

P-Channel 20V(D-S) MOSFET

Product summary		
V_{DS}	-20	V
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$) Typ.	29	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$) Typ.	38	m Ω
I_D ($T_A=25^\circ C$)	-6	A

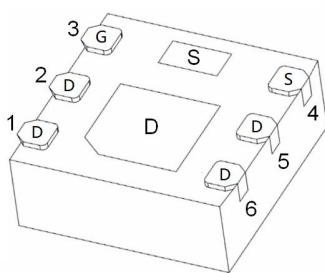
Features

- Trench Power LV MOSFET technology
- Low $R_{DS(ON)}$
- RoHS and Halogen-Free compliant

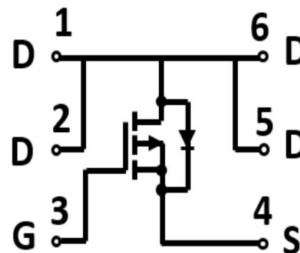
Applications

- Load switch
- Battery charge

Pin Configuration



DFN2X2-6L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECG3415A	DFN2X2-6L	7"	3000pcs

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Continuous Drain Current ^A	$T_A=25^\circ C$	-6
		$T_A=70^\circ C$	-4.8
I_{DM}	Pulse Drain Current Tested ^B	-21	A
P_D	Power Dissipation ^A	2.2	W
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient ^A	56.8	$^\circ C/W$

Electrical Characteristics (at $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-10V, V_{GS}=0V$	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 10V$	--	--	± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ^C	$V_{GS}=-4.5V, I_D=-4A$	--	29	38	m Ω
		$V_{GS}=-2.5V, I_D=-3A$	--	38	55	m Ω
V_{SD}	Forward Voltage	$I_S=-6A, V_{GS}=0V$	--	--	-1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	-6	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-10V$ $f=1\text{MHz}$	--	289	--	pF
C_{oss}	Output Capacitance		--	98	--	pF
C_{rss}	Reverse Transfer Capacitance		--	22	--	pF
Q_g	Total Gate Charge	$V_{DS}=-10V, I_D=-4A$ $V_{GS}=-4.5V$	--	9	--	nC
Q_{gs}	Gate-Source Charge		--	1	--	nC
Q_{gd}	Gate-Drain Charge		--	2.6	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=-10V$ $R_L=1.2\Omega, R_G=1\Omega,$ $V_G=-4.5V$	--	12	--	ns
t_r	Turn-on Rise Time		--	35	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	30	--	ns
t_f	Turn-off Fall Time		--	10	--	ns

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 2OZ copper.

B. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

C. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure 1: Output Characteristics

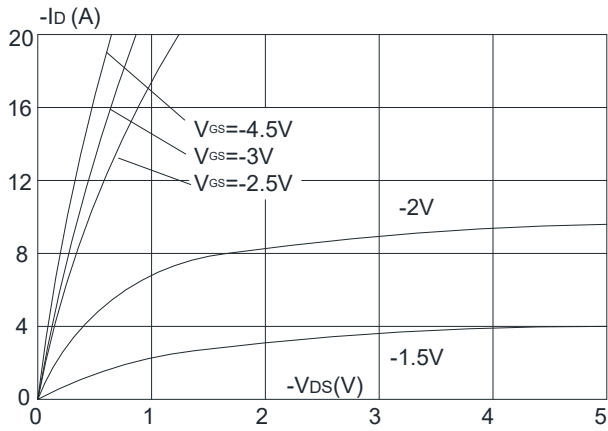


Figure 2: Typical Transfer Characteristics

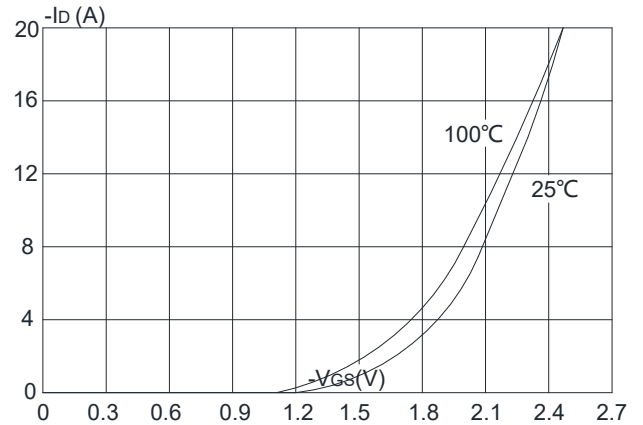


Figure 3: On-resistance vs. Drain Current

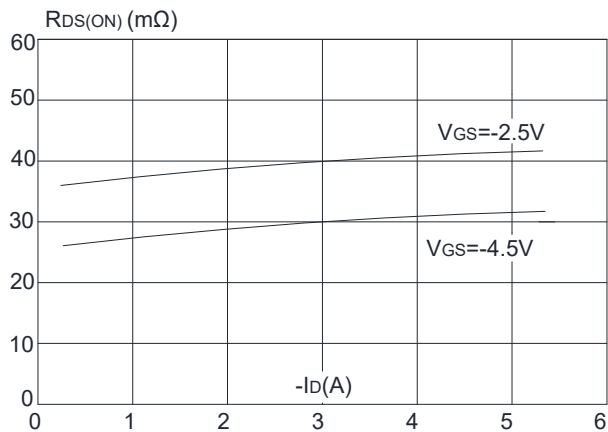


Figure 4: Body Diode Characteristics

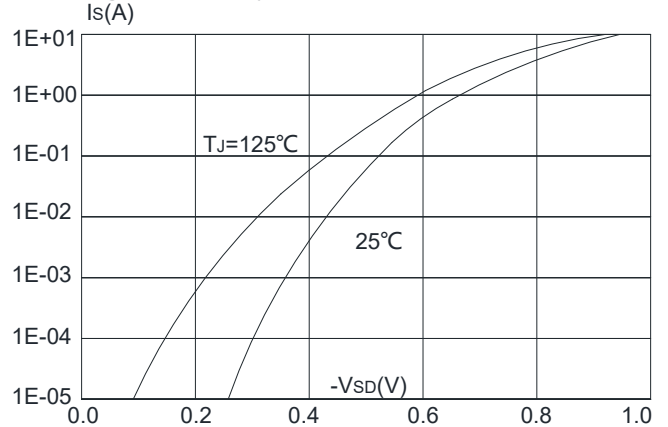


Figure 5: Gate Charge Characteristics

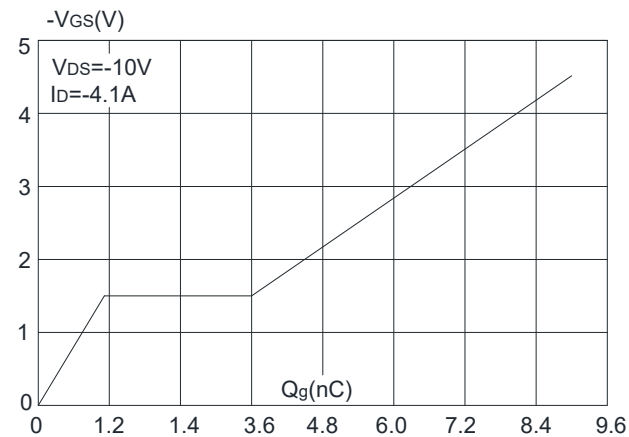
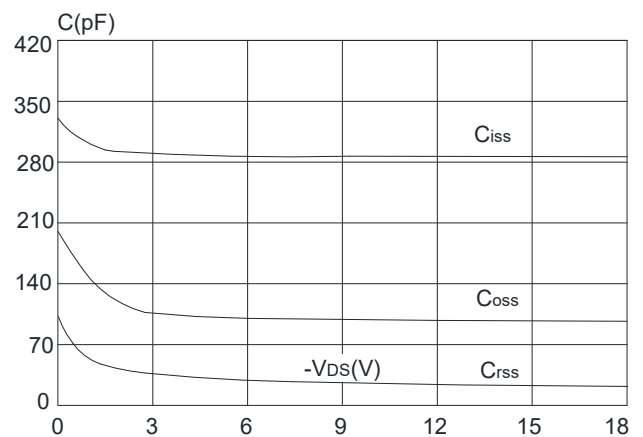


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

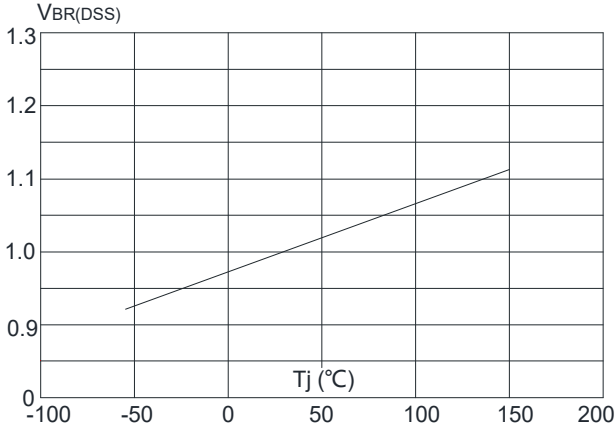


Figure 8: Normalized on Resistance vs. Junction Temperature

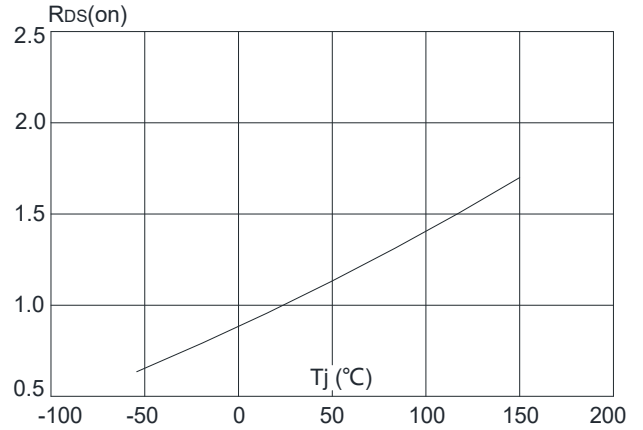


Figure 9: Maximum Safe Operating Area

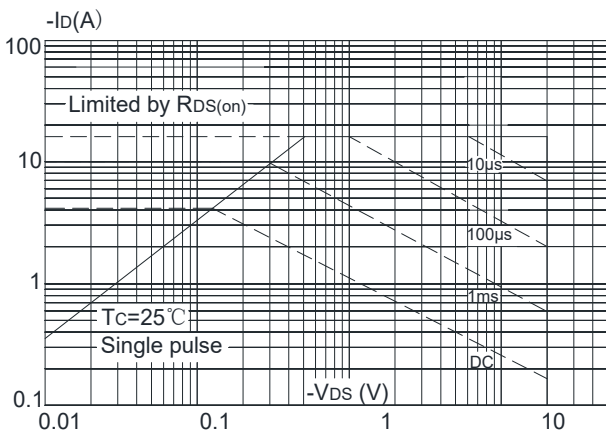


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

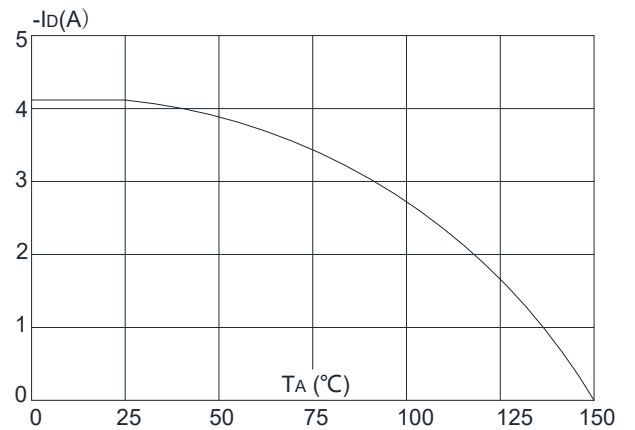
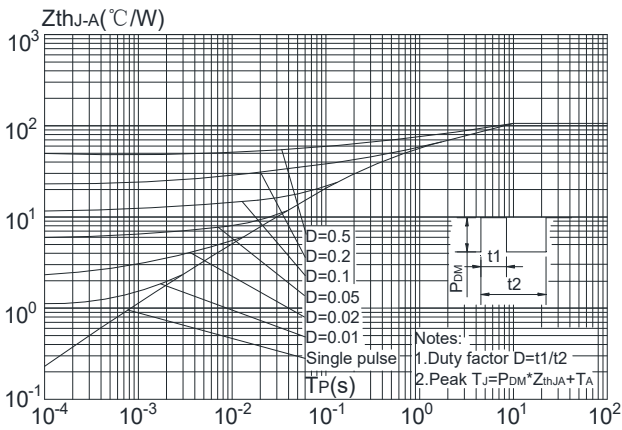
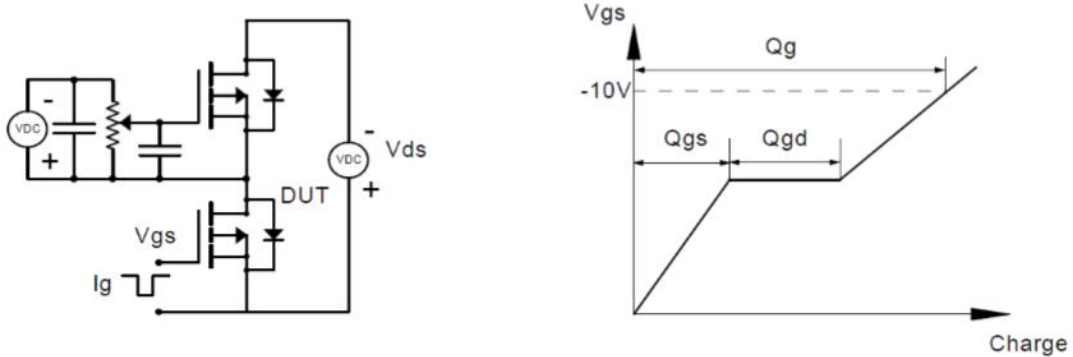


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

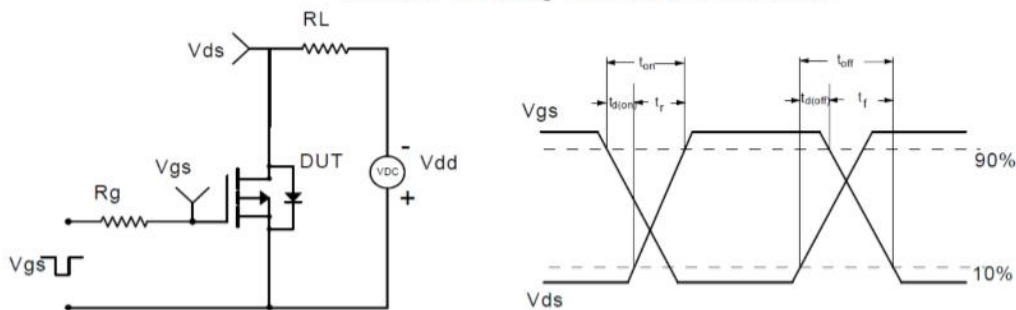


Test Circuit

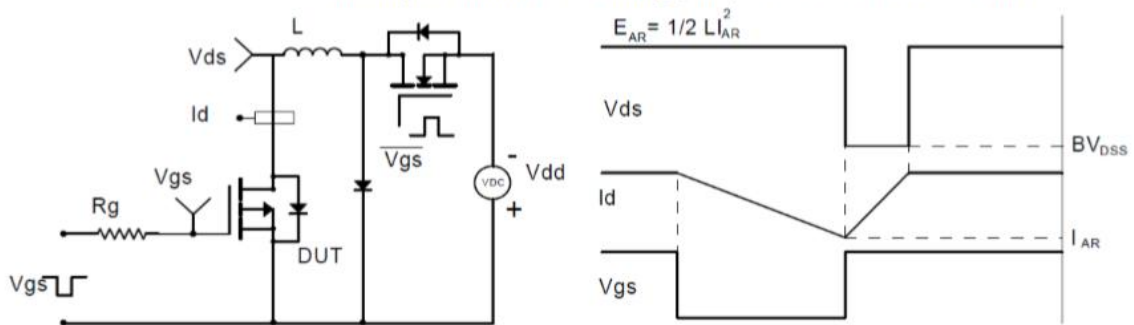
Gate Charge Test Circuit & Waveform



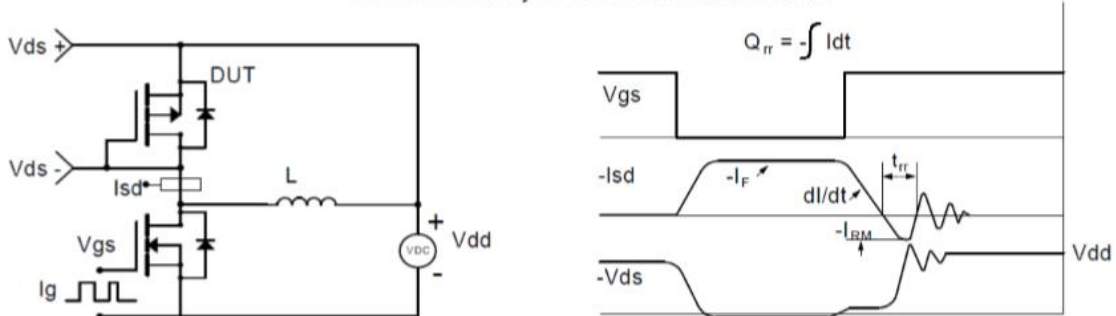
Resistive Switching Test Circuit & Waveforms



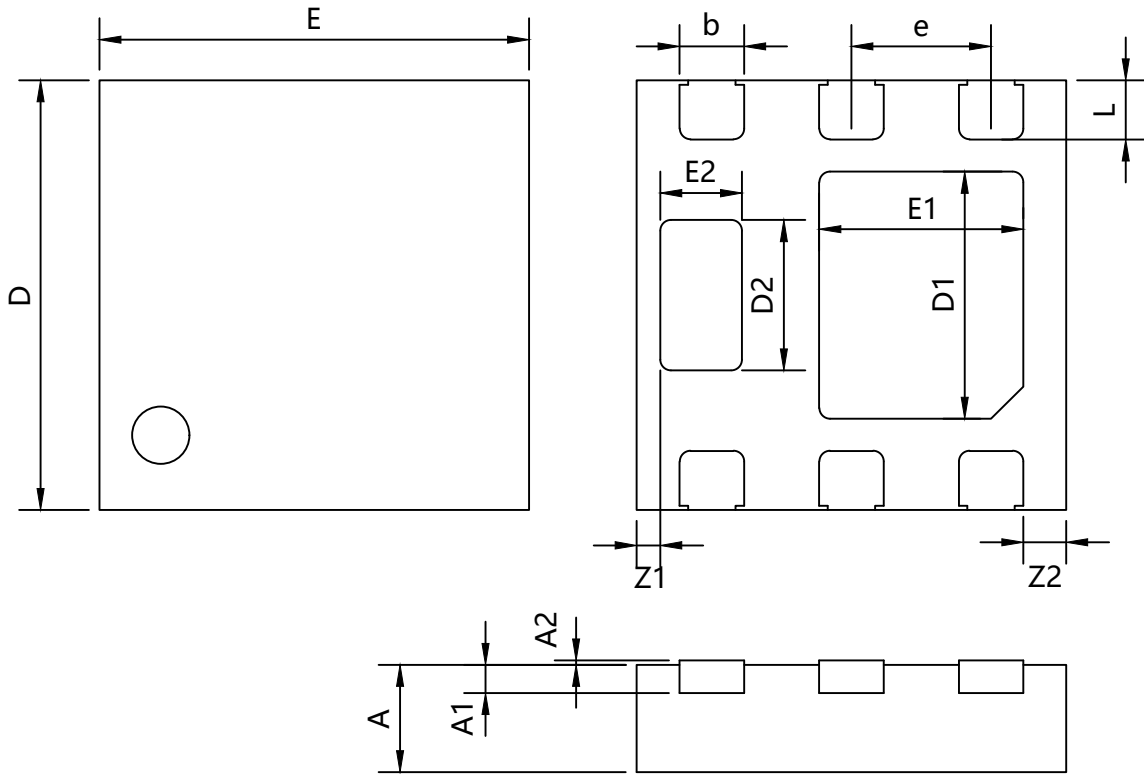
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



DFN2X2-6L Package Information



POD			
	min(mm)	typ(mm)	max(mm)
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D1	1.10	1.15	1.20
E1	0.90	0.95	1.00
D2	0.65	0.70	0.75
E2	0.33	0.38	0.43
L	0.225	0.275	0.325
b	0.25	0.30	0.35
e	0.65ref		
A	0.70	0.75	0.80
A1	0.152bsc		
A2	-	0.00	0.05
Z1	0.06	0.11	0.16
Z2	0.15	0.20	0.25