ALPHA & OMEGA SEMICONDUCTOR

AOSE028V10GA1

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
- Mobile power bank
- Motor driver

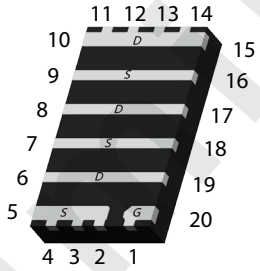
Product Summary at T_J = 25°C

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

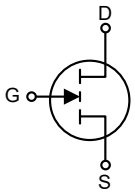
GREEN Product

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
AOSE028V10GA1	En-FCQFN 3x5	Tape and Reel	1500

Contact local sales office for full product datasheet.

Absolute Maximum Ratings

(T_J = 25°C, unless otherwise noted)

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

Thermal Characteristics

Symbol	Parameter	Typ	Note	Units
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	0.38	-	°C/W
$R_{\theta JB}$	Thermal Resistance Junction-to-Board	1.4	-	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(1)	61.11	-	°C/W
T_{sold}	Maximum Reflow Soldering Temperature	260	MSL3	°C

Note:

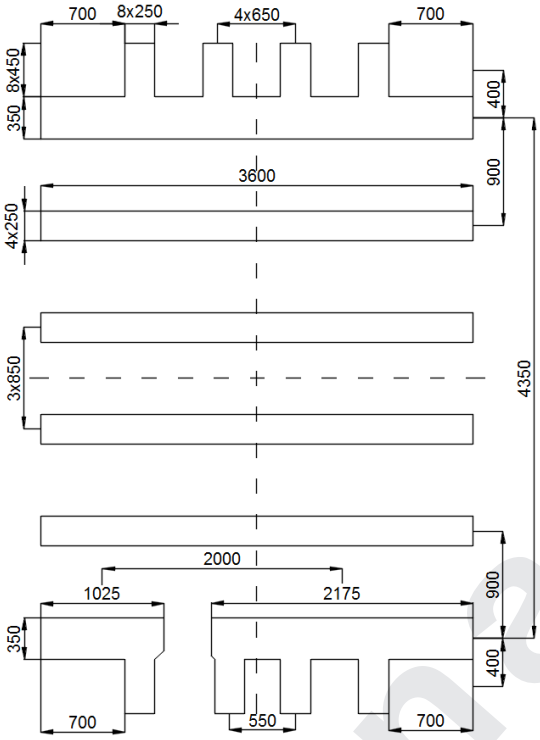
1. $R_{\theta JA}$ is determined with the device mounted on one square inch of copper pad, single layer 2 oz copper on FR4 board.

Electrical Characteristics

(T_J = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Static Characteristics						
B_{VDSS}	Drain-to-Source Voltage	V_{GS} = 0V, I_D = 600µA	100	-	-	V
I_{DSS}	Drain Source Leakage	V_{GS} = 0V, V_{DS} = 80V	-	12	24	µA
I_{GSS}	Gate-to-Source Forward Leakage	V_{GS} = 5V	-	2.5	9	µA
	Gate-to-Source Reverse Leakage	V_{GS} = -4V	-	0.3	0.5	µA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 12.8mA	0.8	1.1	2.5	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS} = 5V, I_D = 30A	-	3.2	2.8	mΩ
V_{SD}	Source-Drain Forward Voltage	I_S = 0.5A, V_{GS} = 0V	-	1.1	-	V
Dynamic Characteristics						
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 COSS	V_{GS} = 0V, V_{DS} = 0V to 50V	-	1150	-	
$C_{OSS(TR)}$	Time Related COSS	V_{GS} = 0V, V_{DS} = 0V to 50V	-	1600	-	
R_G	Gate Resistance	f = 5 MHz, open drain	-	1.8	-	Ω
Q_G	Total Gate Charge	V_{GS} = 5V, V_{DS} = 50V, I_D = 30A	-	14	-	nC
Q_{GS}	Gate to Source Charge	V_{DS} = 50V, I_D = 30A	-	2.8	-	
Q_{GD}	Gate to 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	-	

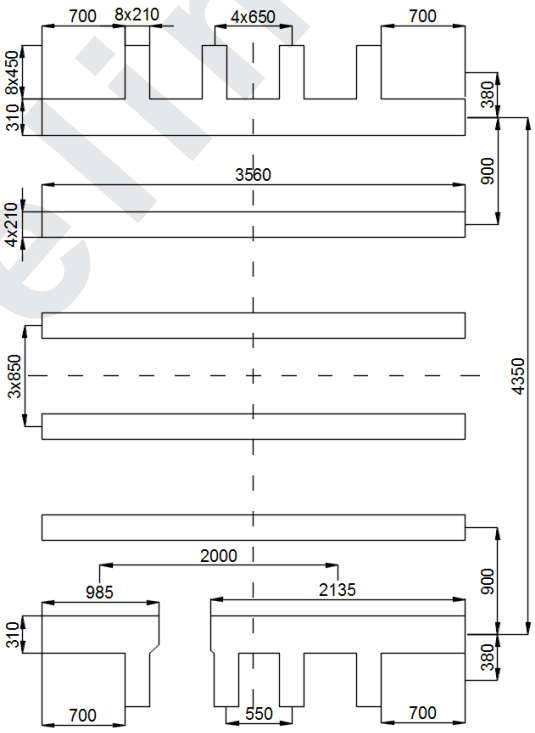
Recommended Land Pattern



Unit: μm

TOP VIEW

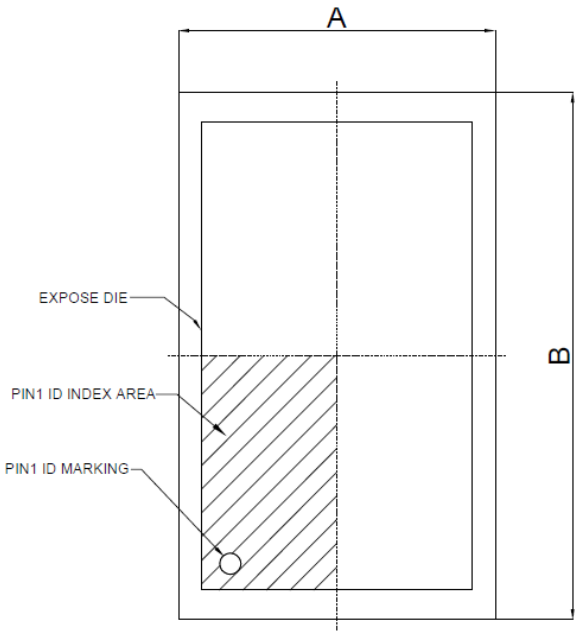
Recommended Stencil Drawing



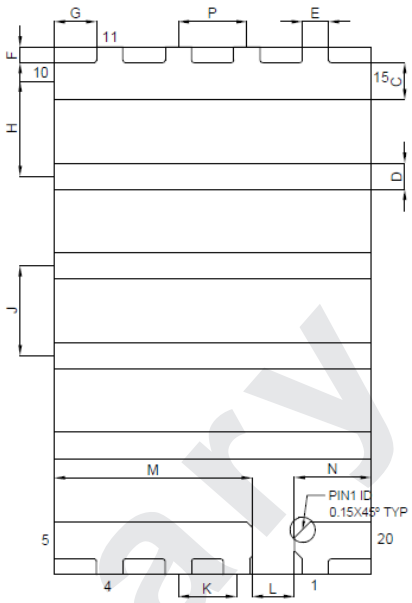
Unit: μm

TOP VIEW

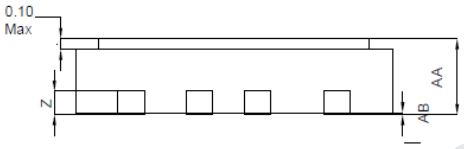
Package Dimensions, QFN3x5-20L



TOP VIEW



BOTTOM VIEW

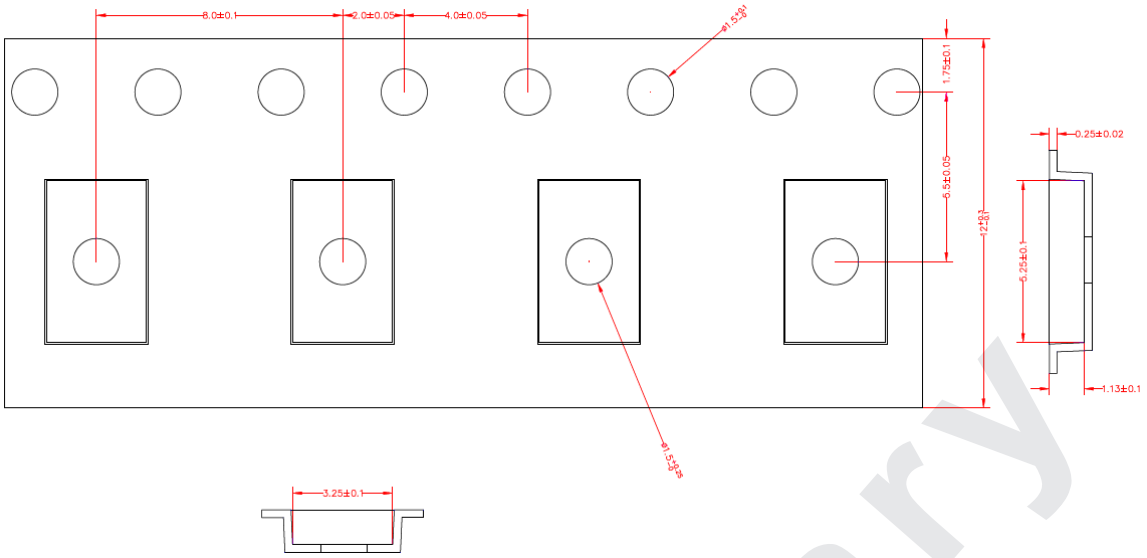


SIDE VIEW

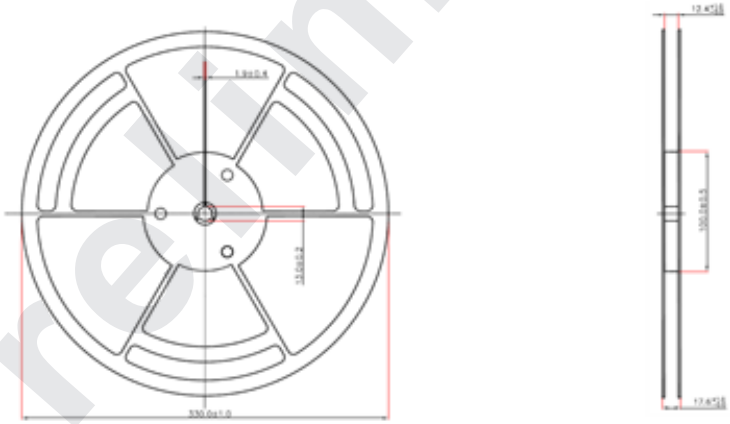
NOTE:
1)ALL DIMENSION ARE IN MILLIMETERS.
2)BOTTOM VIEW IS FT TESTER SIDE VIEW.
3)LEAD COPLANARITY SHALL BE 0.08 MILLIMETERS MAX.
4)COMPLIES WITH JEDEC MO-220.
5)DRAWING IS NOT TO SCALE.

SYMBOL	MILLIMETER			NOTE
	MIN	NOM	MAX	
A	2.90	3.00	3.10	
B	4.90	5.00	5.10	
C	0.30	0.35	0.40	3X
D	0.20	0.25	0.30	4X
E	0.20	0.25	0.30	8X
F	0.15 REF			3X
G	0.40 REF			4X
H	0.90 BASIC			2X
J	0.85 BASIC			3X
K	0.55 BASIC			
P	0.65 BASIC			4X
L	0.35	0.40	0.45	
M	1.775	1.875	1.975	
N	0.625	0.725	0.825	
Z	0.203 REF			
AA	0.75	0.85	0.95	
AB	0.00	0.02	0.05	

Tape and Reel Dimensions, QFN3x5-20L

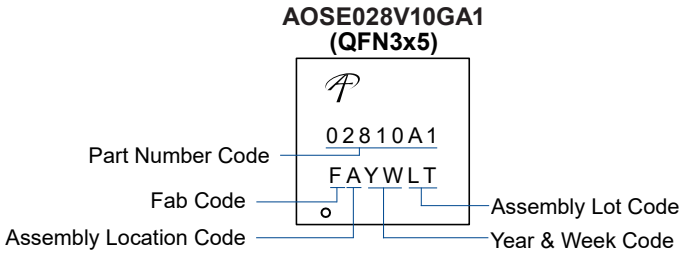


NOTES:
1. CARRIER TAPE COLOR: BLACK.
2. COVER TAPE WIDTH: 9.5±0.10.
3. COVER TAPE COLOR: TRANSPARENT.
4. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.20 MAX.
5. CAMBER NOT TO EXCEED 1MM IN 100MM.
6. MOLD# 3 X 5 X 0.85
7. ALL DIMS IN MM.
8. BAN TO USE THE ENVIRONMENT-RELATED SUBSANCES OF JCET PRESCRIBING.



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

Part Marking



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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.