

80V 1.28mohm N-channel SGT MOSFET
AK1G8N012GAM

Description:

This N channel SGT MOSFET has been designed to ultra low on-state resistance and maintain superior switching performance, especially for high efficiency power management applications.

Features:

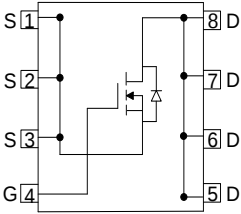
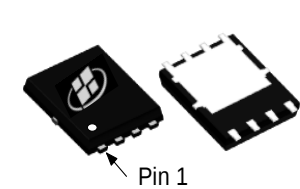
- Low $R_{DS(ON)}$
- RoHS compliant
- Halogen-free

Applications:

- Battery Management System
- Motor Drivers
- DC-DC Converter
- Synchronous Rectification

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	80	V
$R_{DS(ON), max} @V_{GS} = 10\text{ V}$	1.28	m Ω
I_D	283	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AK1G8N012GAM	PDFN5X6	1G8N012GAM	Tape Reel	See the detail package information

Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain - Source Voltage	80	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) ^(Note 1)	283	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$)	179	A
I_{DM}	Drain Current - Pulsed ^(Note 2)	1132	A
V_{GS}	Gate - Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ^(Note 3)	484	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	184	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction - to - Case, Steady State	0.68	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction - to - Ambient, Steady State ^(Note 4)	45	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is silicon limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5 \text{ mH}$, $V_{DD} = 40 \text{ V}$, $I_{AS} = 44 \text{ A}$, $R_g = 50 \Omega$, Starting $T_J = 25^\circ\text{C}$
4. Mount on minimum PCB layout

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
V _{(BR)DSS}	Drain - Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	80			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 80 V, V _{GS} = 0 V,			1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V			±100	nA
V _{GS(th)}	Gate Threshold voltage	V _{DS} = V _{GS} , I _D = 250 μA	2	3	4	V
R _{DS(ON)}	Drain - Source on - state resistance	V _{GS} = 10 V, I _D = 88 A		1.05	1.28	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 40 V, V _{GS} = 0 V, f = 1 MHz		8255		pF
C _{oss}	Output Capacitance			4271		pF
C _{rss}	Reverse Transfer Capacitance			68		pF
R _g	Gate Resistance	f = 1 MHz		2		Ω
Switching Characteristics						
t _{d(on)}	Turn On Delay Time	V _{DD} = 40 V , R _L = 0.5 Ω, V _{GS} = 10 V, R _G = 3.3 Ω		31		ns
t _r	Rise Time			54		ns
t _{d(off)}	Turn Off Delay Time			56		ns
t _f	Fall Time			43		ns
Q _g	Total Gate Charge	V _{DD} = 40 V , I _D = 50 A, V _{GS} = 10 V		113		nC
Q _{gs}	Gate - Source Charge			40		nC
Q _{gd}	Gate - Drain Charge			20		nC
Drain - Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body - Diode Forward Current				283	A
I _{SM}	Maximum Pulsed Body - Diode Forward Current				1132	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 88 A		0.84		V
t _{rr}	Reverse recovery time	V _{DD} = 40 V, I _D = 50 A, di/dt = 100 A/μs		110		ns
Q _{rr}	Reverse recovery charge			260		nC
I _{rrm}	Peak Reverse Recovery Current			4		A

Electrical Characteristics Diagrams

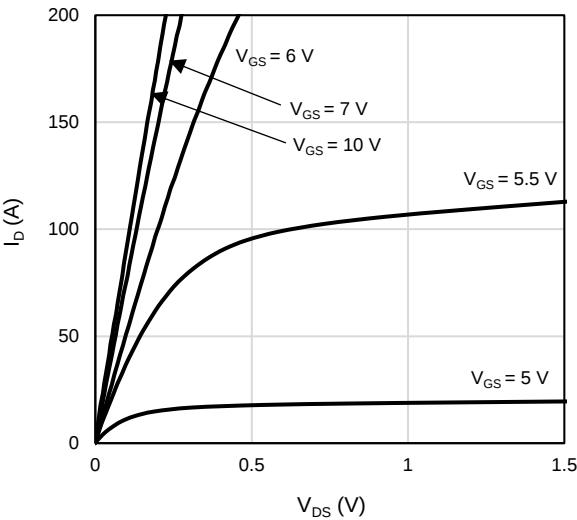


Figure 1: On-Region

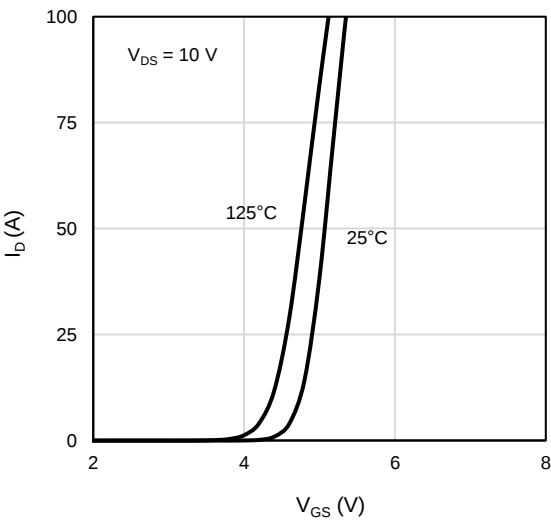


Figure 2: Transfer Characteristics

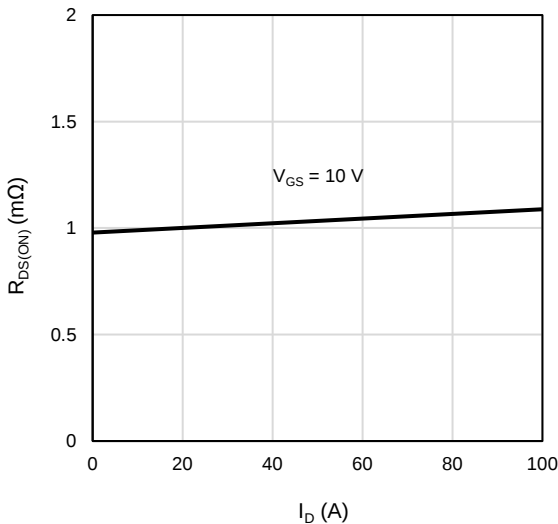


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

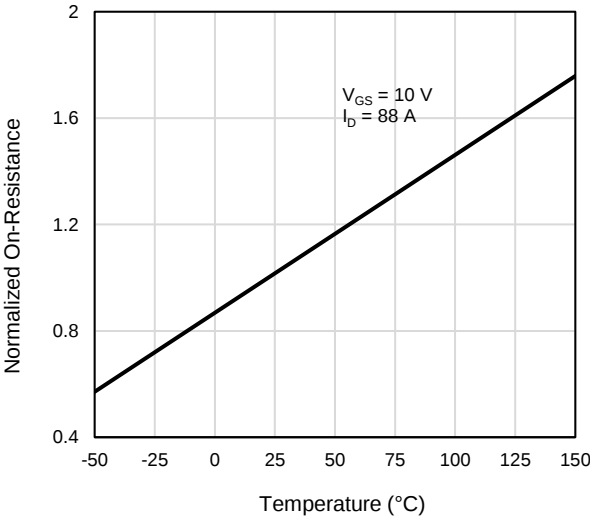


Figure 4: On-Resistance vs. Junction Temperature

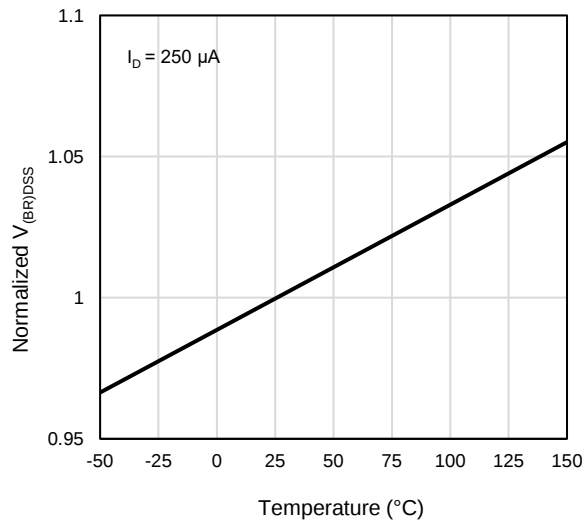


Figure 5: Breakdown Voltage vs. Junction Temperature

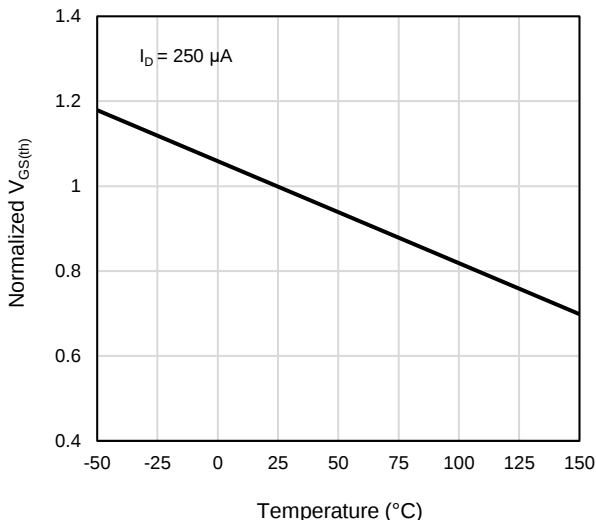


Figure 6: Threshold Voltage vs. Junction Temperature

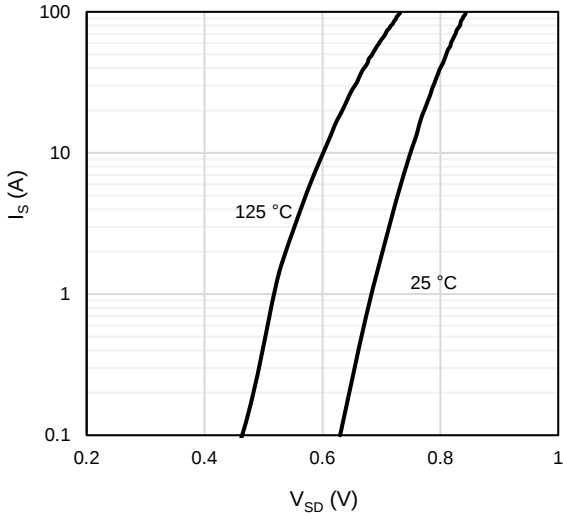


Figure 7: Body-Diode Characteristics

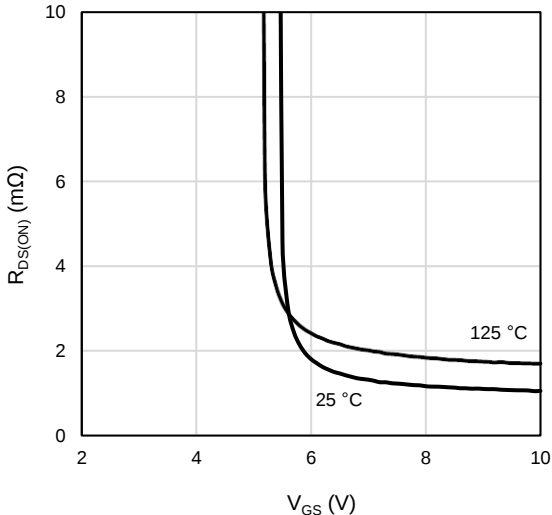


Figure 8: On-Resistance vs. Gate-Source Voltage

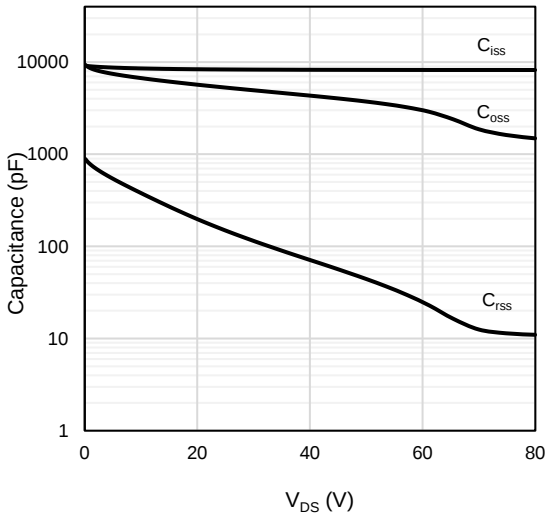


Figure 9: Capacitance Characteristics

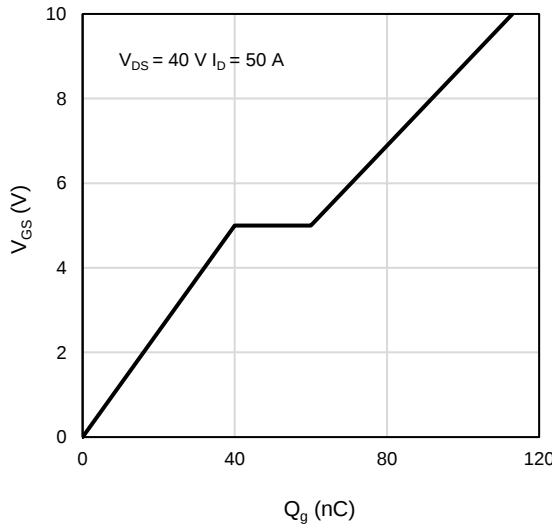


Figure 10: Gate-Charge Characteristics

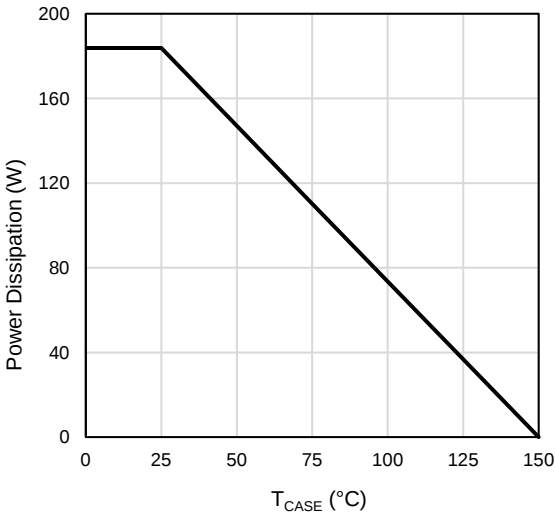


Figure 11: Power De-rating

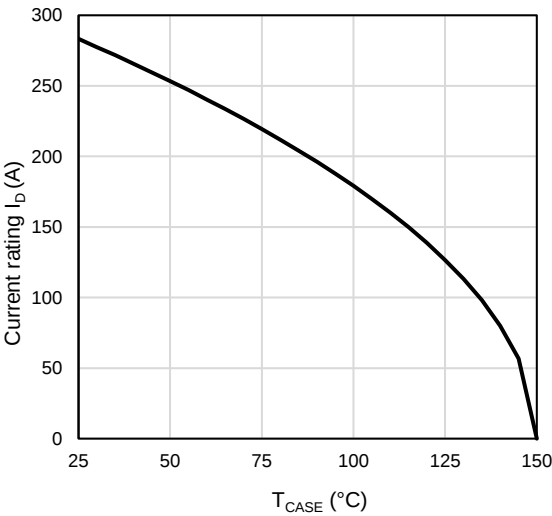


Figure 12: Current De-rating

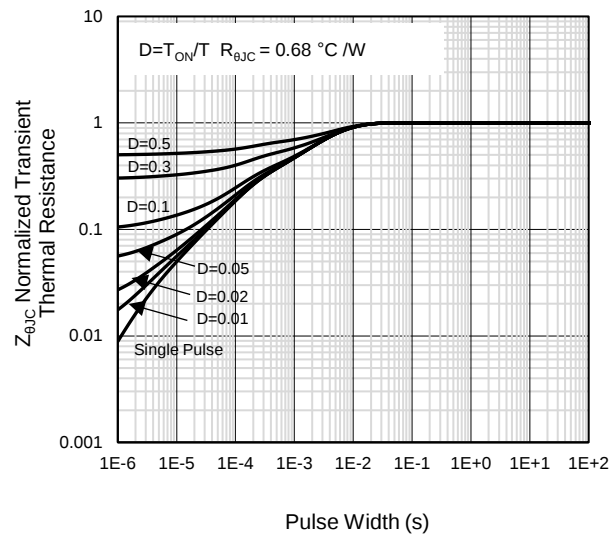


Figure 13: Normalized Maximum Transient Thermal Impedance

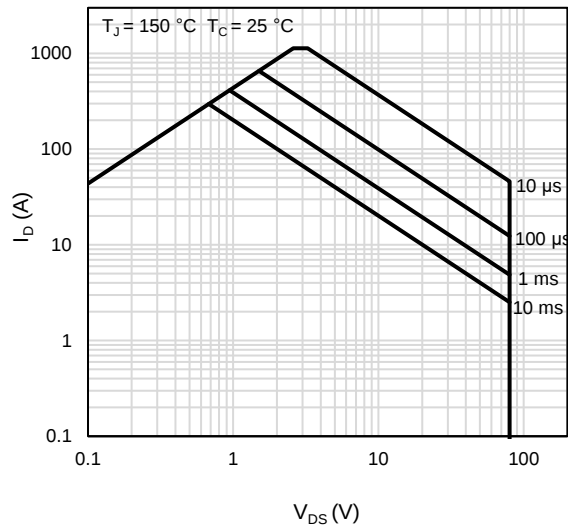
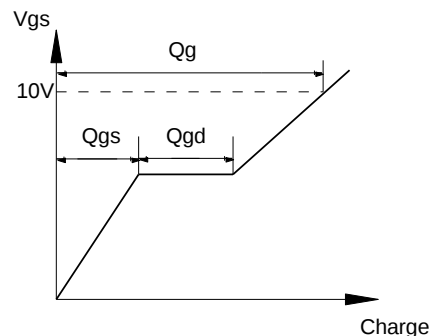
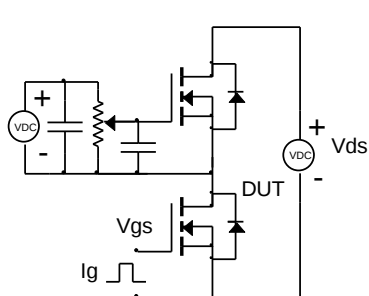


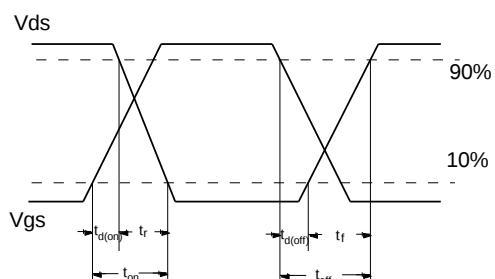
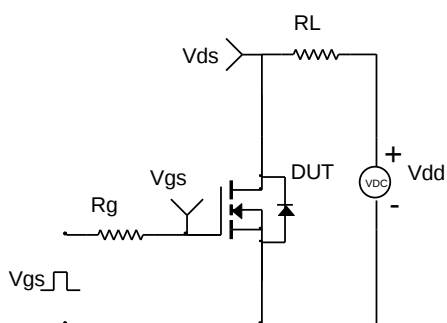
Figure 14: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

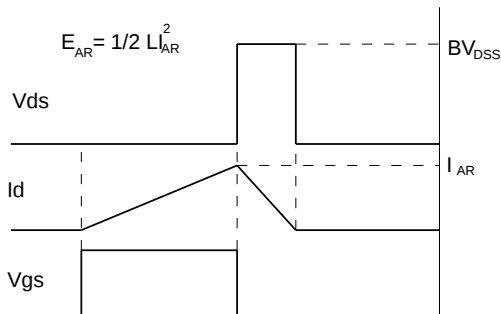
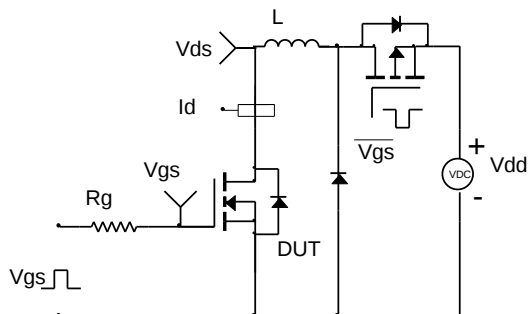
Gate Charge Test Circuit & Waveform



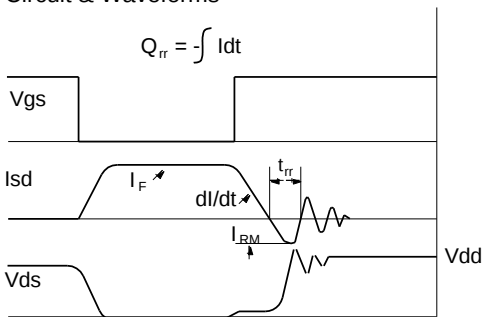
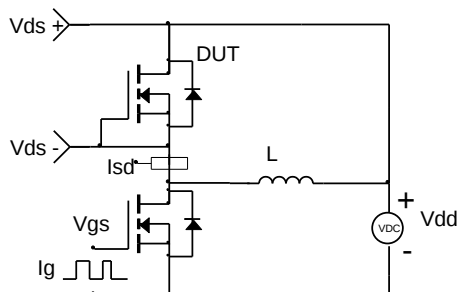
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Revision History

Revision	Released	Remark
Rev.1.1	2025	

Disclaimer

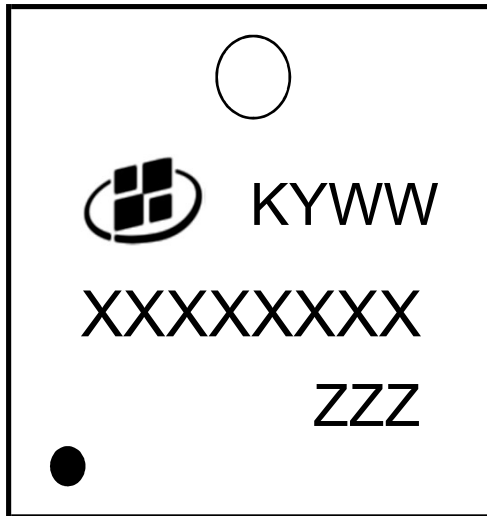
The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Alkaidsemi assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.

Marking Information



Note:

XXXXXXXX = Marking Code

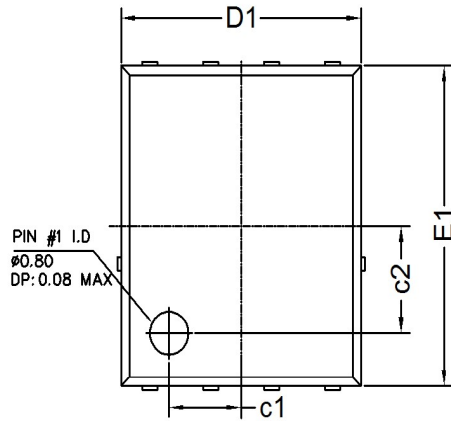
KYWW = Date code

ZZZ

Contact ALKAIDSEMI sales for detail information

POD#	PODGAR-2
REV#	Rev.B

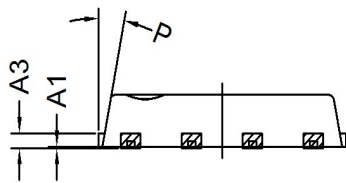
PDFN 5.15×6.15 PACKAGE OUTLINE DRAWING



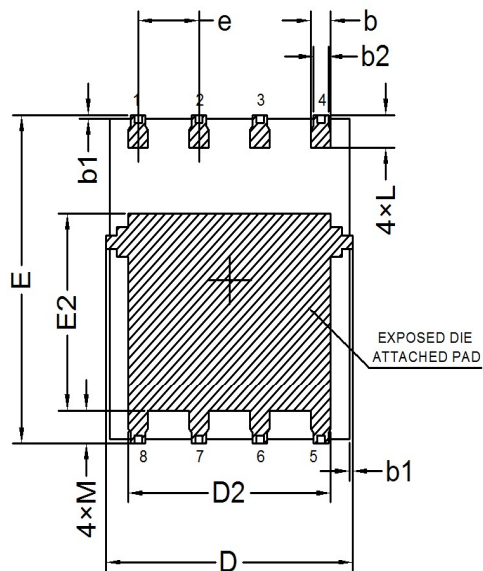
Top View



Side View



Side View

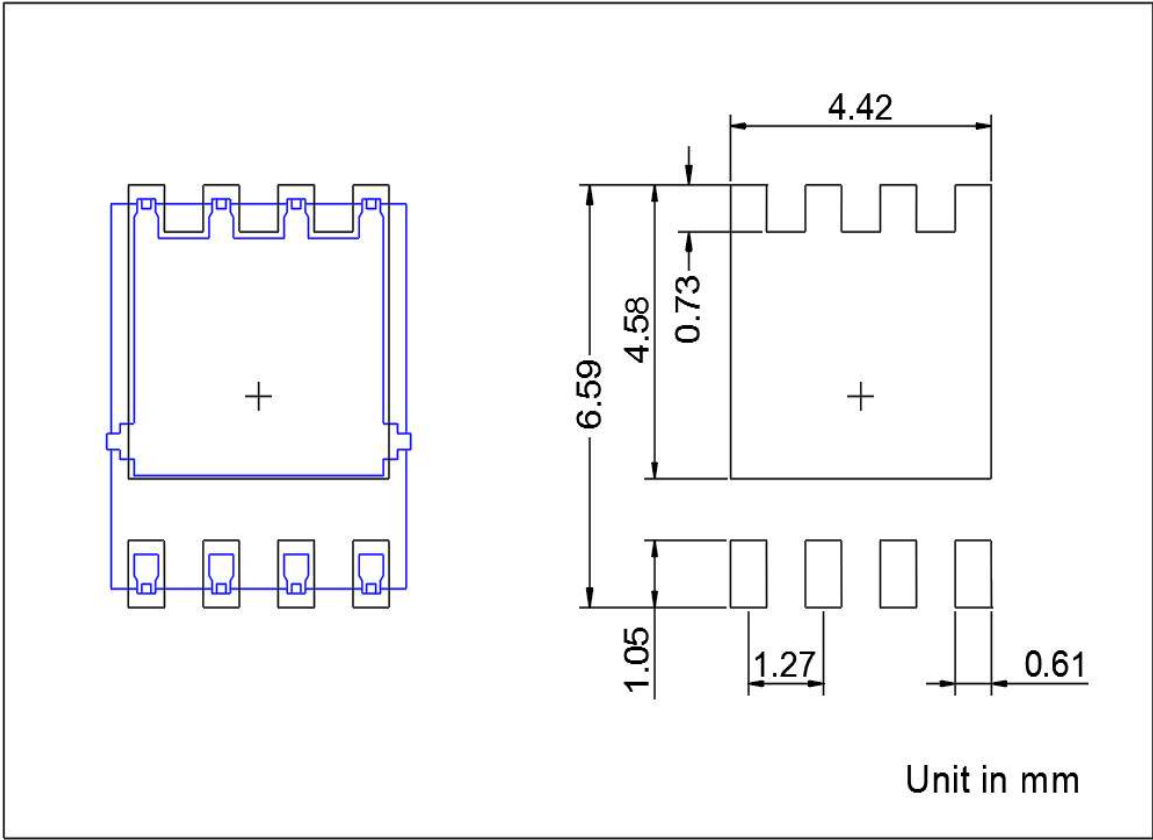


Bottom View

SYMBOL	MIN	MAX
A	0.95	1.05
A1	0.00	0.05
A3	0.25 REF	
b	0.31	0.51
b1	0.03	0.13
b2	0.21	0.41
c1	1.50 REF	
c2	2.00 REF	
D	5.15 BSC	
D1	5.00 BSC	
D2	4.00	4.20
E	6.15 BSC	
E1	6.00 BSC	
E2	3.60	3.80
e	1.27 BSC	
L	0.51	0.71
M	0.51	0.71
P	10°	12°

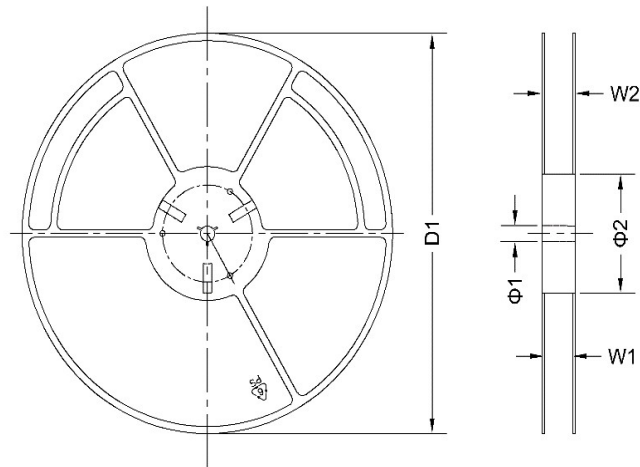
Unit in mm

RECOMMENDED LAND PATTERN



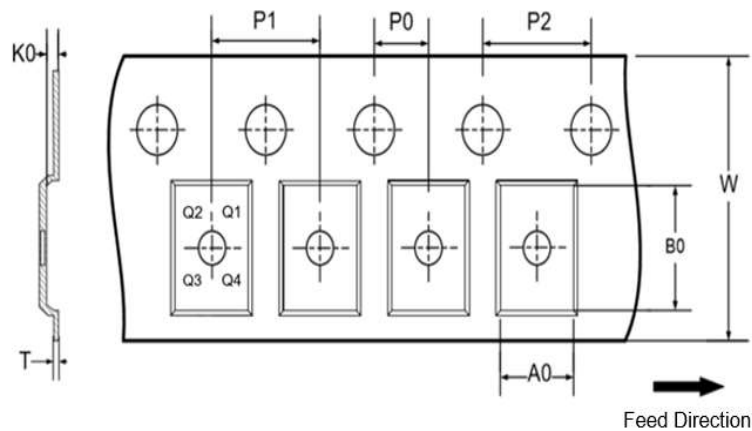
PAK#	PAKGAR-1
REV#	Rev.A

Reel Dimensions



Reel Dimensions (Unit:mm)						
Reel A	D1	W1	W2	Φ1	Φ2	Material
	330	13.4	19.5	13.5	100	PS

Carrier Tape Dimensions



Carrier Tape Dimensions (Unit:mm)										
Tape A	P0	P1	P2	W	A0	B0	K0	T	Pin1 Quadrant	Material
	2	8	4	12	6.6	5.8	1.3	0.3	Q2	PS

Packing Information

Package Type	Tube or Reel	PCS/Reel (Tube)	Reel (Tube) /Inbox	MOQ PCS/Inbox	Inbox /Outbox	MPQ PCS/Outbox
PDFN 5.15×6.15	Reel	5000	2	10000	5	50000