

100V 15mohm N-channel SGT MOSFET

AKG100N15K

Description:

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

Features:

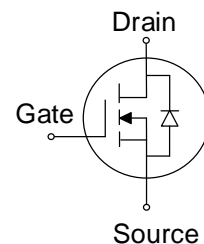
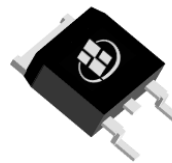
- N-channel, optimized for high-speed smooth switching
- Excellent Gate Charge $\times R_{DS(on)}$ (FOM)
- Very low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)

Applications:

- DC-DC converter
- Power Management
- Motor Drivers
- Load switching

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on), max} @ V_{GS}=10V$	15	m Ω
I_D	55	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG100N15K	TO-252	G100N15K	13 inches Reel	2500

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	100	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	55	A
	Drain Current -Continuous ($T_C = 100^\circ\text{C}$)	35	A
I_{DM}	Drain Current - Pulsed (Note 1,2)	220	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	8	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	83	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	1.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady State (Note 4)	62.5	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5 \text{ mH}$, $V_{DD} = 20 \text{ V}$, $I_{AS} = 5.5 \text{ A}$, $R_G = 25 \ \Omega$, Starting $T_J = 25 \ ^\circ\text{C}$
4. Mount on minimum PCB layout

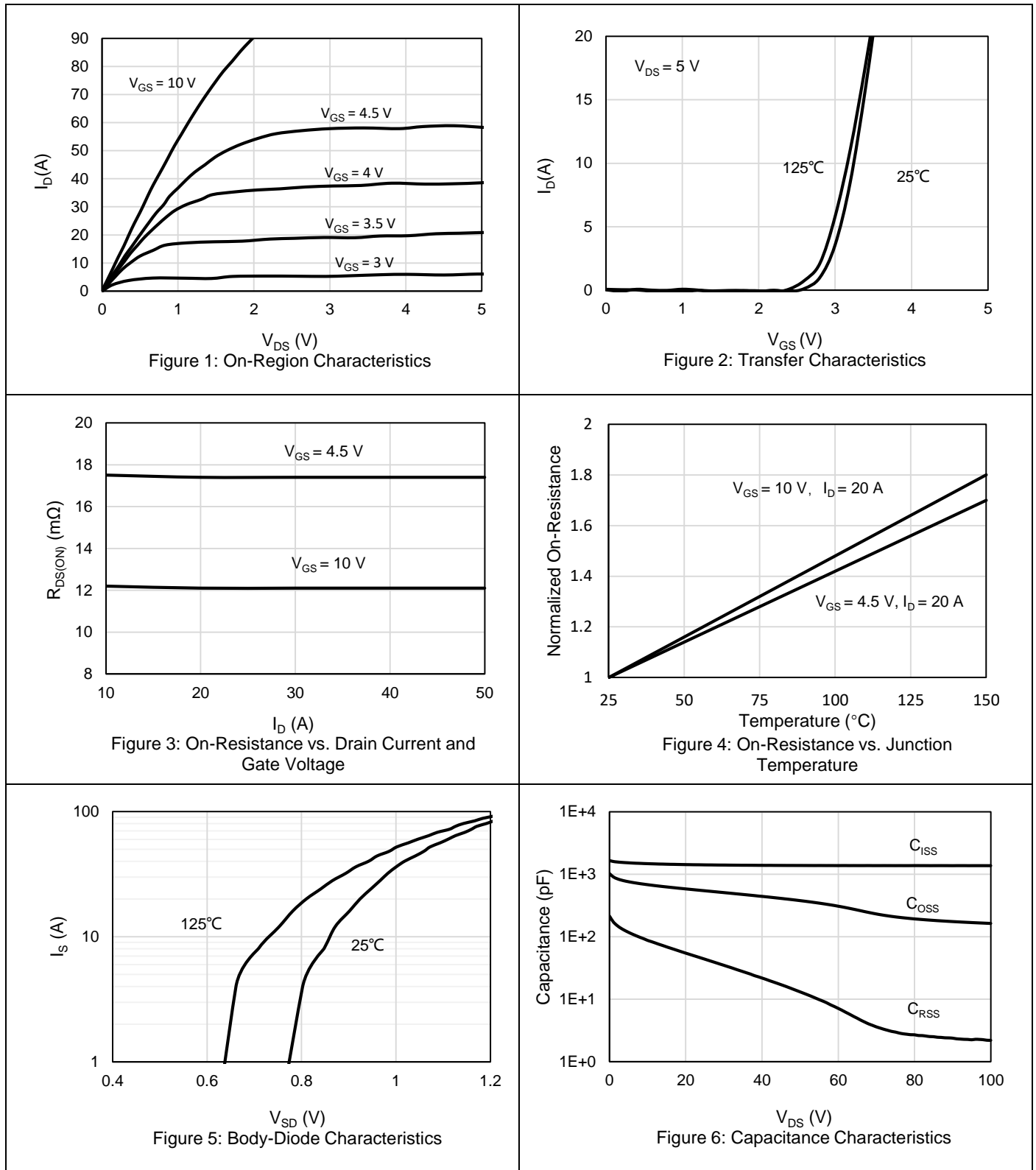
Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	100			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$			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	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.4	2	2.5	V
$R_{DS(on)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		12.5	15	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		15.6	22.5	
Dynamic Characteristics						
C_{ISS}	Input capacitance	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, F = 1\text{ MHz}$		1441		pF
C_{OSS}	Output capacitance			391		pF
C_{RSS}	Reverse transfer capacitance			15		pF
Switching Characteristics						
$T_{D(ON)}$	Turn On Delay Time	$V_{DS} = 50\text{ V}, I_D = 20\text{ A}, V_{GS} = 10\text{ V}, R_{GEN} = 10\ \Omega$		7		ns
T_R	Rise Time			26		ns
$T_{D(OFF)}$	Turn Off Delay Time			30		ns
T_F	Fall Time			12		ns
Q_G	Total Gate Charge	$V_{DS} = 50\text{ V}, I_D = 20\text{ A}, V_{GS} = 10\text{ V}$		22		nC
Q_{GS}	Gate-Source Charge			5		nC
Q_{GD}	Gate-Drain Charge			4		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Body-Diode Forward Current				55	A
I_{SM}	Maximum Pulsed Body-Diode Forward Current ^(NOTE 1)				220	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 20\text{ A}$		0.89		V
T_{RR}	Reverse recovery time	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{S}$		38		ns
Q_{RR}	Reverse recovery charge				39	

Notes:

1. Pulse Test: Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature

Electrical Characteristics Diagrams



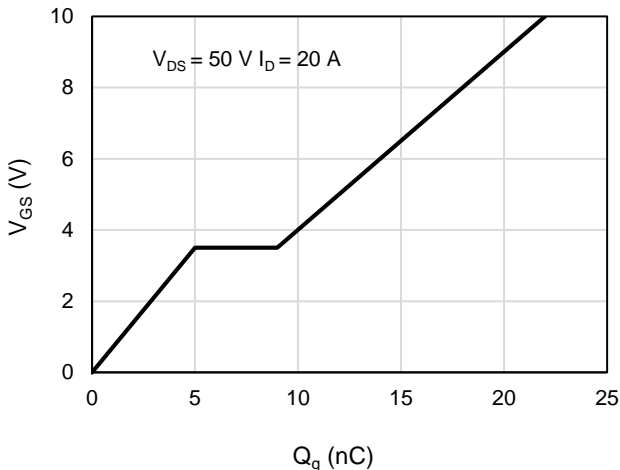


Figure 7: Gate-Charge Characteristics

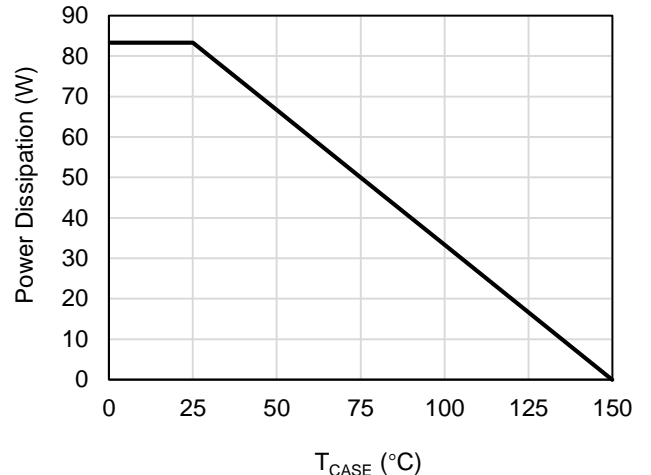


Figure 8: Power De-rating

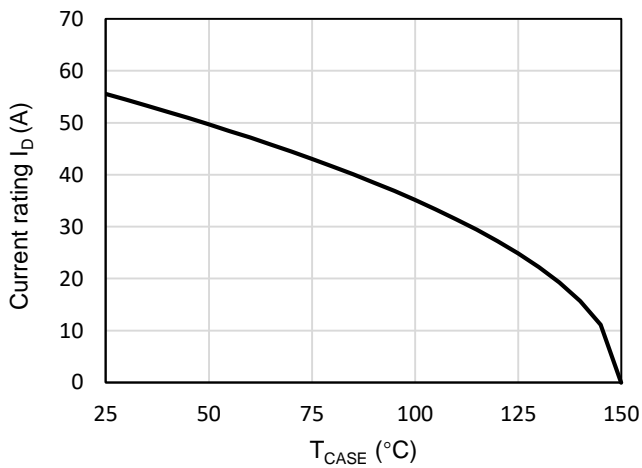


Figure 9: Current De-rating

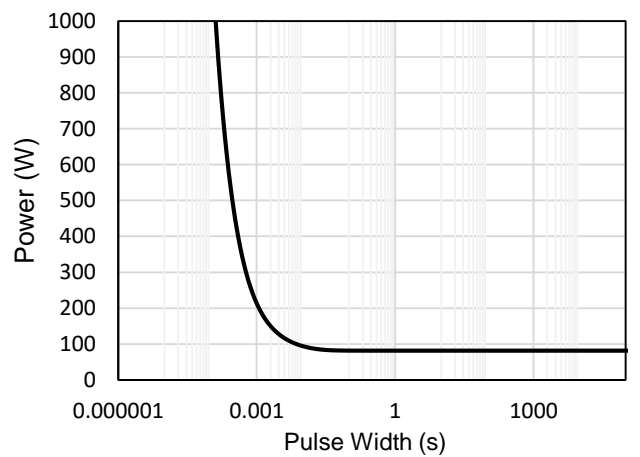


Figure 10: Single Pulse Power Rating Junction-to-Case

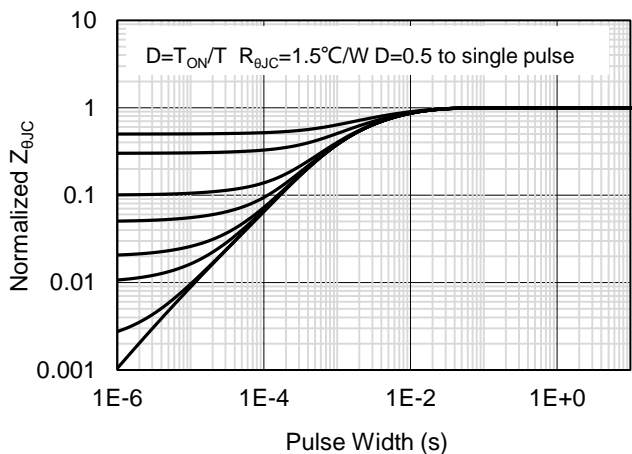


Figure 11: Normalized Maximum Transient Thermal Impedance

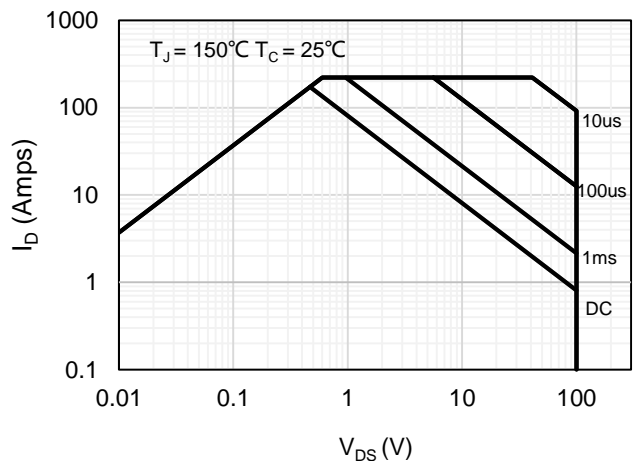
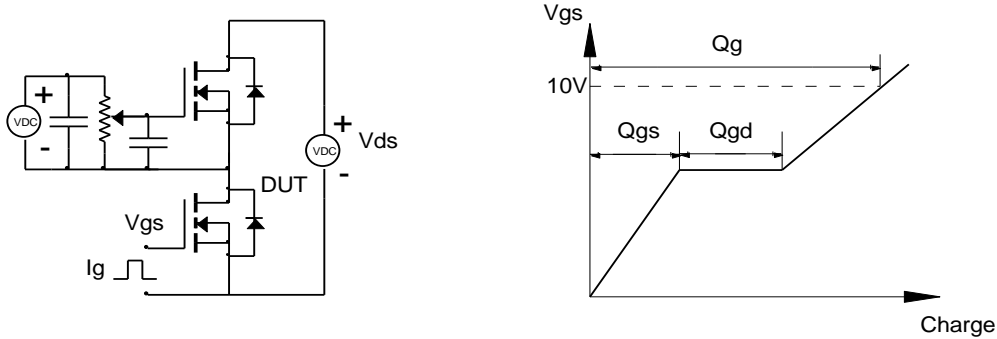


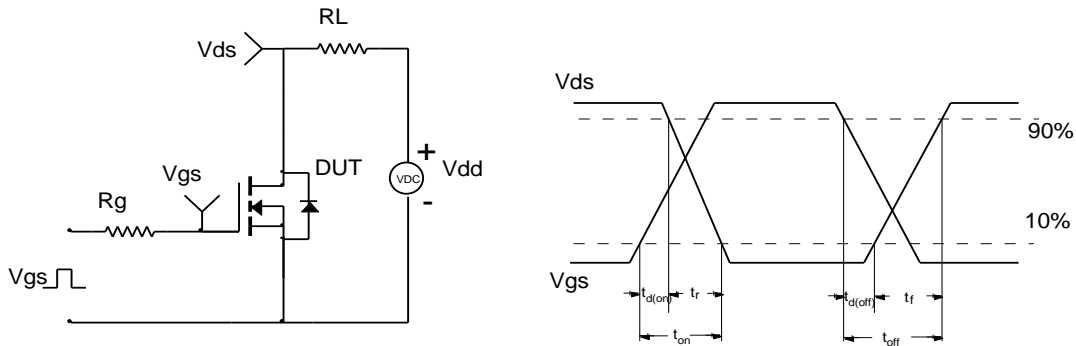
Figure 12: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

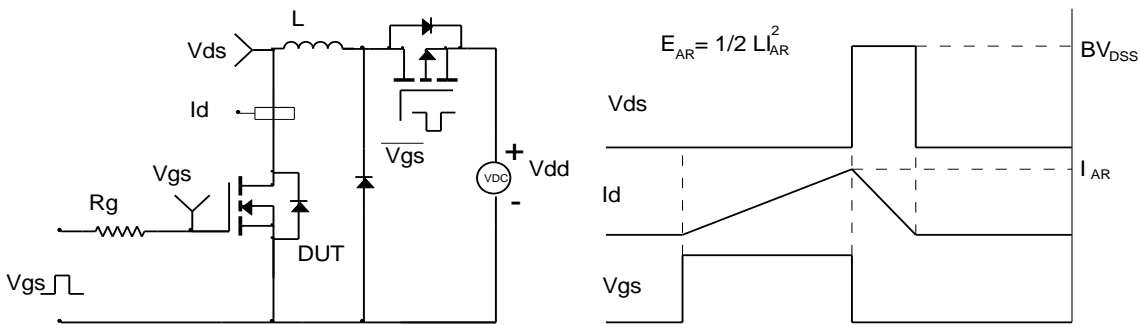
Gate Charge Test Circuit & Waveform



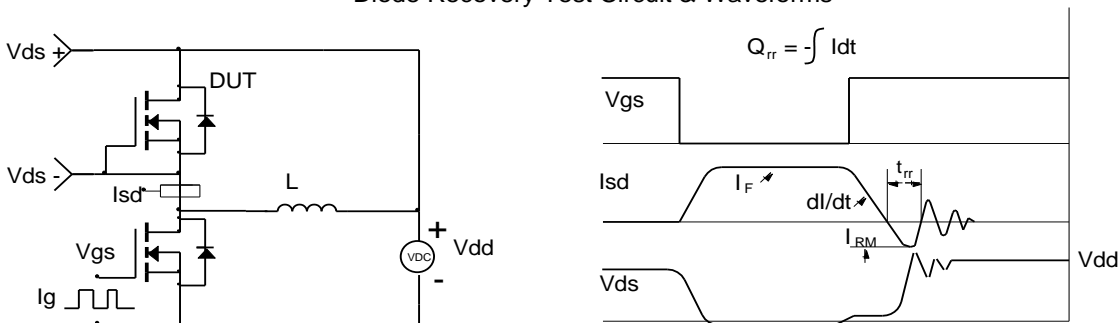
Resistive Switching Test Circuit & Waveforms



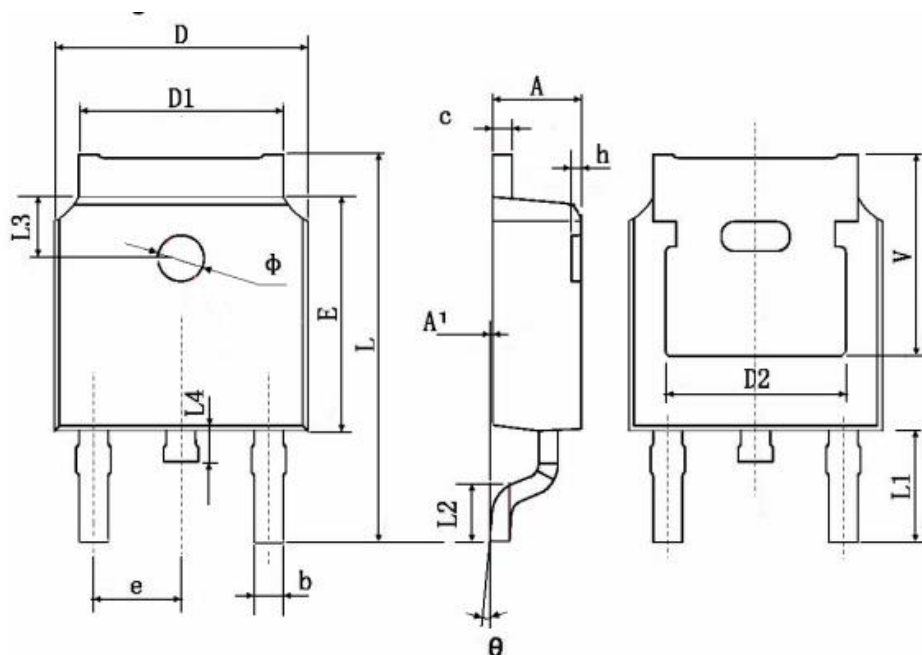
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

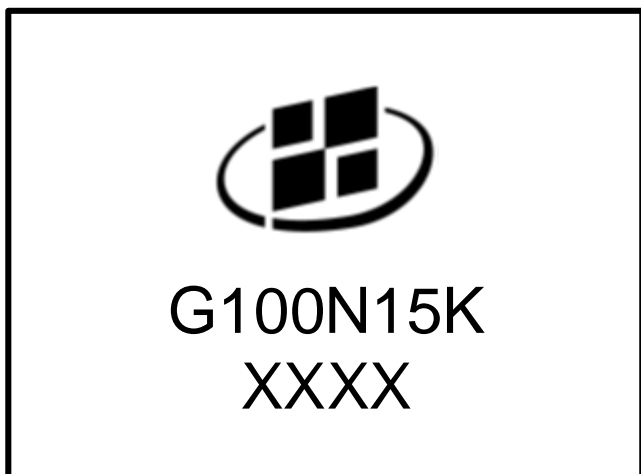


Package Outlines



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.250	2.350	0.089	0.093
A1	0.050	0.150	0.002	0.006
b	0.660	0.860	0.026	0.034
c	0.458	0.558	0.018	0.022
D	6.550	6.650	0.259	0.263
D1	5.234	5.434	0.207	0.215
D2	4.826 TYP.		0.191 TYP.	
E	6.050	6.150	0.239	0.243
e	2.236	2.336	0.088	0.092
L	9.820	10.220	0.388	0.404
L1	3.000 TYP.		0.119 TYP.	
L2	1.400	1.600	0.055	0.063
L3	1.800 TYP.		0.071 TYP.	
L4	0.700	0.900	0.028	0.036
Φ	1.150	1.250	0.045	0.049
θ	0°	3°	0°	3°
h	0.000	0.300	0.000	0.012
V	5.399 TYP		0.213 TYP	

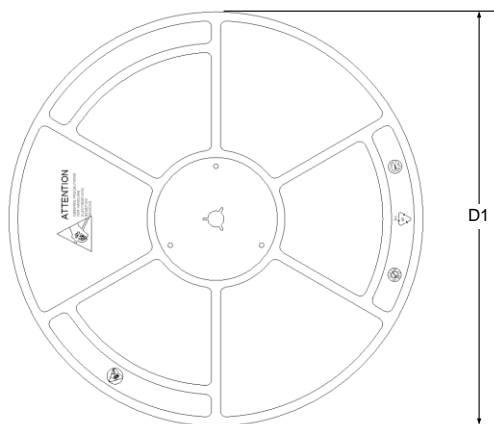
Marking Information



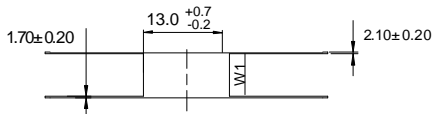
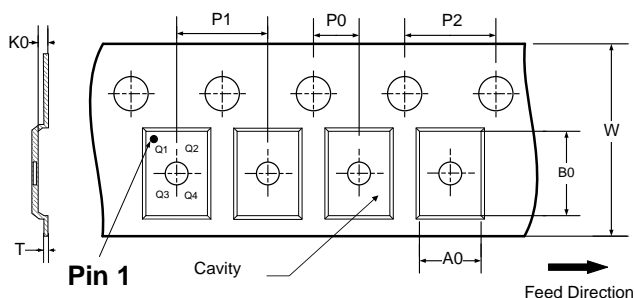
Note:
 YYWW=Date code
 G100N15K=Product Name Code
 Contact ALKAIDSEMI sales for detail information

Reel and Tube 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 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	20.5								Hips	
Tape	P0	P1	P2	W	A0	B0	K0	T	Pin 1 Quadrant	Material	
	4	8	2	16	6.9	10.5	2.9	0.27	Q1	PC	

All dimensions are nominal

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.

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.