

100V 3.8mohm N-channel SGT MOSFET

AKG10N038GL

Description:

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

Features:

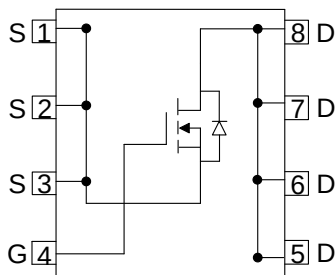
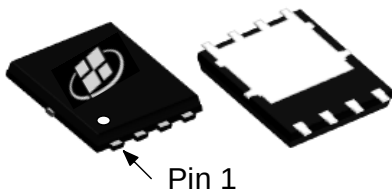
- N-channel, optimized for high-speed smooth switching
- Excellent Gate Charge $\times R_{DS(on)}$ (FOM)
- Very low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)

Applications:

- Power Management
- Motor Drivers
- DC-DC Converters

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on), max} @ V_{GS} = 10V$	3.8	m Ω
I_D	104	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG10N038GL	PDFN5X6	G10N038GL	Tape Reel	See the detail package information

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 ($T_C = 25^\circ\text{C}$) (Note 1)	104	A
	Drain Current -Continuous ($T_C = 100^\circ\text{C}$)	65.7	A
I_{DM}	Drain Current - Pulsed (Note 2)	416	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	324	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	67.5	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	1.85	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Steady State (Note 4)	51.4	$^\circ\text{C/W}$

Notes:

1. The max drain current rating is limited by T_{JMAX}
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5\text{ mH}$, $V_{DD} = 50\text{V}$, $I_{AS} = 36\text{A}$, $R_G = 25\ \Omega$, 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	100			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100 V, V _{GS} = 0 V, T _J = 25°C			1	μA
		V _{DS} = 100 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	1.5	2	2.5	V
R _{DS(ON)}	Drain-Source on-state resistance	V _{GS} = 10 V, I _D = 30 A		3.1	3.8	mΩ
		V _{GS} = 4.5 V, I _D = 30 A		4.2	4.9	
Dynamic Characteristics						
C _{ISS}	Input capacitance	V _{DS} = 50 V, V _{GS} = 0 V, F = 1 MHz		5980		pF
C _{OSS}	Output capacitance			1270		pF
C _{RSS}	Reverse transfer capacitance			31.5		pF
R _G	Gate resistance	F = 1 MHz		1.7		Ω
Switching Characteristics						
T _{D(ON)}	Turn On Delay Time	V _{DS} = 50 V, I _D = 20 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		23.5		ns
T _R	Rise Time			33.6		ns
T _{D(OFF)}	Turn Off Delay Time			89		ns
T _F	Fall Time			25.7		ns
Q _G	Total Gate Charge	V _{DS} = 50 V, I _D = 20 A, V _{GS} = 10 V		100		nC
Q _{GS}	Gate-Source Charge			17		nC
Q _{GD}	Gate-Drain Charge			20.7		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body-Diode Forward Current				67.5	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current (NOTE 1)			270		A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 80 A		0.80		V
T _{RR}	Reverse recovery time	I _F = 20 A,		62.6		ns
Q _{RR}	Reverse recovery charge	di/dt = 100 A/μs		103.8		nC

Electrical Characteristics Diagrams

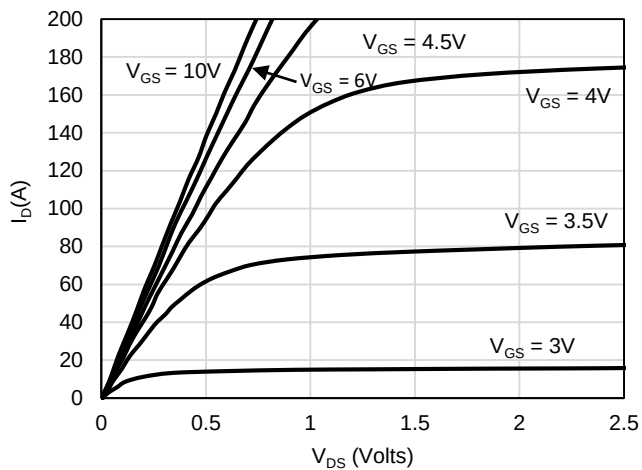


Figure 1: On-Region Characteristics

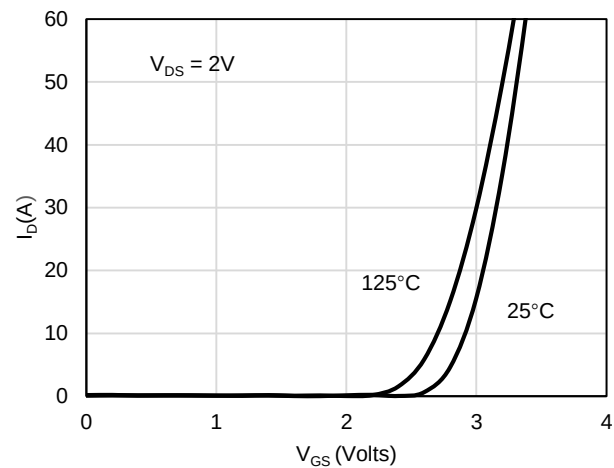


Figure 2: Transfer Characteristics

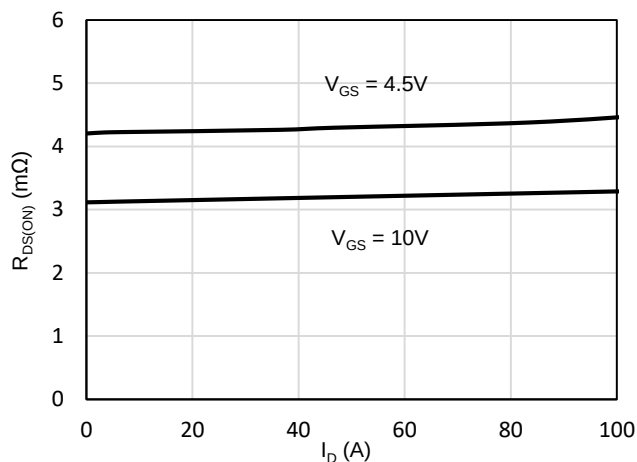


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

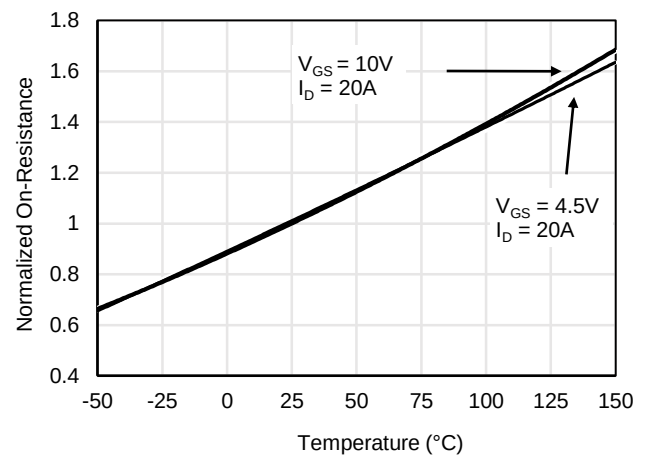


Figure 4: On-Resistance vs. Junction Temperature

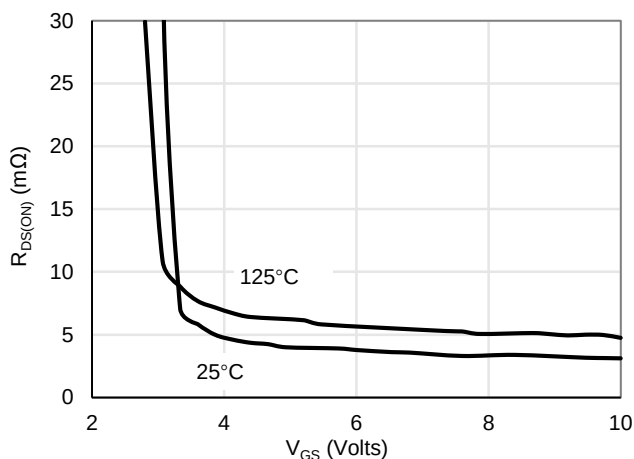


Figure 5: On-Resistance vs. Gate-Source Voltage

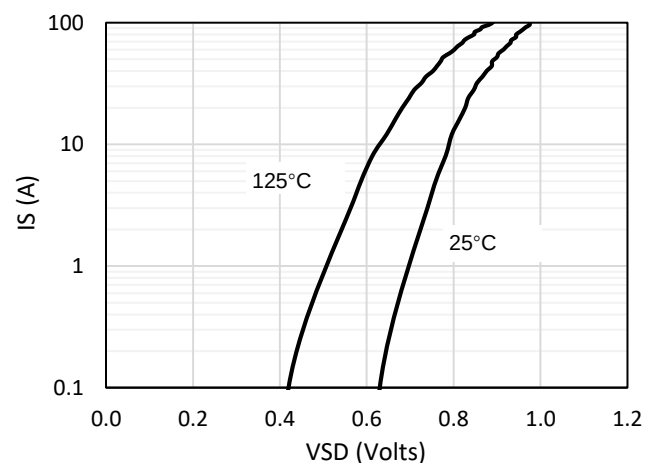
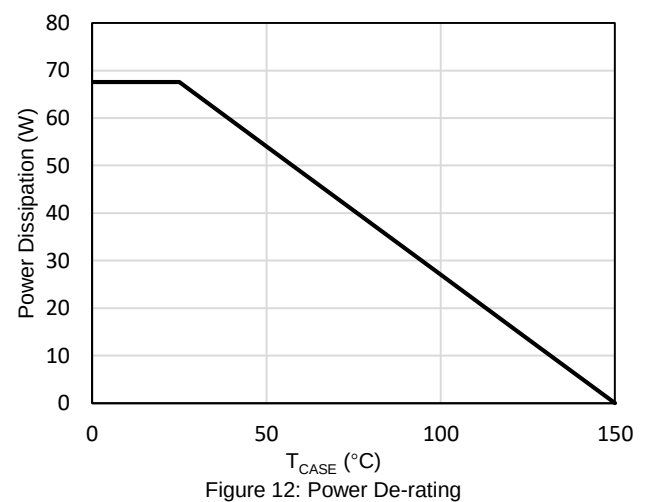
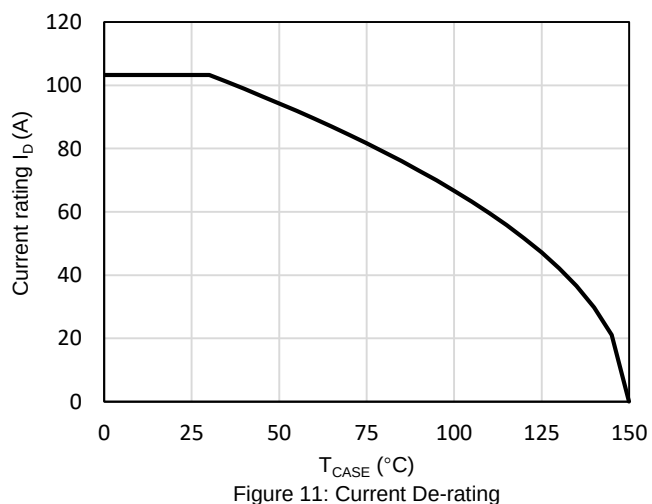
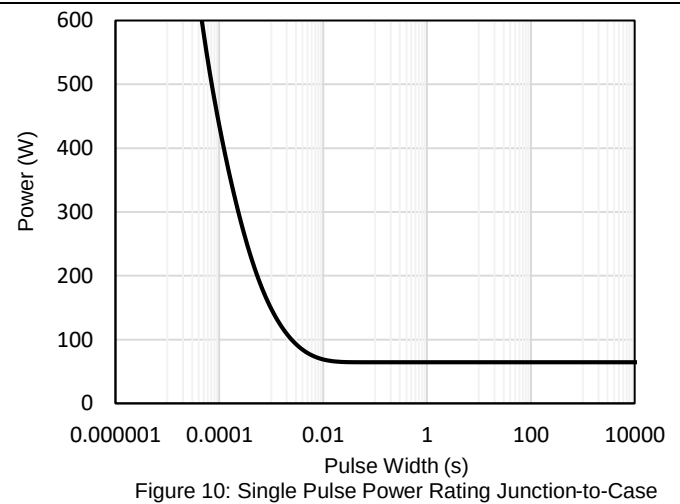
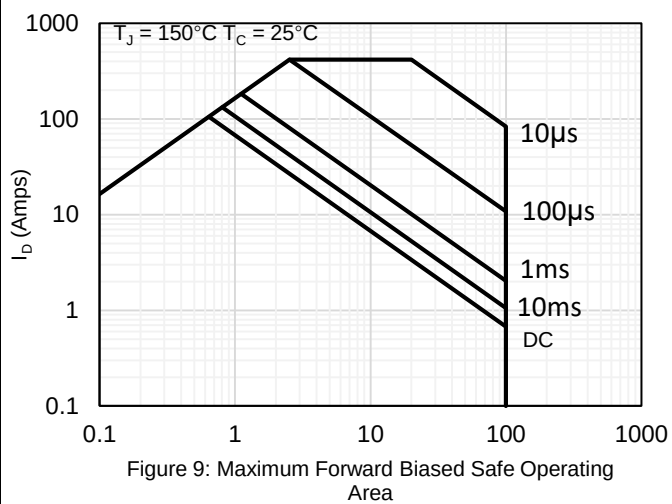
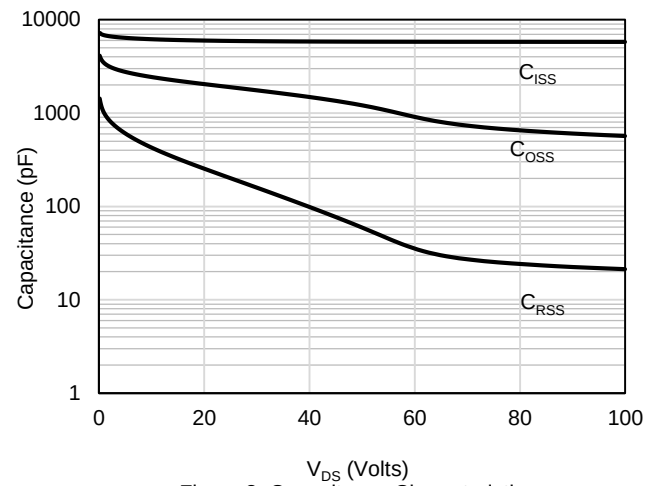
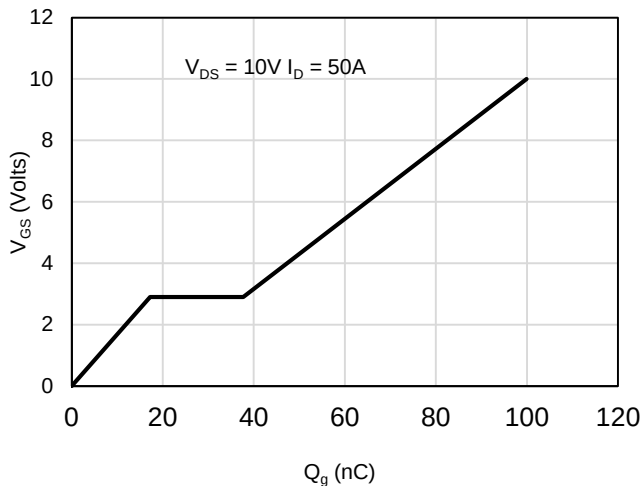
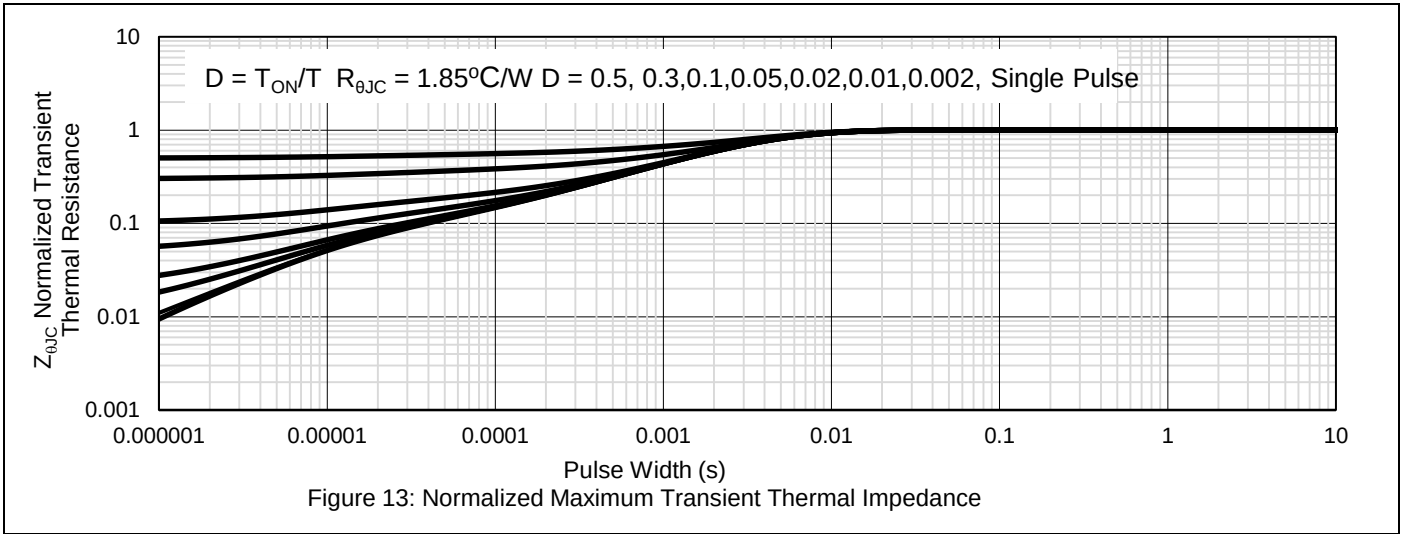


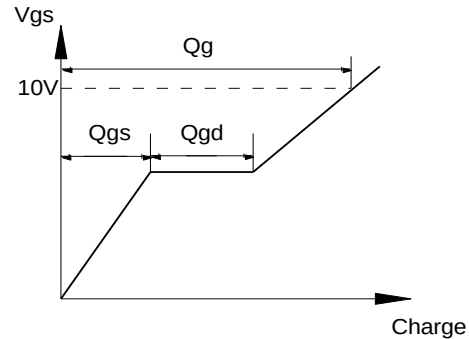
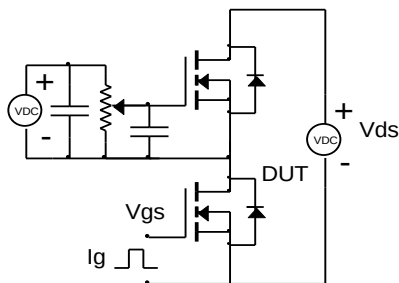
Figure 6: Body-Diode Characteristics



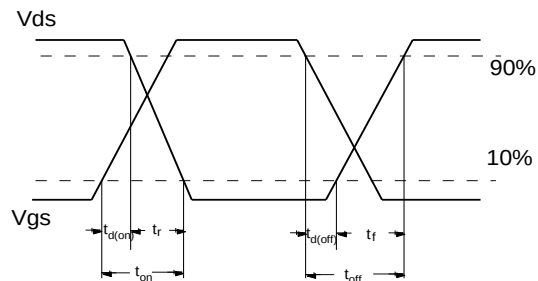
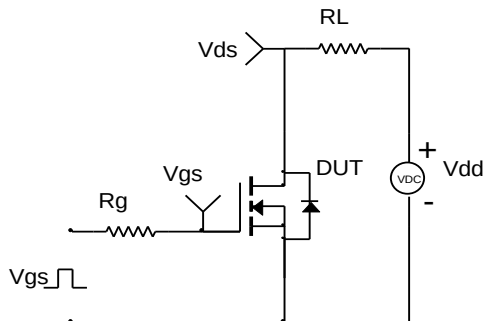


Test Circuit and Waveform

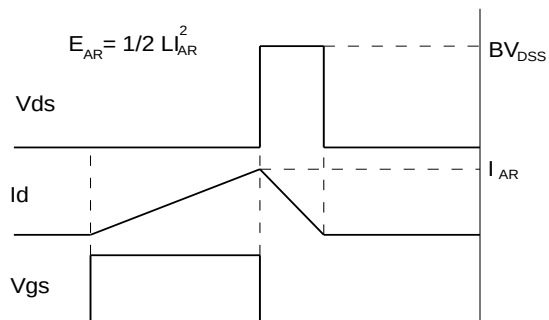
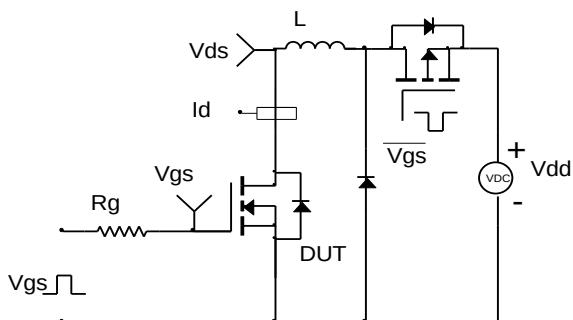
Gate Charge Test Circuit & Waveform



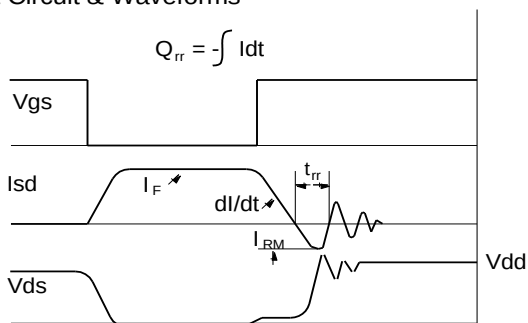
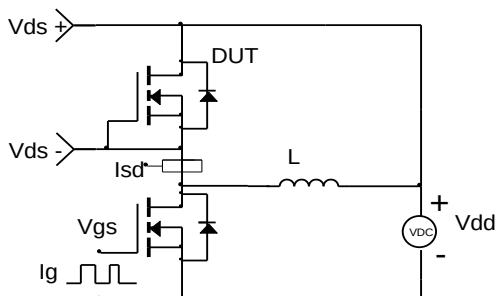
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Revision History

Revision	Release Date	Remark
Rev.1.0	2022-01-13	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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