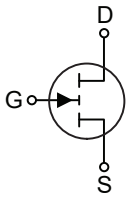
$V_{DS, max}$	100V
$R_{DS(on), max}$ @ V_{GS} = 5V	2.8mΩ
$Q_{g, typ}$ @ V_{DS} = 50V	14nC
$I_{DS, Pulse}$	320A
Q_{oss} @ V_{DS} = 50V	85nC

Pin Configuration

Top View



Bottom View



Pin Information

Pin	Pin Description	Pin Function
1, 20	Gate	Driver Gate
2-5, 7, 9, 16, 18	Source	Source
6, 8, 10-15, 17, 19	Drain	Power Drain

Ordering Information

Ordering Part Number	Package Type	Form	Shipping Quantity
AOFQ028V10GA1	FCQFN3x5	Tape and Reel	1500

Contact local sales office for full product datasheet.

Absolute Maximum Ratings

(T_J = 25°C, unless otherwise noted)

Symbol	Parameter	AOFQ028V10GA1	Units
V_{DS}	Drain-Source Voltage (Continuous)	100	V
$V_{DS(tr)}$	Drain-Source Voltage (up to 300,000 5ms pulse at 150°C)	120	
I_D	Continuous Drain Current	80	A
	Pulsed (25°C, T_{Pulse} = 100µs)	320	
V_{GS}	Gate-Source Voltage	-4 to 6	V
$T_{j, stg}$	Operating and Storage Temperature	-40 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ	Max	Note	Units
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient (1)	61.06			°C/W
$R_{\theta JB}$	Thermal Resistance Junction-to-Board	1.89			°C/W
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	14.15			°C/W
T_{sold}	Maximum Reflow Soldering Temperature	260		MSL3	°C

Electrical Characteristics

(T_J = 25°C, unless otherwise noted)

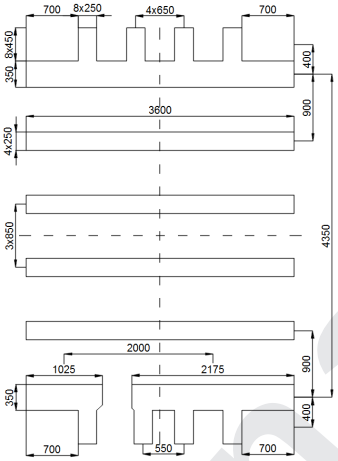
Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Voltage	V_{GS} = 0 V, I_D = 600µA	100			V
I_{DSS}	Drain-Source Leakage	V_{DS} = 80V, V_{GS} = 0V		12	24	µA
I_{GSS}	Gate-Source Forward Leakage	V_{GS} = 5V		2.5	9	µA
	Gate-Source Reverse Leakage	V_{GS} = -4V		0.3	0.5	µA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS} , I_D = 13mA	0.8	1.1	2.5	V
$R_{DS(on)}$	Drain-Source On-State-Resistance	V_{GS} = 5V, I_D = 30A		2.2	2.8	mΩ
V_{SD}	Source-Drain Forward Voltage	I_S = 0.5A,V_{GS} = 0V		1.5		V
DYNAMIC						
C_{ISS}	Input Capacitance	V_{GS} = 0V, V_{DS} = 50V		1500		pF
C_{OSS}	Output Capacitance	V_{GS} = 0V, V_{DS} = 50V		700		
C_{RSS}	Reverse Transfer Capacitance	V_{GS} = 0V, V_{DS} = 50V		12.5		
$C_{OSS(ER)}$	Energy Related C_{OSS}	V_{GS} = 0V, V_{DS} = 0V to 50V		1150		
$C_{OSS(TR)}$	Time Related C_{OSS}	V_{GS} = 0V, V_{DS} = 0V to 50V		1600		
R_G	Gate Resistance	f = 5MHz, open drain		1.8		Ω
Q_G	Total Gate Charge	V_{GS} = 5V, V_{DS} = 50V, I_D = 30A		14		nC
Q_{GS}	Gate-Source Charge	V_{DS} = 50V, I_D = 30A		2.8		
Q_{GD}	Gate-Drain Charge	V_{DS} = 50V, I_D = 30A		3		
$Q_{G(TH)}$	Gate Charge at Threshold	V_{DS} = 50V, I_D = 30A		1.5		
Q_{OSS}	Output Charge	V_{GS} = 0V, V_{DS} = 50V		85		

Note:

1. $R_{\theta JA}$ is determined with the device mounted on one square inch of copper pad, single layer 2oz copper on FR4 board.

Land Pattern, FCQFN3x5

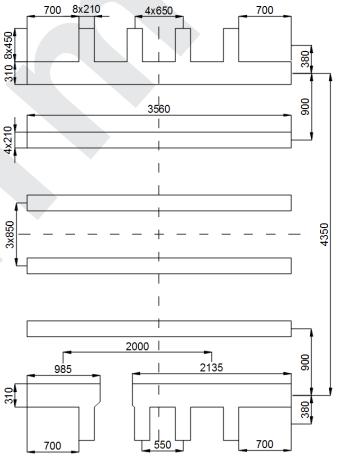
Recommended land pattern



Unit: µm

TOP VIEW

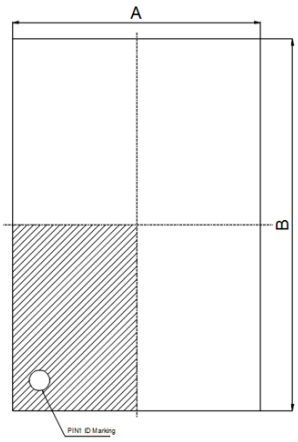
Recommended Stencil drawing



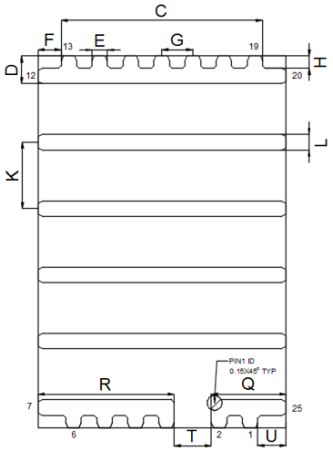
Unit: µm

TOP VIEW

Package Dimensions, FCQFN3x5

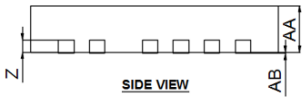


TOP VIEW



BOTTOM VIEW

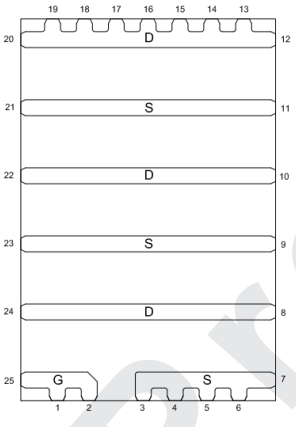
SYMBOL	MILLIMETER			NOTE
	MIN	NOM	MAX	
A	3.9	4.0	4.1	
B	5.9	6.0	6.1	
C	3.15	3.25	3.35	
D	0.35	0.45	0.55	3X
E	0.20	0.25	0.30	13X
F		0.375 REF		2X
G		0.5 BASIC		10X
H		0.2 REF		3X
K		1.07 BASIC		6X
L	0.20	0.25	0.30	4X
Q	1.1	1.2	1.3	
R	2.1	2.2	2.3	
T	0.55	0.60	0.65	
U		0.45 REF		2X
Z		0.203 REF		7X
AA	0.75	0.85	0.95	
AB	0.00	0.02	0.05	



SIDE VIEW

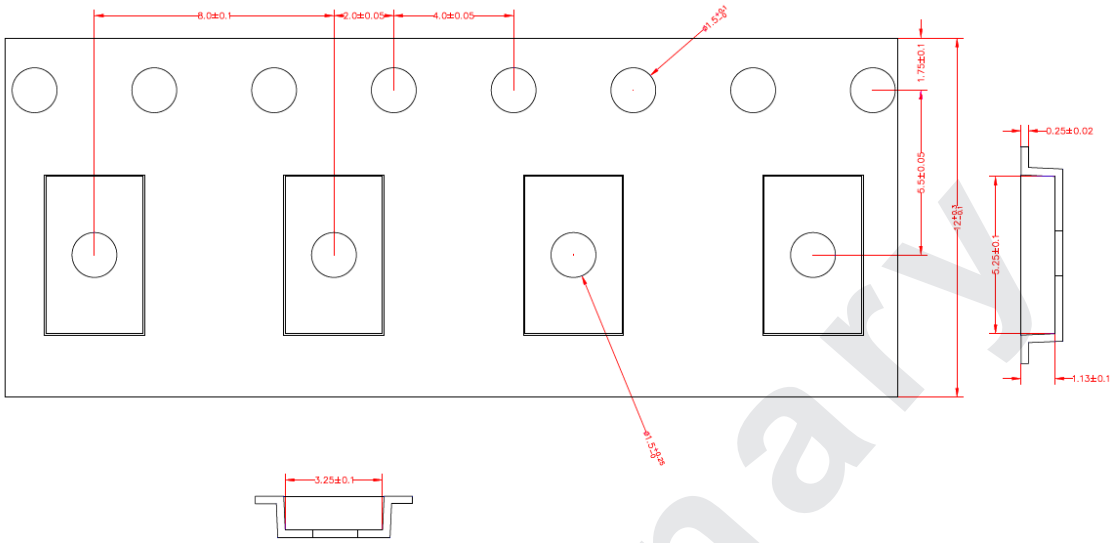
NOTE:
1)ALL DIMENSION ARE IN MILLIMETERS.
2)BOTTOM VIEW IS FT TESTER SIDE VIEW.
3)LEAD COPLANARITY SHALL BE 0.08 MILLIMETERS MAX.
4)COMPLIES WITH JEDEC MO-220.
5)DRAWING IS NOT TO SCALE.

PIN Configuration



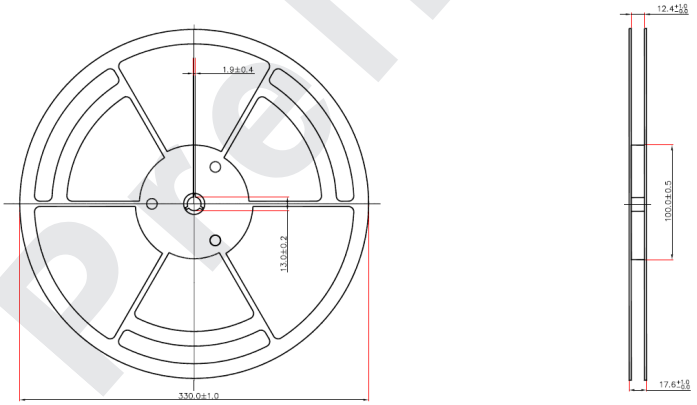
TOP VIEW

Tape and Reel Dimensions, FCQFN3x5



NOTES:

1. CARRIER TAPE COLOR: BLACK.
2. COVER TAPE WIDTH: 9.5±0.10.
3. COVER TAPE COLOR: TRANSPARENT.
4. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.20 MAX.
5. CAMBER NOT TO EXCEED 1MM IN 100MM.
6. MOLD# 3 X 5 X 0.85
7. ALL DIMS IN MM.
8. BAN TO USE THE ENVIRONMENT-RELATED SUBSTANCES OF JCET PRESCRIBING



NOTES:

1. COLOR: BLUE.
2. ALL DIM IN mm.
3. GENERAL TOLERANCE ±0.25.
4. BAN TO USE THE ENVIRONMENT-RELATED SUBSTANCES OF JCET PRESCRIBING.

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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.