

40V 1.1mohm N-channel SGT MOSFET
AKG40N011G

Description:

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

Features:

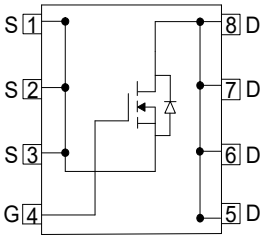
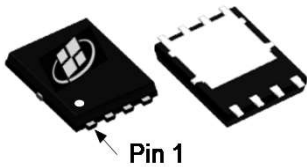
- Low $R_{DS(ON)}$
- RoHS compliant (Note 1)
- Halogen-free (Note 1)
- Excellent Gate Charge $\times R_{DS(ON)}$ (FOM)
- N-channel, optimized for high-speed smooth switching

Applications:

- Power Management
- Motor Drivers
- DC-DC Converter

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(ON), max} @V_{GS} = 10V$	1.1	m Ω
I_D	200	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG40N011G	PDFN5X6	AKG40N011G	13 Inches 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	40	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) ^(Note 1)	238	A
	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) ^(Note 2)	200	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$)	150	A
I_{DM}	Drain Current - Pulsed ^(Note 2,3)	600	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ^(Note 4)	441	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	104	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	1.2	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady State ^(Note 5)	45	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is silicon limited
2. The max drain current rating is package limited
3. Repetitive Rating: Pulse width limited by maximum junction temperature
4. $L = 0.5 \text{ mH}$, $V_{DD} = 20 \text{ V}$, $I_{AS} = 42 \text{ A}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
5. 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	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	40			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$			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	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.2	1.7	2.2	V
$R_{DS(ON)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		0.9	1.1	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 30\text{ A}$		1.3	1.5	$\text{m}\Omega$

Dynamic Characteristics

C_{ISS}	Input Capacitance	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{ MHz}$		4988		pF
C_{OSS}	Output Capacitance			1738		pF
C_{RSS}	Reverse Transfer Capacitance			71		pF
R_G	Gate Resistance	$F = 1\text{ MHz}$		5.5		Ω

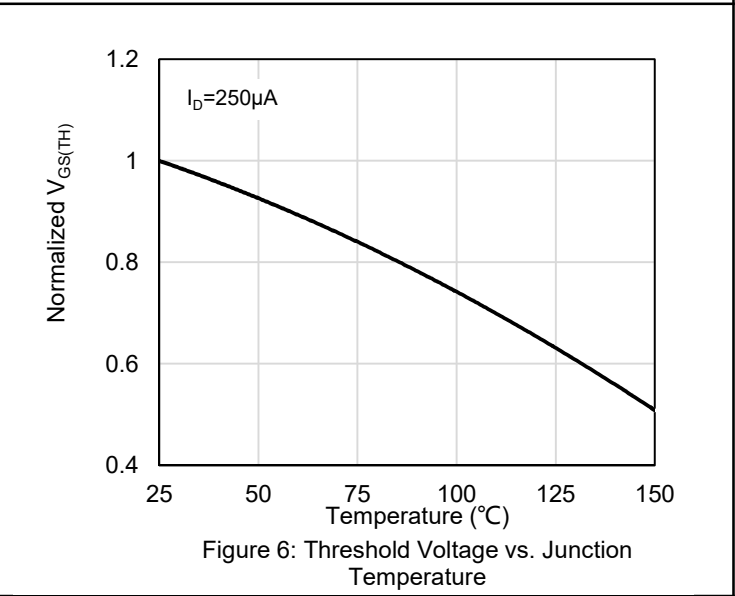
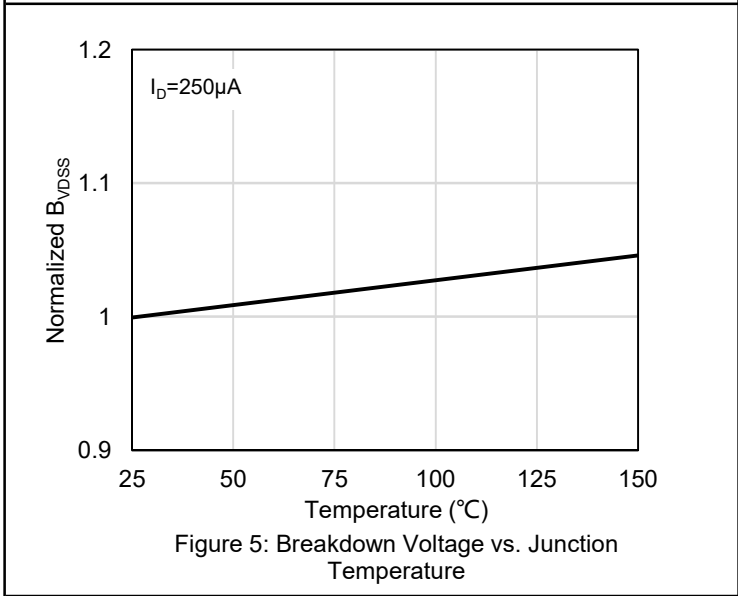
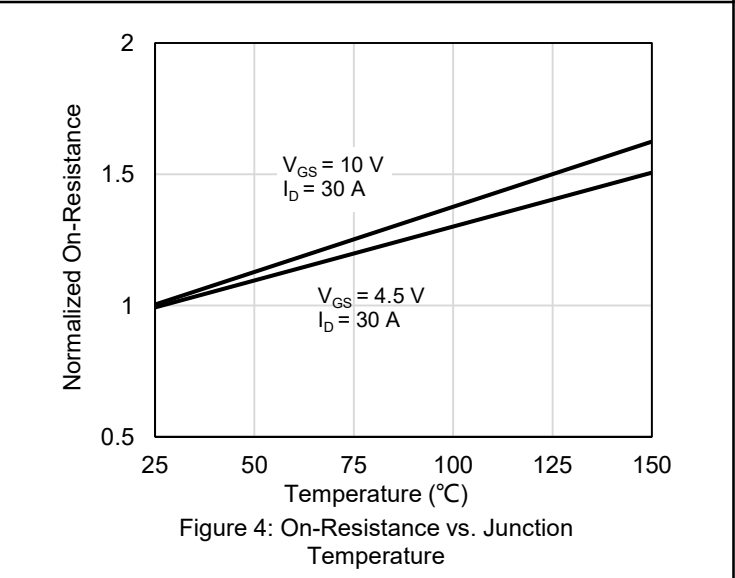
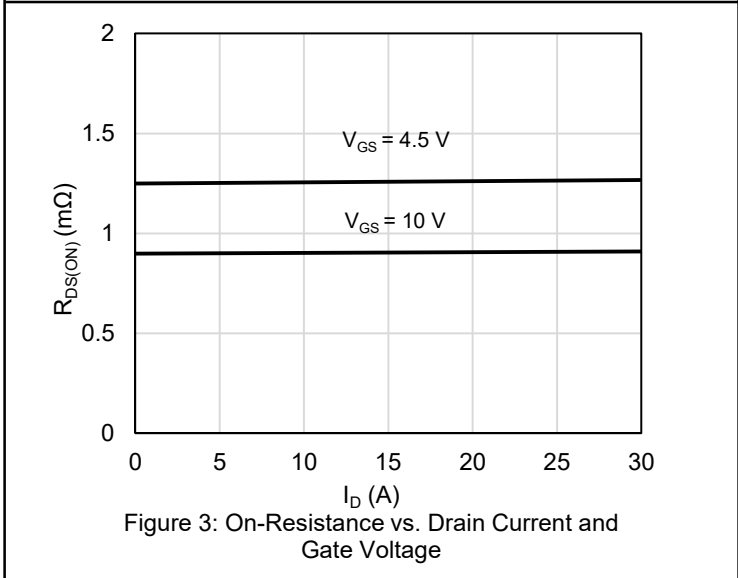
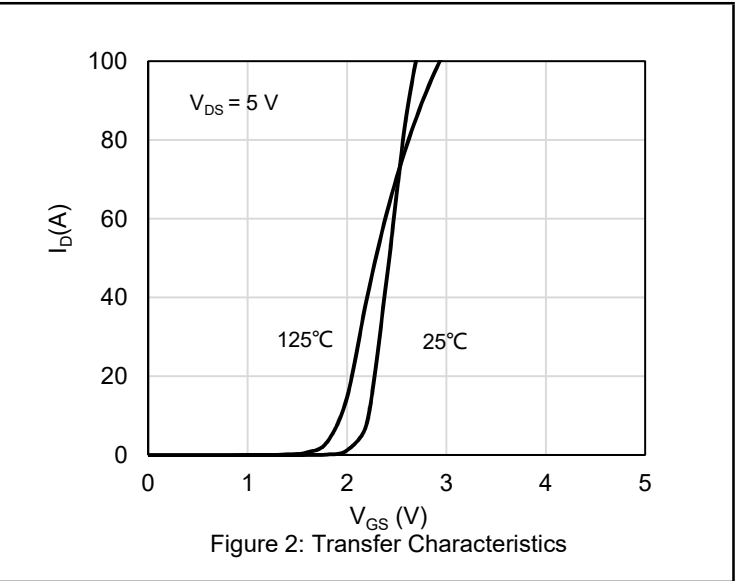
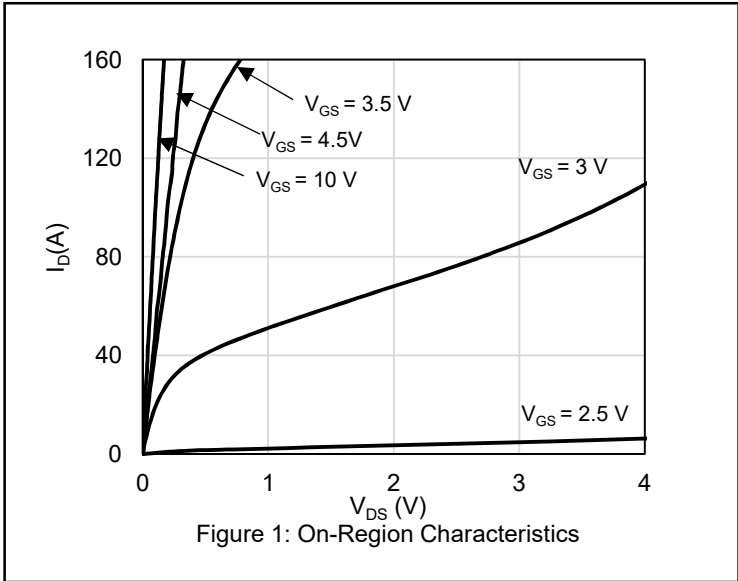
Switching Characteristics

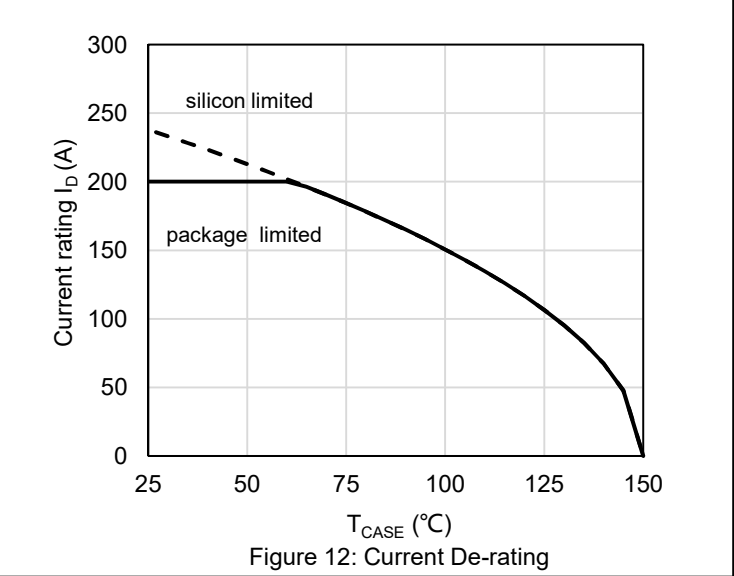
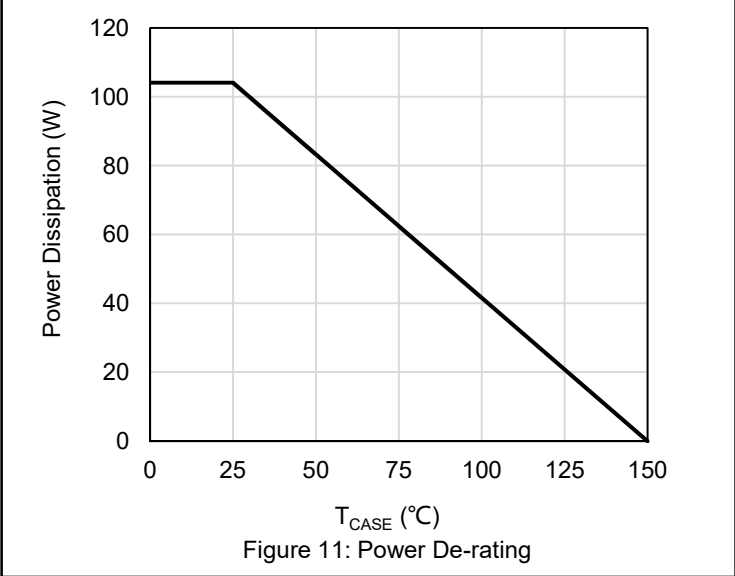
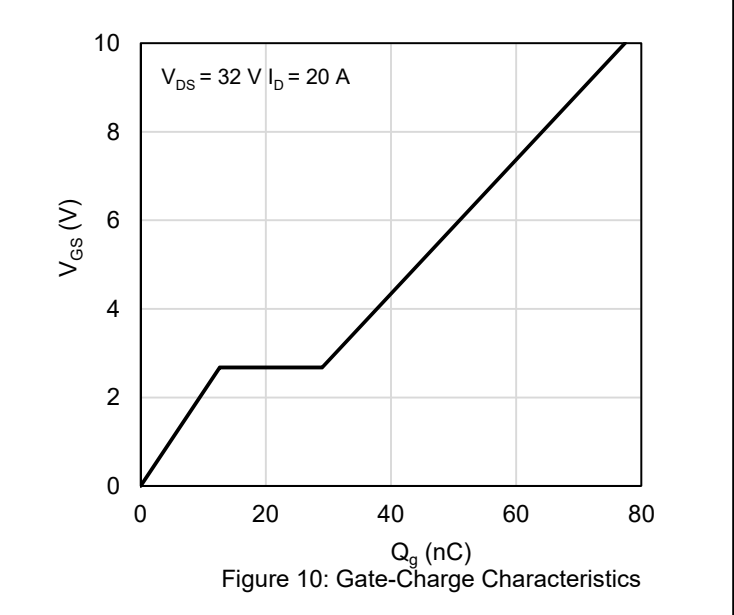
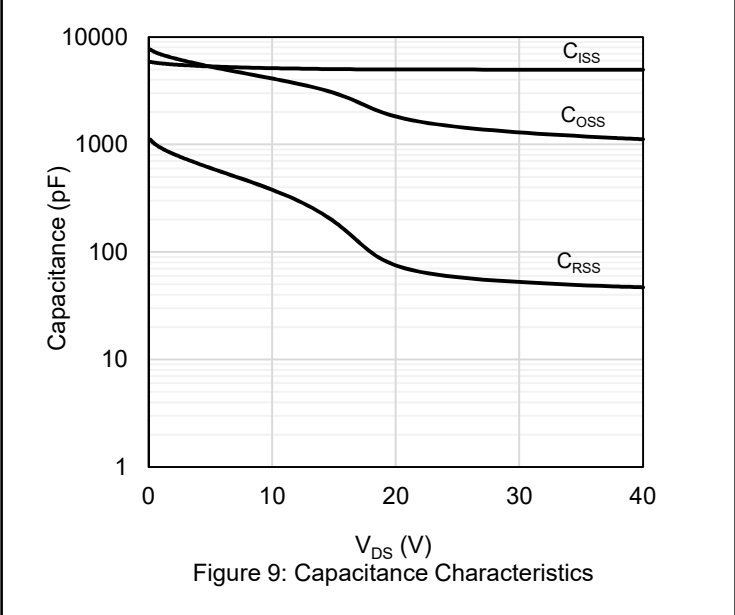
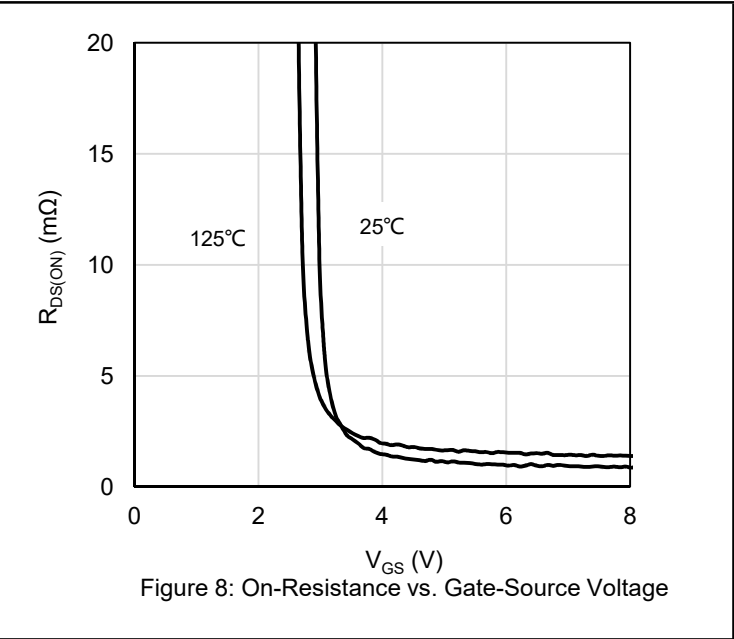
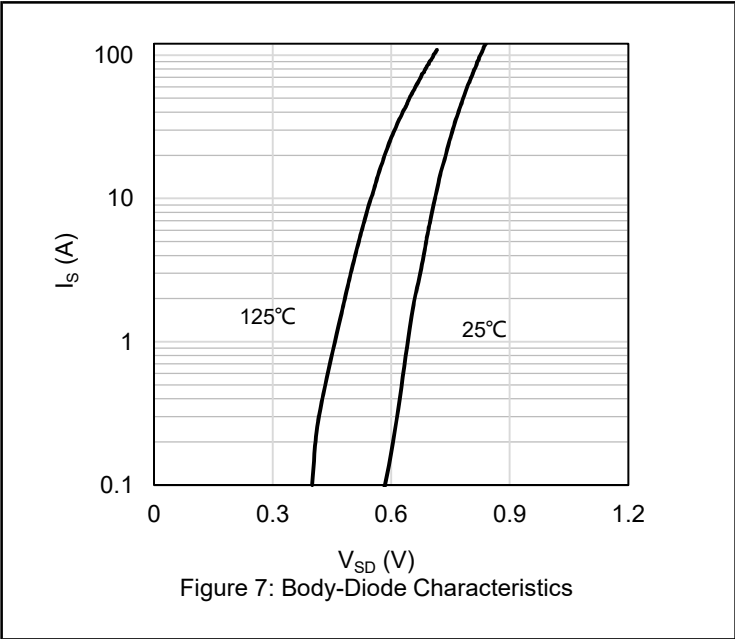
$T_{D(ON)}$	Turn On Delay Time	$V_{DD} = 20\text{ V}, R_L = 1\text{ }\Omega,$ $V_{GS} = 10\text{ V}, R_G = 10\text{ }\Omega$		13		nS
T_R	Rise Time			58		nS
$T_{D(OFF)}$	Turn Off Delay Time			182		nS
T_F	Fall Time			149		nS
Q_G	Total Gate Charge	$V_{DD} = 32\text{ V}, I_D = 20\text{ A},$ $V_{GS} = 10\text{ V}$		77		nC
Q_{GS}	Gate-Source Charge			12.6		nC
Q_{GD}	Gate-Drain Charge			16.4		nC

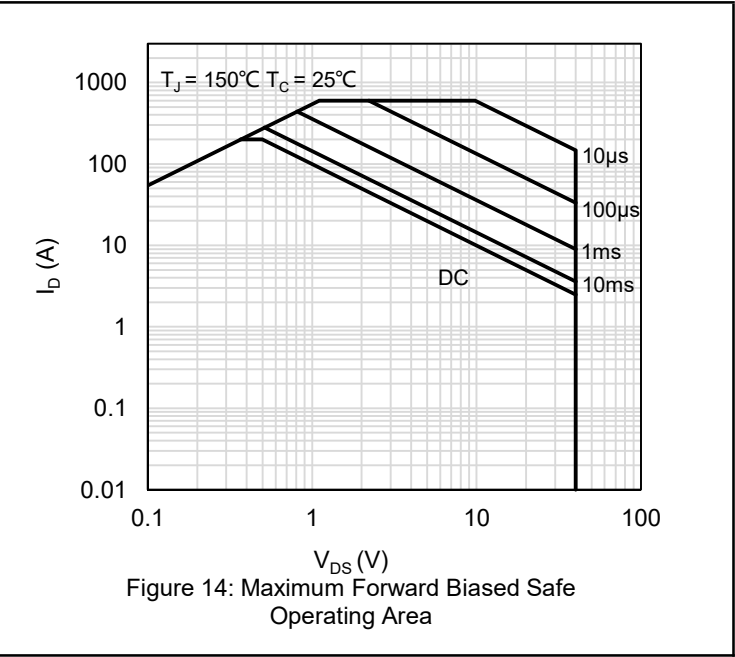
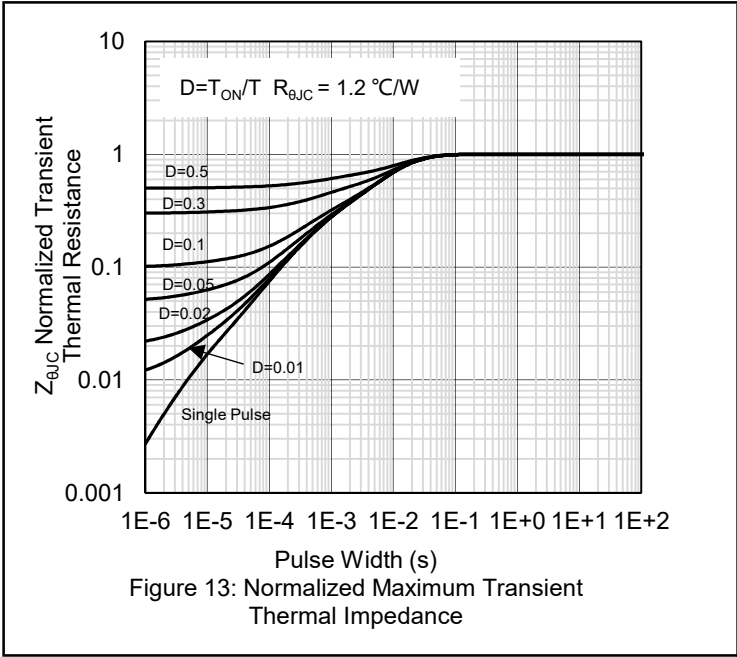
Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Body-Diode Forward Current			200	A
I_{SM}	Maximum Pulsed Body-Diode Forward Current ^(NOTE 2)			800	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1\text{ A}$		0.65	V
T_{RR}	Reverse Recovery Time	$V_{DD} = 20\text{ V}, I_D = 20\text{ A},$ $di/dt = 100\text{ A}/\mu\text{S}$		53.5	nS
Q_{RR}	Reverse Recovery Charge			60	nC
I_{RRM}	Peak Reverse Recovery Current			2	A

Electrical Characteristics Diagrams

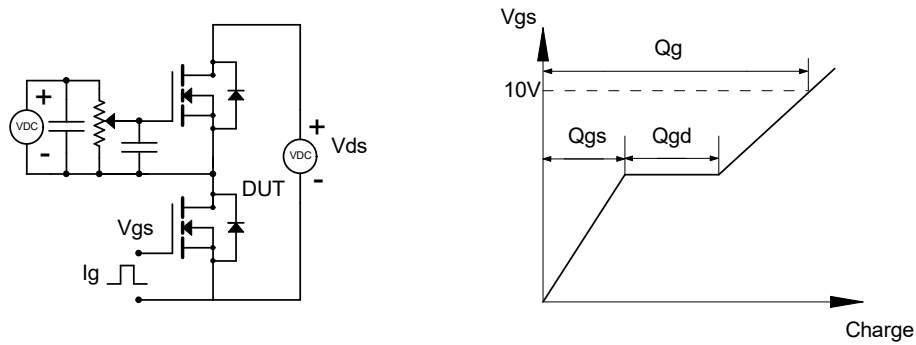




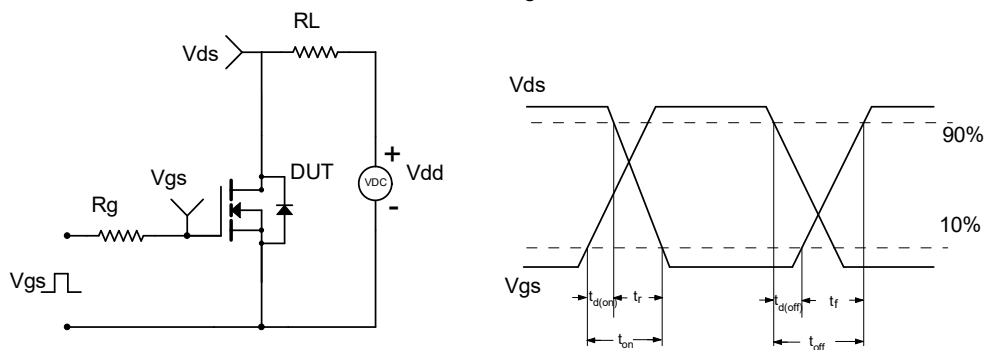


Test Circuit and Waveform

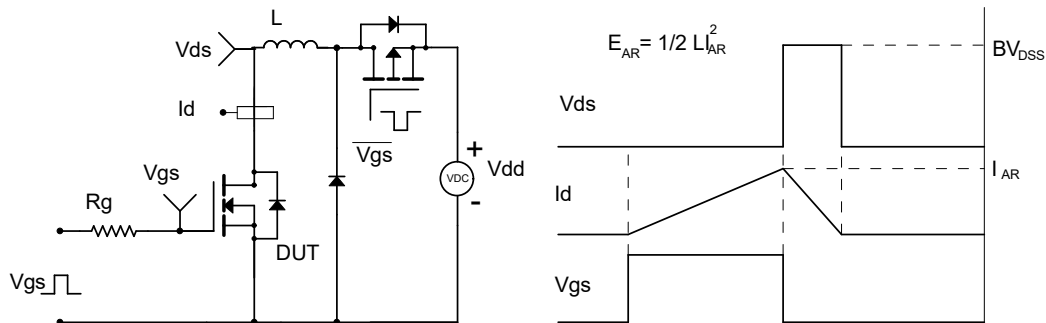
Gate Charge Test Circuit & Waveform



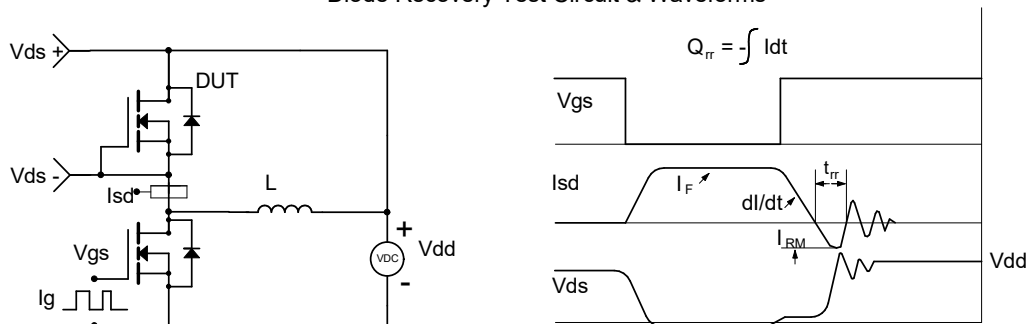
Resistive Switching Test Circuit & Waveforms



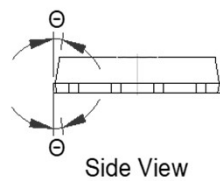
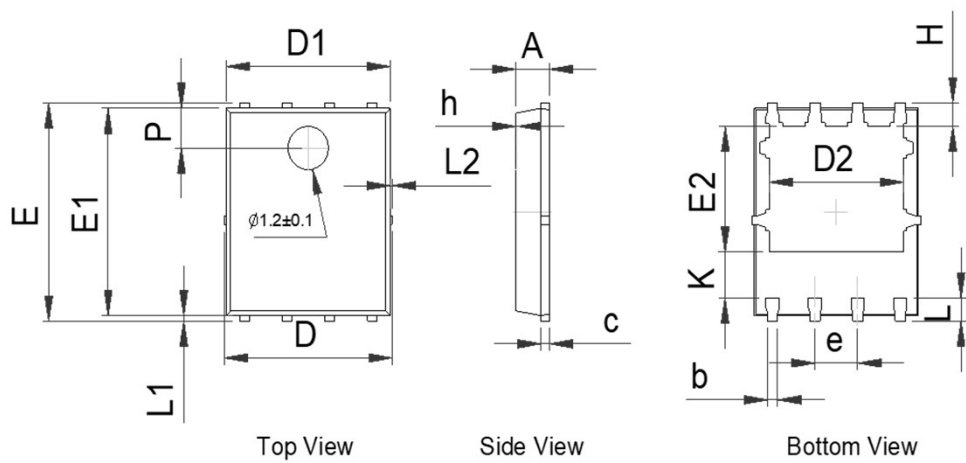
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



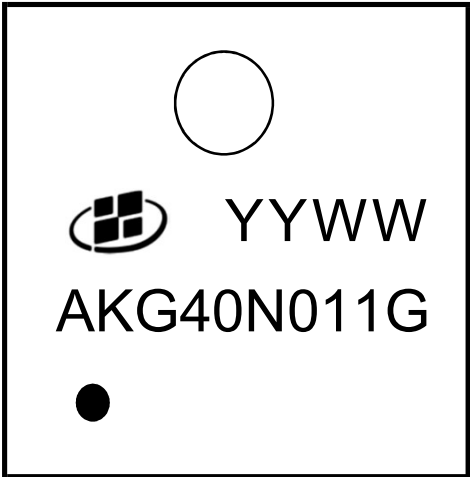
Package Outlines



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

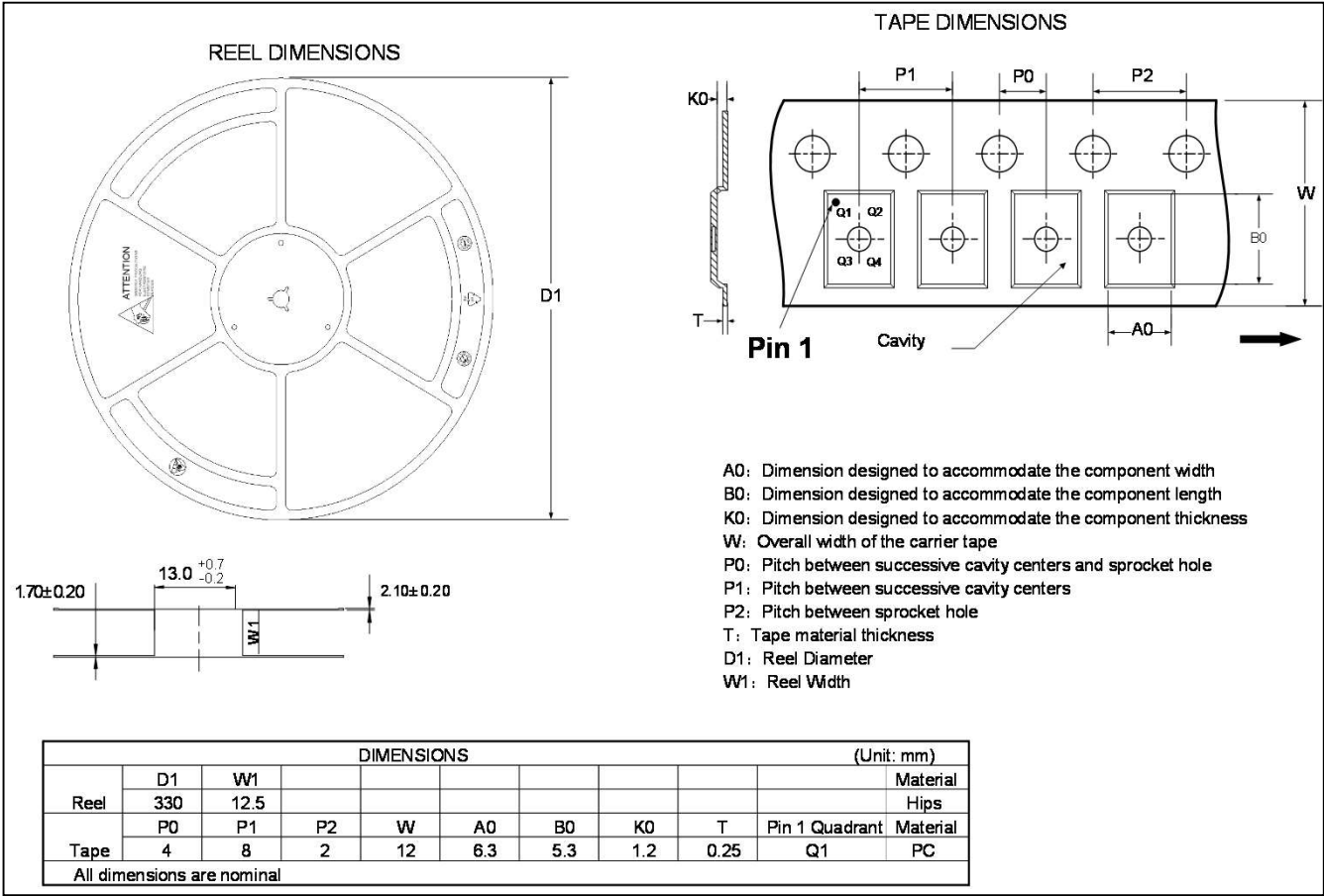
Unit in mm

Marking Information



Note:
AKG40N011G = Product Name Code
YYWW = Date code
Contact ALKAIDSEMI sales for detail information

Tape & Reel Information



Revision History

Revision	Release Date	Remark
Rev.1.6	2023/3/1	

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.