

## Description

### N-channel Enhancement Mode Power MOSFET

#### Features

- 60V, 200A  
 $R_{DS(ON)} < 2.2m\Omega @ V_{GS} = 10V$
- Advanced Split Gate Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge

#### Applications

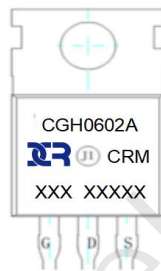
- Load Switch
- PWM Application
- Power Management



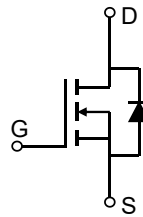
100% UIS TESTED!  
100%  $\Delta V_{ds}$  TESTED!



TO-220C-3L



Marking and Pin Assignment



Schematic Diagram

### Package Marking and Ordering Information

Device Marking	Device	Outline	Package	TUBE (pcs)	Inner Box (pcs)	Per Carton (pcs)
CRMCGH0602A	CRMCGH0602A	TUBE	TO-220C-3L	50	1000	5000

### Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-to-Source Voltage	60	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	800	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(2)</sup>	784	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ\text{C}$	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <sup>(3)</sup>	60	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.9	
$T_J, T_{STG}$	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$

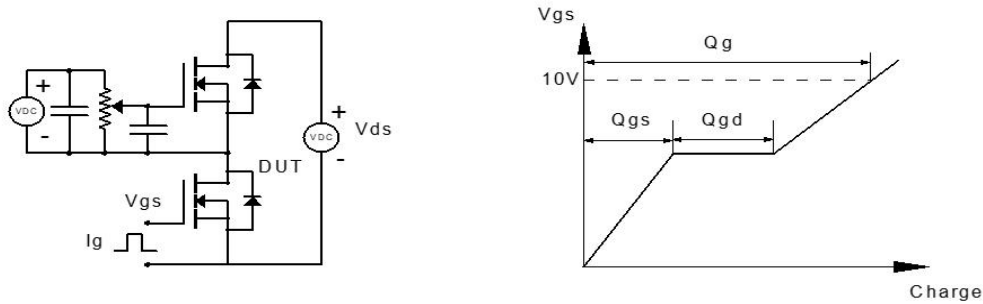


## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise specified)

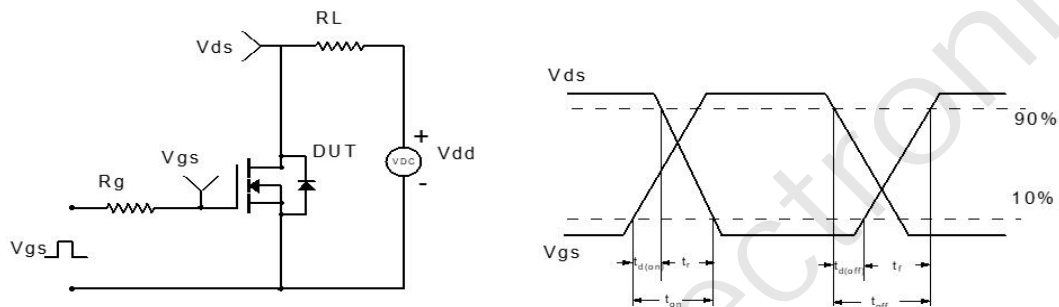
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	60	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V	-	-	1.0	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0	3.0	4.0	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(4)</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A	-	1.8	2.2	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz	-	7397	-	pF
C <sub>oss</sub>	Output Capacitance		-	3885	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	203	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to 10V V <sub>DS</sub> = 30V, I <sub>D</sub> = 30A	-	120	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	37	-	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		-	33	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 30V I <sub>D</sub> = 30A, R <sub>GEN</sub> = 3Ω	-	26	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	33	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	50	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	25	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	200	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	800	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = 30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> = 30A, di/dt = 100A/us	-	74	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	123	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2. E<sub>AS</sub> condition: Starting T<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>G</sub>=10V, R<sub>G</sub>=25ohm, L=0.5mH, I<sub>AS</sub>=56A
  3. R<sub>θJA</sub> is measured with the device mounted on a 1inch<sup>2</sup> pad of 2oz copper FR4 PCB
  4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

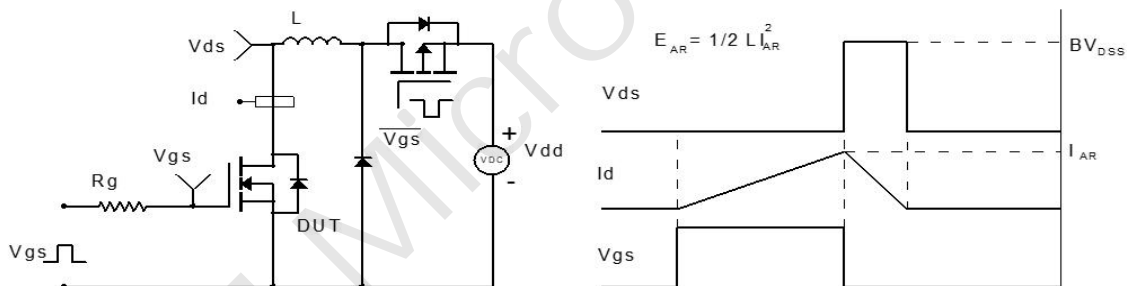
## Test Circuit



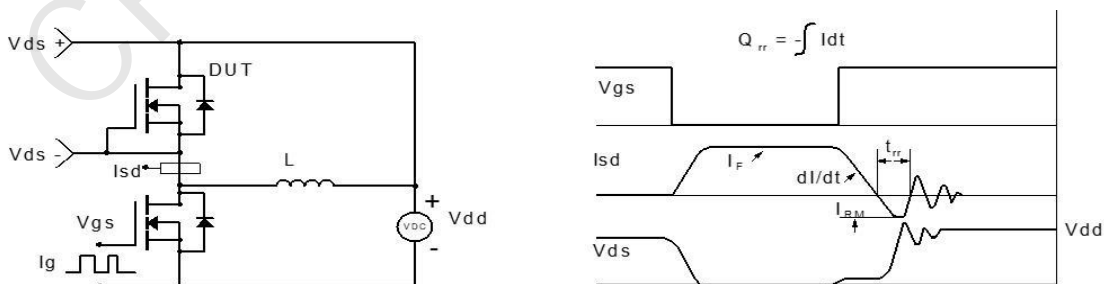
**Figure 1: Gate Charge Test Circuit & Waveform**



**Figure 2: Resistive Switching Test Circuit & Waveform**

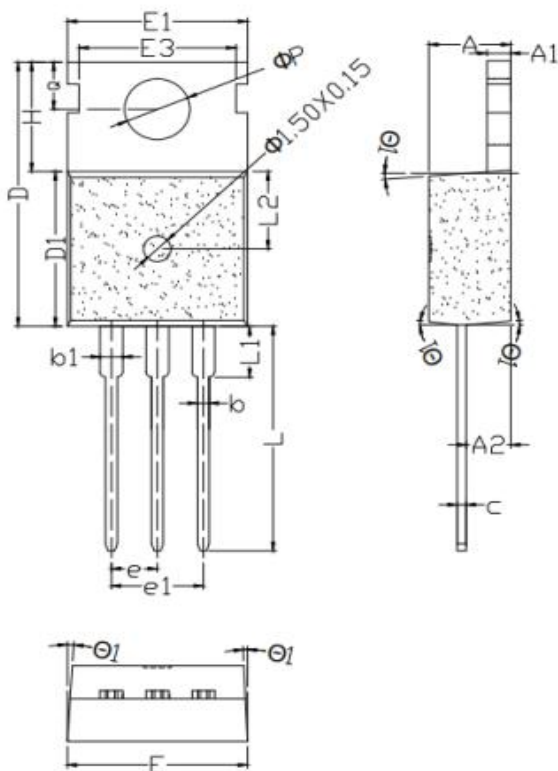


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**



**Figure 4: Diode Recovery Test Circuit & Waveform**

## Package Mechanical Data(TO-220C-3L)



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.40	4.50	4.60
*A1	1.25	1.30	1.35
*A2	2.30	2.4	2.50
*b	0.75	0.80	0.85
*b1	1.25	1.33	1.42
*c	0.45	0.50	0.55
D	15.65	15.75	15.85
*D1	9.10	9.20	9.30
D2	12.80	13.00	13.20
*E	9.88	10.02	10.15
*E1	9.78	9.88	10.10
E2	7.50	7.70	7.90
E3	8.60	8.70	8.80
*e	2.50	2.54	2.58
e1	5.08REF		
H	6.40	6.50	6.60
*L	13.10	13.28	13.45
*L1	—	—	3.40
L2	4.55	4.65	4.75
* $\Phi P$	3.63	3.68	3.75
*Q	2.70	2.80	2.90
$\theta 1$	2°	—	7°

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