

30V 1.5mohm N-channel SGT MOSFET
AKG3N015GL

Description:

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

Features:

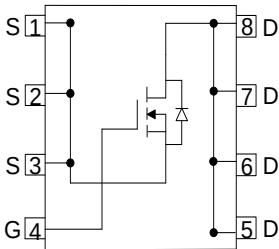
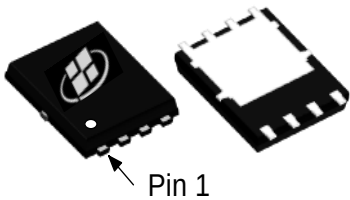
- Low FOM $R_{DS(ON)} \times Q_G$
- Ultra-low on-resistance
- RoHS compliant ^(Note 1)
- Halogen-free ^(Note 1)

Applications:

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

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(ON), max} @V_{GS} = 10V$	1.5	mΩ
I_D	165	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG3N015GL	PDFN5X6	AKG3N015GL	Tape Reel	5000PCS

Notes:

1. Contact ALKAIDSEMI sales for detail information

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) ^(Note 1)	165	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$)	104	A
I_{DM}	Drain Current - Pulsed ^(Note 2)	530	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ^(Note 3)	132	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	69	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	1.8	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady State ^(Note 4)	60	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5\text{ mH}$, $V_{DD} = 15\text{ V}$, $I_{AS} = 23\text{ A}$, $R_G = 25\ \Omega$, 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
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Static Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V},$			1	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA
$V_{GS(TH)}$	Gate Threshold voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1	1.7	2.5	V
$R_{DS(ON)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		1.3	1.5	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		2.2	2.8	m Ω

Dynamic Characteristics

C_{ISS}	Input Capacitance	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{ MHz}$		2874		pF
C_{OSS}	Output Capacitance			1151		pF
C_{RSS}	Reverse Transfer Capacitance			76		pF
R_G	Gate Resistance	$F = 1\text{ MHz}$		1.6		Ω

Switching Characteristics

$T_{D(ON)}$	Turn On Delay Time	$V_{DD} = 15\text{ V}, R_L = 0.75\text{ }\Omega,$ $V_{GS} = 10\text{ V}, R_G = 3\text{ }\Omega$		12		nS
T_R	Rise Time			48.5		nS
$T_{D(OFF)}$	Turn Off Delay Time			39.5		nS
T_F	Fall Time			14.5		nS
Q_G	Total Gate Charge	$V_{DD} = 15\text{ V}, I_D = 20\text{ A},$ $V_{GS} = 10\text{ V}$		46.5		nC
Q_{GS}	Gate-Source Charge			7.7		nC
Q_{GD}	Gate-Drain Charge			11		nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Body-Diode Forward Current				165	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current ^(NOTE 1)				530	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 1 A		0.65	1	V
T _{RR}	Reverse recovery time	V _{DD} = 20 V, I _D = 20 A, di/dt = 100 A/μS		46.1		nS
Q _{RR}	Reverse recovery charge			43.7		nC
I _{RRM}	Peak Reverse Recovery Current			1.6		A

Electrical Characteristics Diagrams

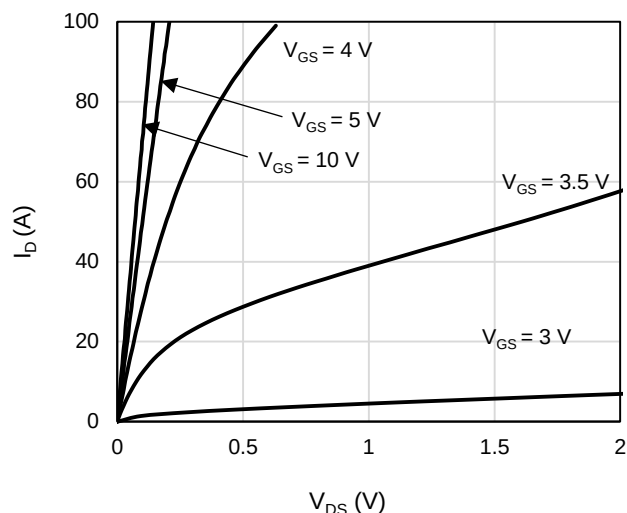


Figure 1: On-Region Characteristics

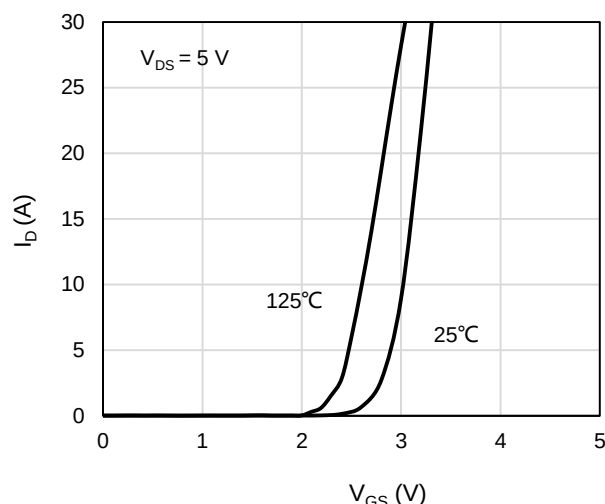


Figure 2: Transfer Characteristics

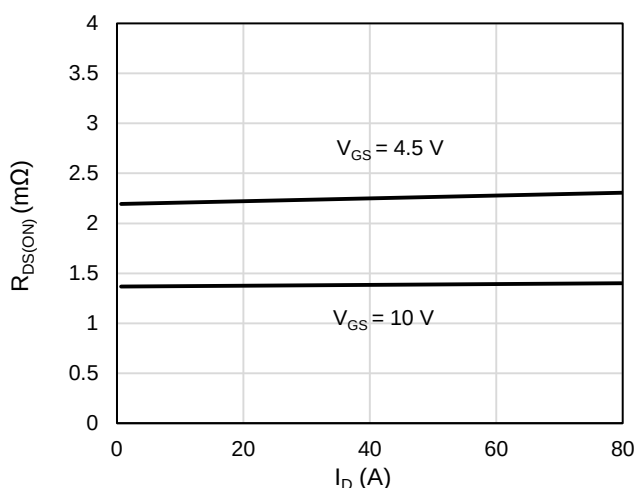


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

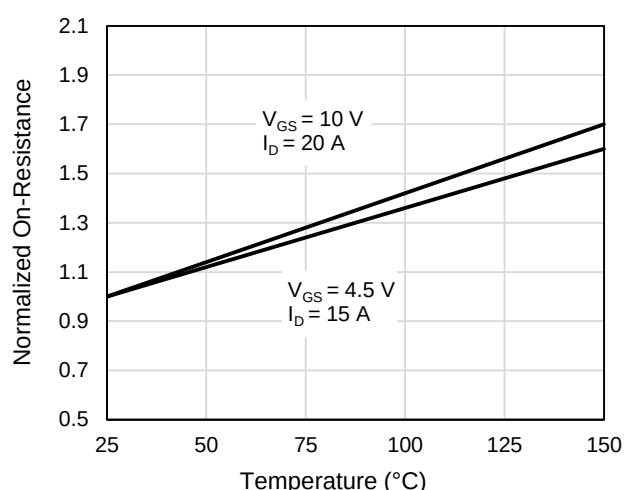


Figure 4: On-Resistance vs. Junction Temperature

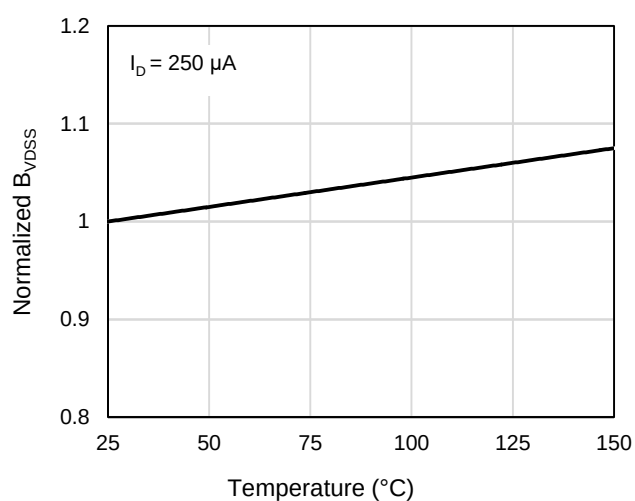


Figure 5: Breakdown Voltage vs. Junction Temperature

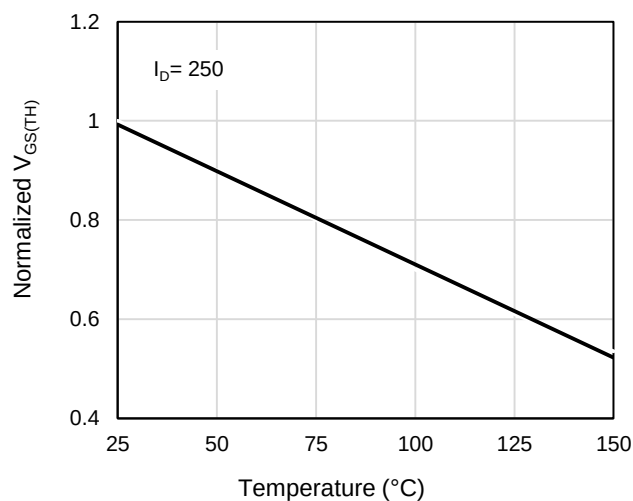


Figure 6: Threshold Voltage vs. Junction Temperature

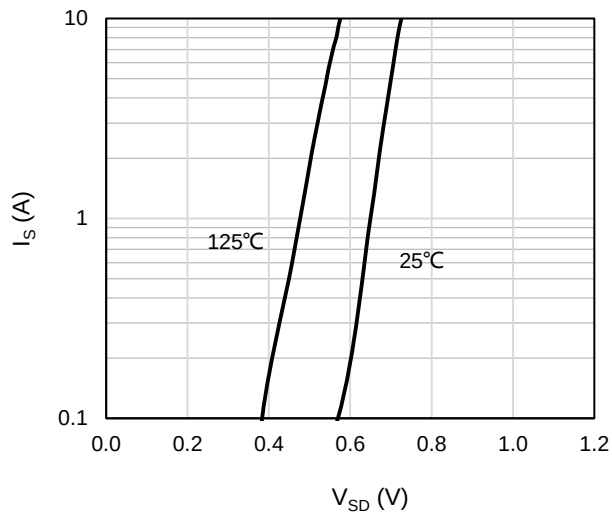


Figure 7: Body-Diode Characteristics

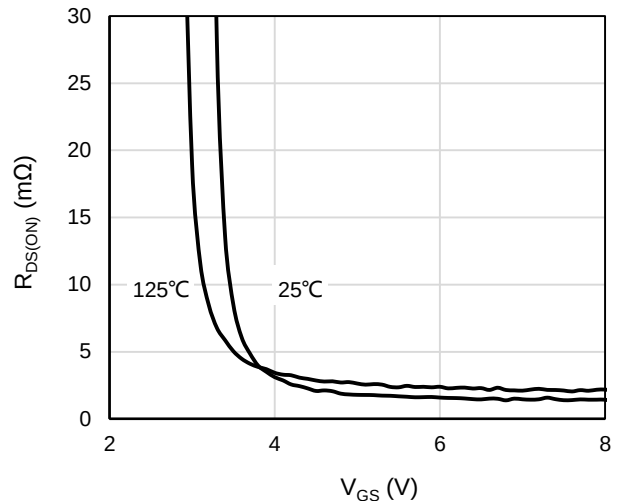


Figure 8: On-Resistance vs. Gate-Source Voltage

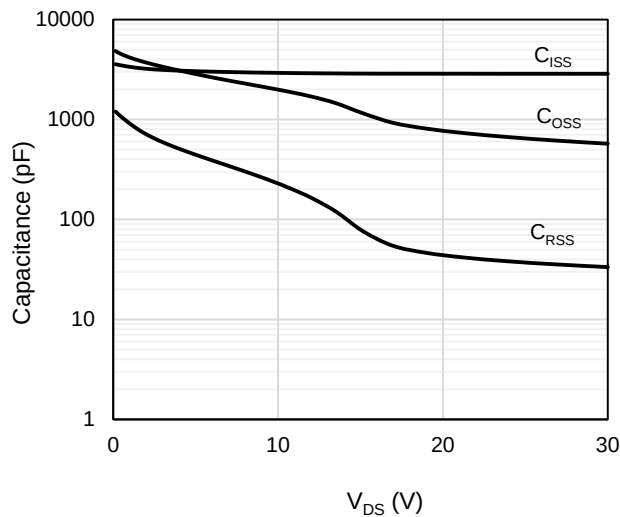


Figure 9: Capacitance Characteristics

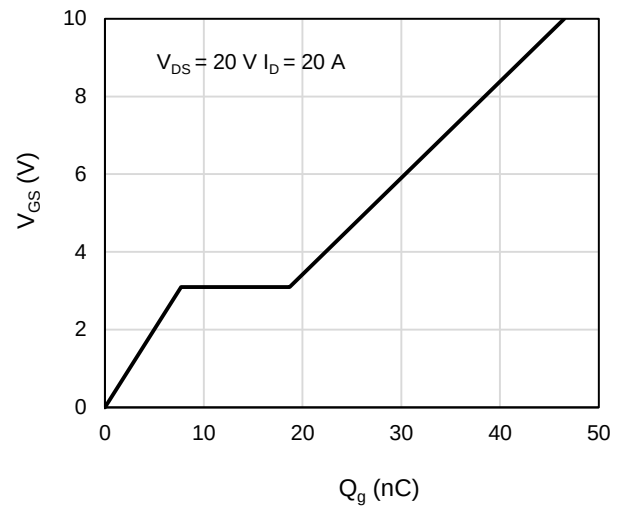


Figure 10: Gate-Charge Characteristics

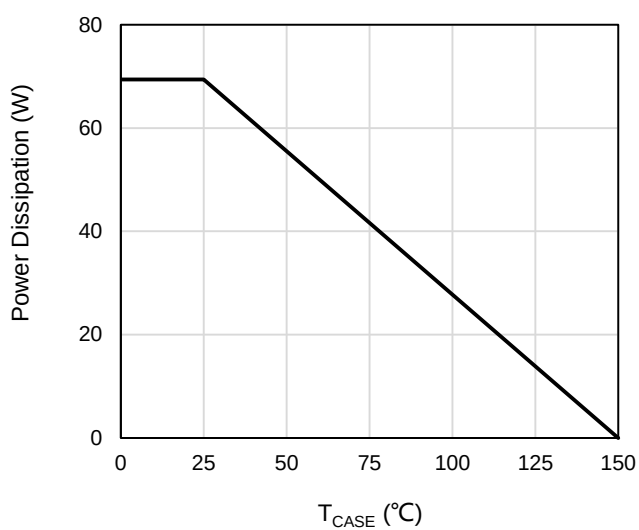


Figure 11: Power De-rating

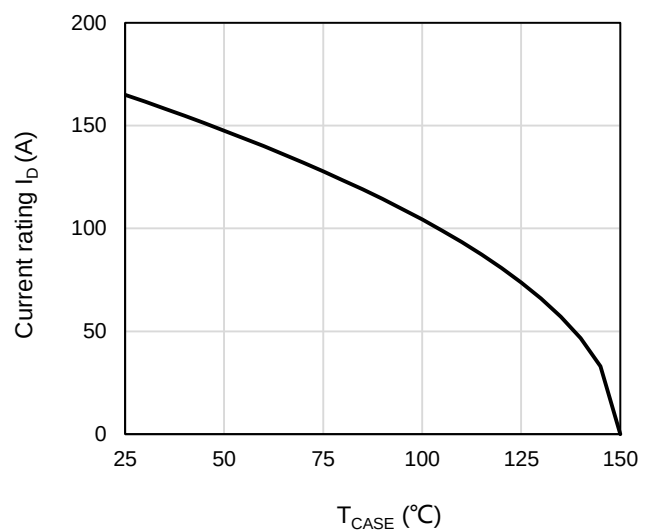


Figure 12: Current De-rating

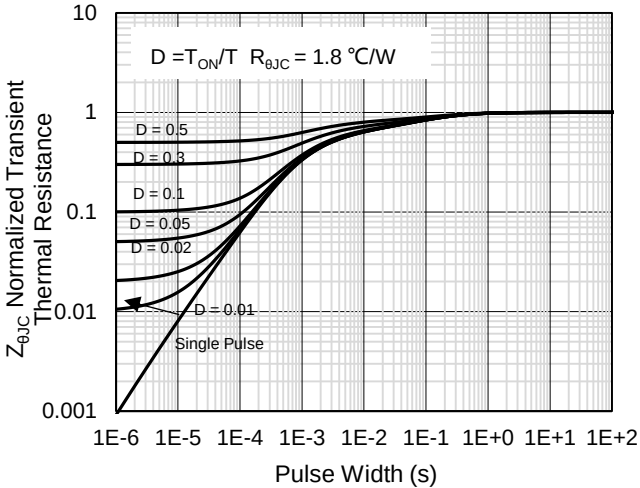


Figure 13: Normalized Maximum Transient Thermal Impedance

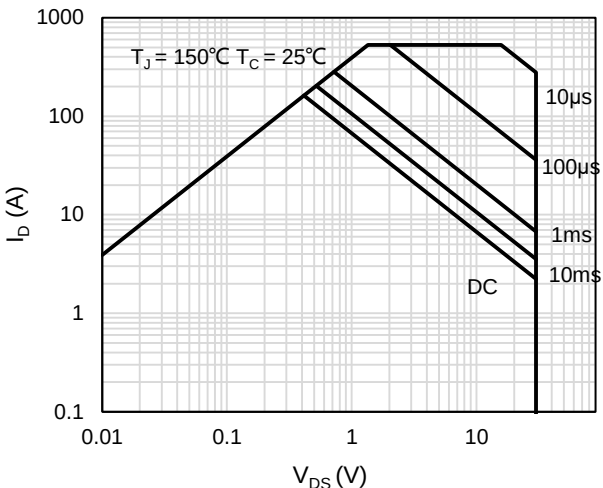
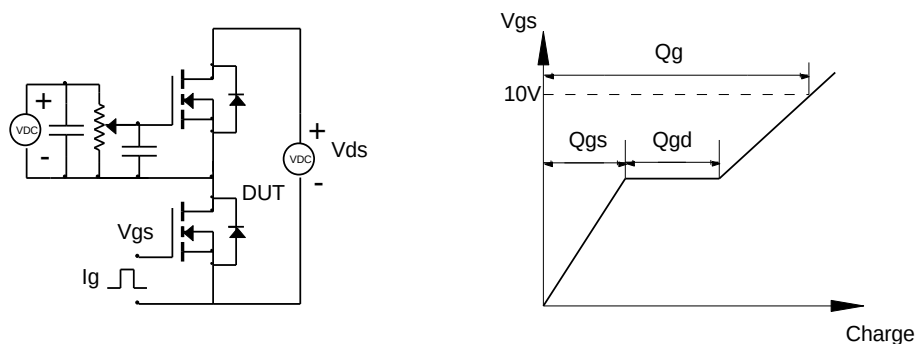


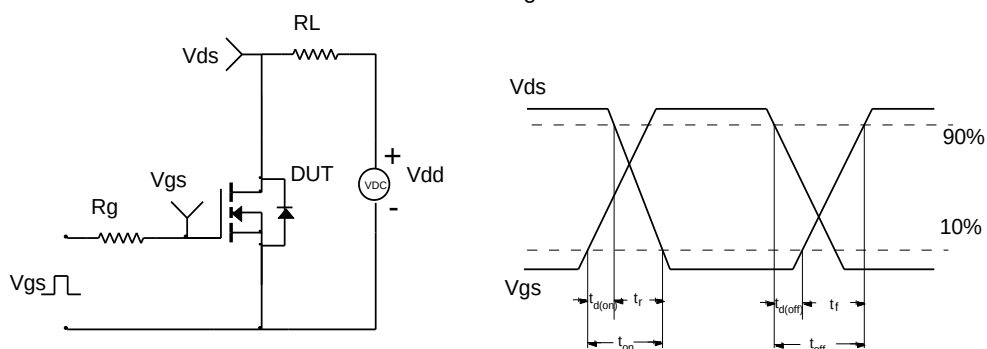
Figure 14: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

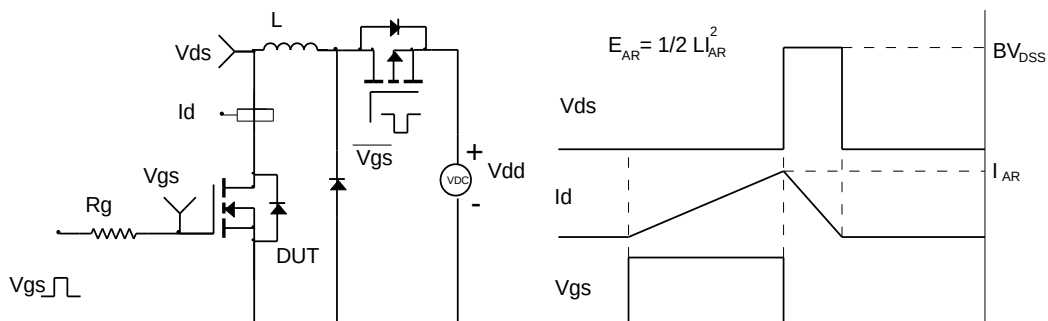
Gate Charge Test Circuit & Waveform



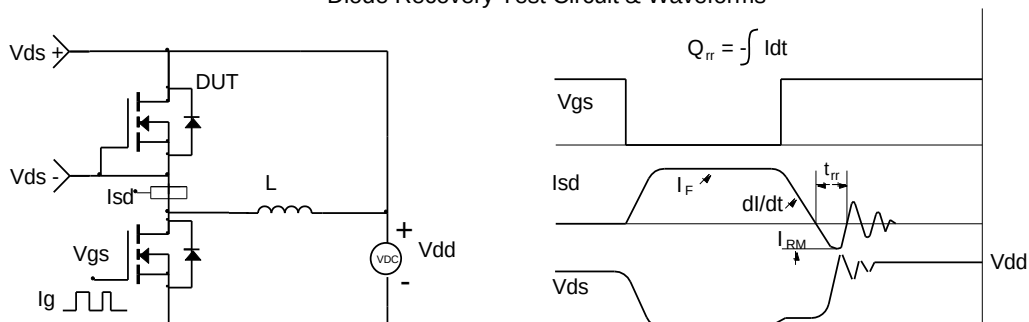
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

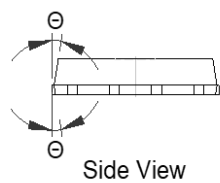
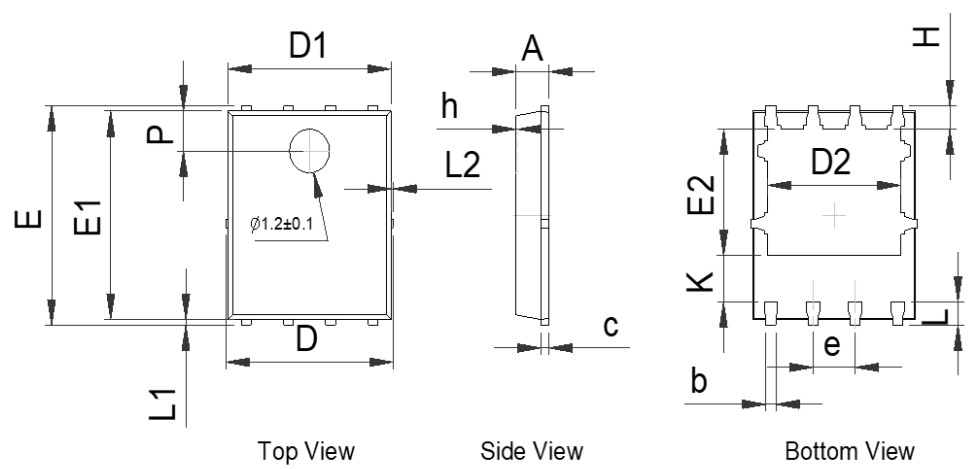


Diode Recovery Test Circuit & Waveforms





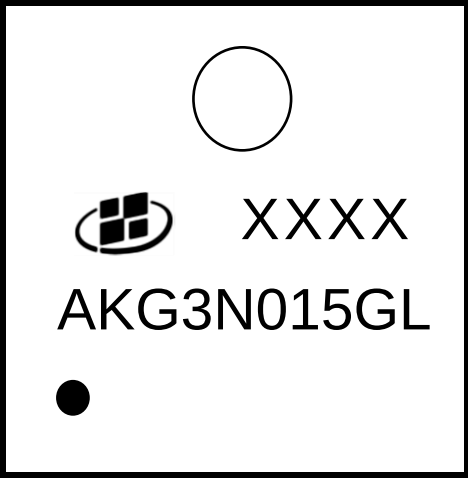
Package Outlines



SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.20	0.30	0.40
c	0.21	0.25	0.34
D	—	—	5.10
D1	4.80	4.90	5.00
D2	3.91	4.01	4.11
e	1.27 BSC		
E	5.90	6.00	6.10
E1	5.65	5.75	5.85
E2	3.375	3.475	3.575
H	0.55	0.65	0.75
h	—	—	0.10
K	1.20	—	—
L	0.55	0.65	0.75
L1	0.05	0.15	0.25
L2	—	—	0.12
θ	8°	10°	12°
p	1.00	1.10	1.20

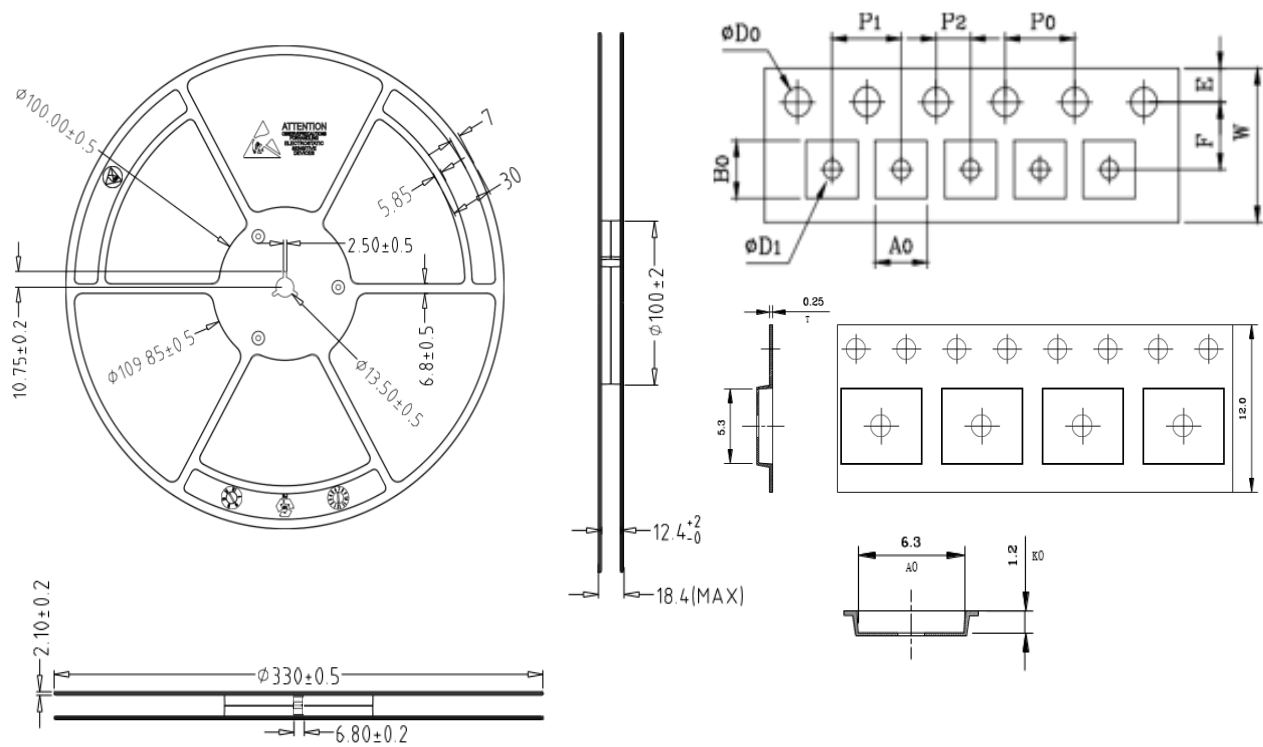
Unit in mm

Marking Information



Note:
AKG3N015GL = Product Name Code
XXXX = Date code
Contact ALKAIDSEMI sales for detail information

Tape & Reel Information



DIMENSIONS							
(Unit: mm)							
W	P1	E	F	D0	D1	P0	P2
12	8	1.75	5.5	1.5	1.5	4	2
A0	B0	K0	T				
6.3	5.3	1.2	0.25				

All dimensions are nominal

Revision History

Revision	Release Date	Remark
Rev.1.1	2023/7/7	

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.