Description

N-channel Enhancement Mode Power MOSFET

Features

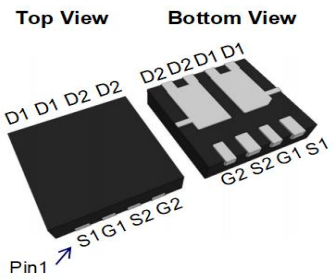
- 60V, 35A
  $R_{DS(ON)}$ Typ= 11.5mΩ @ V_{GS} = 10V
  $R_{DS(ON)}$ Typ= 14mΩ @ V_{GS} = 4.5V
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

Applications

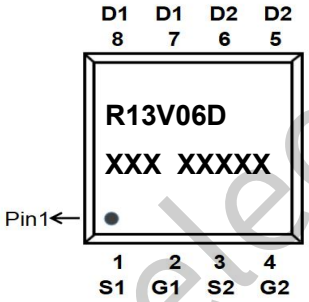
- Load Switch
- PWM Application
- Power Management

100% UIS TESTED!
100% ΔVds TESTED!

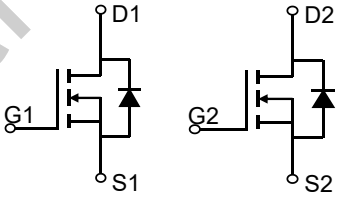
RoHS



DFN3.3x3.3-8L-D



Marking and Pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
R13V06D	CRMRGL0614AD	TAPING	DFN3.3x3.3-8L-D	13"	5000	50000

Absolute Maximum Ratings (@ T_J = 25°C unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		60	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25°C	35	A
		T_C = 100°C	21	
I_{DM}	Pulsed Drain Current (1)		140	A
E_{AS}	Single Pulsed Avalanche Energy (2)		49	mJ
P_D	Power Dissipation	T_C = 25°C	18	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (3)		50	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		7	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = 10V, I_D = 20A	-	11.5	14.0	mΩ
		V_{GS} = 4.5V, I_D = 10A	-	14.0	19.0	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} =30V, f = 1MHz	-	930	-	pF
C_{oss}	Output Capacitance		-	230	-	pF
C_{rss}	Reverse Transfer Capacitance		-	8	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 30V, I_D = 10A	-	32.8	-	nC
Q_{gs}	Gate Source Charge		-	5.3	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	6.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} =30V I_D= 10A, R_{GEN} =4.7Ω	-	9	-	ns
t_r	Turn-On Rise Time		-	19.4	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	31.5	-	ns
t_f	Turn-Off Fall Time		-	8.9	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	35	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	140	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-	-	1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting T_J=25C, V_{DD}=30V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=14A

3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB

4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

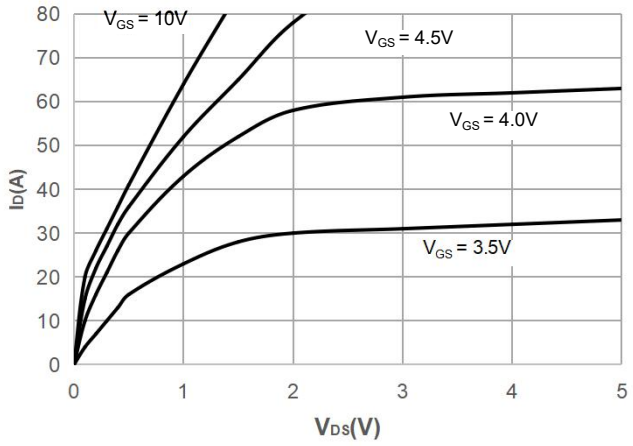


Figure 2: Typical Transfer Characteristics

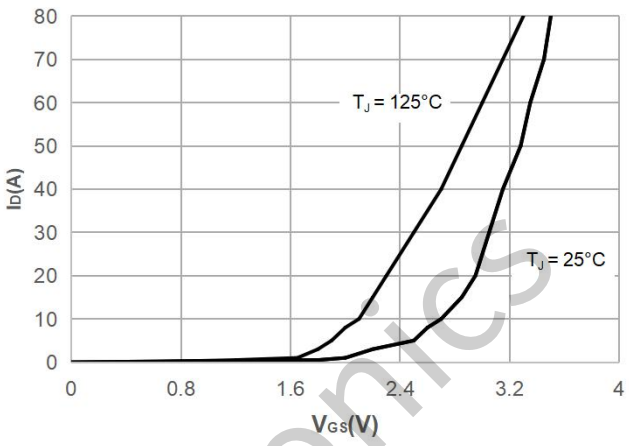


Figure 3: On-resistance vs. Drain Current

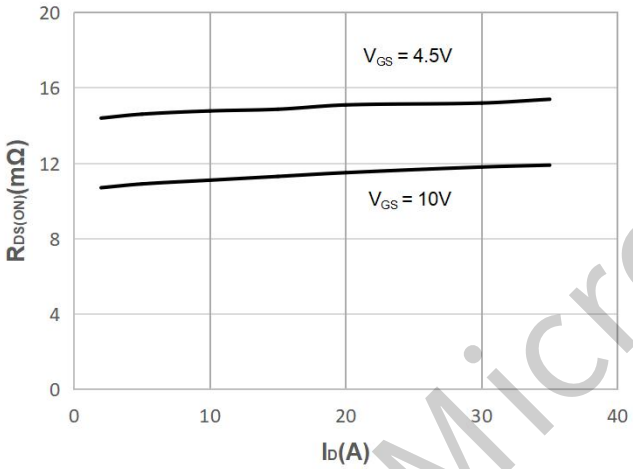


Figure 4: Body Diode Characteristics

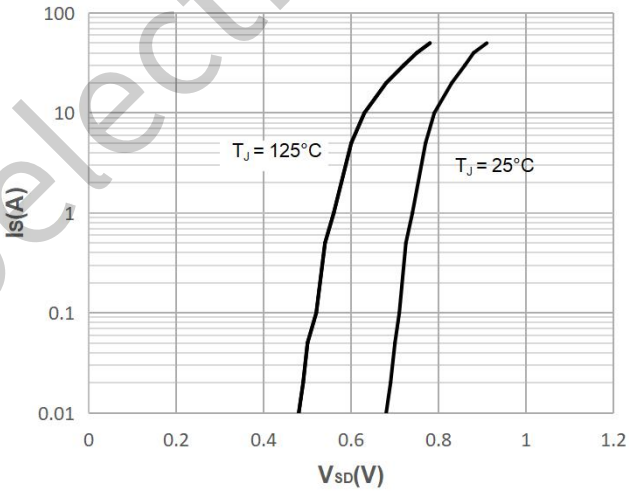


Figure 5: Gate Charge Characteristics

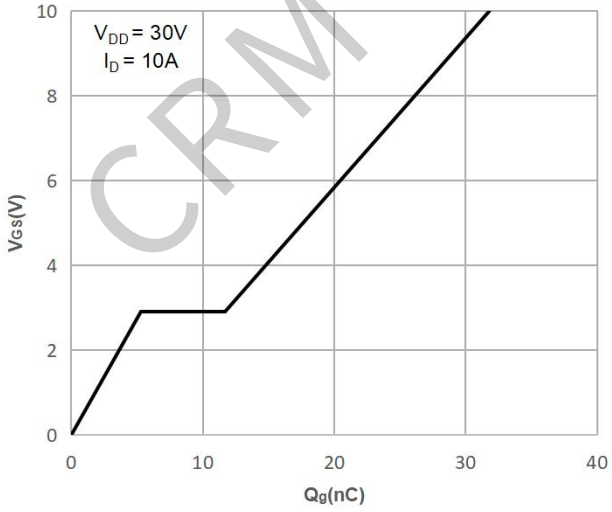
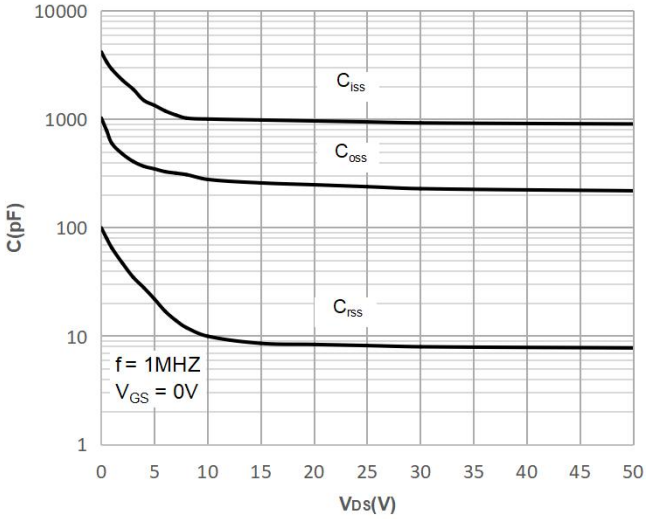


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

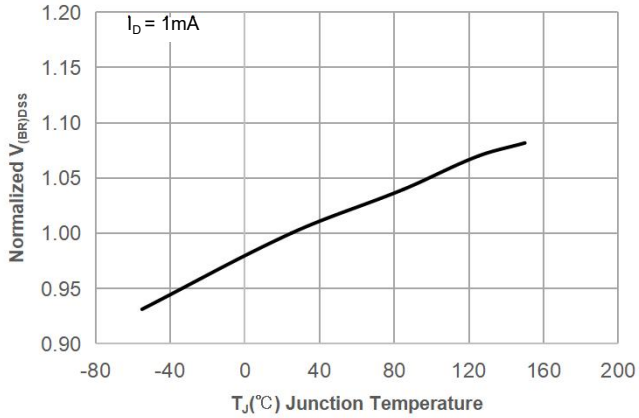


Figure 8: Normalized on Resistance vs. Junction Temperature

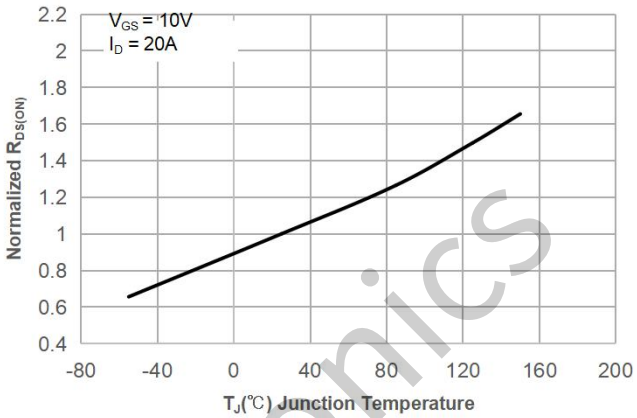


Figure 9: Maximum Safe Operating Area

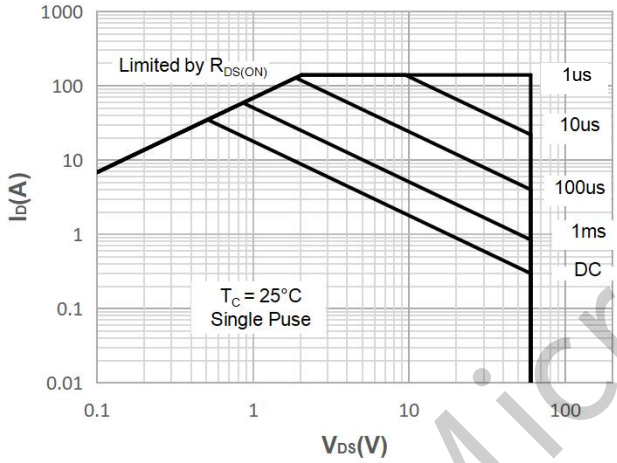


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

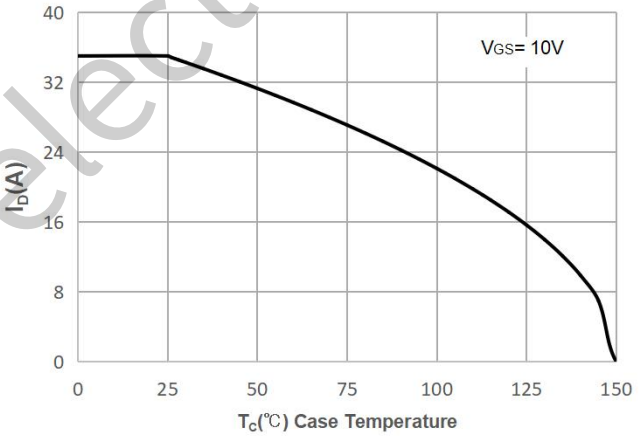


Figure 11: Normalized Maximum Transient Thermal Impedance

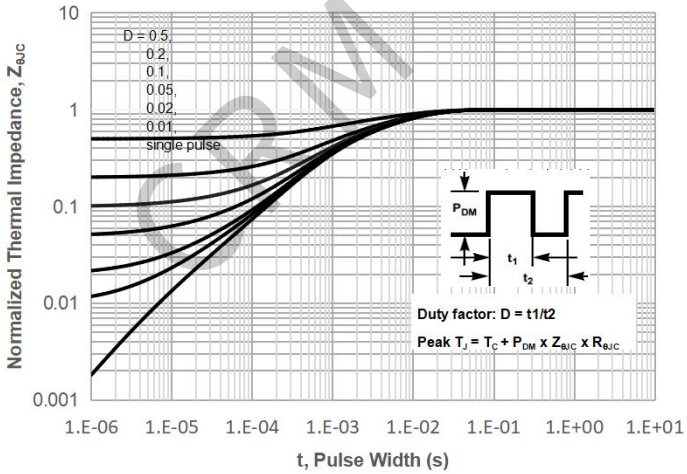
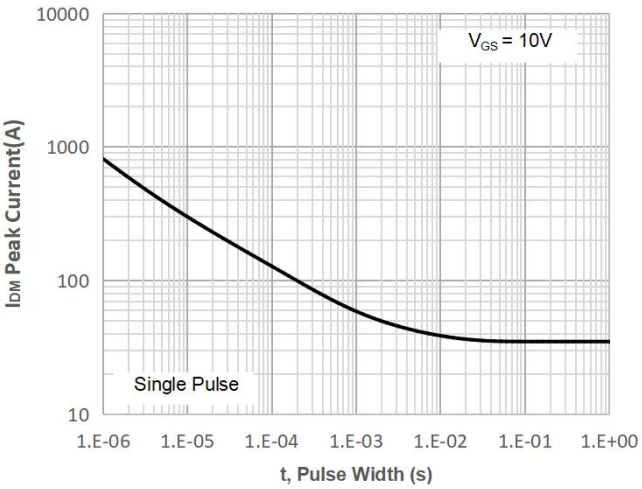


Figure 12: Peak Current Capacity



Test Circuit

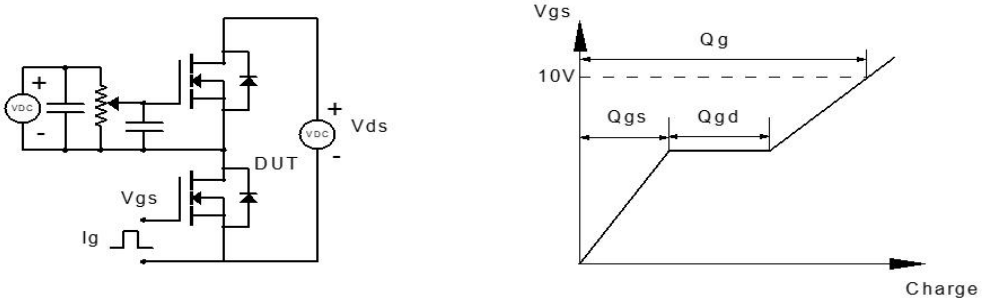


Figure 1: Gate Charge Test Circuit & Waveform

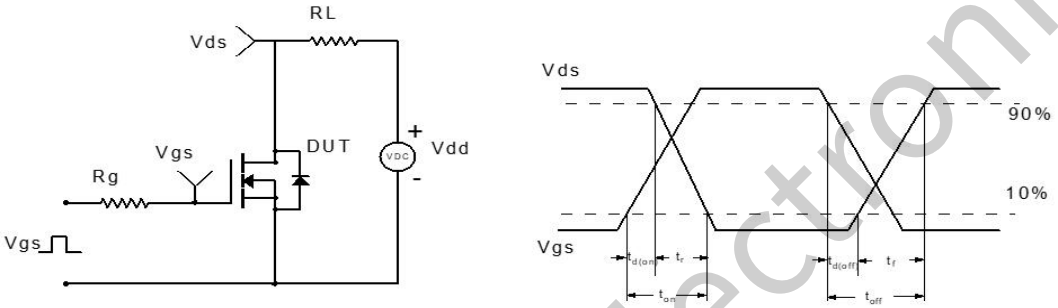


Figure 2: Resistive Switching Test Circuit & Waveform

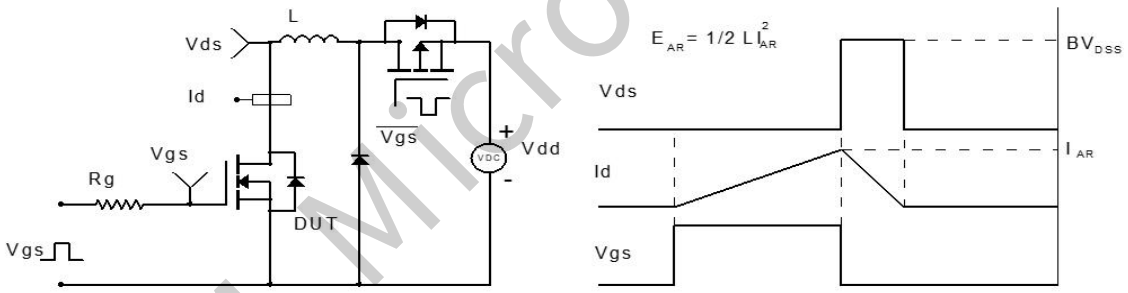


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

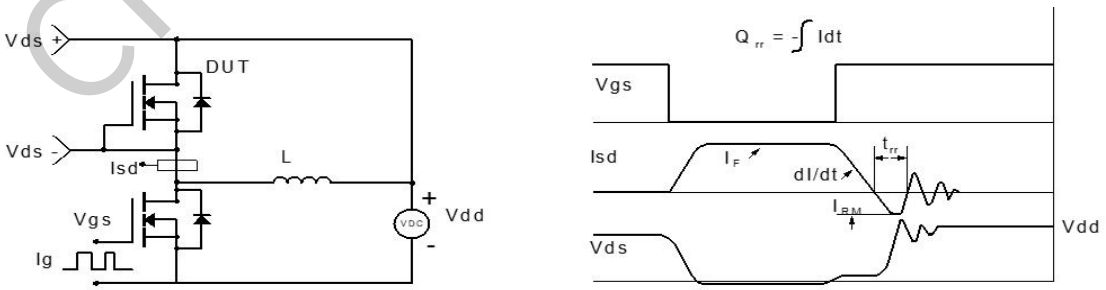
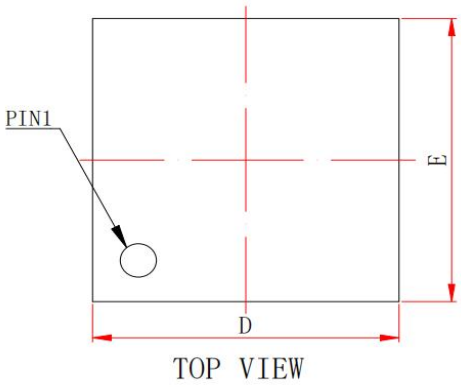
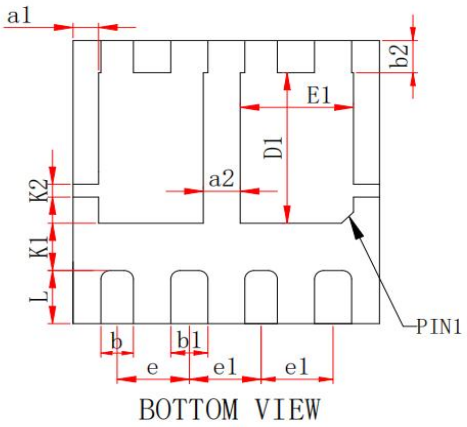
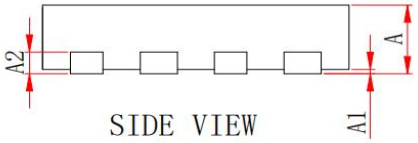


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(DFN3.3x3.3-8L-D)







STMBOL	MIN	NOM	MAX
D	3.20	3.30	3.40
E	3.20	3.30	3.40
A	0.70	0.75	0.80
A1	0.00	-	0.05
A2		0.203REF	
L	0.50	0.60	0.70
b	0.30	0.35	0.40
b1	0.35	0.40	0.45
e		0.775BSC	
e1		0.725BSC	
K1		0.500BSC	
K2		0.200BSC	
b2	0.30	0.35	0.40
E1	0.10	1.15	1.20
D1	1.70	1.75	1.80
a1	0.30	0.35	0.40
a2	0.30	0.35	0.40