

60V 2.3mohm N-channel SGT MOSFET

AKG60N023G

Description:

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

Features:

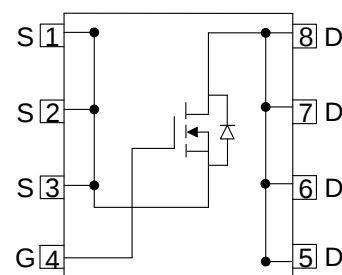
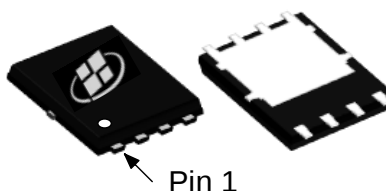
- N-channel, optimized for high-speed smooth switching
- Excellent Gate Charge $\times R_{DS(on)}$ (FOM)
- Very low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)

Applications:

- DC-DC Conversion
- Power Tools
- Motor Driving
- Power Management

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on), max} @ V_{GS} = 10V$	2.3	m Ω
I_D	134	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG60N023G	PDFN5X6-8L	G60N023G	13 inches Reel	5000

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	60	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) (Note 1)	134	A
	Drain Current -Continuous ($T_C = 100^\circ\text{C}$)	84	A
I_{DM}	Drain Current - Pulsed (Note 2)	500	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	380	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	65.7	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	1.9	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Steady-State (Note 4)	45.3	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is limited by T_{JMAX}
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5\text{ mH}$, $V_{DD} = 20\text{ V}$, $I_{AS} = 39\text{ A}$, $R_G = 25\ \Omega$, 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
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60 V, V _{GS} = 0 V, T _J = 25°C			1	μA
		V _{DS} = 60 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	1.4	2	2.5	V
R _{DS(ON)}	Drain-Source on-state resistance	V _{GS} = 10 V, I _D = 12 A		1.9	2.3	mΩ
		V _{GS} = 4.5 V, I _D = 12 A		3	4.5	
Dynamic Characteristics						
C _{ISS}	Input capacitance	V _{DS} = 30 V, V _{GS} = 0 V, F = 1 MHz		6046		pF
C _{OSS}	Output capacitance			1044		pF
C _{RSS}	Reverse transfer capacitance			115		pF
Switching Characteristics						
T _{D(ON)}	Turn On Delay Time	V _{DD} = 30 V, I _D = 25 A, V _{GS} = 10 V, R _G = 2 Ω		8		ns
T _R	RiseTime			15		ns
T _{D(OFF)}	Turn Off Delay Time			55		ns
T _F	Fall Time			25		ns
Q _G	Total Gate Charge	V _{DD} = 30 V, I _D = 25 A, V _{GS} = 10 V		112		nC
Q _{GS}	Gate-Source Charge			20		nC
Q _{GD}	Gate-Drain Charge			22		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body-Diode Forward Current				134	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current ^(NOTE 1)				536	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 20 A		0.79		V
T _{RR}	Reverse recovery time	I _F = 20 A		72		ns
Q _{RR}	Reverse recovery charge	di/dt = 100 A/μS		100		nC

Electrical Characteristics Diagrams

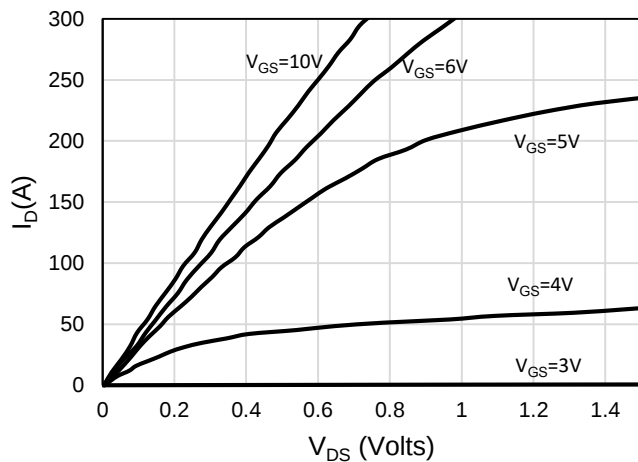


Figure 1: On-Region Characteristics

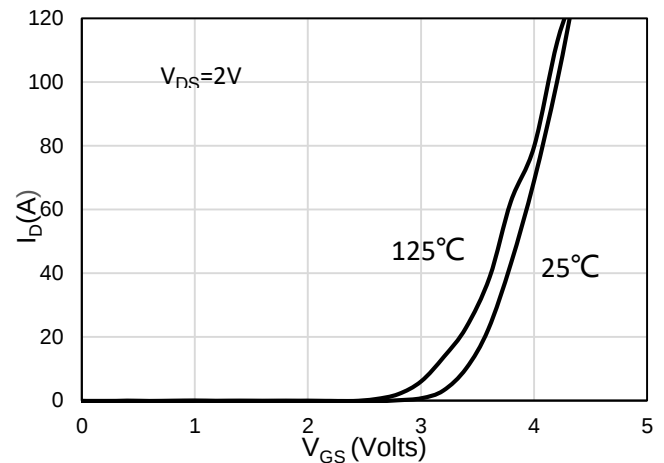


Figure 2: Transfer Characteristics

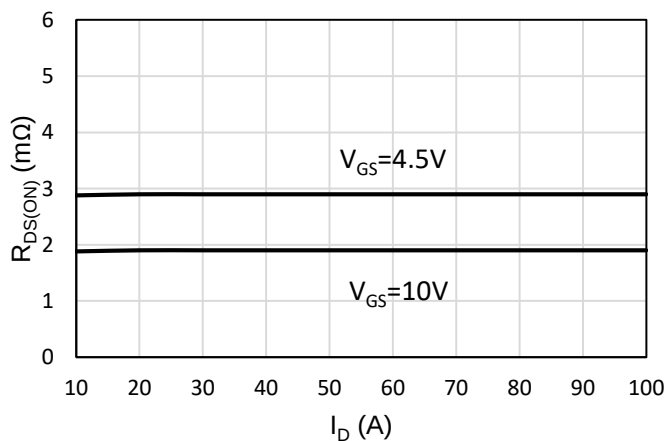


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

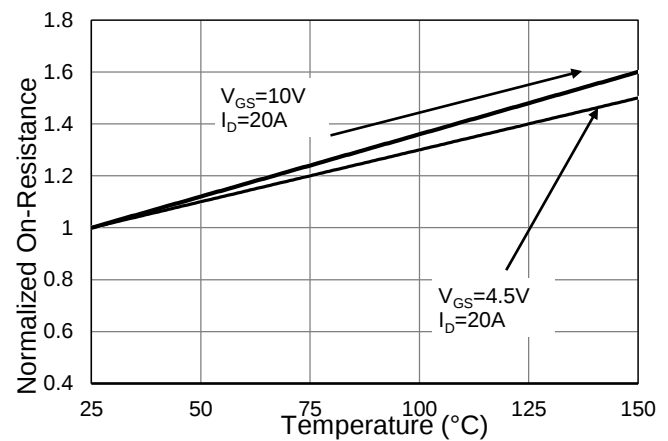


Figure 4: On-Resistance vs. Junction Temperature

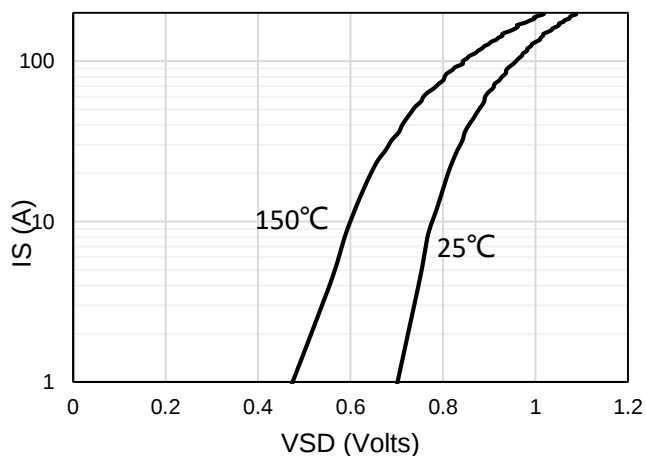


Figure 5: Body-Diode Characteristics

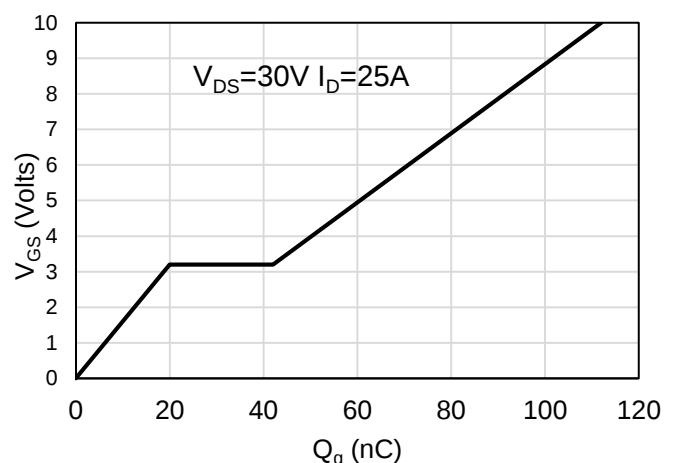


Figure 6: Gate-Charge Characteristics

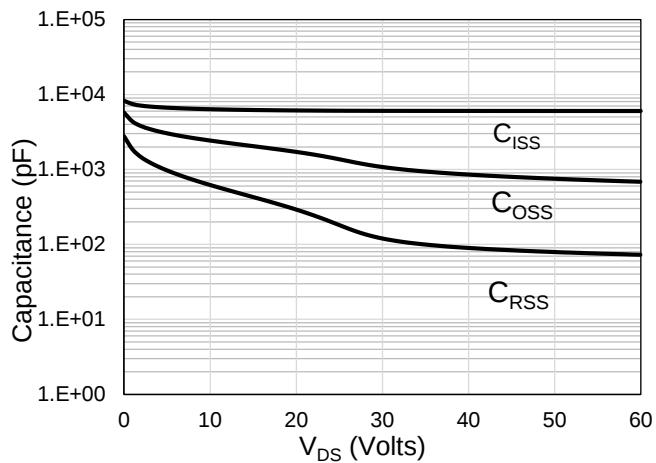


Figure 7: Capacitance Characteristics

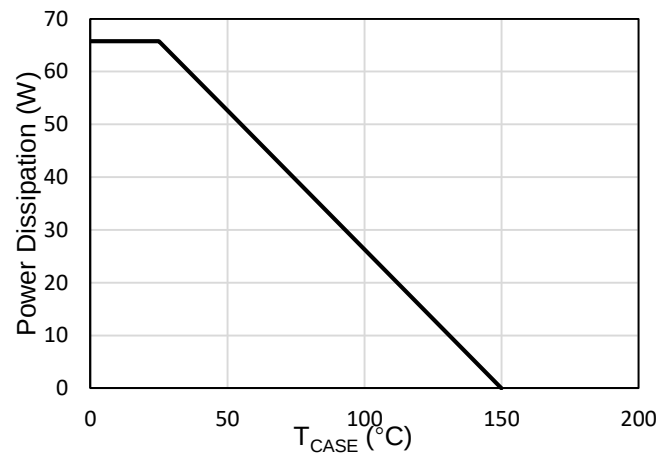


Figure 8: Power De-rating

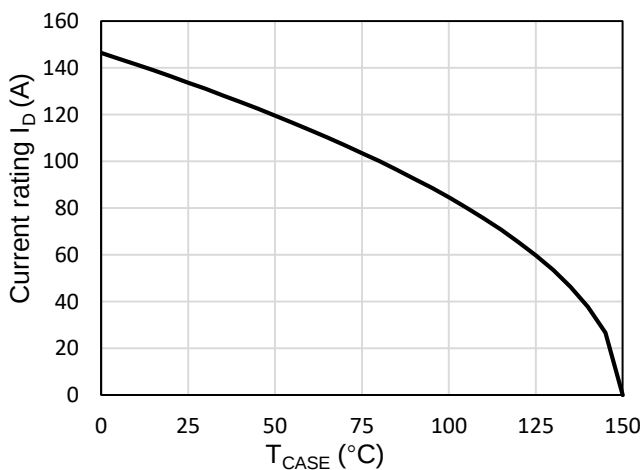


Figure 9: Current De-rating

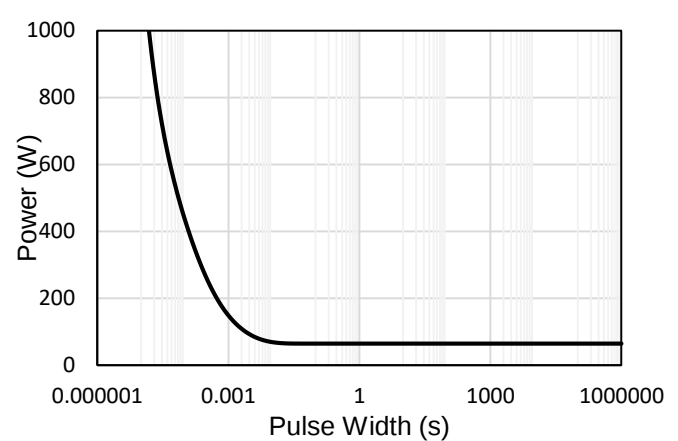
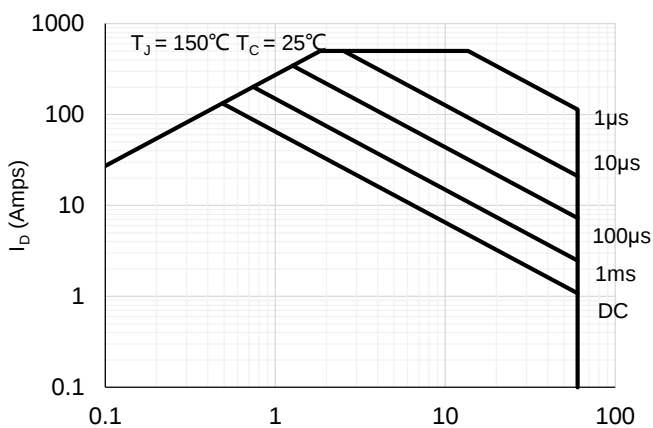
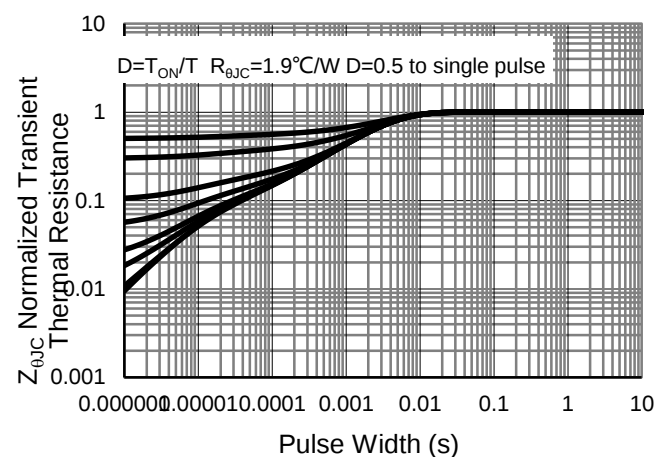
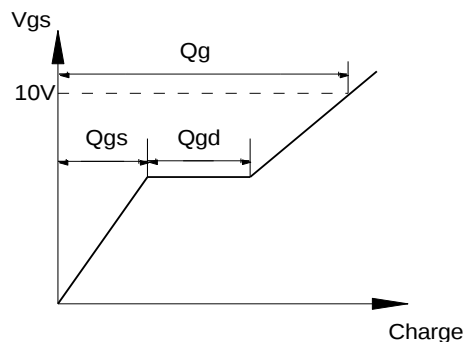
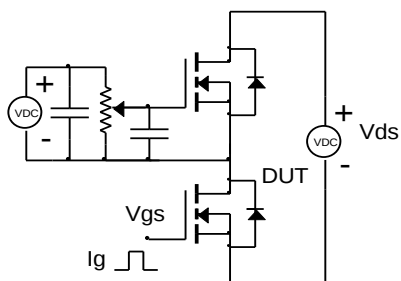
Figure 10: Single Pulse Power Rating
Junction-to-CaseFigure 11: Maximum Forward Biased Safe
Operating Area

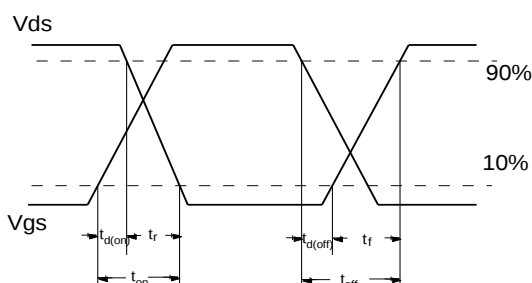
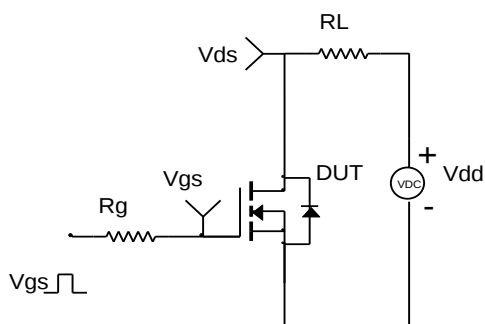
Figure 12: Normalized Maximum...

Test Circuit and Waveform

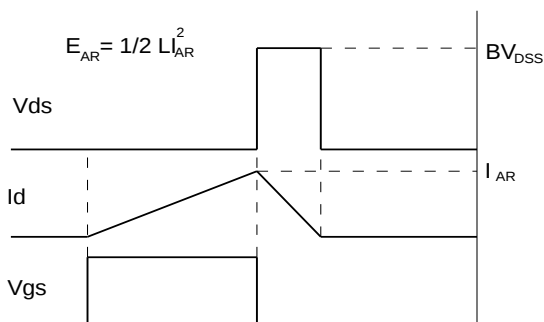
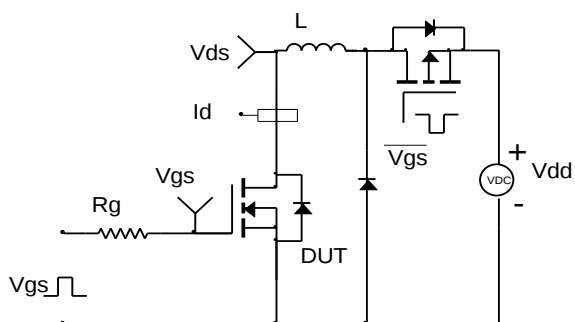
Gate Charge Test Circuit & Waveform



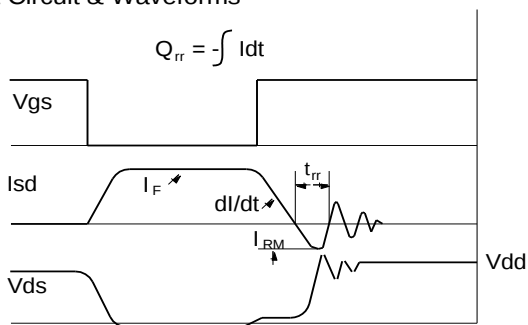
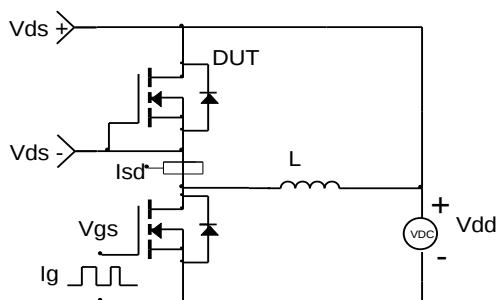
Resistive Switching Test Circuit & Waveforms



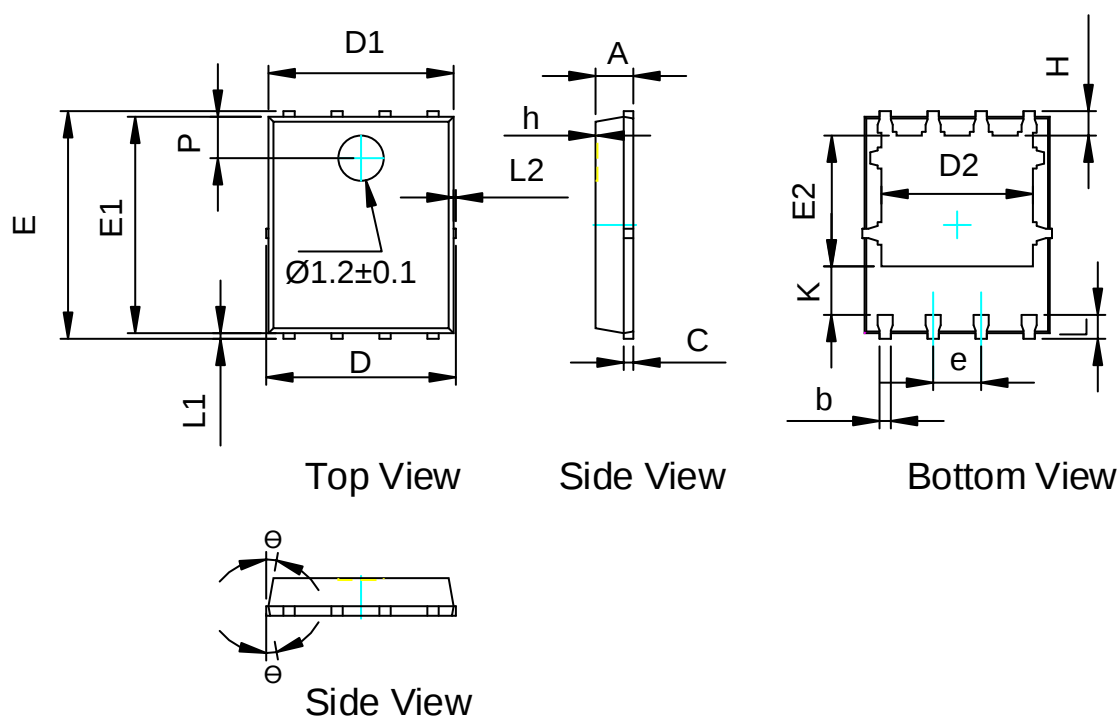
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



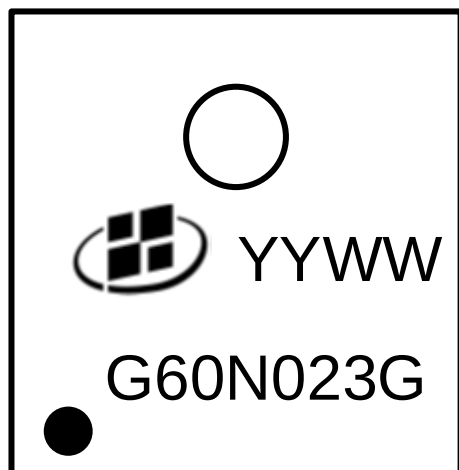
Package Outlines



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	—	—	0.05
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

COMMON DIMENSIONS: (UNITS OF MEASURE = MILLIMETER)

Marking Information



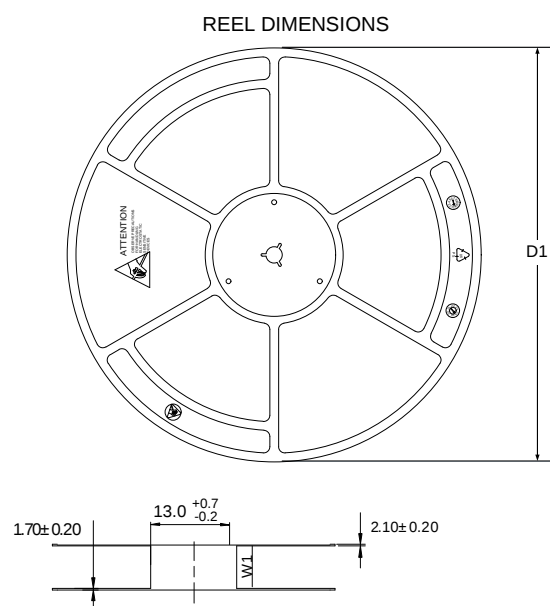
Note:

YYWW = Date code

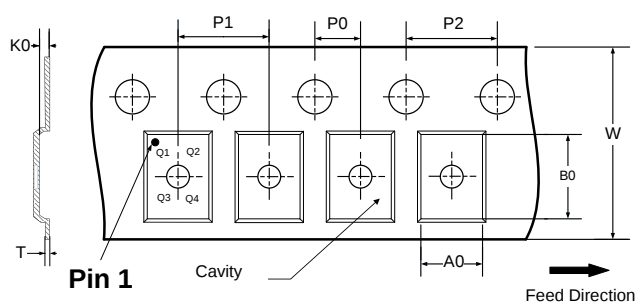
G60N023G = Product Name Code

Contact ALKAIDSEMI sales for detail information

Reel and Tube Information



TAPE DIMENSIONS



A0: Dimension designed to accommodate the component width
 B0: Dimension designed to accommodate the component length
 K0: Dimension designed to accommodate the component thickness
 W: Overall width of the carrier tape
 P0: Pitch between successive cavity centers and sprocket hole
 P1: Pitch between successive cavity centers
 P2: Pitch between sprocket hole
 T: Tape material thickness
 D1: Reel Diameter
 W1: Reel Width

DIMENSIONS										(Unit: mm)
Reel	D1	W1								Material
	330	12.5								Hips
Tape	P0	P1	P2	W	A0	B0	K0	T	Pin 1 Quadrant	Material
	4	8	2	12	6.3	5.3	1.2	0.25	Q1	PC

All dimensions are nominal

Revision History

Revision	Release Date	Remark
Rev.1.0	2022-01-17	Initial release

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.