

40V 3.6mohm N-channel SGT MOSFET
AKG4N036GL

Description:

This N channel SGT MOSFET has been designed to low on-state resistance, low switching loss with good EAS performance, especially for DC-DC and Motor driving applications.

Features:

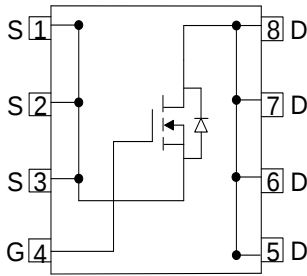
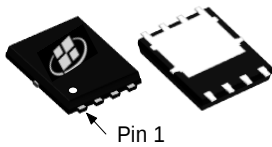
- Low FOM $R_{DS(ON)} \times Q_G$
- Ultra-low on-resistance
- RoHS compliant ^(Note 1)
- Halogen-free ^(Note 1)

Applications:

- Battery management
- Solenoid and Motor Drivers
- DC-DC Converter

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(ON), max} @ V_{GS} = 10V$	3.6	mΩ
I_D	100	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AKG4N036GL	PDFN5X6	G4N036GL	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	40	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) ^(Note 1)	100	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$)	68	A
I_{DM}	Drain Current - Pulsed ^(Note 2)	400	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ^(Note 3)	110	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	67	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)	52	$^\circ\text{C/W}$

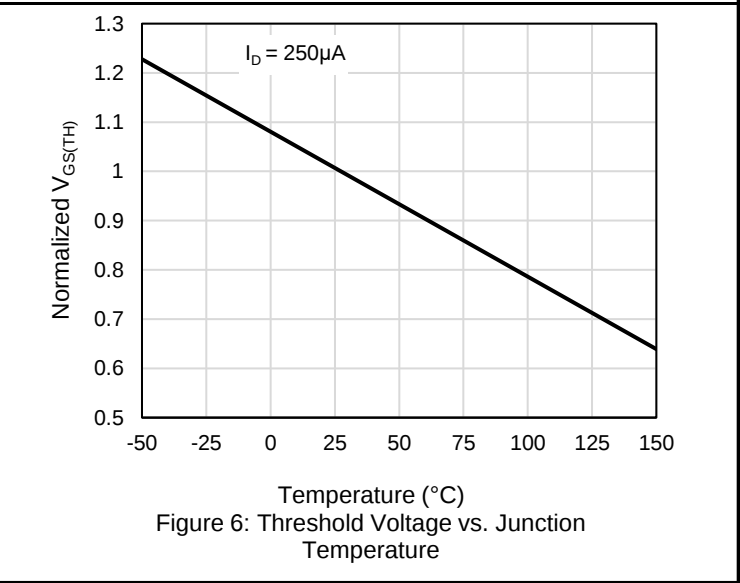
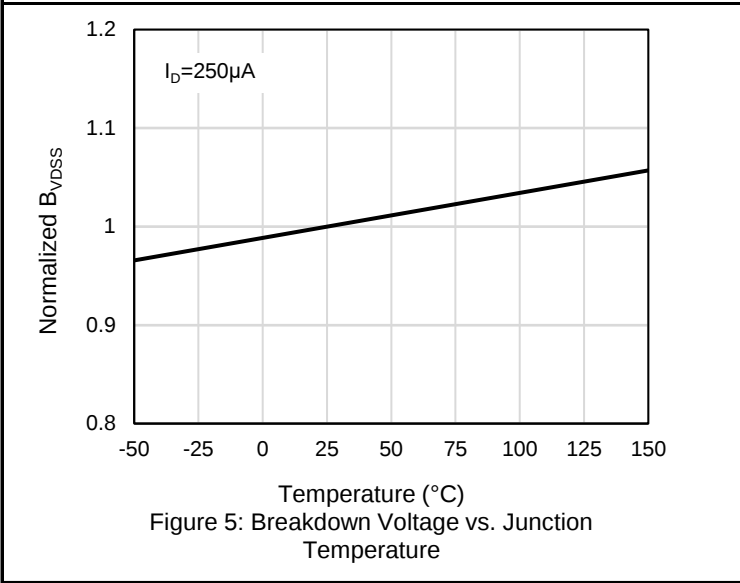
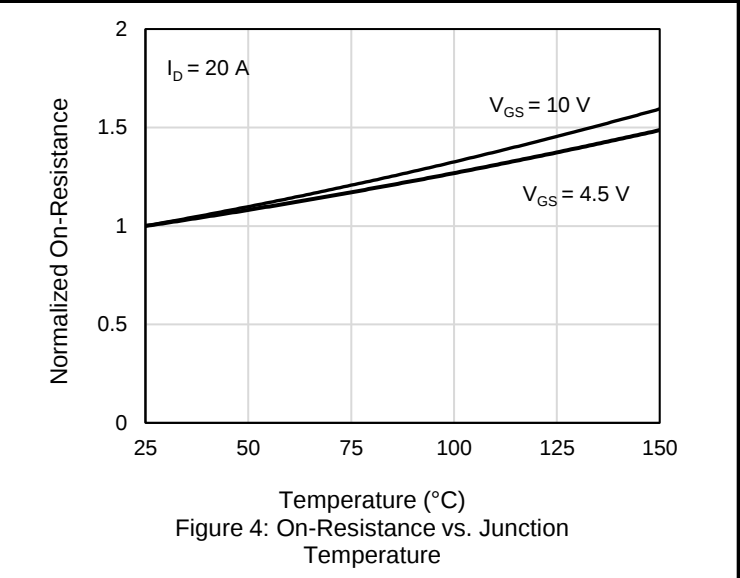
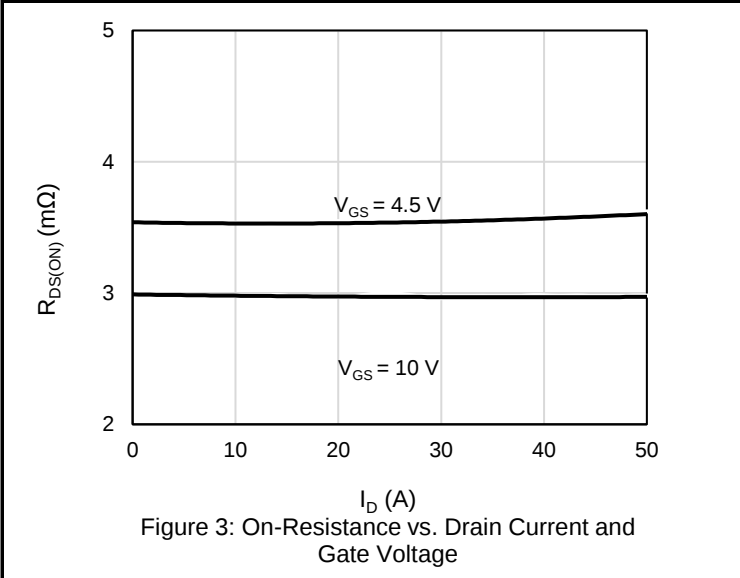
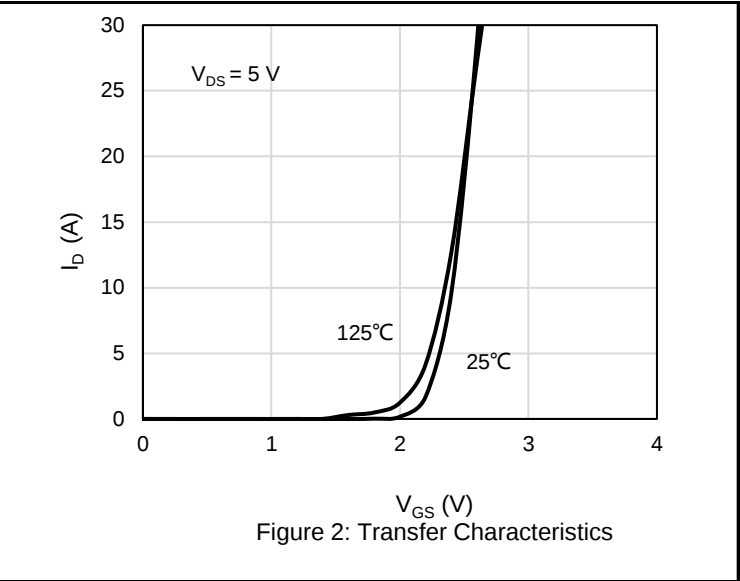
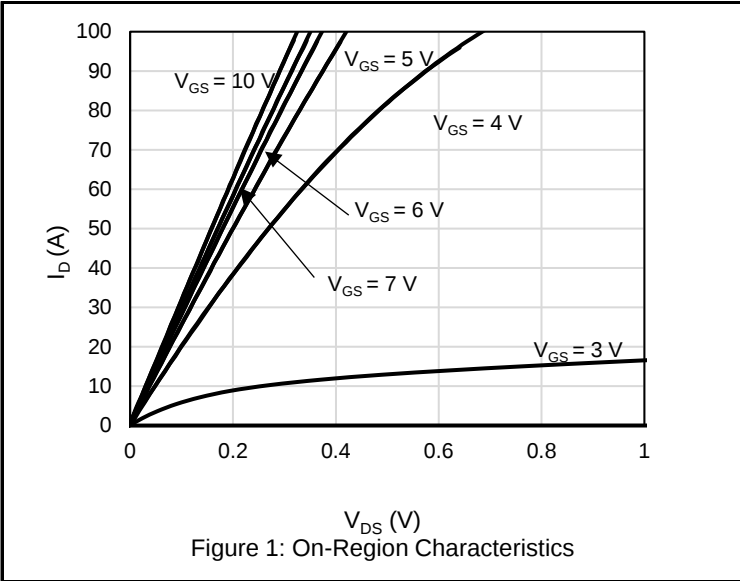
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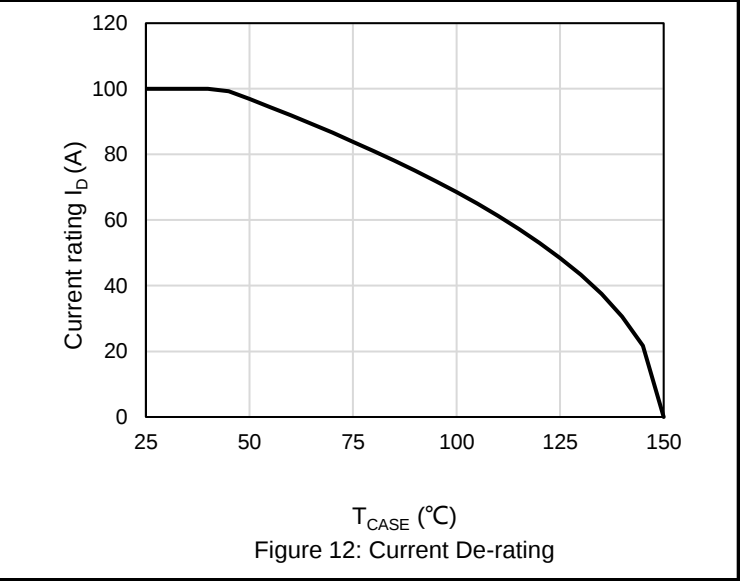
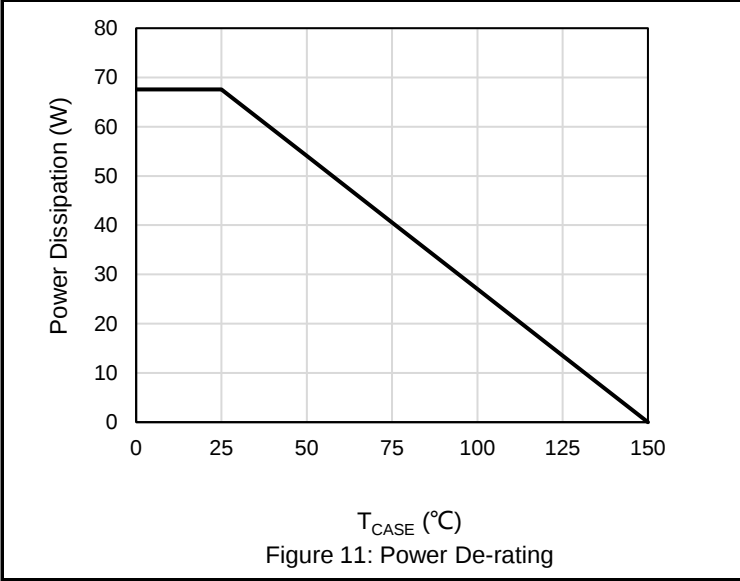
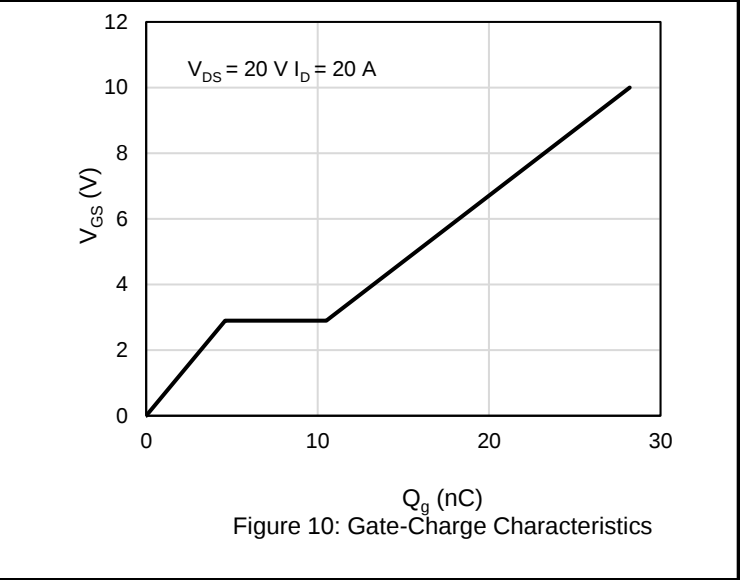
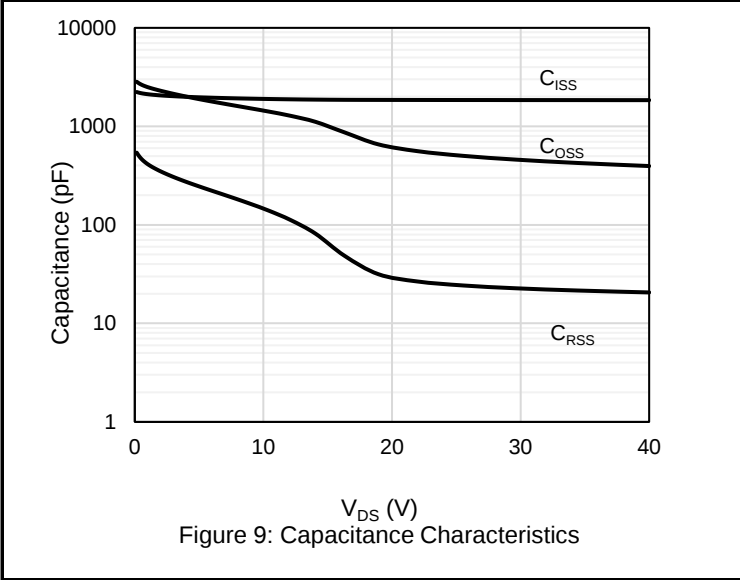
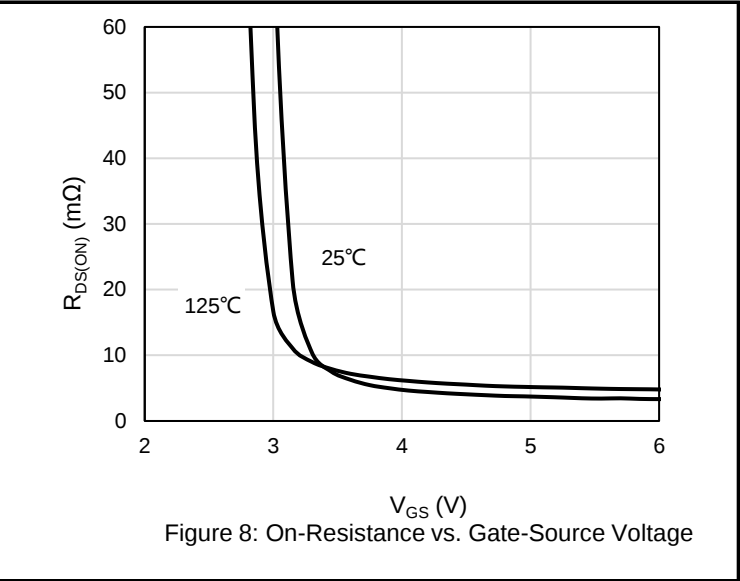
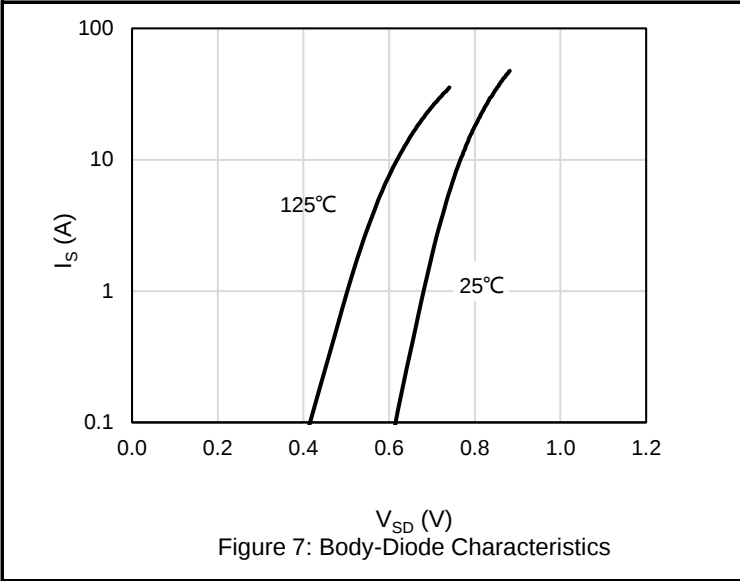
1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $L = 0.5 \text{ mH}$, $V_{DD} = 50\text{V}$, $I_{AS} = 21 \text{ A}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
4. Mount on minimum PCB layout

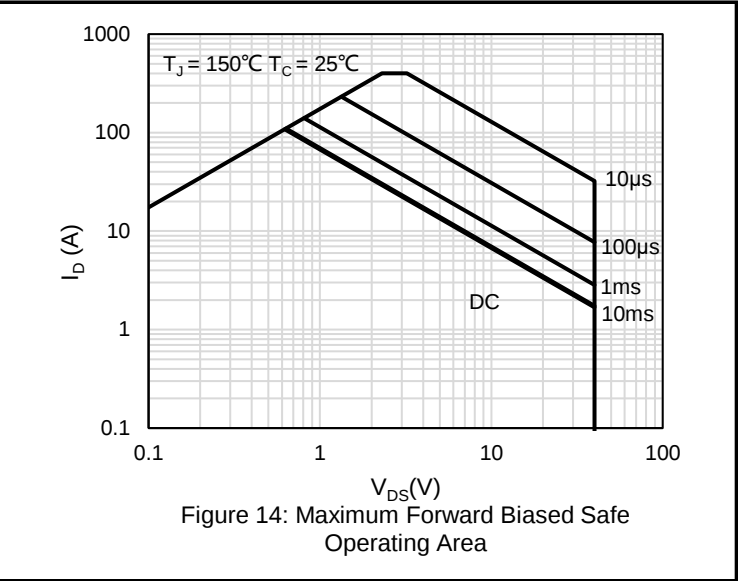
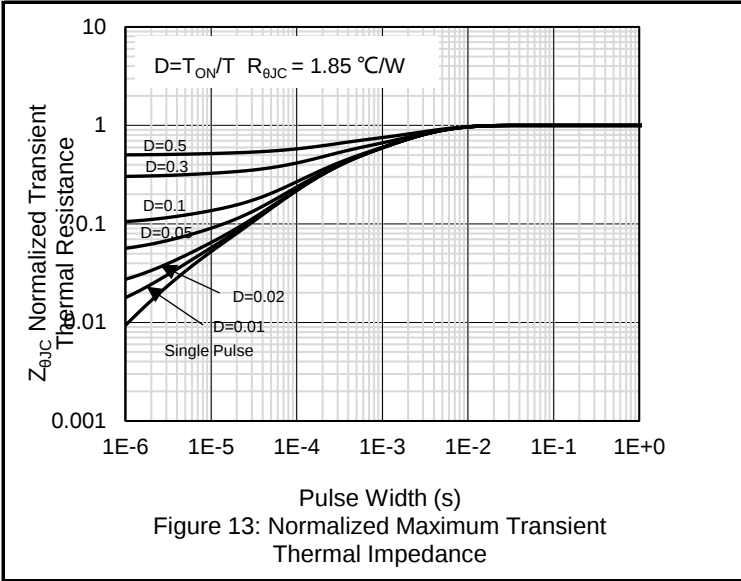
Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 40 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	1	1.7	2.5	V
R _{DS(ON)}	Drain-Source on-state resistance	V _{GS} = 10 V, I _D = 20 A		3	3.6	mΩ
		V _{GS} = 4.5 V, I _D = 20 A		3.5	5.5	mΩ
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{DS} = 20 V, V _{GS} = 0 V, F = 1 MHz		1850		pF
C _{OSS}	Output Capacitance			608		pF
C _{RSS}	Reverse Transfer Capacitance			29		pF
R _G	Gate Resistance	F = 1 MHz		7.2		Ω
Switching Characteristics						
T _{D(ON)}	Turn On Delay Time	V _{DD} = 20 V , R _L = 1 Ω, V _{GS} = 10 V, R _G = 6 Ω		9		ns
T _R	Rise Time			51		ns
T _{D(OFF)}	Turn Off Delay Time			45.5		ns
T _F	Fall Time			78		ns
Q _G	Total Gate Charge	V _{DD} = 20 V , I _D = 20 A, V _{GS} = 10 V		28.2		nC
Q _{GS}	Gate-Source Charge			4.6		nC
Q _{GD}	Gate-Drain Charge			5.9		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body-Diode Forward Current				100	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current				400	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 1 A		0.7	1	V
T _{RR}	Reverse recovery time	V _{DD} = 20 V, I _D = 15 A, di/dt = 100 A/μs		40		ns
Q _{RR}	Reverse recovery charge			27		nC
I _{RRM}	Peak Reverse Recovery Current			1.1		A

Electrical Characteristics Diagrams

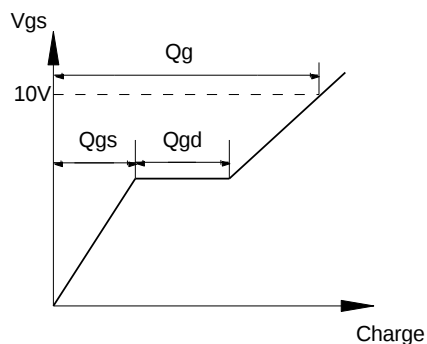
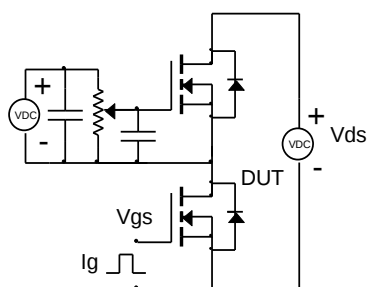




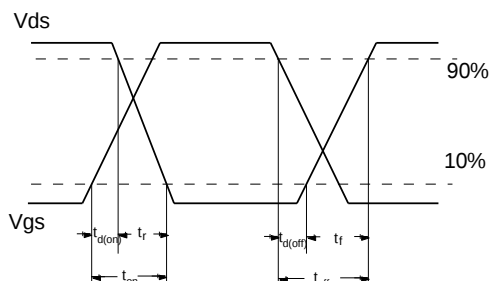
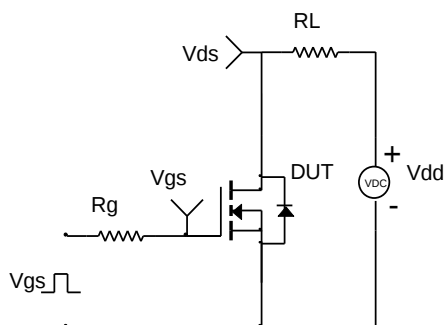


Test Circuit and Waveform

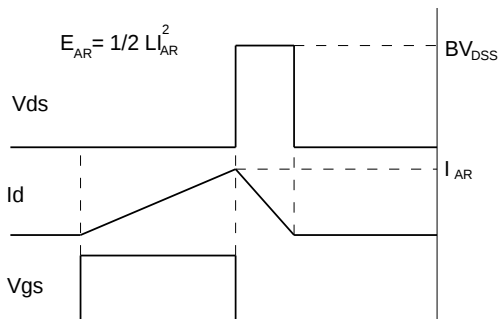
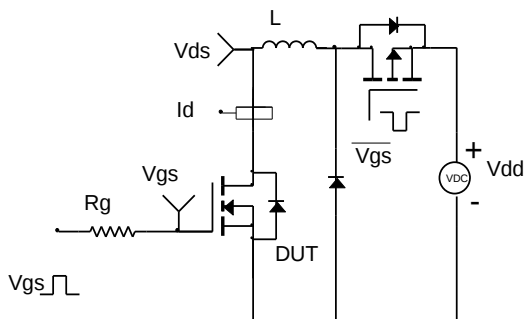
Gate Charge Test Circuit & Waveform



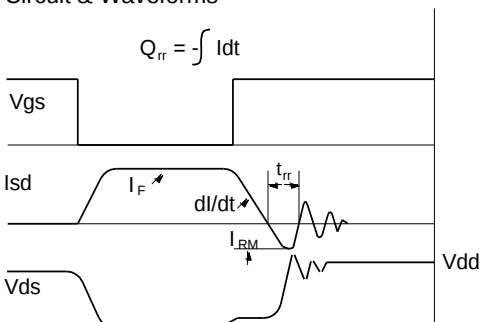
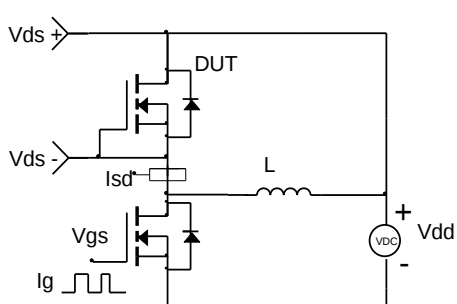
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Revision History

Revision	Release Date	Remark
Rev.1.1	2023/6/26	

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.