

100V 8mohm N-channel SGT MOSFET

AKG100N8P

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:

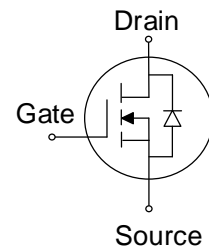
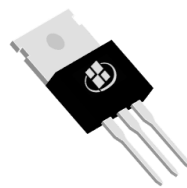
- N-channel, optimized for high-speed smooth switching
- Excellent Gate Charge $\times R_{DS(on)}$ (FOM)
- Very low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)

Applications:

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

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on), max} @ V_{GS} = 10V$	8	m Ω
I_D	120	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG100N8P	TO-220	G100N8P	Tube	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	100	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	120	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$)	77.5	A
I_{DM}	Drain Current - Pulsed (Note 1,2)	460	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	60	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	192	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	0.65	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady-State (Note 4)	51	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5\text{ mH}$, $V_{DD} = 20\text{ V}$, $I_{AS} = 15.5\text{ A}$, $R_G = 25\ \Omega$, Starting $T_J = 25\ ^\circ\text{C}$
4. Mount on minimum PCB layout

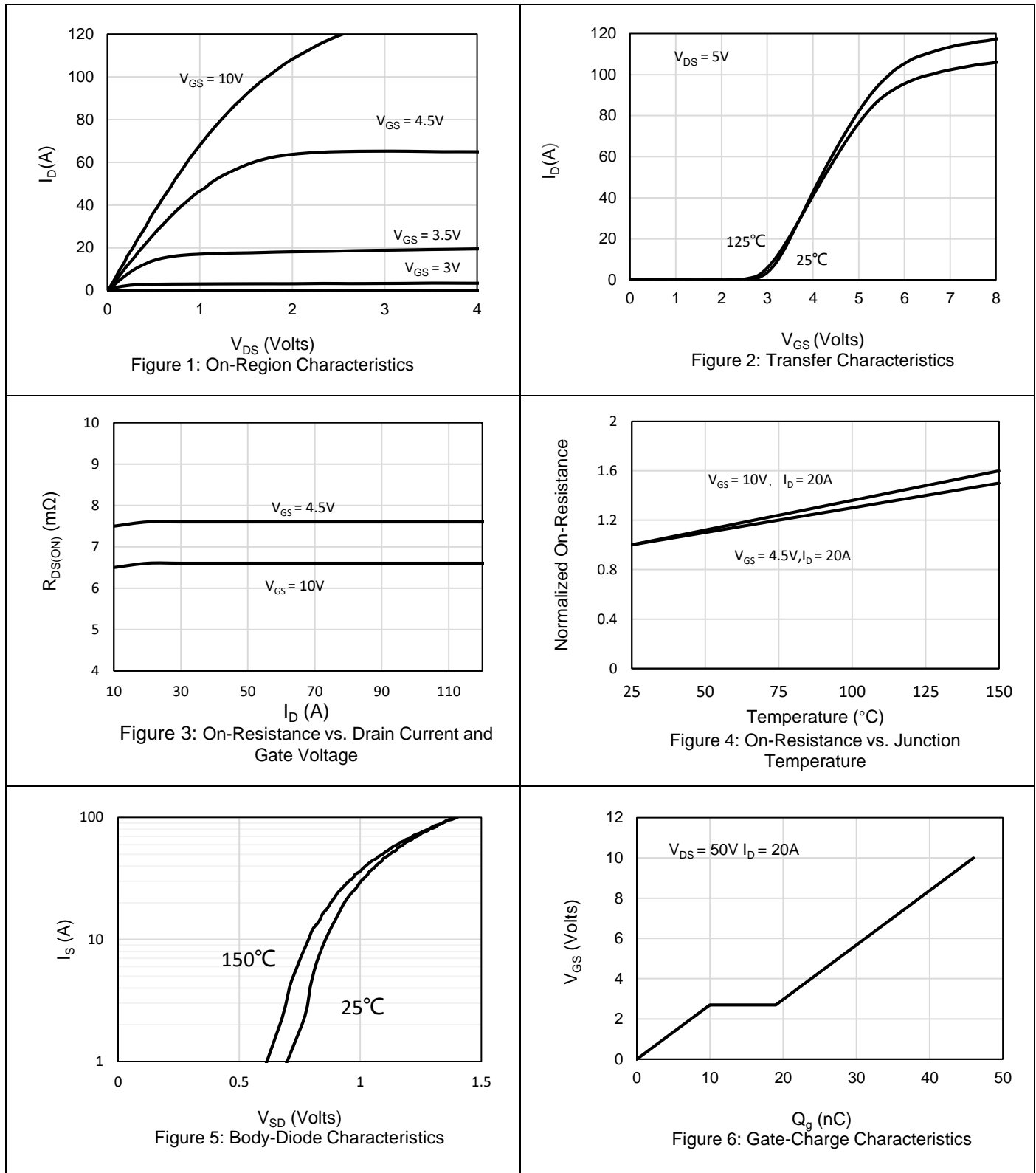
Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)

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	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$			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	2	3	V
$R_{DS(ON)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		6.8	8	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		7.8	11.4	
Dynamic Characteristics						
C_{ISS}	Input capacitance	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, F = 1\text{ MHz}$		2953		pF
C_{OSS}	Output capacitance			750		pF
C_{RSS}	Reverse transfer capacitance			23		pF
Switching Characteristics						
$T_{D(ON)}$	Turn On Delay Time	$V_{DS} = 50\text{ V}, I_D = 20\text{ A}, V_{GS} = 10\text{ V}, R_{GEN} = 10\ \Omega$		16		ns
T_R	Rise Time			29		ns
$T_{D(OFF)}$	Turn Off Delay Time			63		ns
T_F	Fall Time			26		ns
Q_G	Total Gate Charge	$V_{DS} = 50\text{ V}, I_D = 20\text{ A}, V_{GS} = 10\text{ V}$		46		nC
Q_{GS}	Gate-Source Charge			10		nC
Q_{GD}	Gate-Drain Charge			9		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	$V_{GS} = 0\text{ V}, I_S = 20\text{ A}$		0.84	1.2	V
T_{RR}	Reverse recovery time	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		41		ns
Q_{RR}	Reverse recovery charge				110	

Notes:

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

Electrical Characteristics Diagrams



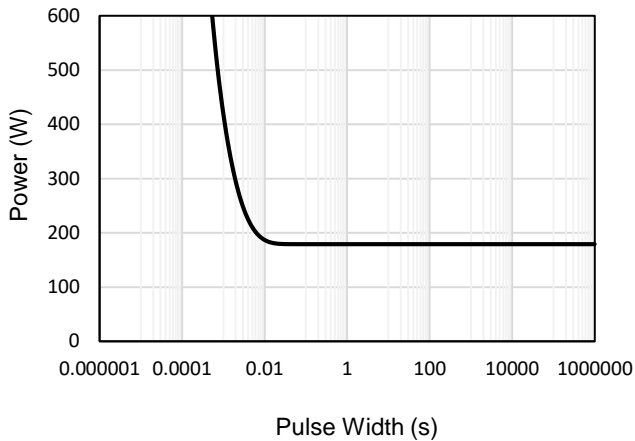


Figure 11: Single Pulse Power Rating Junction-to-Case

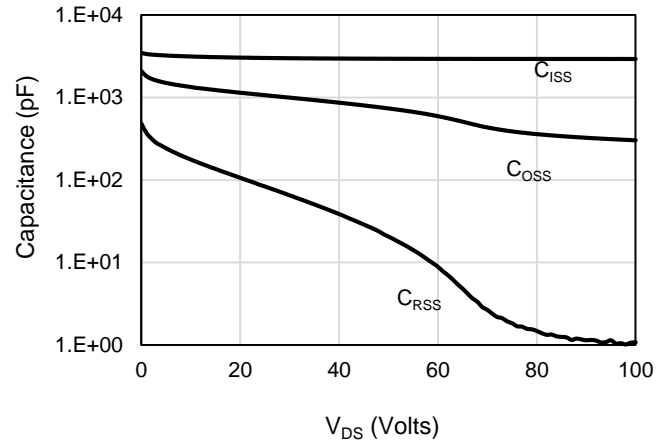


Figure 8: Capacitance Characteristics

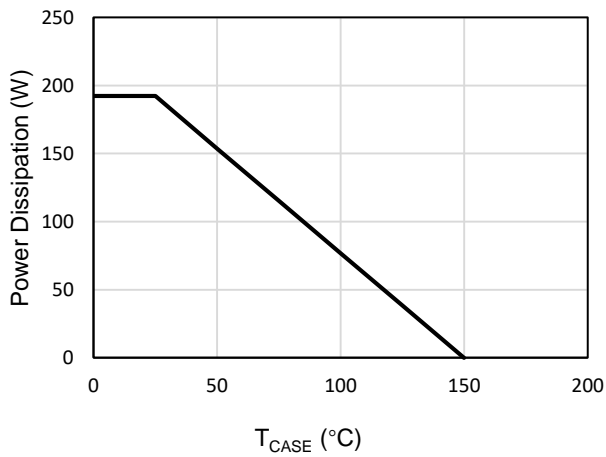


Figure 9: Power De-rating

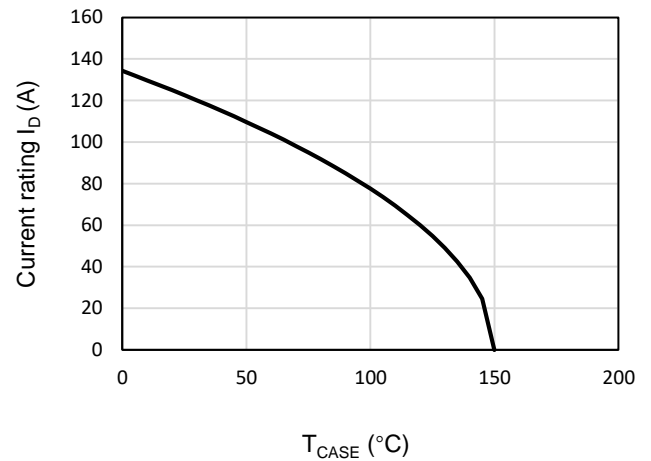


Figure 10: Current De-rating

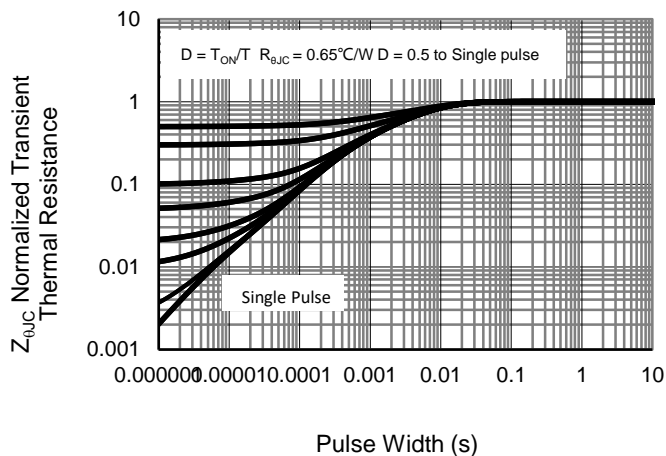


Figure 11: Normalized Maximum Transient Thermal Impedance

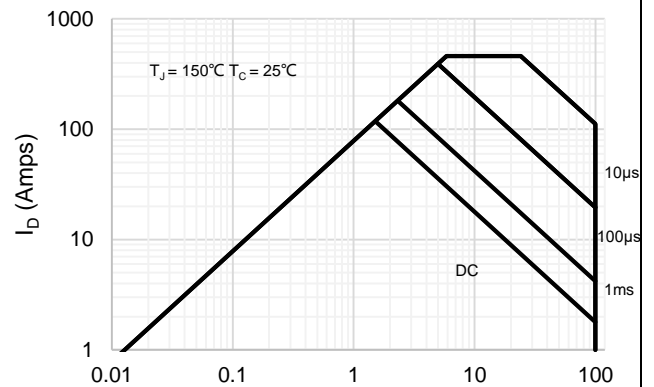
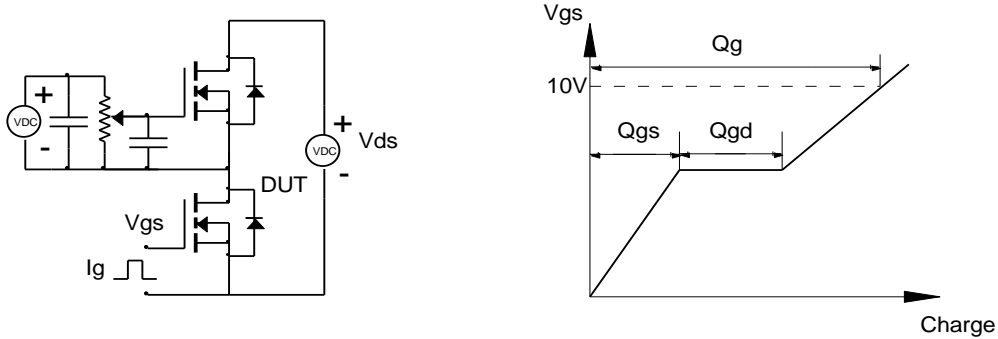


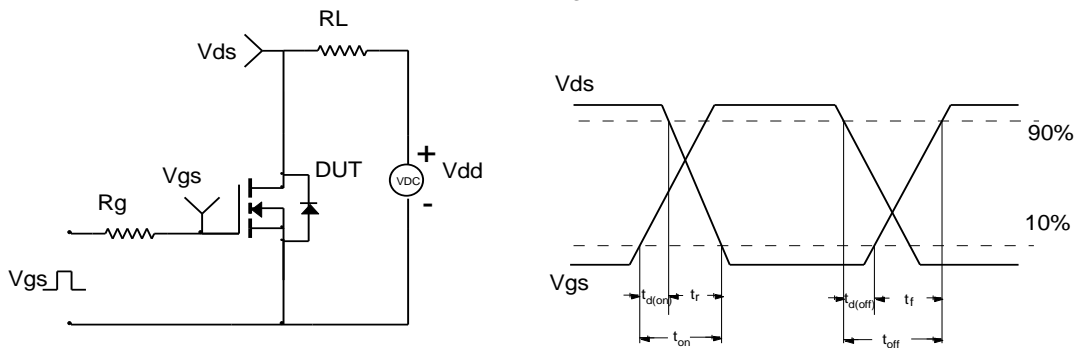
Figure 12: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

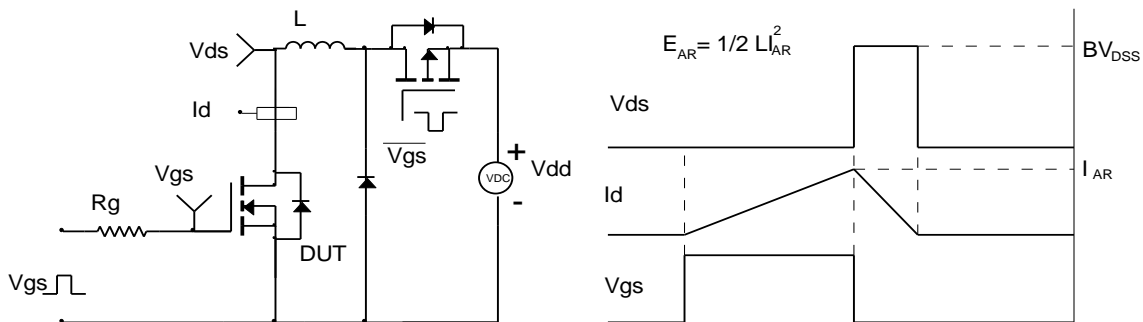
Gate Charge Test Circuit & Waveform



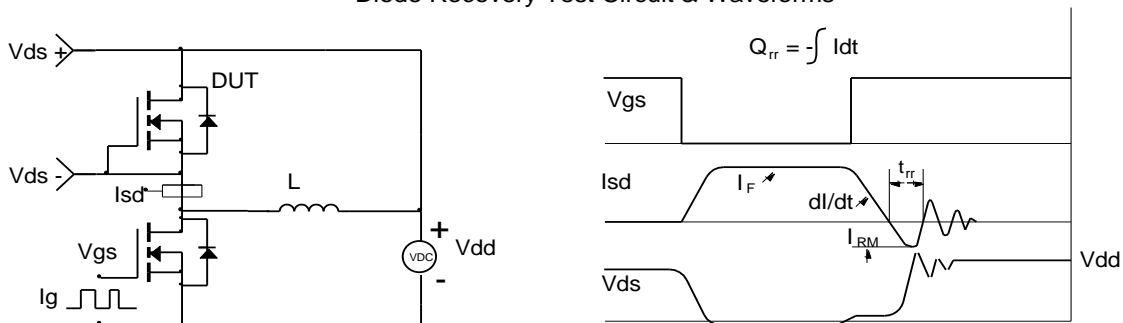
Resistive Switching Test Circuit & Waveforms



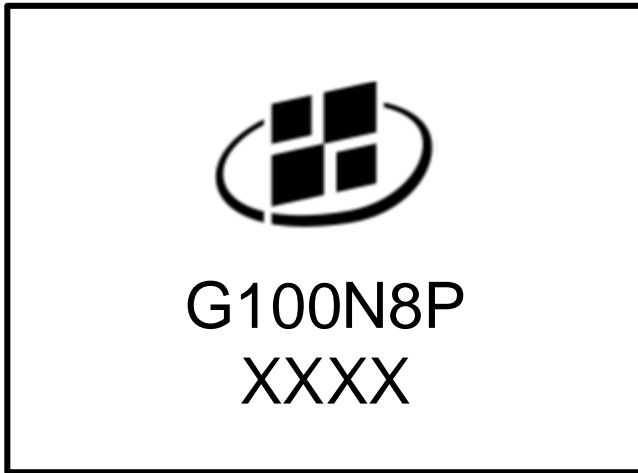
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Marking Information



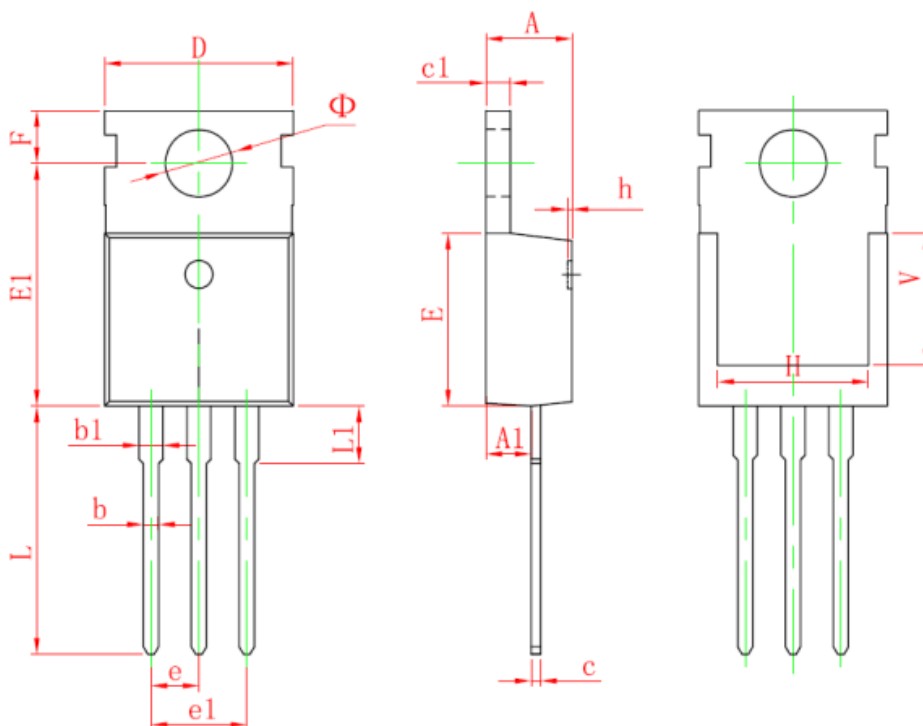
Note:

YYWW = Date code

G100N8P = Product Name Code

Contact ALKAIDSEMI sales for detail information

Package Outlines



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

Revision History

Revision	Release Date	Remark
Rev. 1.1	2022-3-10	

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.