Dual N-Channel MOSFET, 30V, 12mΩ, 10A

General Description

The VAD3214O utilizes the advanced Trench technology and low resistance package to achieve extremely low on-resistance device which makes the system design an efficient and reliable solution for use in a wide variety of applications.

Features

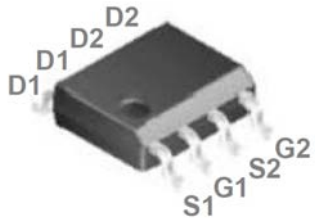
- 30V, 10A, $R_{DS(on)}$=12mΩ@Vgs= 10V
- High Efficiency
- Improved dv/dt, di/dt capability
- 100% EAS Guaranteed
- Green Device

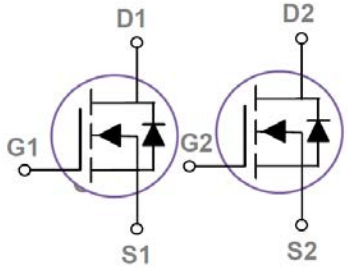
Application

Lithium-ion Battery Pack Applications

Product Summary

$V_{(BR)DSS}$	$R_{(DS)on}$	Id
30V	12 mΩ	10A





Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	Condition
Drain-Source Voltage	V_{DS}	30	V	
Continuous drain current(1)	I_D	10 8	A	T_A=25°C T_A=70°C
Gate-Source Voltage	V_{GS}	±20	V	Static
Pulsed drain current(2)	I_{DM}	36	A	T_C=25°C
Power dissipation @ T_C=25°C	P_{diss}	1.5	W	T_A=25°C
Continuous diode forward current	I_S	9	A	T_C=25°C
Storage Temperature Range	T_{STG}	-55 to150	°C	
Operation Junction Temperature Range	T_J	-55 to 150	°C	

(1) Limited by T_{j_max}.

(2) Pulse width T_P limited by $T_{j,max}$

Thermal characteristics

Symbol	Parameter	Min	Typ	Max	Unit
R_{thJA}	Thermal resistance, junction-ambient, max	---	---	85	°C/W
T_{sold}	Soldering temperature, max	---	---	260	°C

Package and Ordering Information

Device	Package
VAD3214O	SOP8

Electrical Characteristics (T_j=25°C, unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Static Characteristic						
Drain-Source breakdown Voltage	$V_{(BR)DSS}$	30	---	---	V	V_{GS}=0V, I_D=0.25mA
Gate Threshold Voltage	$V_{(GS)th}$	1.2	---	2.5	V	V_{DS}=V_{GS}, I_D=0.25mA
Drain-Source on resistance	$R_{(DS)on}$	---	---	12	mΩ	V_{GS}=10V, I_D=8A, T_j=25° C
		---	---	18	mΩ	V_{GS}=4.5V, I_D=6A, T_j=25° C
Zero gate voltage drain current	I_{DSS}	---	---	1	uA	V_{DS}=24V, V_{GS}=0V, T_j=25° C
Gate-Source leakage current	I_{GSS}	---	---	100	nA	V_{GS}=±20V, V_{DS}=0V
Dynamic Characteristic						
Input Capacitance	C_{iss}	760	940	1175	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Output Capacitance	C_{oss}	92	131	163	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Reverse Transfer Capacitance	C_{rss}	76	109	153	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Turn-on delay time	$T_{d(on)}$	---	4.2	---	nS	V_{DD}=15V, V_{GS}=10V, I_D=8A, R_G=1.5Ω;
Rise time	T_r	---	8.2	---	nS	
Turn-off delay time	$T_{d(off)}$	---	31	---	nS	
Fall time	T_f	---	4	---	nS	
Gate Charge Characteristic						
Gate to source charge	Q_{gs}	---	3.88	---	nC	V_{DD}=15V, I_D=8A, V_{GS}= 4.5V
Gate to drain charge	Q_{gd}	---	3.44	---	nC	
Gate charge total	Q_g	---	9.63	---	nC	
Reverse diode characteristic						
Diode forward voltage	V_{FD}	---	---	1	V	V_{GS}=0V, I_F=1A, T_j=25° C
Continuous Source Current	I_{csc}	---	---	9	A	V_G=V_D=0V, Force current
Reverse Recovery Time	t_{rr}	---	8	---	nS	IF=8A, di/dt=100A/uS, T_j=25° C
Reverse Recovery Charge	Q_{rr}	---	2.9	---	nC	

Electrical Characteristic Diagrams

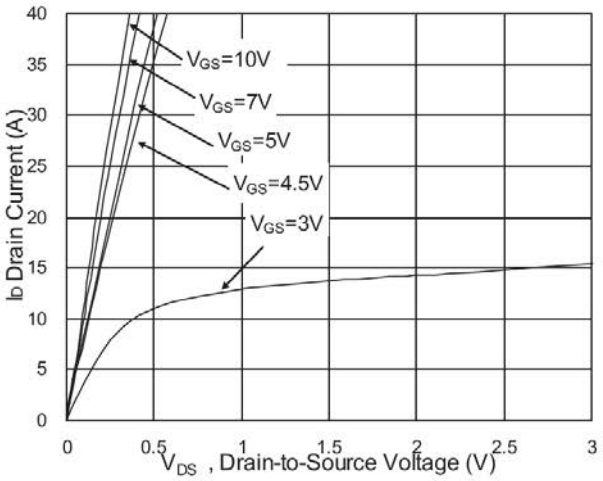


Figure 1 Typical Output Characteristic

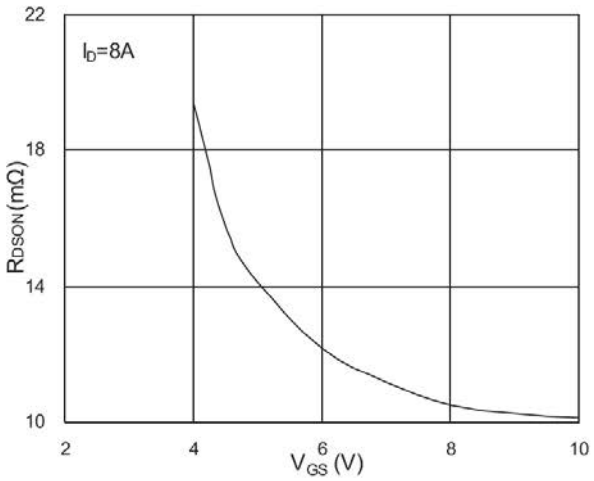


Figure 2 On-Resistance vs. GS voltage

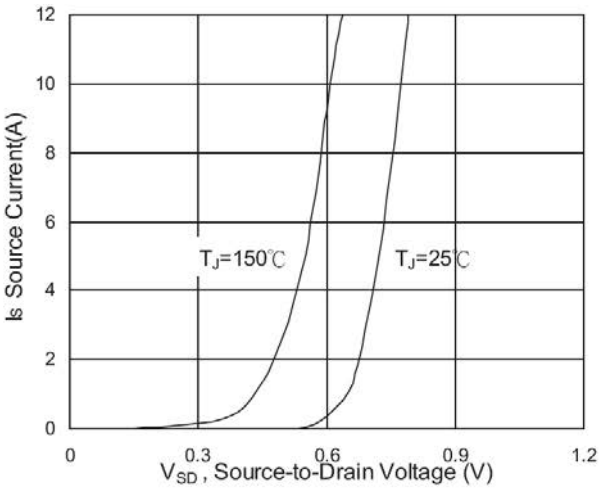


Figure 3 Forward Characteristic of Reverse

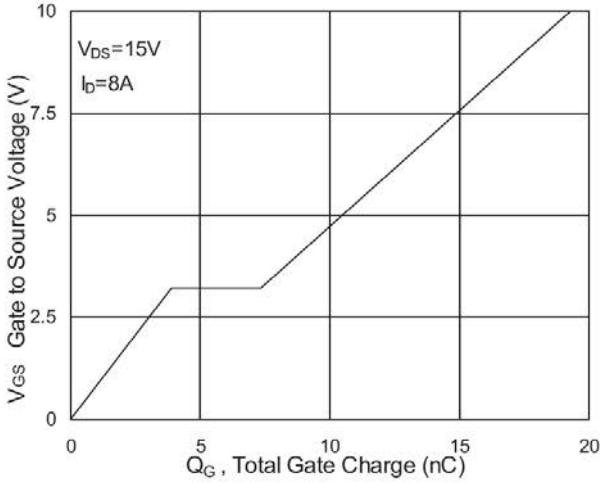


Figure 4 Gate Charge Waveform

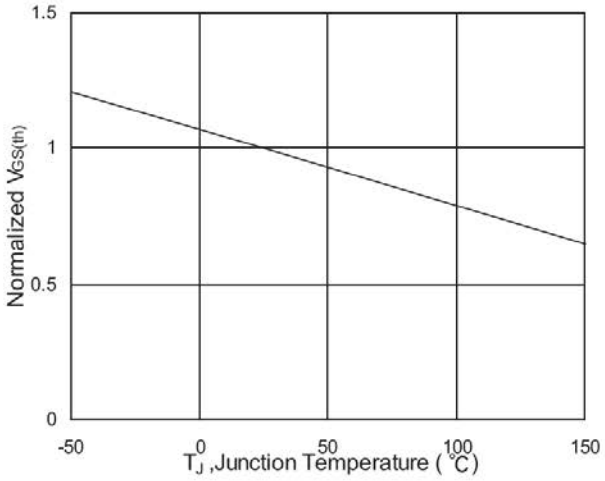


Figure 5 Normalized $V_{GS(th)}$ vs. T_J

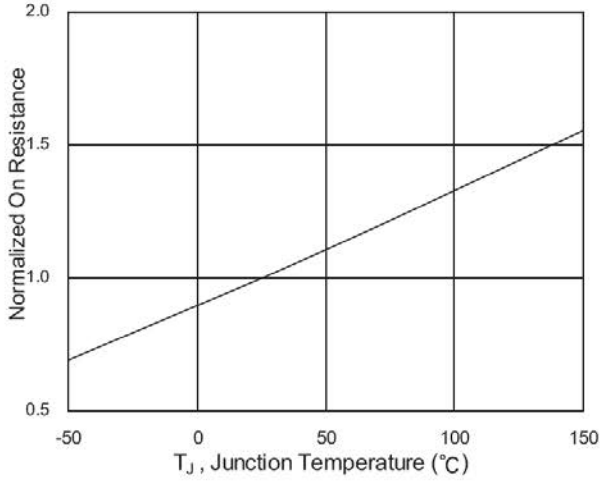


Figure 6 Normalized Rdson vs. T_J

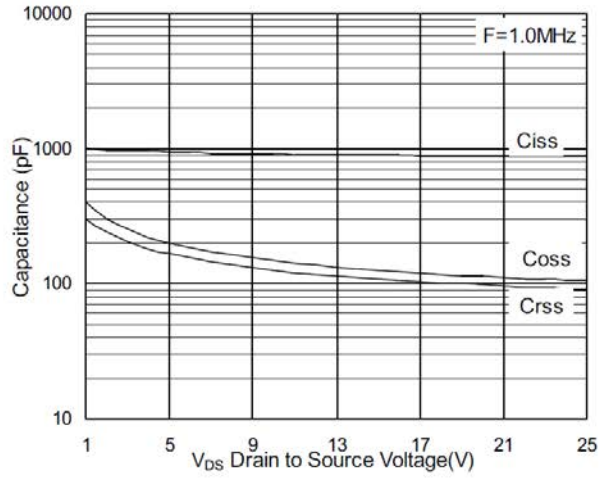


Figure 7 Capacitance Characteristic

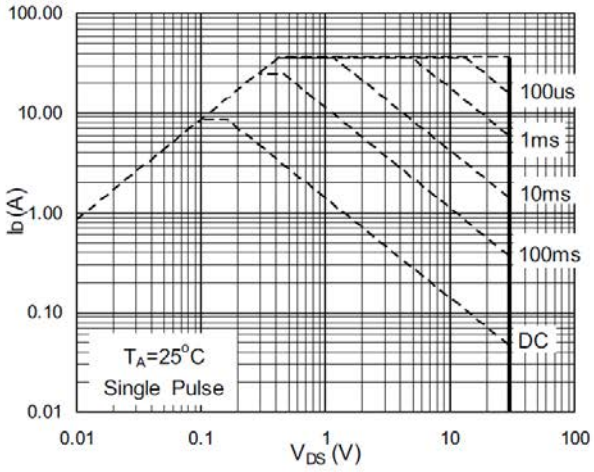


Figure 8 Safe Operating Area

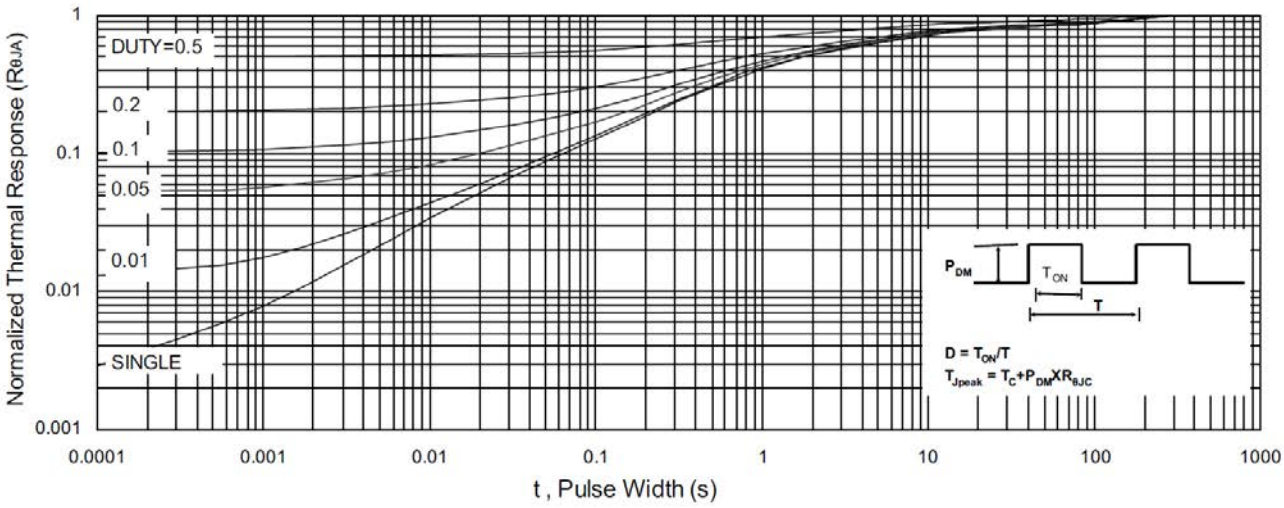


Figure 9 Normalized Maximum Transient Thermal Impedance

Parameter Test Circuits

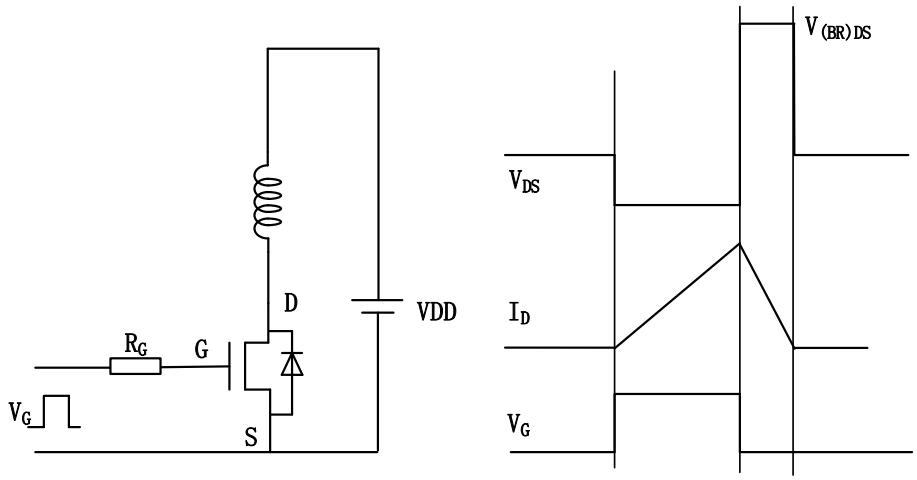


Figure 10 Unclamped Inductive Switching (UIS) Test circuit and waveforms

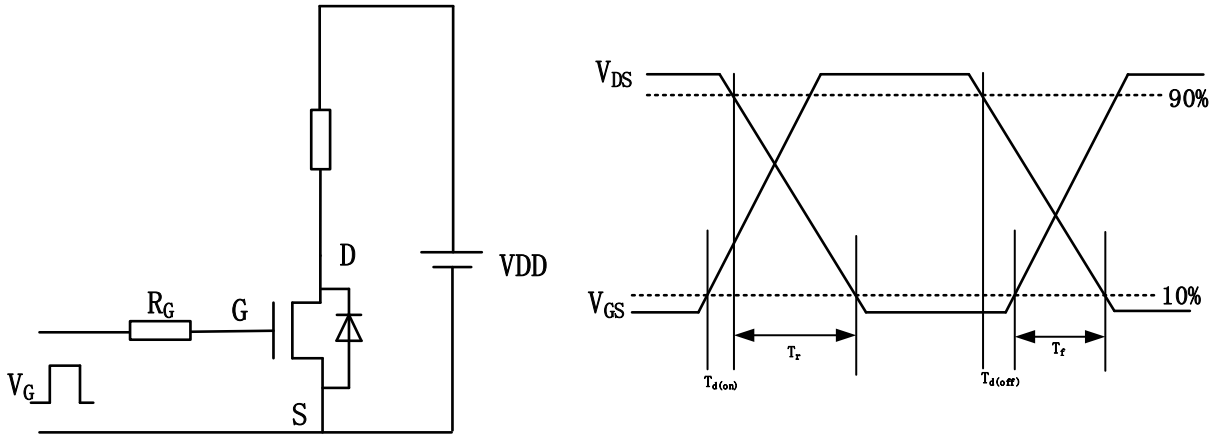


Figure 11 Resistive Switching time Test circuit and waveforms

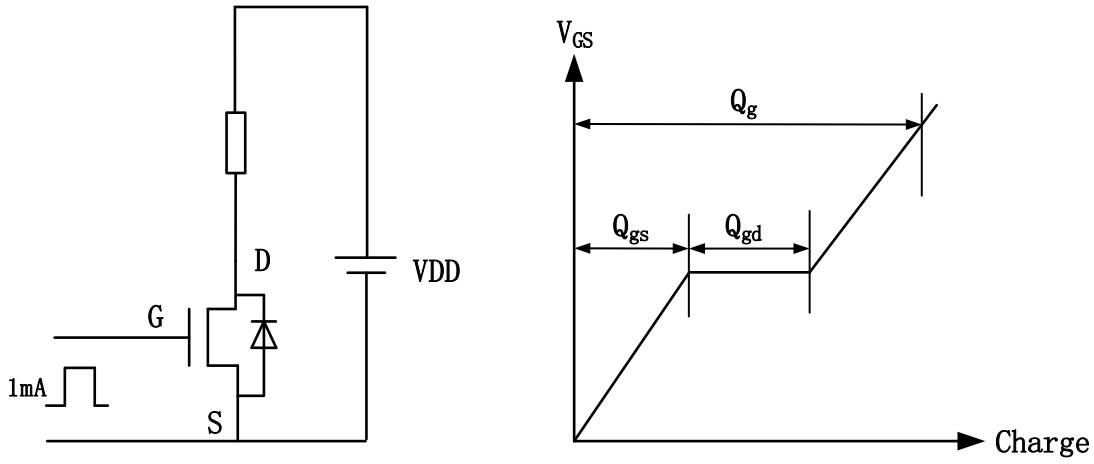
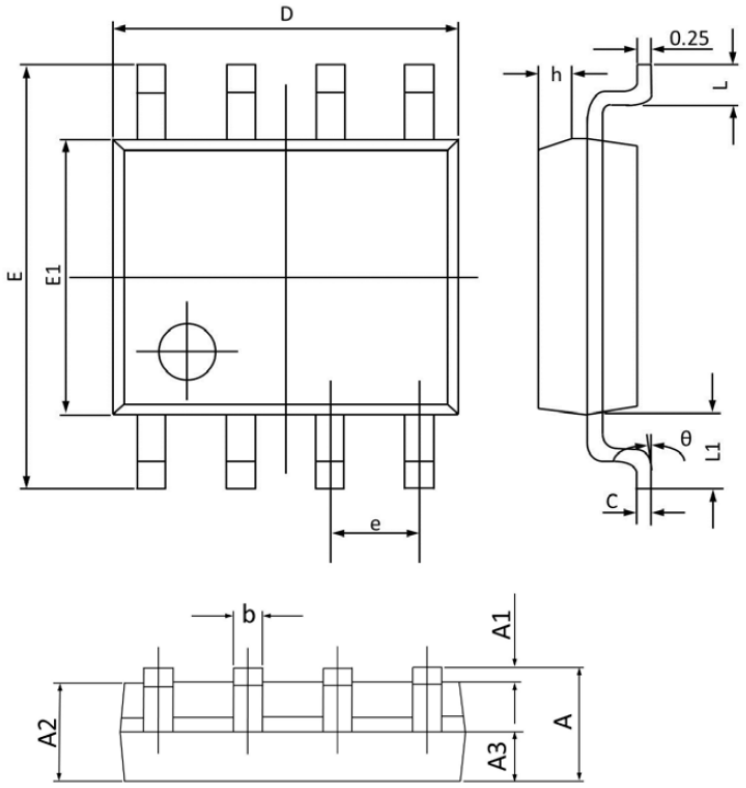


Figure 12 Gate charge Test circuit and waveforms

Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°