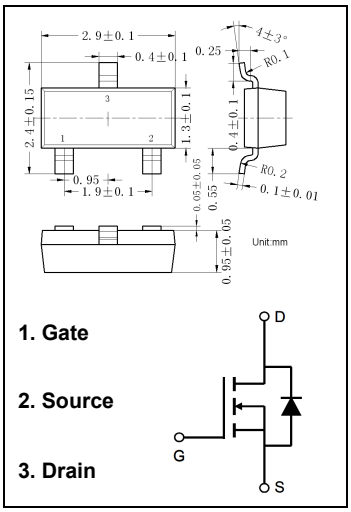
SOT-23 Plastic-Encapsulate Mosfets

LJ3414 N-Channel Mosfet



Features

- V_{DS} = 20V
- I_D = 3A (V_{GS} = 4.5V)
- $R_{DS(ON)}$ < 62mΩ (V_{GS} = 4.5V)
- $R_{DS(ON)}$ < 70mΩ (V_{GS} = 2.5V)
- $R_{DS(ON)}$ < 85mΩ (V_{GS} = 1.8V)

Applications

The LJ3414 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

Marking:3414

Maximum Ratings (T_a=25°C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{DS}	Drain-Source voltage		20	V
V_{GS}	Gate-Source voltage		±8	V
I_D	Continuous Drain Current [A]	T_a=25°C	3	A
		T_a=70°C	2.5	
I_{DM}	Pulsed Drain Current [B]		16	
P_D	Power Dissipation [B]	T_a=25°C	1.4	W
		T_a=70°C	0.9	
T_J, T_{STG}	Junction and Storage Temperature Range		-55 to +150	°C

Thermal Characteristics

Symbol	Parameter		Typ	Max	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient [A]	t ≤ 10s	70	90	°C/W
	Maximum Junction-to-Ambient [A]	Steady-State	100	125	°C/W
$R_{\theta JL}$	Maximum Junction-to-Lead [C]	Steady-State	63	80	°C/W

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 20 V, V_{GS} = 0 V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-body Leakage current	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
$V_{GS(th)}$	Gate-Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.7	1.0	V
$I_{D(ON)}$	On-state Drain Current	V_{GS} = 4.5V, V_{DS} = 5V	16			A
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 4.5V, I_D = 3A		51	62	mΩ
		T_J=125°C		68	85	
		V_{GS} = 2.5V, I_D = 2.8A		58	70	
		V_{GS} = 1.8V, I_D = 2.5A		68	85	
g_{fs}	Forward Trans conductance	V_{DS} = 5V, I_D = 3A		11		S
V_{SD}	Diode Forward Voltage	I_S = 1A, V_{GS}=0 V		0.7	1.0	V
I_S	Maximum Body-Diode Continuous Current				2	A
Dynamic Parameters						
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 10V f = 1.0MHz		260	320	pF
C_{oss}	Output Capacitance			48		
C_{rss}	Reverse Transfer Capacitance			27		
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		3	4.5	Ω
Dynamic Parameters						
Q_g	Total Gate Charge	V_{GS} = 4.5V V_{DS} = 10V I_D = 3A		2.9	3.8	nC
Q_{gs}	Gate Source Charge			0.4		
Q_{gd}	Gate Drain Charge			0.6		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} = 5V, V_{DS} = 10V, R_L = 3.3Ω,R_{GEN} = 6Ω		2.5		ns
t_r	Turn-On Rise Time			3.2		
$t_{D(off)}$	Turn-Off Delay Time			21		
t_f	Turn-Off Fall Time			3		
t_{rr}	Body Diode Reverse Recovery Time	I_F = 3A, dI/dt = 100A/μs		14	19	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F = 3A, dI/dt = 100A/μs		3.8		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. copper, in a still air environment with T_a=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B. Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25°C. The SOA curve provides a single pulse rating.

Typical Characteristics

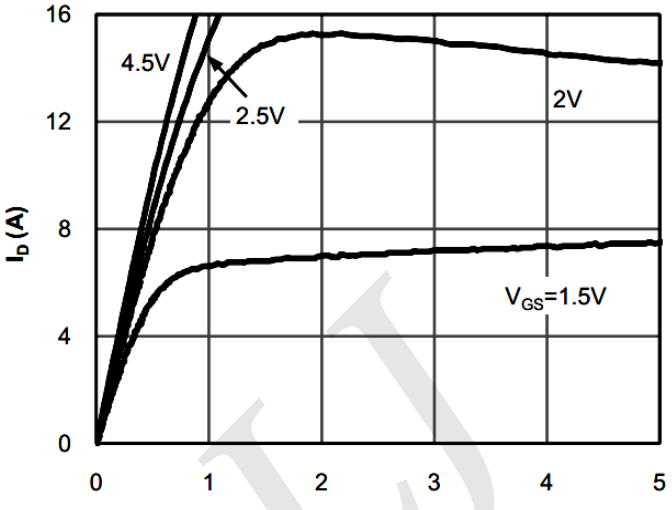


Figure 1: On-Region Characteristics

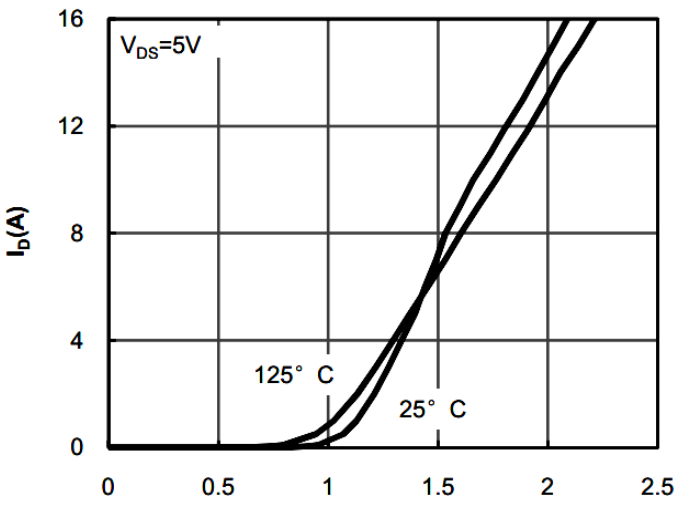


Figure 2: Transfer Characteristics

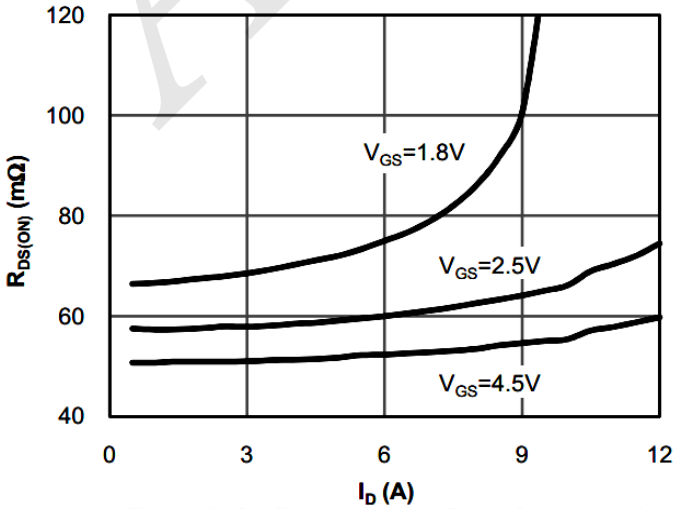


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

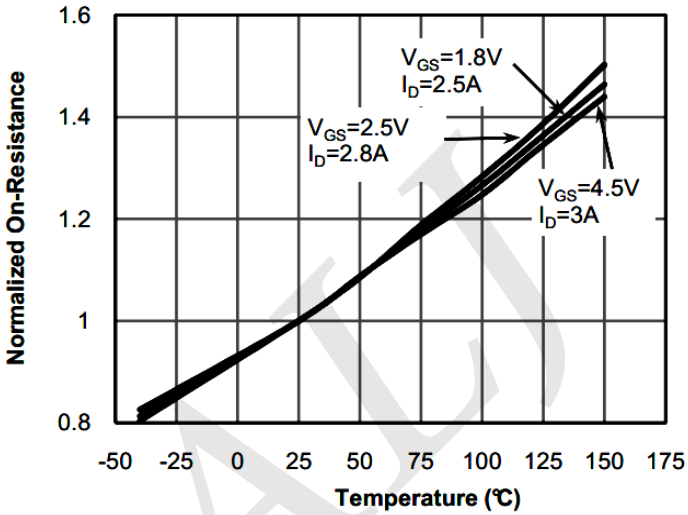


Figure 4: On-Resistance vs. Junction Temperature

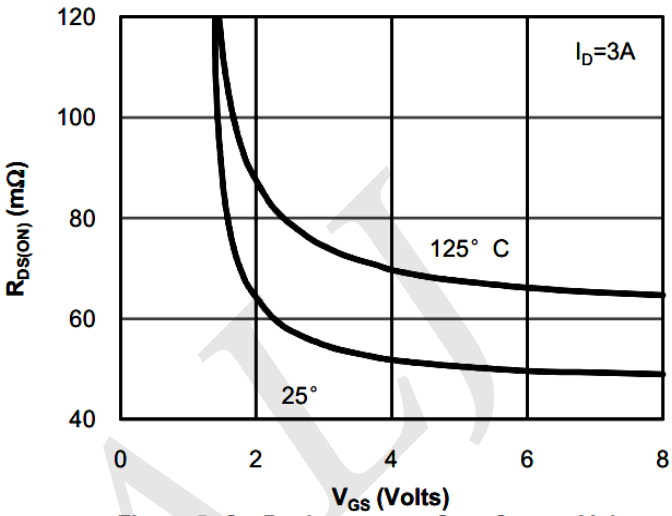


Figure 5: On-Resistance vs. Gate-Source Voltage

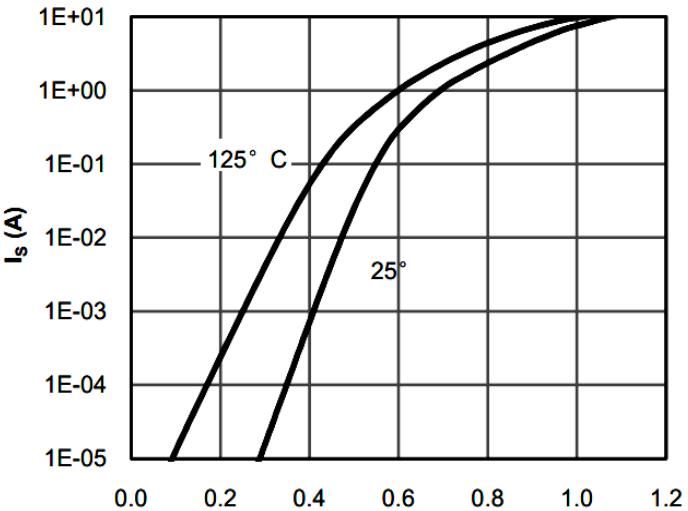


Figure 6: Body-Diode Characteristics

AUK

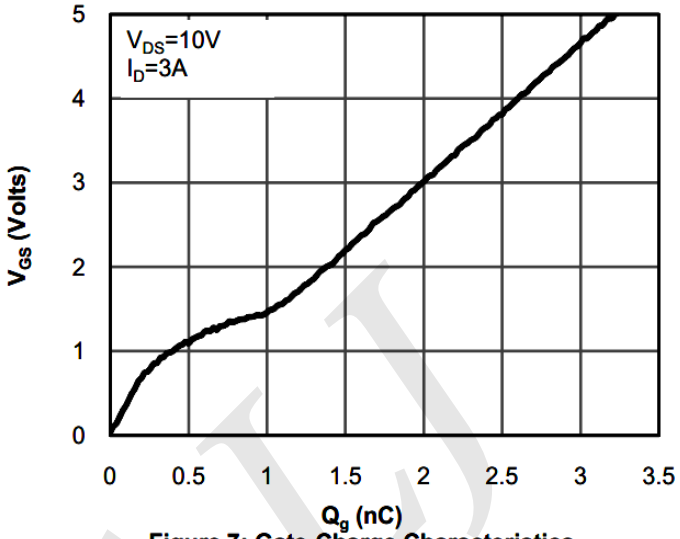


Figure 7: Gate-Charge Characteristics

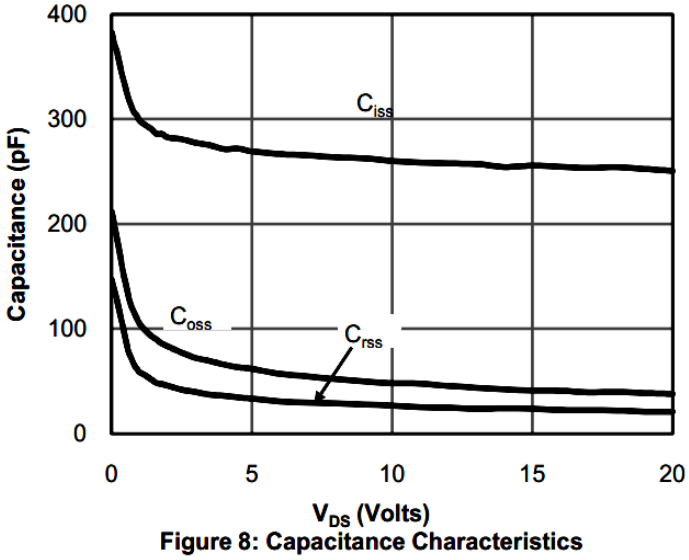


Figure 8: Capacitance Characteristics

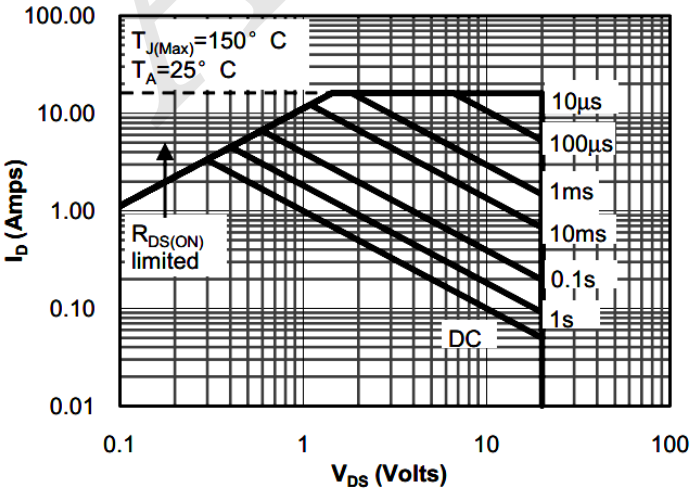


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

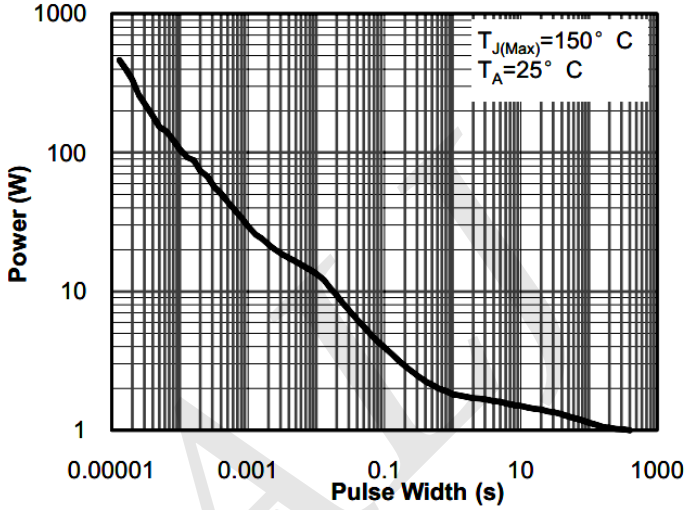


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

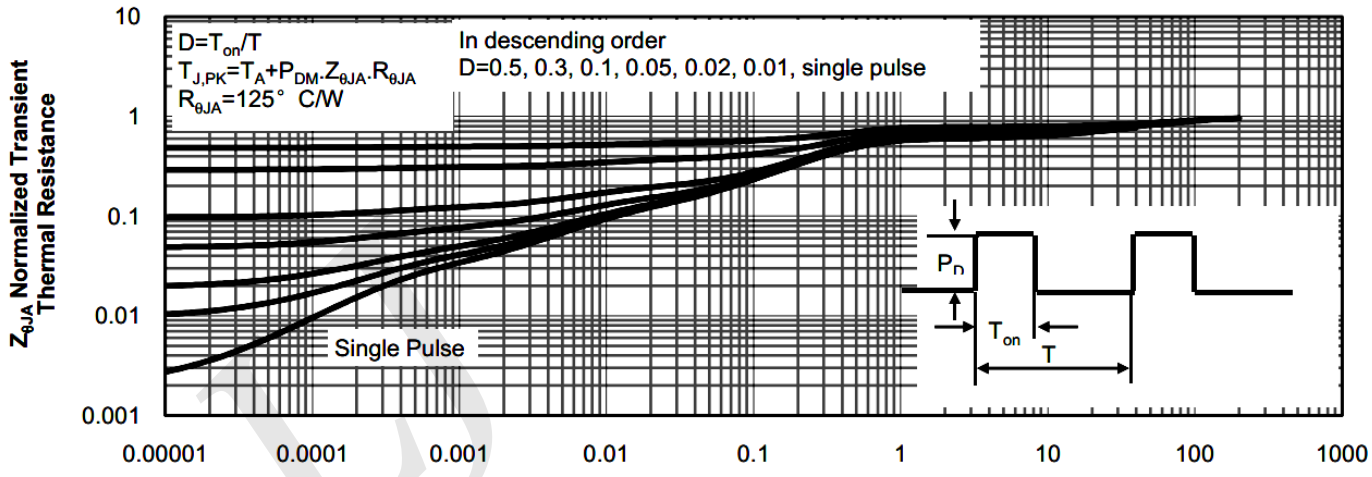
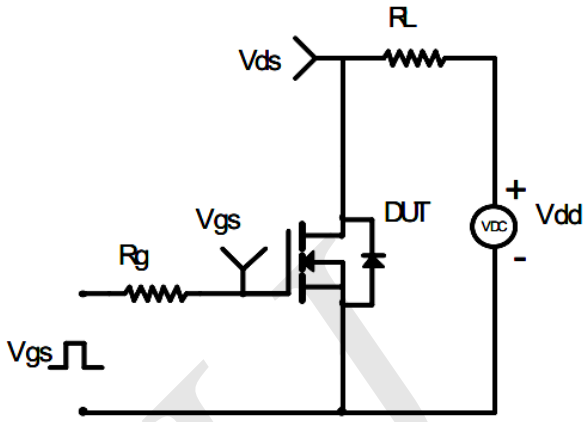
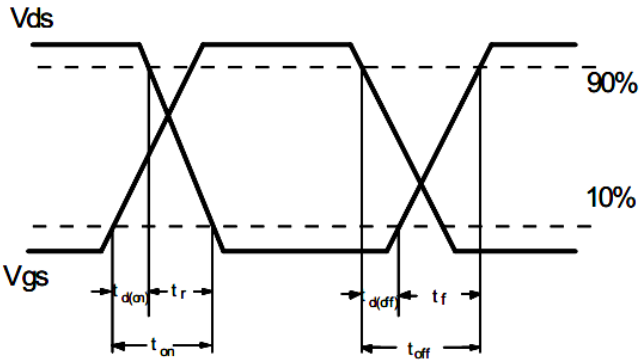


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

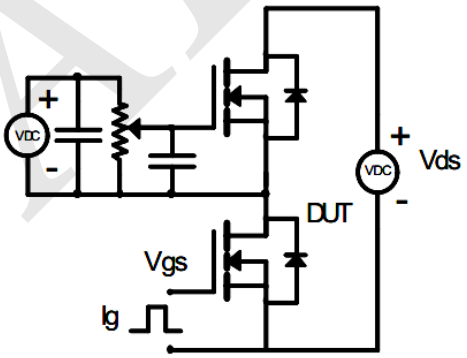
Test Circuit & Waveforms

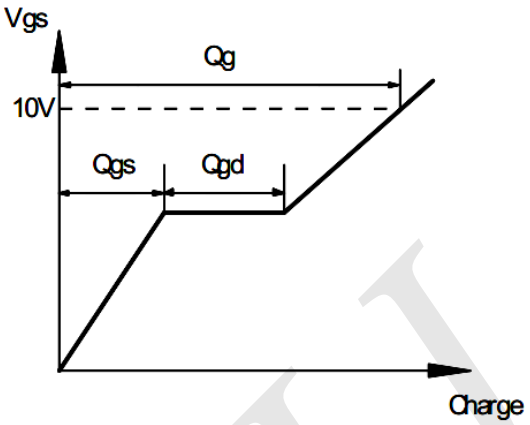
Resistive Switching Test Circuit & Waveforms



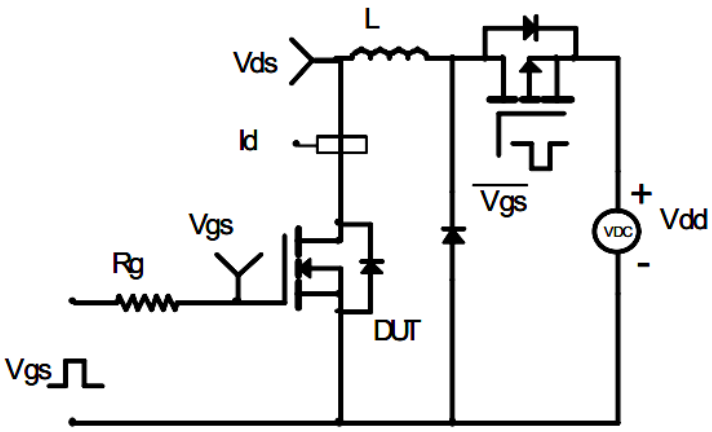


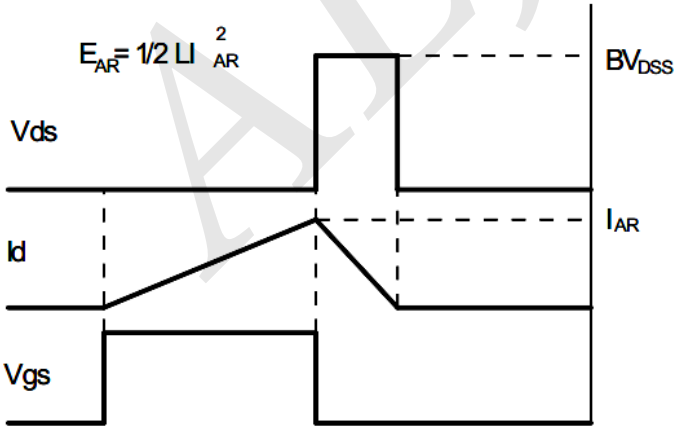
Gate Charge Test Circuit & Waveform





Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms

