CRMVTL0413A

N-Channel 40V, 10.9mΩ Typ. Power MOSFET

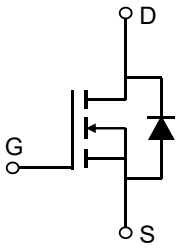
Description

Features

- 40V, 13A

  $R_{DS(ON)}$ Typ = 10.9mΩ @ V_{GS} = 10V

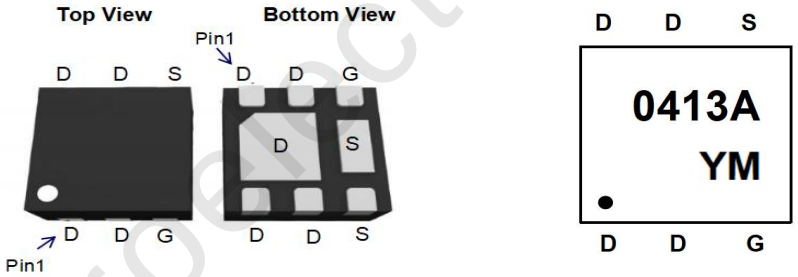
  $R_{DS(ON)}$ Typ = 13.5mΩ @ V_{GS} = 4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power Management



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	Reel Size	Reel (pcs)	Per Carton (pcs)
CRMVTL0413A	0413A	DFN2020-6L	TAPING	7"	3000	120000

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

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		40	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C= 25°C	13	A
		T_C = 100°C	7.8	A
I_{DM}	Pulsed Drain Current (1)		52	A
P_D	Power Dissipation	T_C = 25°C	5	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		25	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

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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	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, 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	1.3	1.8	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(2)	V_{GS} = 10V, I_D = 5A	-	10.9	14.2	mΩ
		V_{GS} = 4.5V, I_D = 3A	-	13.5	17.6	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	1172	-	pF
C_{oss}	Output Capacitance		-	104	-	pF
C_{rss}	Reverse Transfer Capacitance		-	84	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 20V, I_D = 5A	-	26	-	nC
Q_{gs}	Gate Source Charge		-	6	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V I_D= 5A, R_{GEN} = 3Ω	-	7	-	ns
t_r	Turn-On Rise Time		-	11	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	26	-	ns
t_f	Turn-Off Fall Time		-	5	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	13	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	52	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 5A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 5A, di/dt = 100A/us	-	10	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	6	-	nC

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

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

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Test Circuit

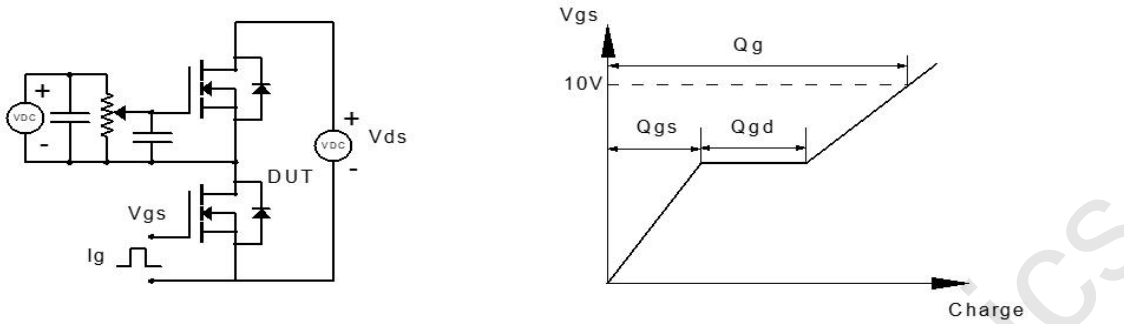

Figure 1: Gate Charge Test Circuit & Waveform

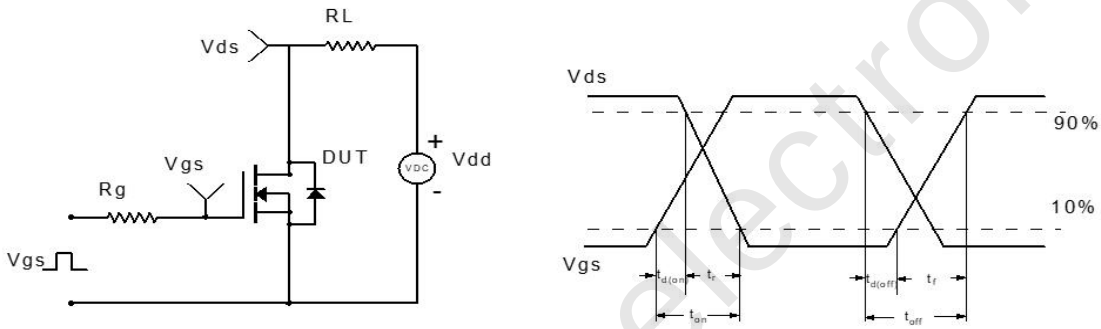

Figure 2: Resistive Switching Test Circuit & Waveform

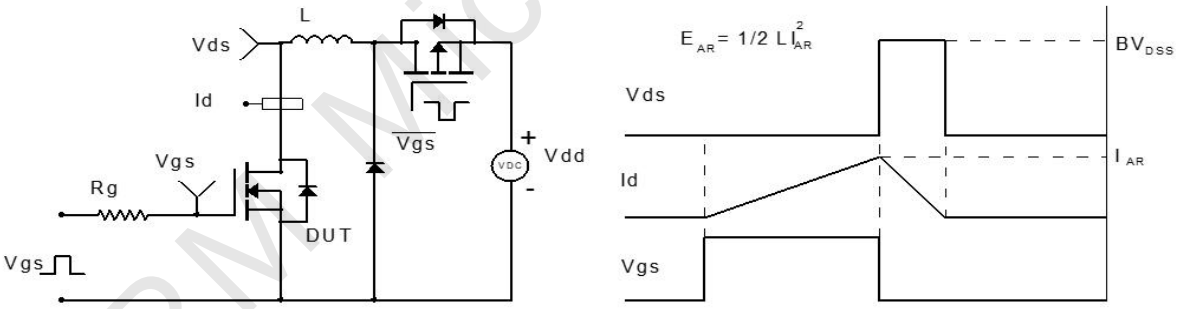

Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

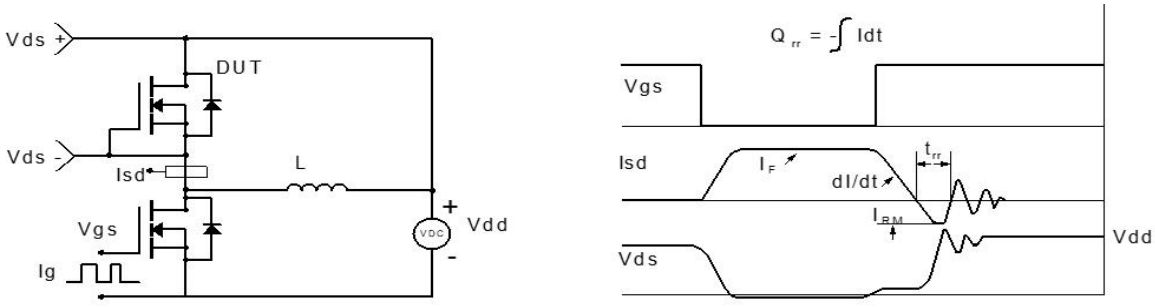

Figure 4: Diode Recovery Test Circuit & Waveform

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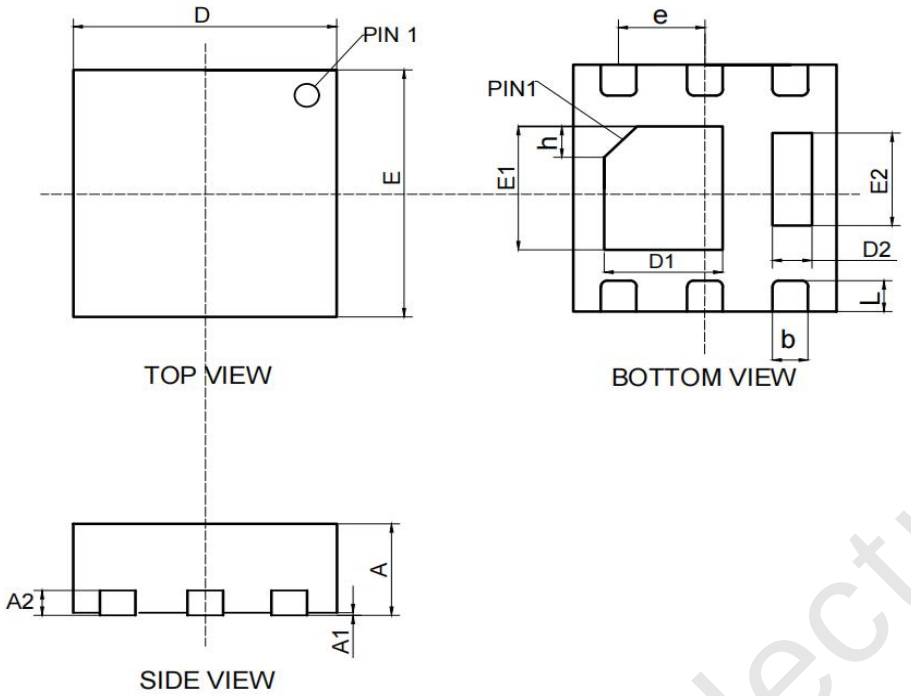
Package Mechanical Data(DFN2020-6L)



SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	NA	0.02	0.05
A2	0.18	0.20	0.25
b	0.20	0.27	0.34
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D1	0.80	0.90	1.00
E1	0.90	1.00	1.10
D2	0.20	0.30	0.40
E2	0.65	0.75	0.85
L	0.20	0.25	0.35
h	0.20	0.25	0.30
e	0.65 BSC		

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