

# 70V 8.2mohm N-channel SGT MOSFET

## AKG70N082D

### 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:

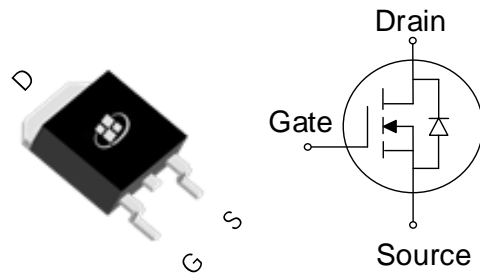
- N-channel, optimized for high-speed smooth switching
- Excellent Gate Charge  $\times R_{DS(on)}$  (FOM)
- Very low on-resistance
- RoHS compliant <sup>(Note 1)</sup>
- Halogen-free <sup>(Note 1)</sup>

### Applications:

- DC-DC Converter
- Powertrain Management
- Motor Driver

### Key Performance Parameters:

Parameter	Value	Unit
$V_{DS}$	70	V
$R_{DS(on), max} @V_{GS}=10V$	8.2	m $\Omega$
$I_D$	100	A



### Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG70N082D	TO-263	G70N082D	Tape Reel	1000

### 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	70	V
$I_D$	Drain Current - Continuous ( $T_C = 25^\circ\text{C}$ )	100	A
	Drain Current -Continuous ( $T_C = 100^\circ\text{C}$ )	65	A
$I_{DM}$	Drain Current - Pulsed <sup>(Note 1,2)</sup>	400	A
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(Note 3)</sup>	100	mJ
$P_D$	Power Dissipation ( $T_C = 25^\circ\text{C}$ )	139	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	0.9	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Steady-State <sup>(Note 4)</sup>	41.6	$^\circ\text{C/W}$

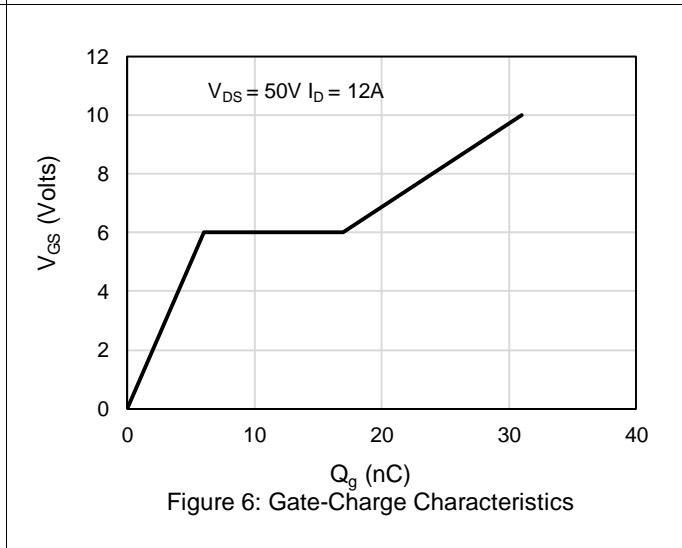
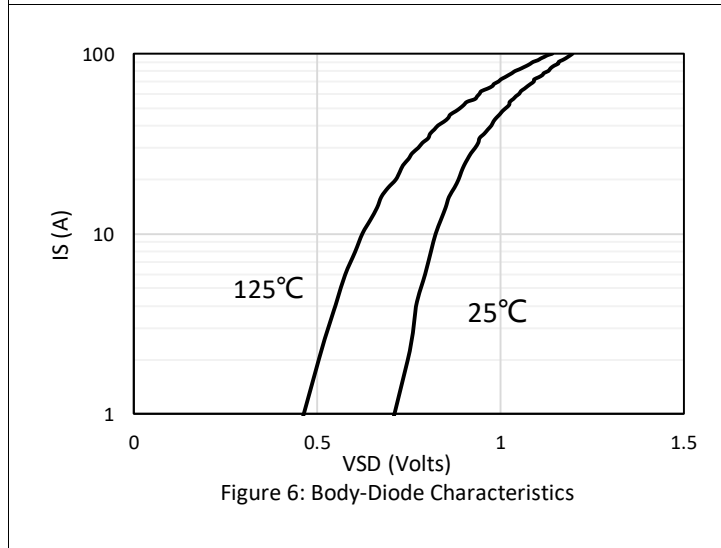
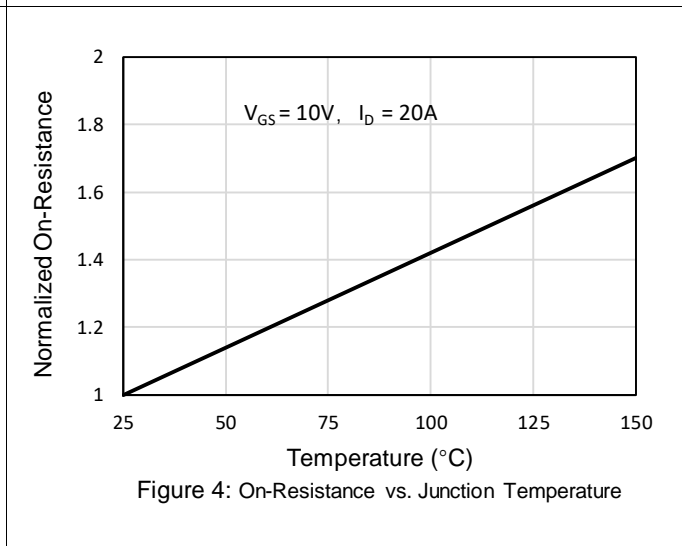
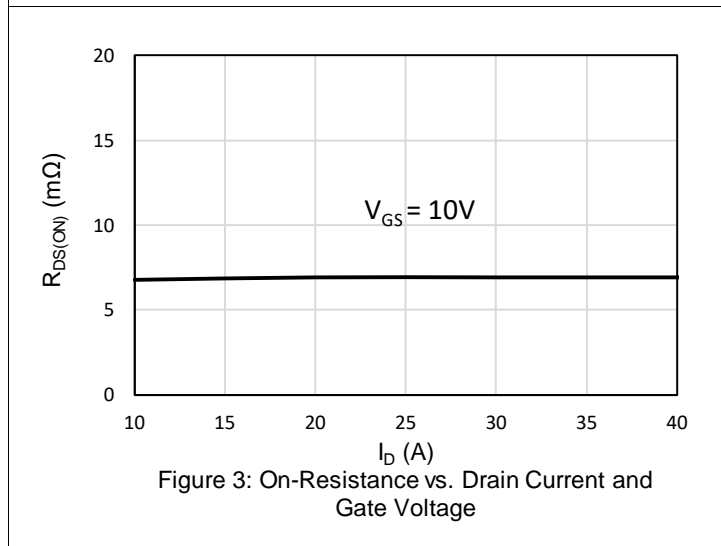
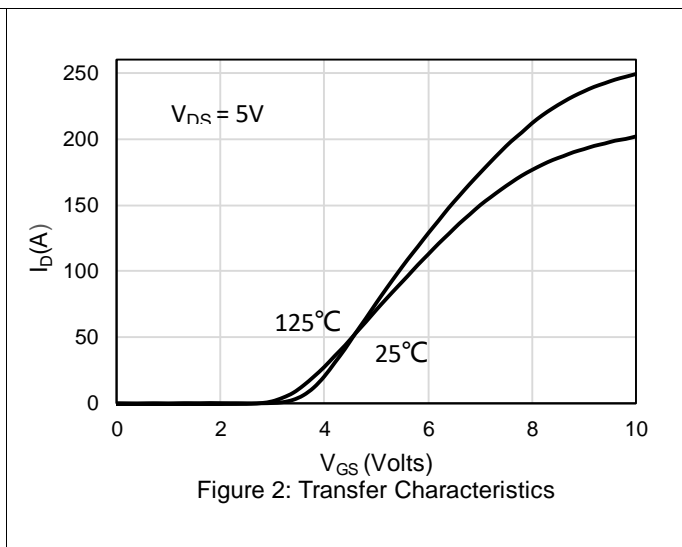
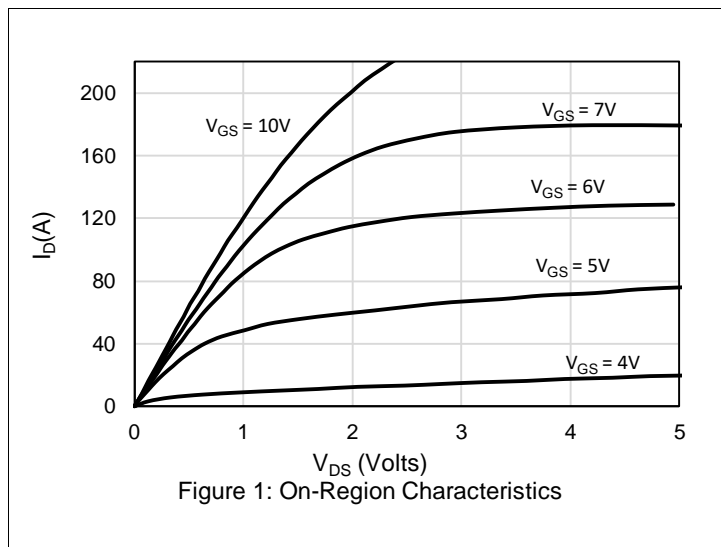
**Notes:**

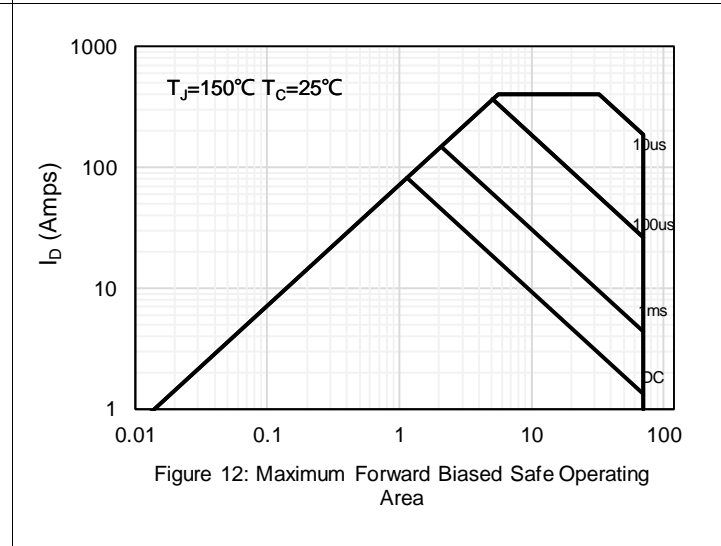
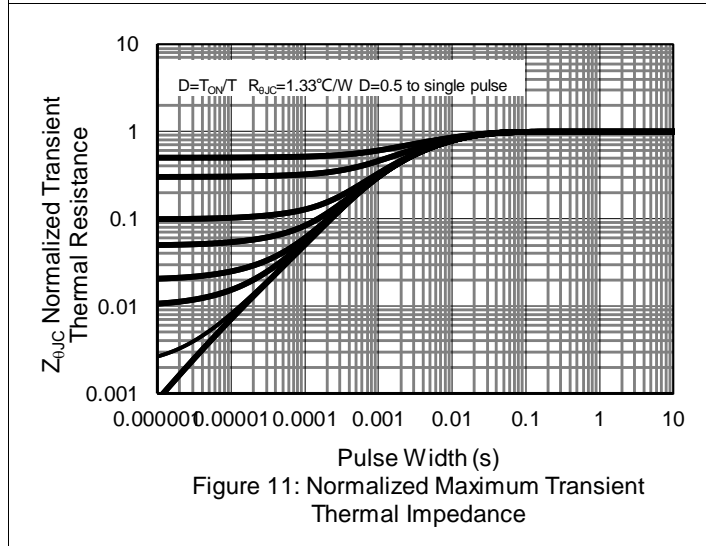
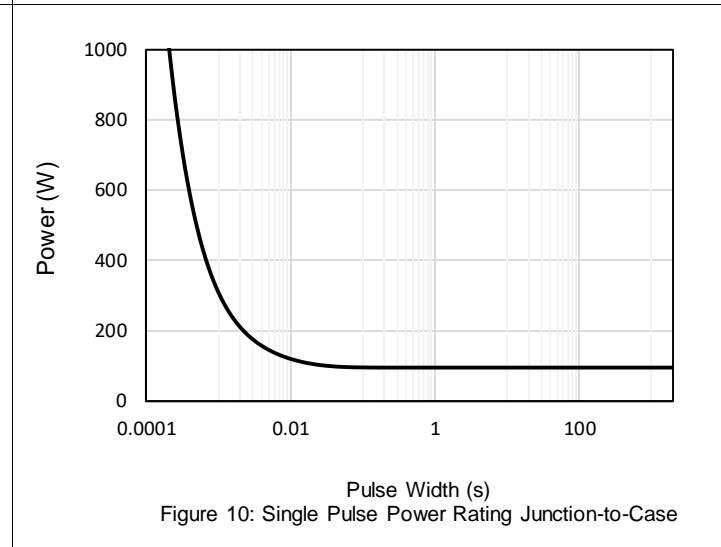
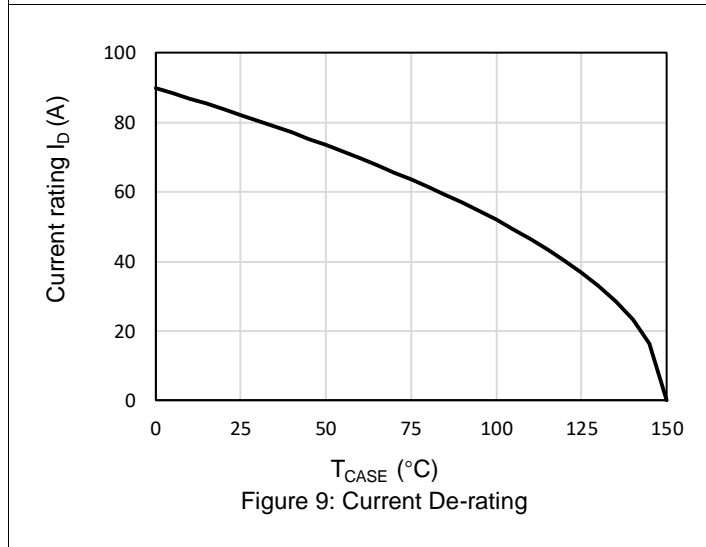
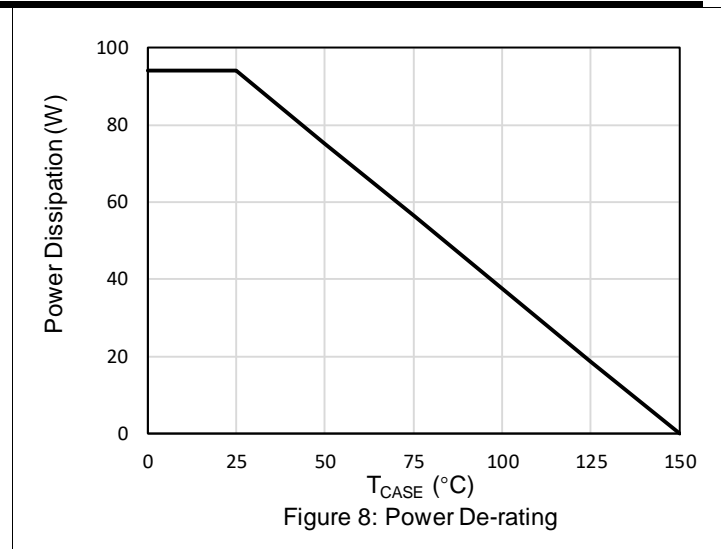
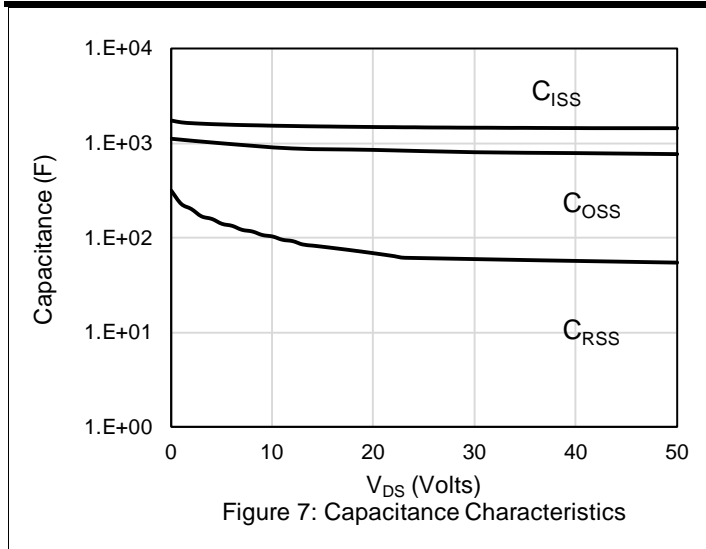
1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3.  $L = 0.5\text{ mH}$ ,  $V_{DD} = 20\text{ V}$ ,  $I_{AS} = 20\text{ A}$ ,  $R_G = 25\ \Omega$ , Starting  $T_J = 25\ ^\circ\text{C}$
4. Mount on minimum PCB layout

**Electrical Characteristics** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	70			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 70\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$			1	$\mu\text{A}$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			$\pm 100$	nA
$V_{GS(TH)}$	Gate Threshold voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		6.8	8.2	m $\Omega$
<b>Dynamic Characteristics</b>						
$C_{ISS}$	Input capacitance	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, F = 1\text{ MHz}$		1446		pF
$C_{OSS}$	Output capacitance			770		pF
$C_{RSS}$	Reverse transfer capacitance			55		pF
<b>Switching Characteristics</b>						
$T_{D(ON)}$	Turn On Delay Time	$V_{DS} = 50\text{ V}, I_D = 40\text{ A}, V_{GS} = 10\text{ V}, R_{GEN} = 4.7\ \Omega$		8.4		ns
$T_R$	Rise Time			9.0		ns
$T_{D(OFF)}$	Turn Off Delay Time			23.6		ns
$T_F$	Fall Time			18		ns
$Q_G$	Total Gate Charge	$V_{DS} = 50\text{ V}, I_D = 40\text{ A}, V_{GS} = 10\text{ V}$		28		nC
$Q_{GS}$	Gate-Source Charge			5.2		nC
$Q_{GD}$	Gate-Drain Charge			6.0		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Body-Diode Forward Current				100	A
$I_{SM}$	Maximum Pulsed Body-Diode Forward Current <sup>(NOTE 2)</sup>				400	A
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 40\text{ A}$		0.7		V

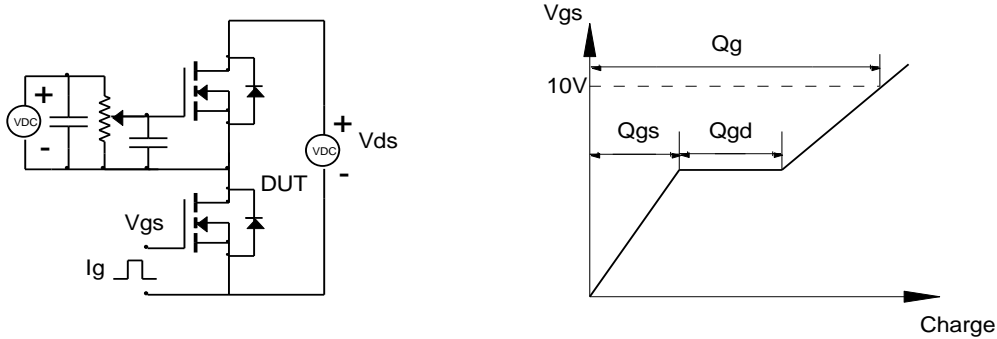
# Electrical Characteristics Diagrams



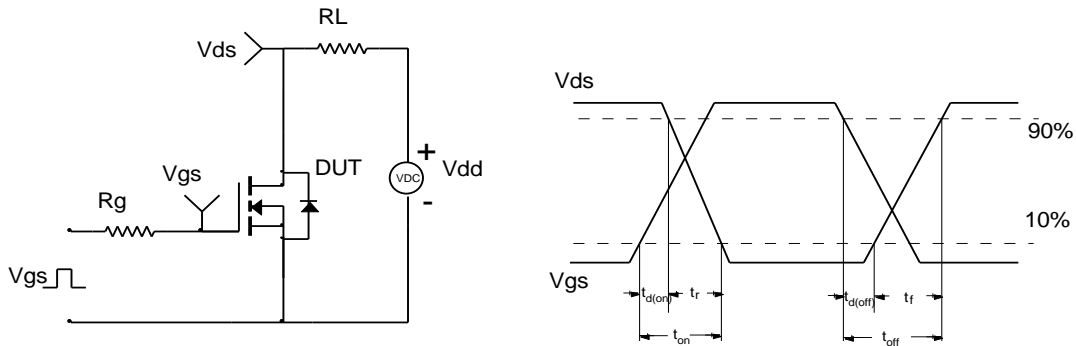


# Test Circuit and Waveform

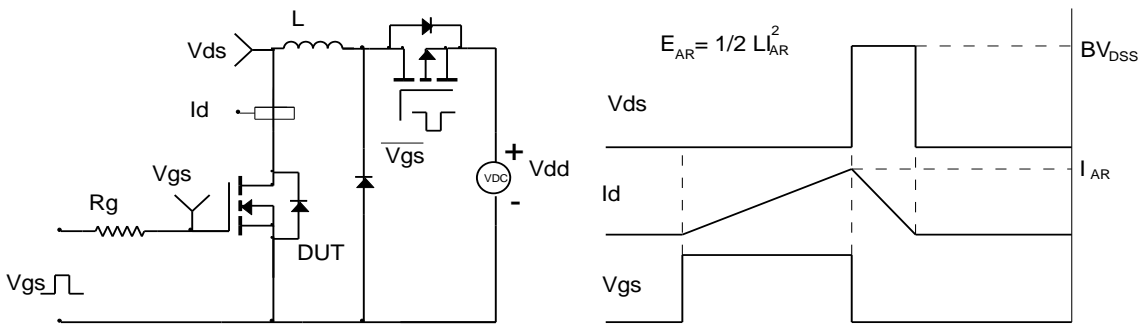
Gate Charge Test Circuit & Waveform



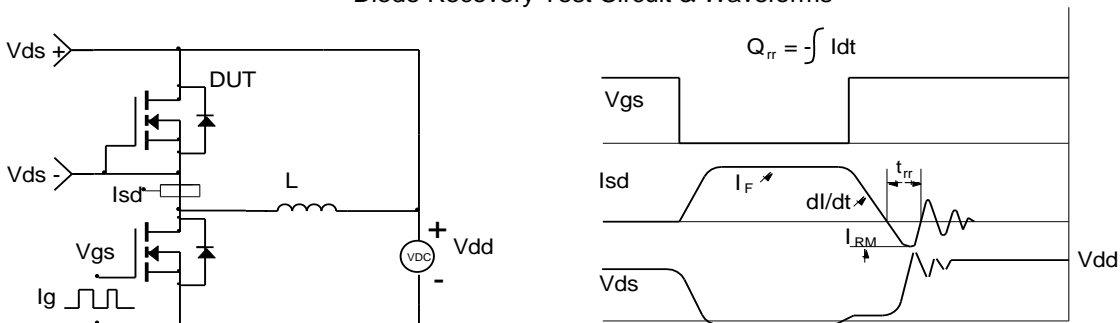
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

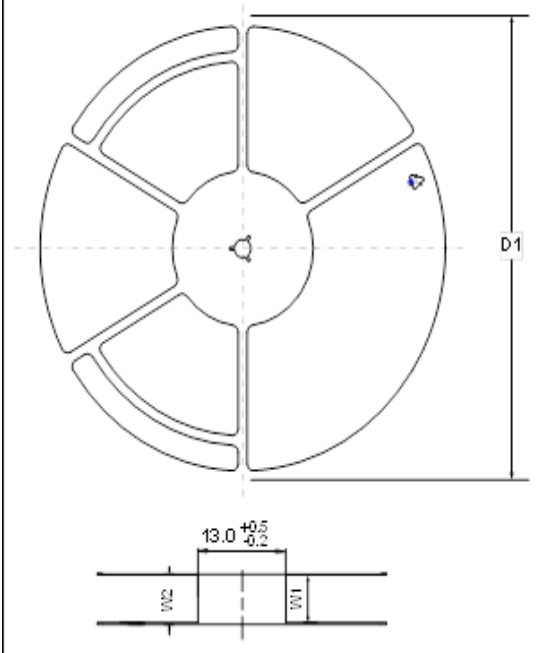


# Marking Information

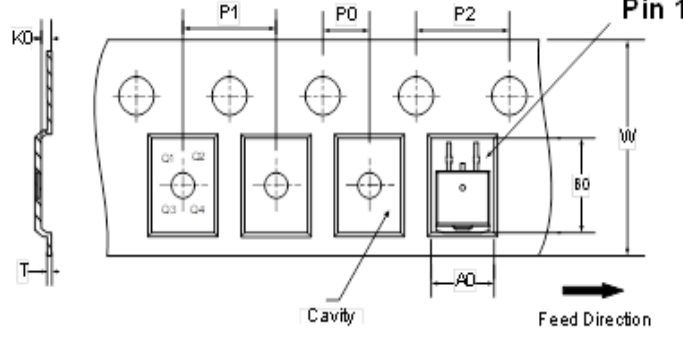


Note:  
 YYWW=Date code  
 G70N082D=Product Name Code  
 Contact ALKAIDSEMI sales for detail information

### REEL DIMENSIONS



### TAPE DIMENSIONS

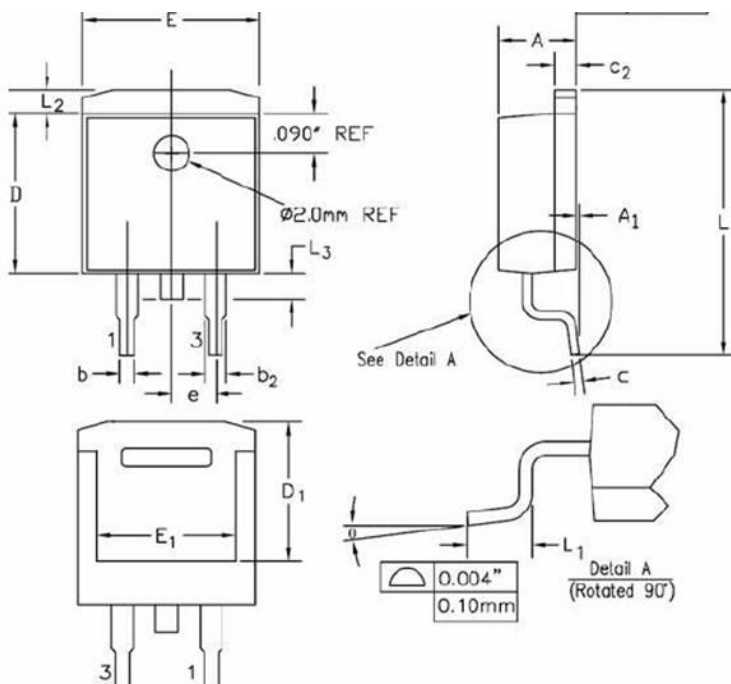


A0: Dimension designed to accommodate the component width  
 B0: Dimension designed to accommodate the component length  
 KD: Dimension designed to accommodate the component thickness  
 W: Overall width of the carrier tape  
 P0: Pitch between sprocket hole  
 P1: Pitch between successive cavity centers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

DIMENSIONS										(Unit: mm)	
Reel	D1	W1	W2							Material	
	330	25.65	31							Hips	
Tape	P0	P1	P2	W	A0	B0	KD	T	Pin 1 Quadrant	Material	
	4	12	2	24	10.5	16.1	5.1	0.4	Q2	PC	

All dimensions are nominal

# 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	
$\theta$	0°	8°	0°	8°	



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## Revision History

Revision	Release Date	Remark
Rev. 1.0	2021-12-09	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.

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