

70V 5.9mohm N-channel SGT MOSFET AKG70N059D

Description:

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

Features:

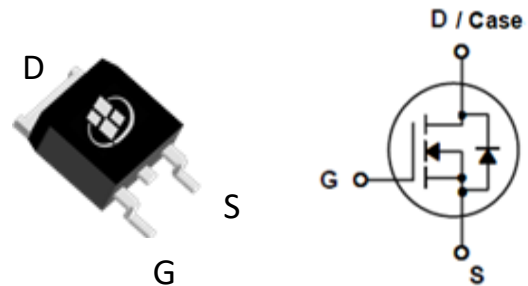
- Low $R_{DS(ON)}$
- RoHS compliant ^(Note 1)
- Halogen-free ^(Note 1)

Applications:

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

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	70	V
$R_{DS(ON), max} @ V_{GS} = 10V$	5.9	m Ω
I_D	120	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG70N059D	TO-263	G70N059D	Tape Reel	1000PCS

Notes:

1. Contact ALKAIDSEMI sales for detail information

Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	70	V
I _D	Drain Current - Continuous (T _C = 25°C) ^(Note 1)	135	A
	Drain Current - Continuous (T _C = 25°C) ^(Note 2)	120	A
	Drain Current - Continuous (T _C = 100°C)	86	A
I _{DM}	Drain Current - Pulsed ^(Note 3)	460	A
V _{GS}	Gate-Source Voltage	± 20	V
E _{AS}	Single Pulsed Avalanche Energy ^(Note 4)	168	mJ
P _D	Power Dissipation (T _C = 25°C)	178	W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
R _{θJC}	Thermal Resistance, Junction-to-Case, Steady-State	0.7	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient, Steady State ^(Note 4)	55	°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 mH, V_{DD} = 35 V, I_{AS} = 25.5 A, R_G = 50 Ω, Starting T_J = 25 °C
5. Mount on minimum PCB layout

Electrical Characteristics (T _J = 25°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	70			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 70 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 = 40 A		5.1	5.9	mΩ
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{DS} = 35 V, V _{GS} = 0 V, F = 1 MHz		2056		pF
C _{OSS}	Output Capacitance			716		pF
C _{RSS}	Reverse Transfer Capacitance			49.5		pF
R _G	Gate Resistance	F = 1 MHz		1.7		Ω
Switching Characteristics						
T _{D(ON)}	Turn On Delay Time	V _{DD} = 35 V , R _L = 0.9 Ω, V _{GS} = 10 V, R _G =2.7 Ω		14		nS
T _R	Rise Time			48		nS
T _{D(OFF)}	Turn Off Delay Time			28.5		nS
T _F	Fall Time			12		nS
Q _G	Total Gate Charge	V _{DD} = 35 V , I _D = 40 A, V _{GS} = 10 V		37		nC
Q _{GS}	Gate-Source Charge			8.5		nC
Q _{GD}	Gate-Drain Charge			13		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body-Diode Forward Current				120	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current ^(NOTE 1)				460	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 40 A		0.9	1.3	V
T _{RR}	Reverse recovery time	VDD = 35 V, ID = 40 A, di/dt = 100 A/μS		40		nS
Q _{RR}	Reverse recovery charge			28		nC
I _{RRM}	Peak Reverse Recovery Current			1.4		A

Electrical Characteristics Diagrams

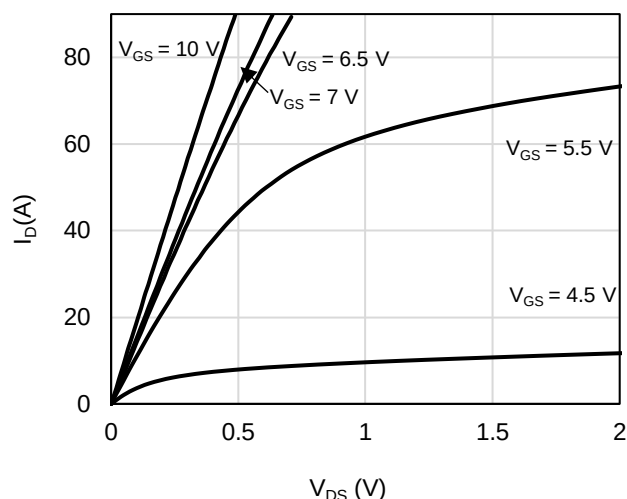


Figure 1: On-Region Characteristics

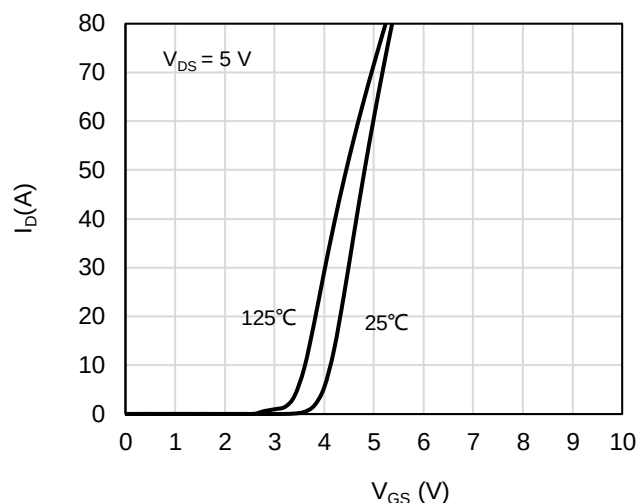


Figure 2: Transfer Characteristics

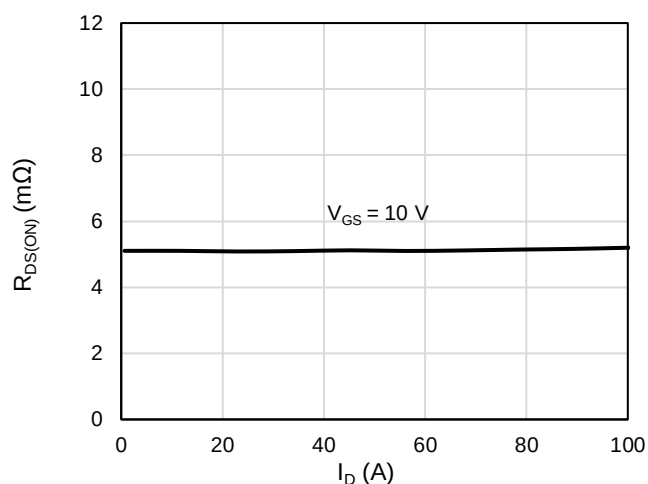


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

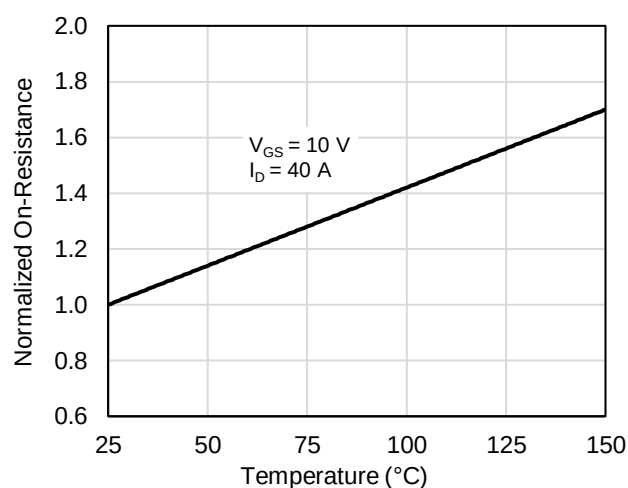


Figure 4: On-Resistance vs. Junction Temperature

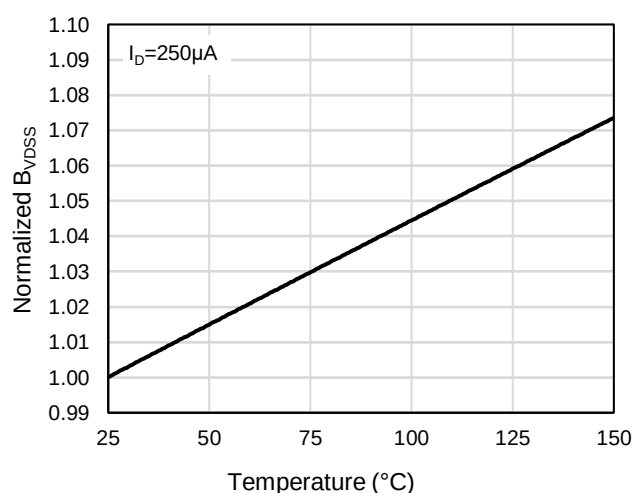


Figure 5: Breakdown Voltage vs. Junction Temperature

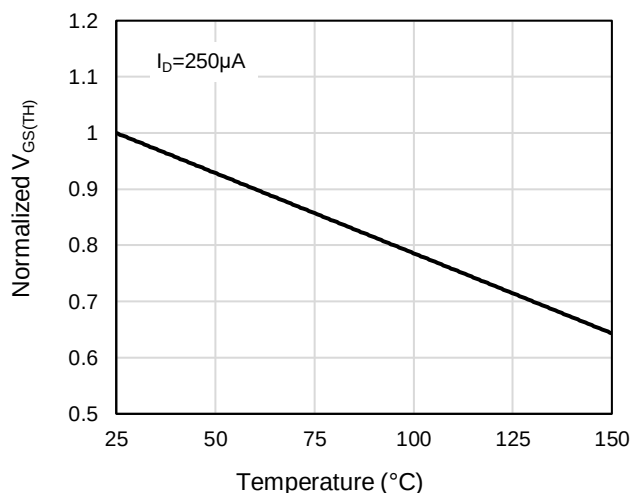


Figure 6: Threshold Voltage vs. Junction Temperature

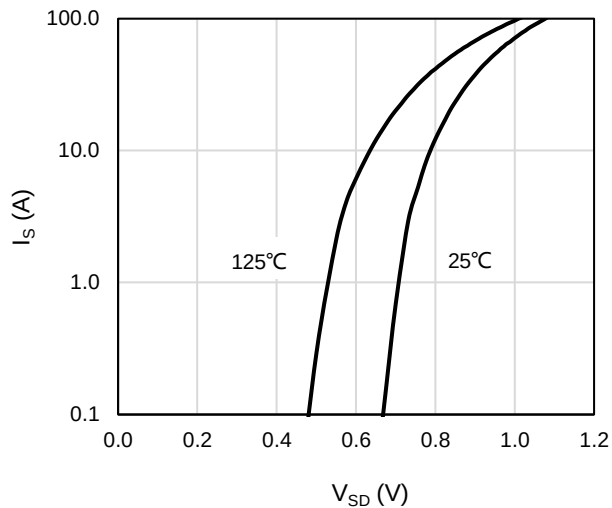


Figure 7: Body-Diode Characteristics

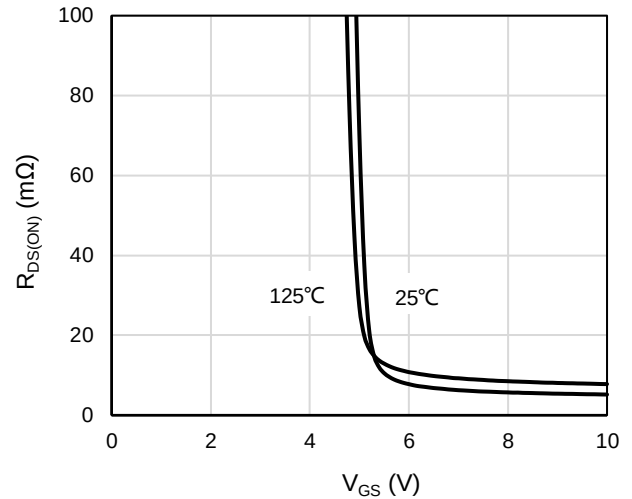


Figure 8: On-Resistance vs. Gate-Source Voltage

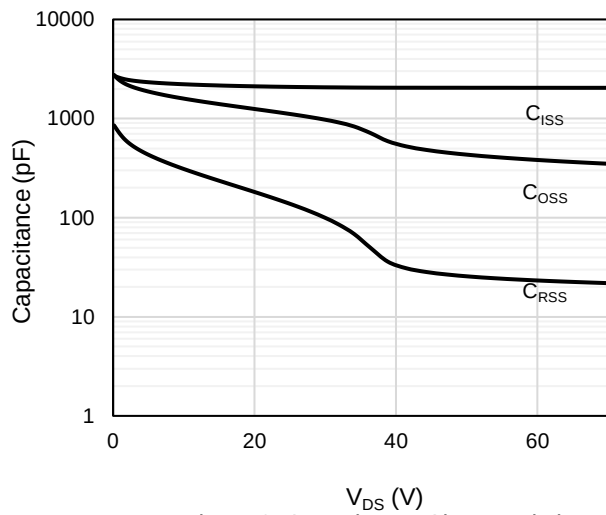


Figure 9: Capacitance Characteristics

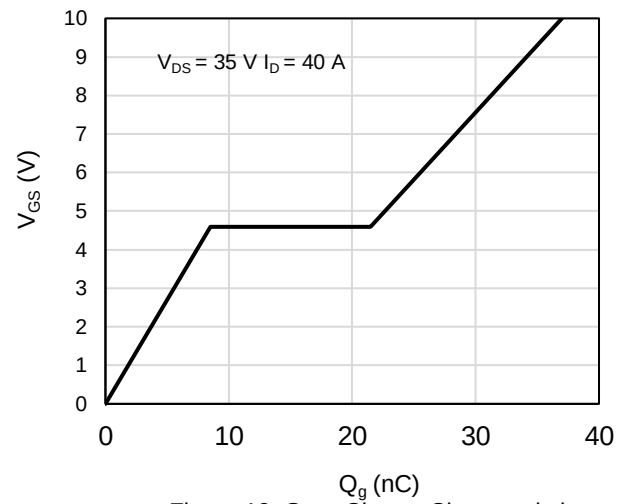


Figure 10: Gate-Charge Characteristics

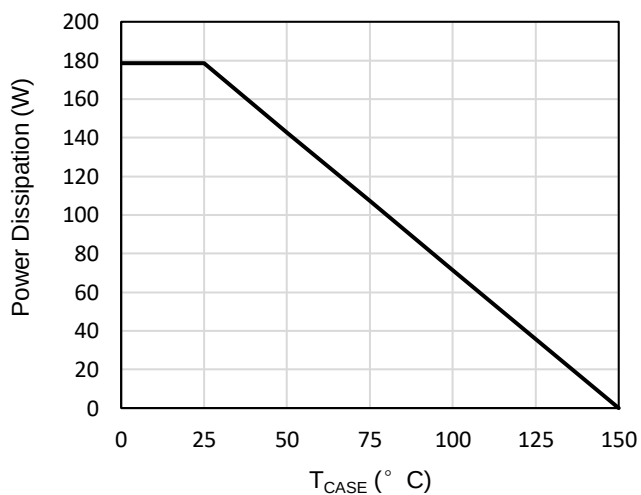


Figure 11: Power De-rating

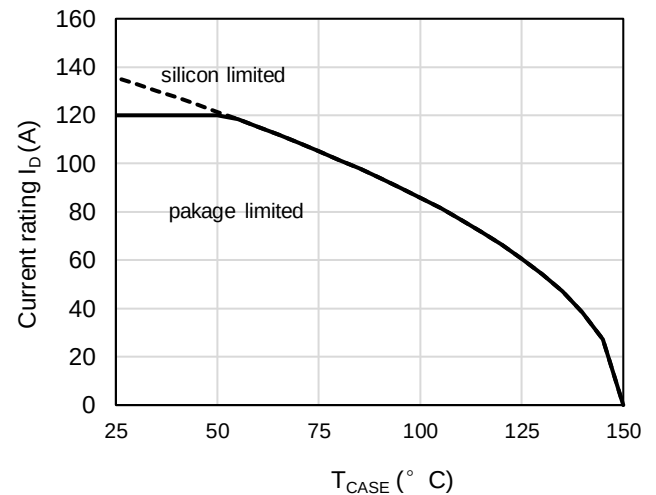
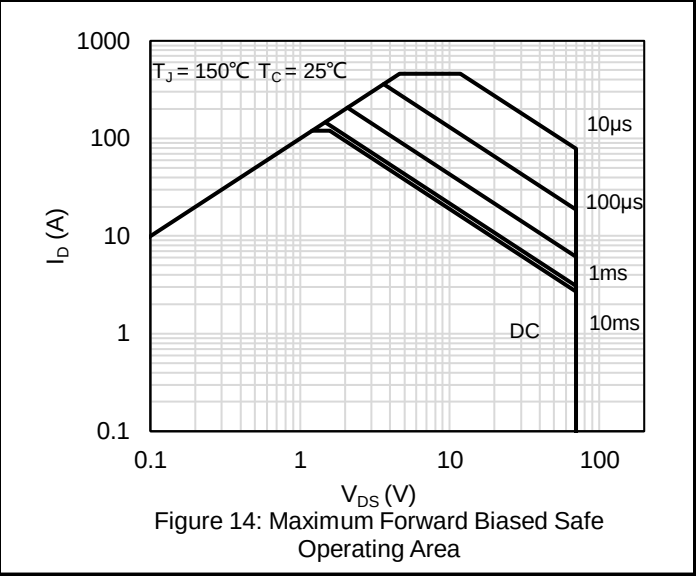
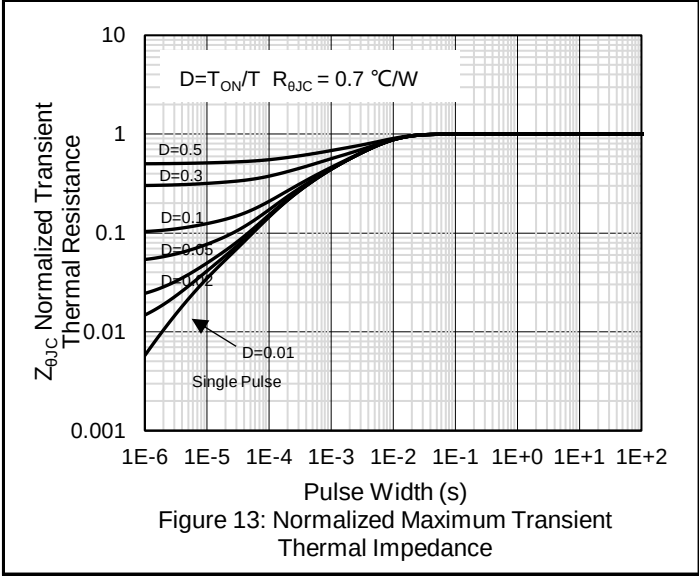
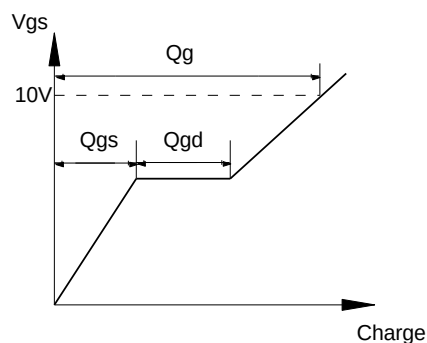
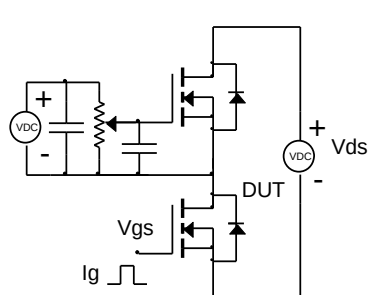


Figure 12: Current De-rating

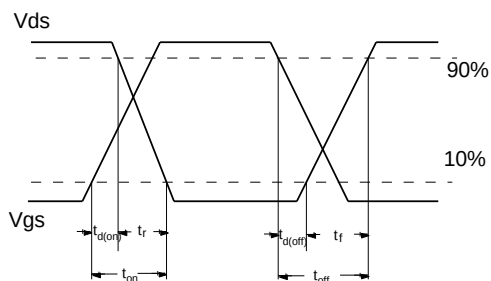
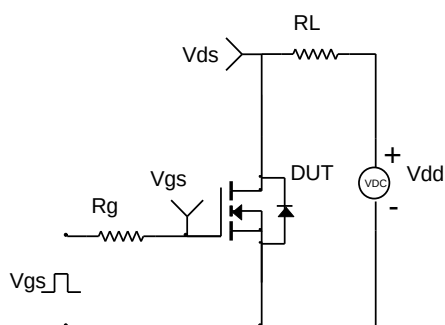


Test Circuit and Waveform

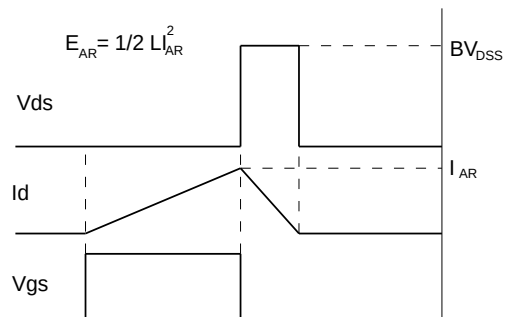
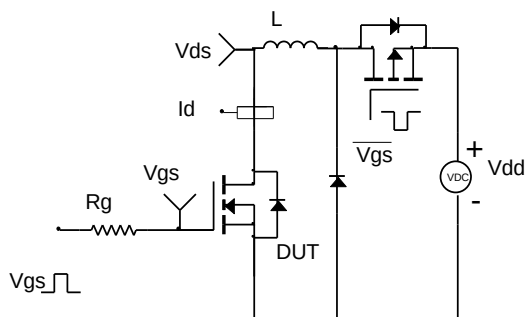
Gate Charge Test Circuit & Waveform



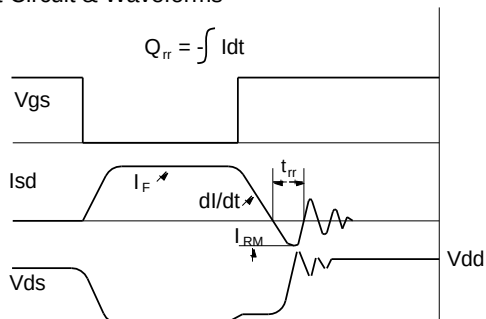
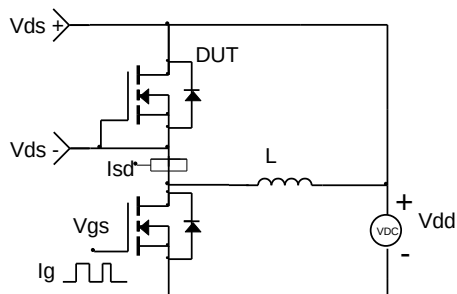
Resistive Switching Test Circuit & Waveforms



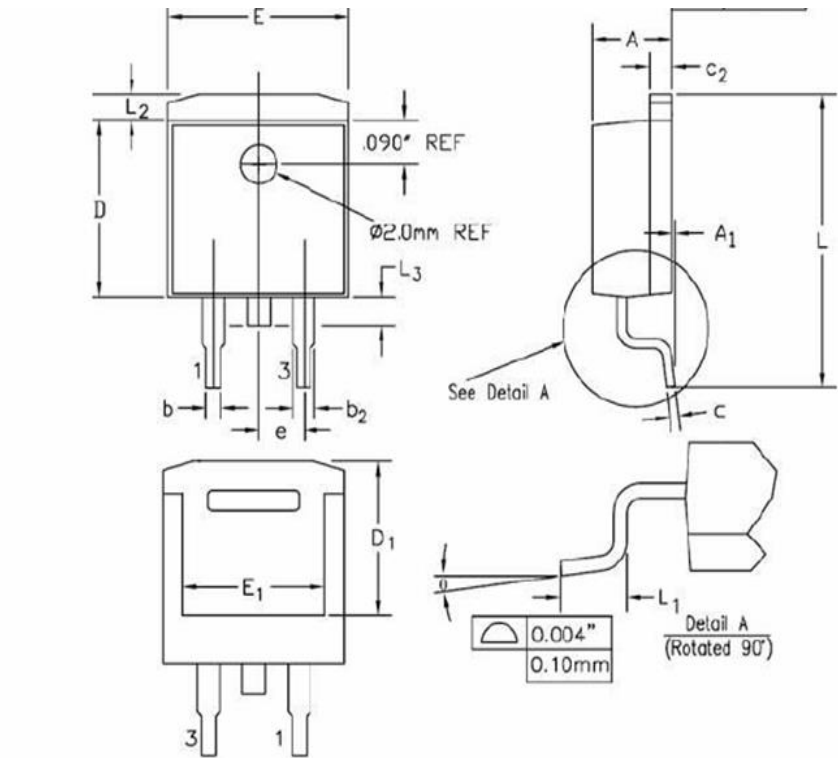
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outlines



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	
A1	-	0.010	-	0.25	
b	0.028	0.037	0.71	0.94	
b2	0.045	0.055	1.15	1.40	
c	0.018	0.024	0.46	0.61	
c2	0.048	0.055	1.22	1.40	
D	0.350	0.370	8.89	9.40	
D1	0.315	0.324	8.01	8.23	
E	0.395	0.405	10.04	10.28	
E1	0.310	0.318	7.88	8.08	
e	0.100 BSC.		2.54 BSC.		
L	0.580	0.620	14.73	15.75	
L1	0.090	0.110	2.29	2.79	
L2	0.045	0.055	1.15	1.39	
L3	0.050	0.070	1.27	1.77	
θ	0°	8°	0°	8°	

Marking Information



G70N059D
XXXXXXX

Note:

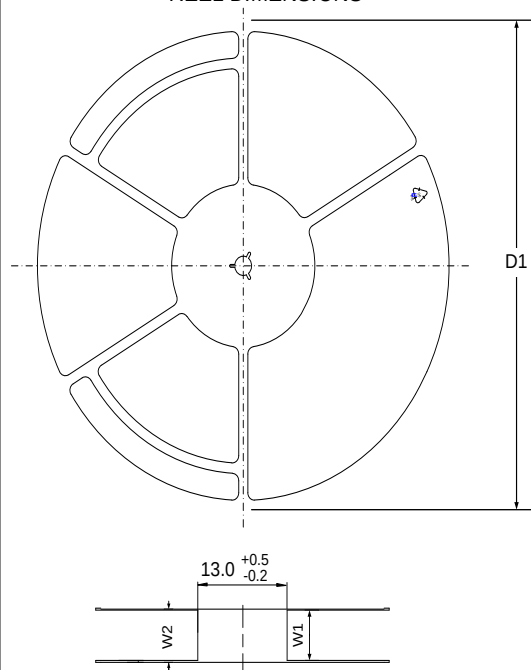
G70N059D = Product Name Code

XXXXXXX = Date code

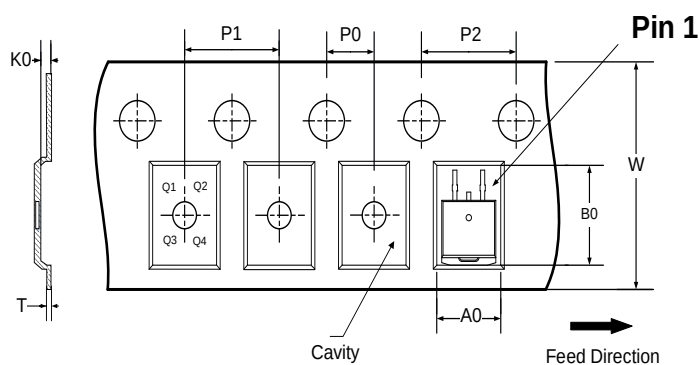
Contact ALKAIDSEMI sales for detail information

Tape & Reel Information

REEL DIMENSIONS



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 sprocket hole
 P1: Pitch between successive cavity centers
 P2: Pitch between successive cavity centers and sprocket hole
 T: Tape material thickness
 D1: Reel Diameter
 W1: Reel Width

DIMENSIONS

(Unit: mm)

	D1	W1	W2							Material
Reel	330	25.65	31							Hips
	P0	P1	P2	W	A0	B0	K0	T	Pin 1 Quadrant	Material
Tape	4	12	2	24	10.5	16.1	5.1	0.4	Q2	PC

All dimensions are nominal

Revision History

Revision	Release Date	Remark
Rev.1.0	2022/8/2	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.

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