

40V 2.5mohm N-channel SGT MOSFET

AKG40N025G

Description:

This N channel SGT MOSFET has been designed to very low on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, especial for high efficiency power management applications.

Features:

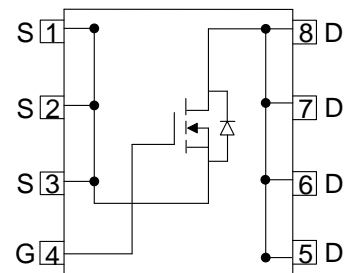
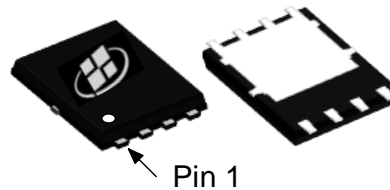
- N-channel, optimized for high-speed smooth switching
- Excellent Gate Charge $\times R_{DS(on)}$ (FOM)
- Very low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)

Applications:

- DC-DC Conversion
- Power tools
- Motor Driving
- Power Management

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(on), max} @ V_{GS} = 10\text{ V}$	2.5	m Ω
I_D	115	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG40N025G	PDFN5X6	AKG40N025G	13 inches Reel	5000 PCS

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	40	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) (Note 1)	115	A
	Drain Current -Continuous ($T_C = 100^\circ\text{C}$)	74	A
I_{DM}	Drain Current - Pulsed (Note 2)	460	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	144	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	62.5	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	2	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Steady State (Note 4)	65	$^\circ\text{C}/\text{W}$

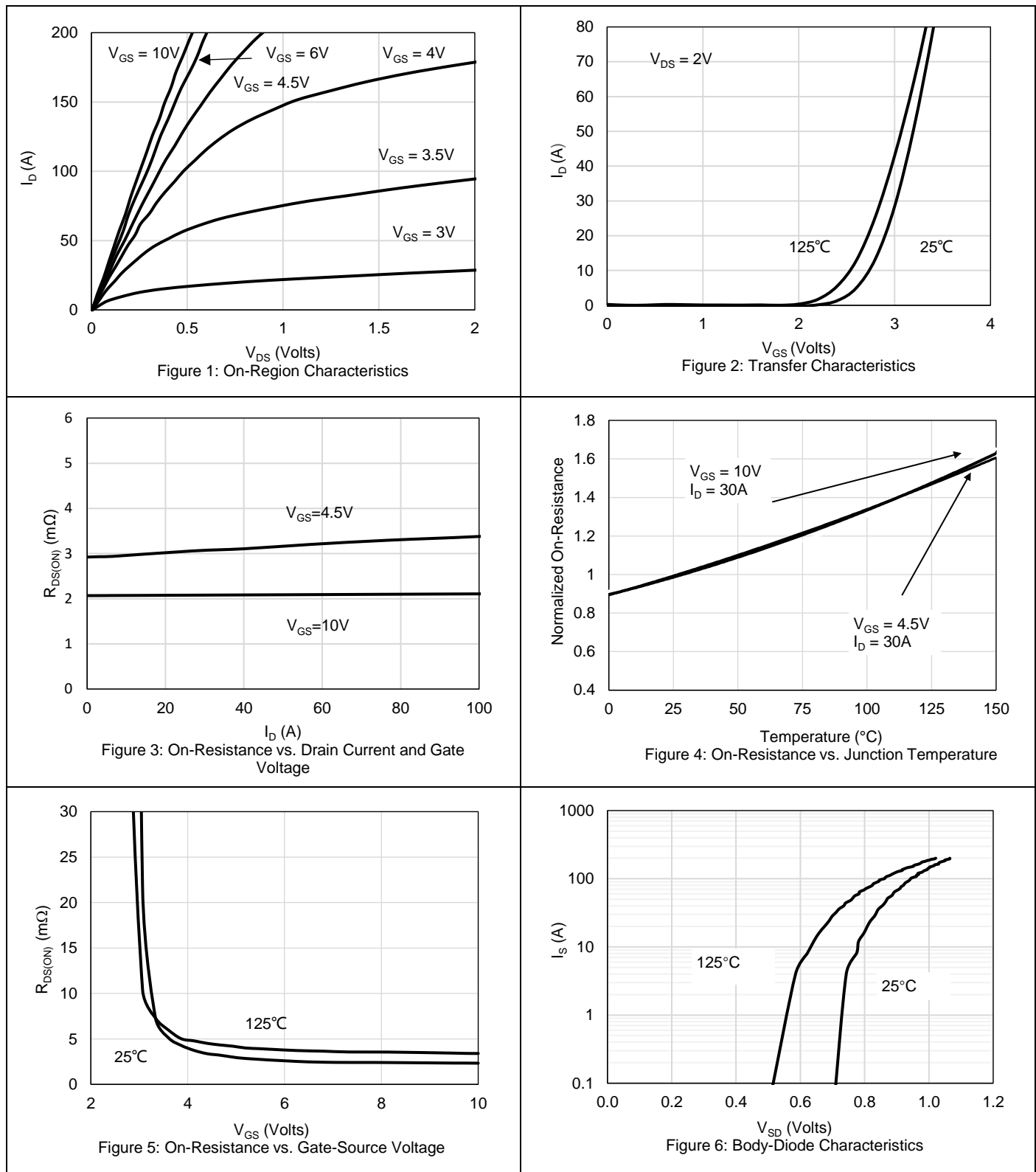
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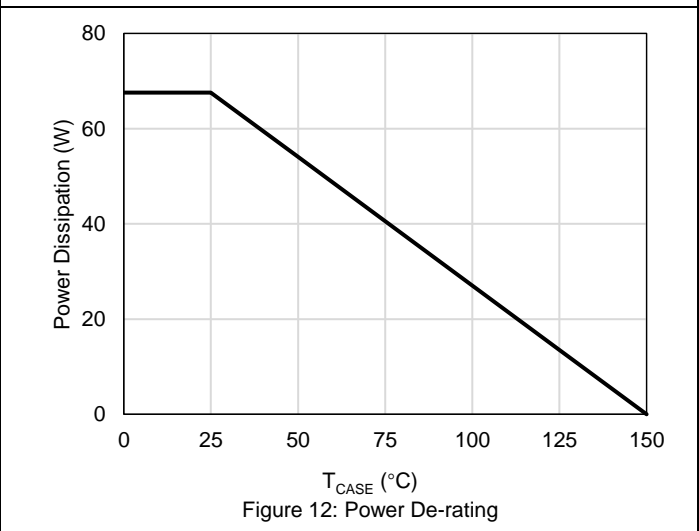
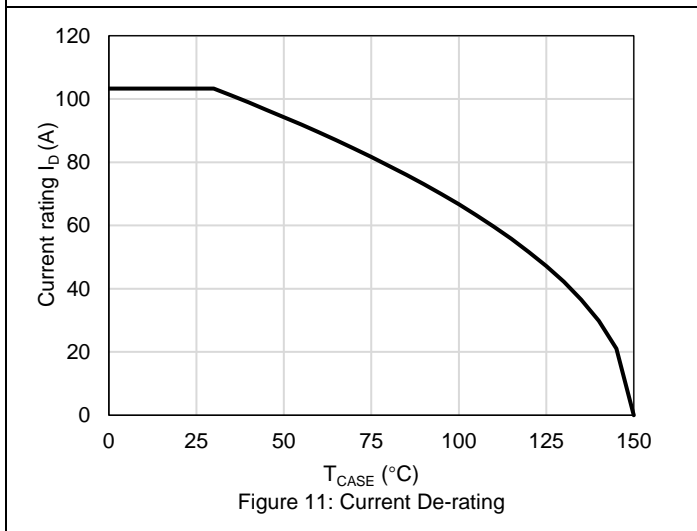
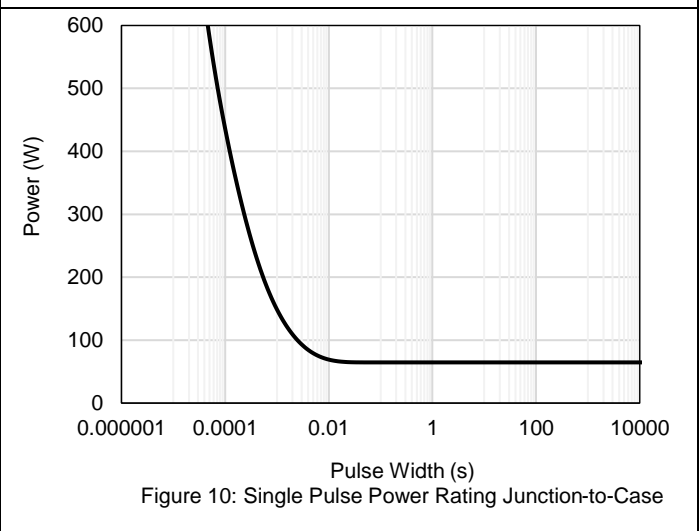
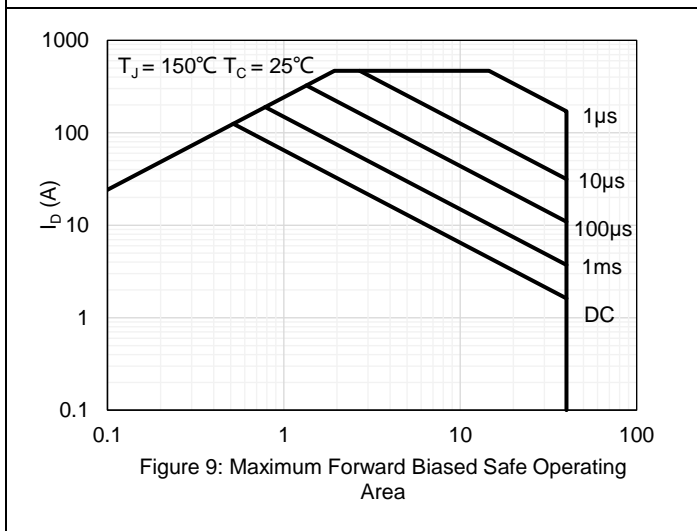
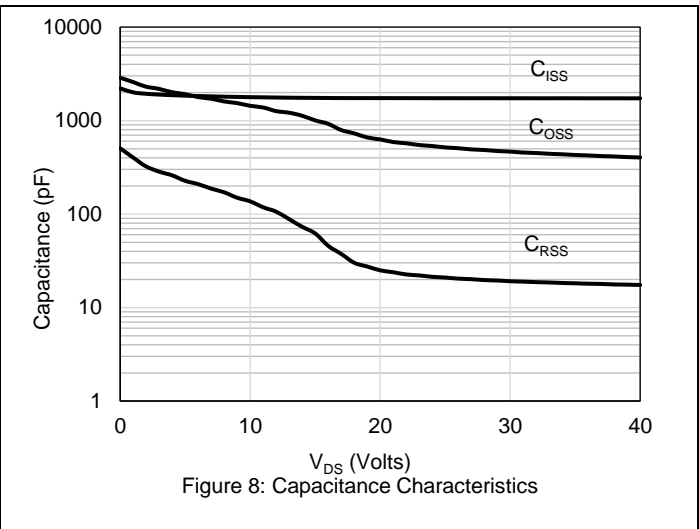
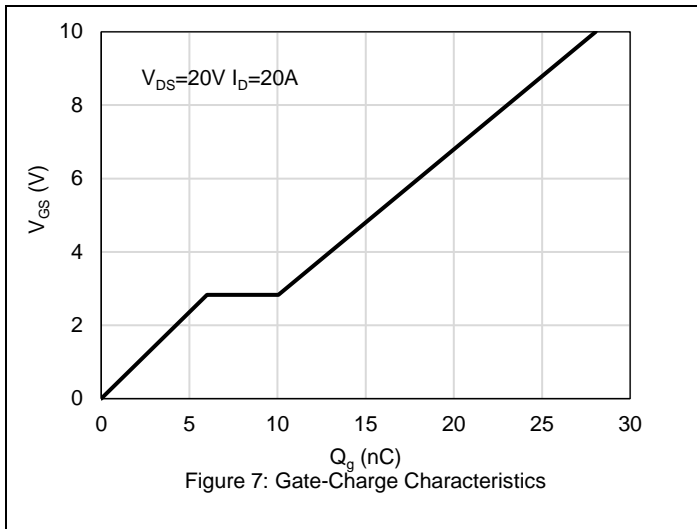
1. The max drain current rating is limited by T_{JMAX}
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5 \text{ mH}$, $V_{DD} = 20 \text{ V}$, $I_{AS} = 24 \text{ A}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
4. Mount on minimum PCB layout

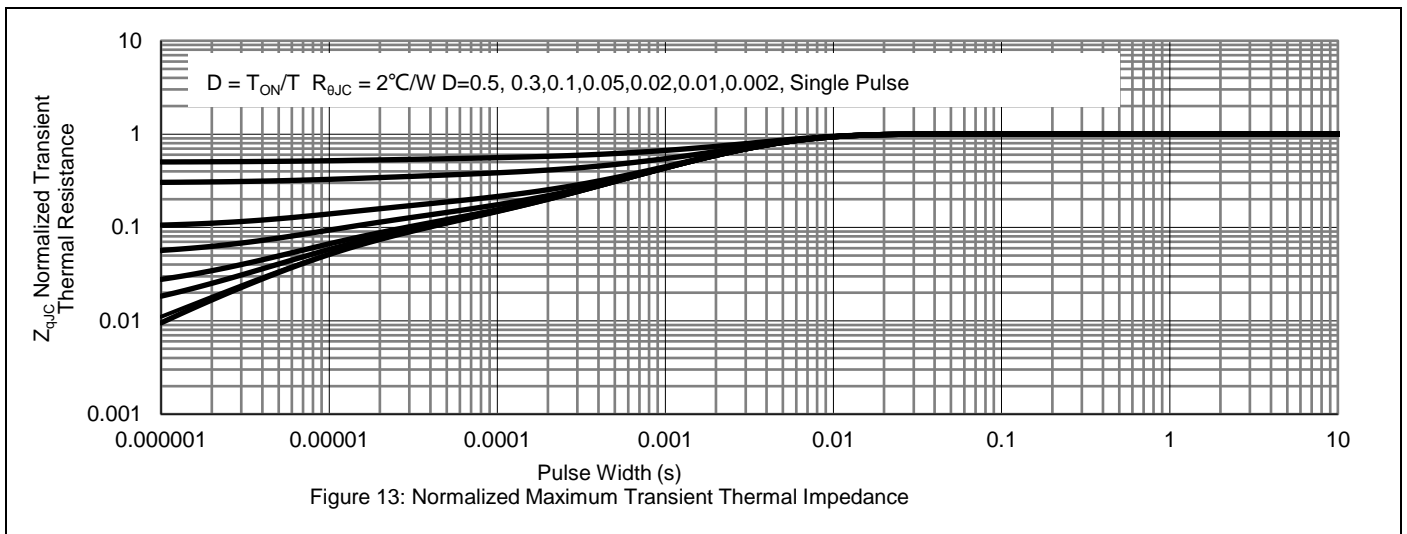
Electrical Characteristics (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 40 V, V _{GS} = 0 V, T _J = 25°C			1	μA
		V _{DS} = 40 V, V _{GS} = 0 V, T _J = 150°C			250	
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	1.2	1.7	2.2	V
R _{DS(ON)}	Drain-Source on-state resistance	V _{GS} = 10 V, I _D = 30 A		2	2.5	mΩ
		V _{GS} = 4.5 V, I _D = 30 A		3	3.75	
Dynamic Characteristics						
C _{ISS}	Input capacitance	V _{DS} = 20 V, V _{GS} = 0 V, F = 1 MHz		1827		pF
C _{OSS}	Output capacitance			623		pF
C _{RSS}	Reverse transfer capacitance			22		pF
R _G	Gate resistance	F = 1 MHz		3.8		Ω
Switching Characteristics						
T _{D(ON)}	Turn On Delay Time	V _{DD} = 20 V, I _D = 20 A, V _{GS} = 10 V, R _G = 6 Ω		6.2		ns
T _R	RiseTime			27.4		ns
T _{D(OFF)}	Turn Off Delay Time			39.8		ns
T _F	Fall Time			16.6		ns
Q _G	Total Gate Charge	V _{DD} = 20 V, I _D = 20 A, V _{GS} = 10 V		28.3		nC
Q _{GS}	Gate-Source Charge			6.2		nC
Q _{GD}	Gate-Drain Charge			4.6		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body-Diode Forward Current				115	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current (NOTE 1)				460	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 20 A		0.79	1.2	V
T _{RR}	Reverse recovery time	I _S = 20 A di/dt = 100 A/μS		36		ns
Q _{RR}	Reverse recovery charge				20	

Electrical Characteristics Diagrams

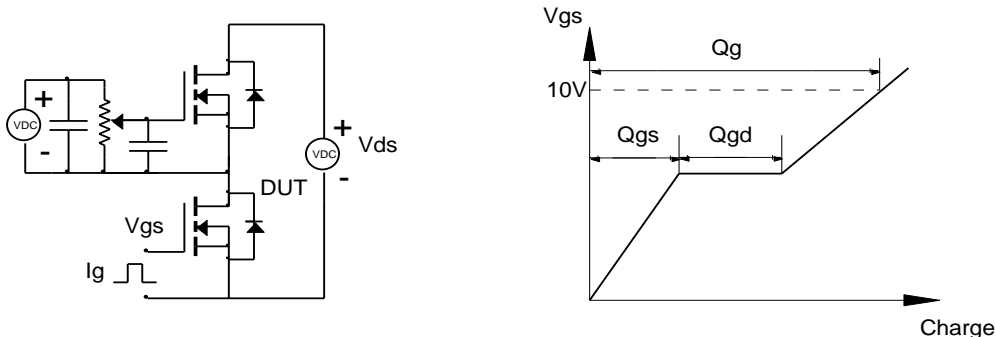




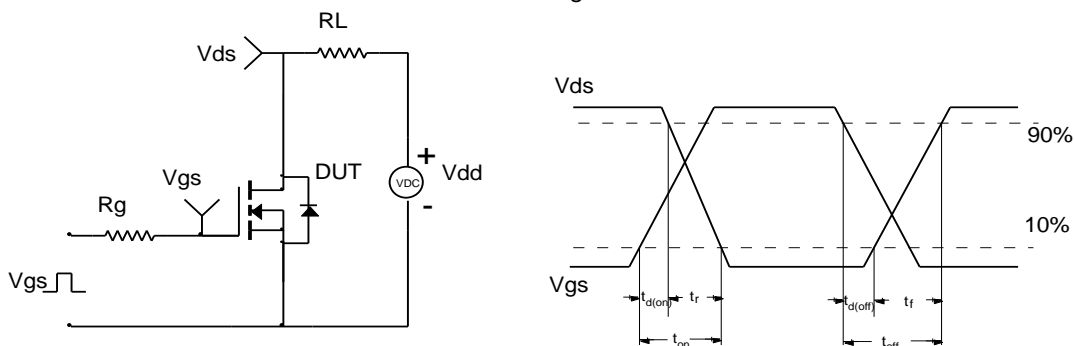


Test Circuit and Waveform

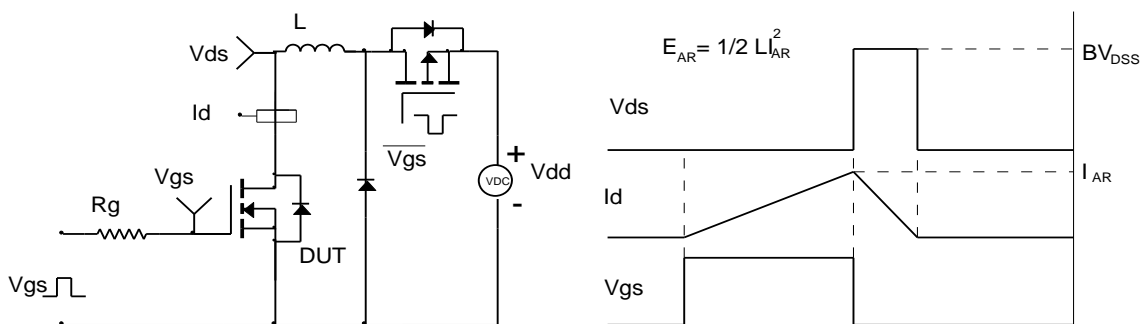
Gate Charge Test Circuit & Waveform



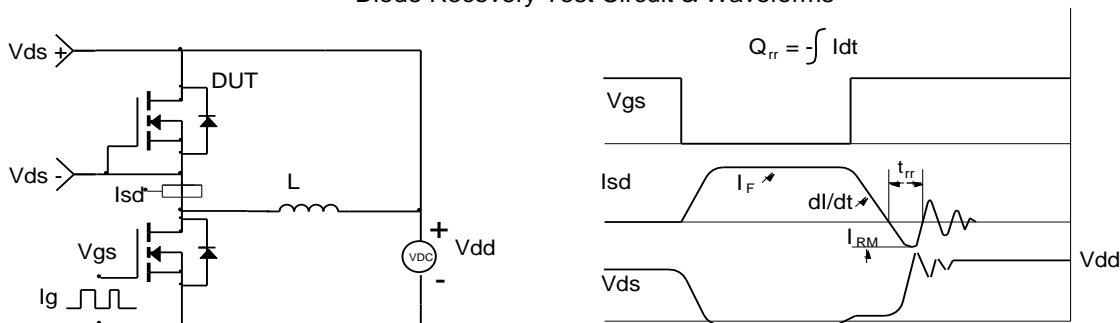
Resistive Switching Test Circuit & Waveforms



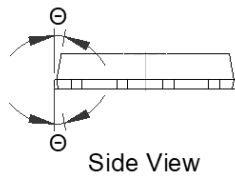
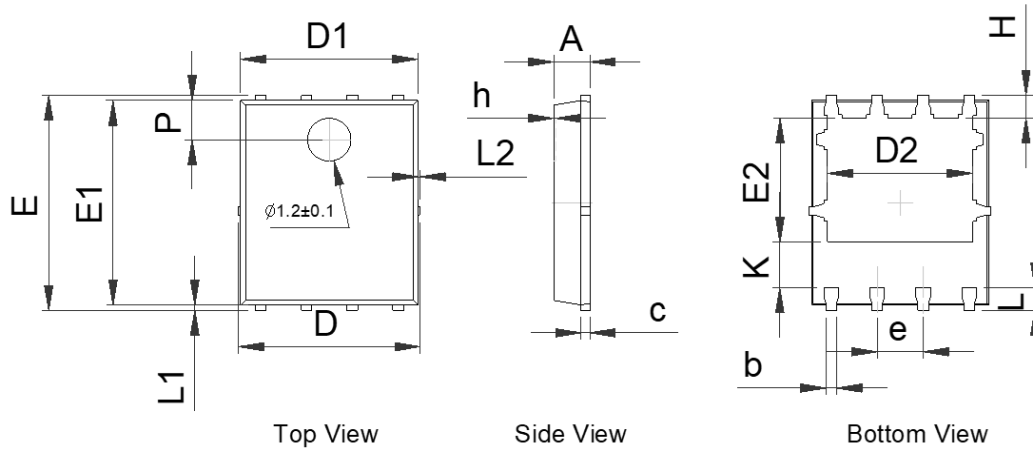
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



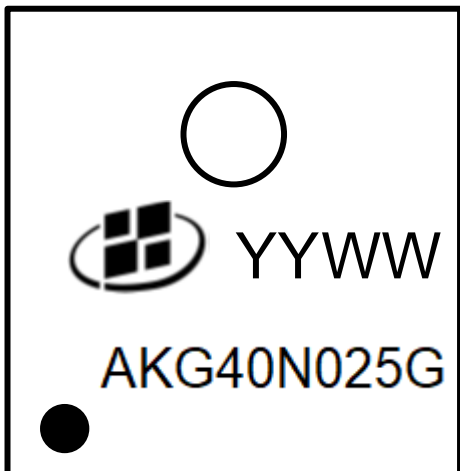
Package Outlines



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



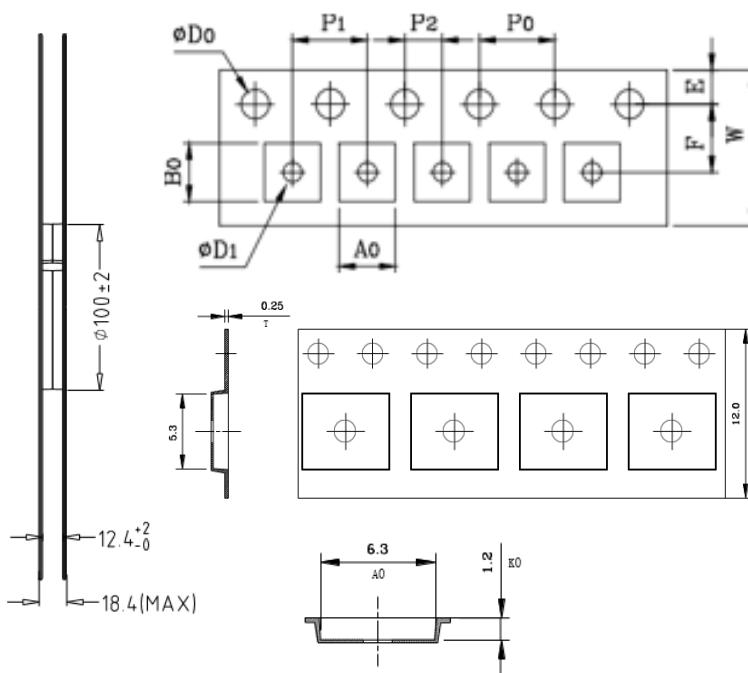
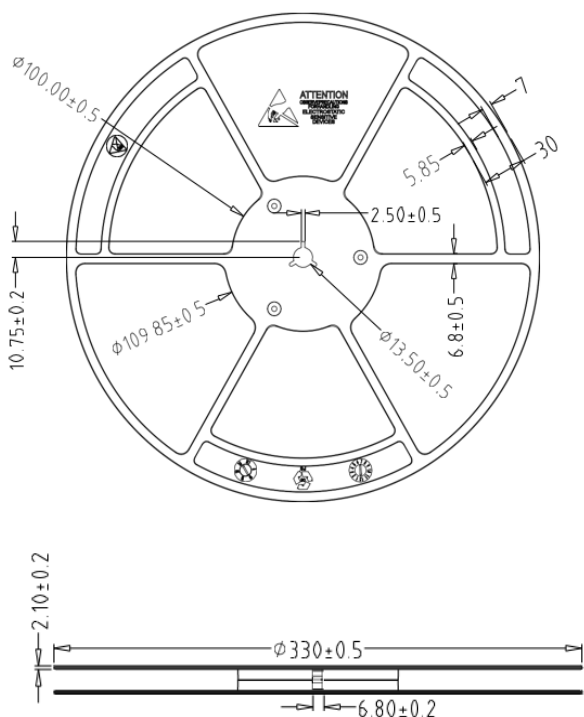
Note:

YYWW = Date code

AKG40N025G = Product Name Code

Contact ALKAIDSEMI sales for detail information

Reel and Tube 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	2023-07-07	

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.

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