

## Description

### N-channel Enhancement Mode Power MOSFET

#### Features

- 60V, 50A  
 $R_{DS(ON)}$  Typ= 11.3m $\Omega$  @  $V_{GS} = 10V$   
 $R_{DS(ON)}$  Typ= 13.7m $\Omega$  @  $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge

#### Applications

- Load Switch
- PWM Application
- Power Management



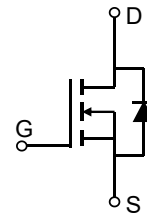
**100% UIS TESTED!**  
**100%  $\Delta V_{ds}$  TESTED!**



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)
CRMCTL0617A	CRMCTL0617A	TUBE	TO-220C-3L	50	1000	5000

### Absolute Maximum Ratings (@ $T_J = 25^\circ C$ 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	$T_C = 25^\circ C$	50
		$T_C = 100^\circ C$	30
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	200	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(2)</sup>	72	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	75
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.67	$^\circ C/W$
$T_J, T_{STG}$	Junction & Storage Temperature Range	-55 to 150	$^\circ C$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
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
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0	1.5	2.0	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(3)</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A	-	11.3	14.7	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A	-	13.7	18.0	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz	-	1950	-	pF
C <sub>oss</sub>	Output Capacitance		-	136	-	pF
C <sub>riss</sub>	Reverse Transfer Capacitance		-	117	-	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	-	45	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	8	-	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		-	11	-	nC
<b>Switching Characteristics</b>						
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> = 1.8Ω	-	11	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	79	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	33	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	107	-	ns
<b>Drain-Source Diode Characteristics and Max Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	200	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	-	14	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	10	-	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>=17A
  3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

## Test Circuit

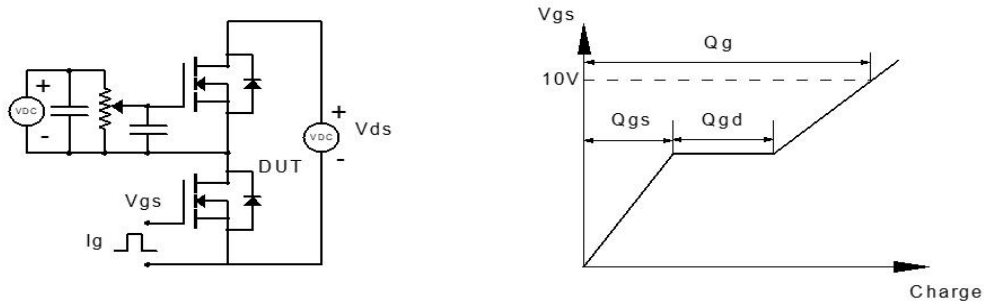


Figure 1: Gate Charge Test Circuit & Waveform

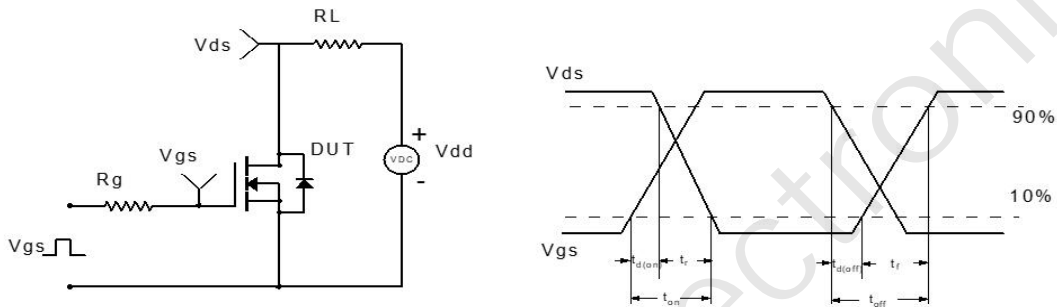


Figure 2: Resistive Switching Test Circuit & Waveform

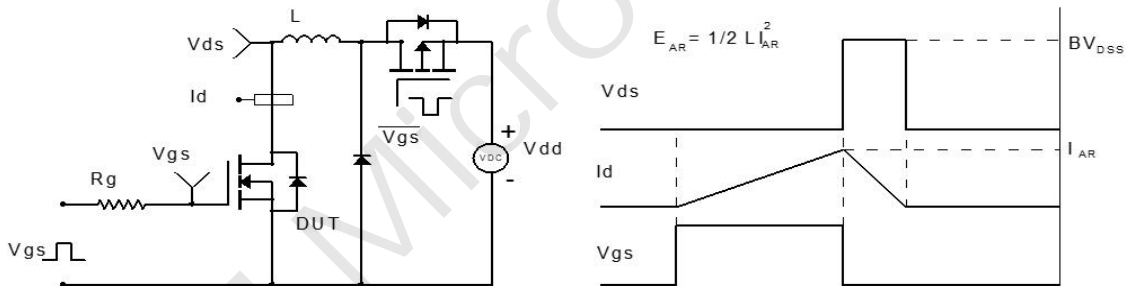


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

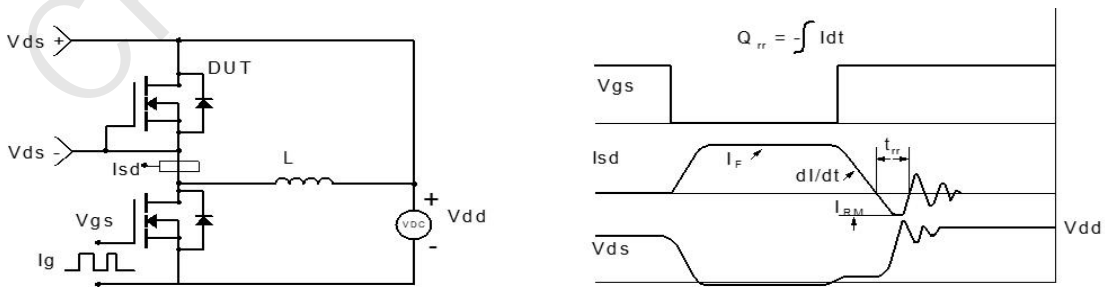
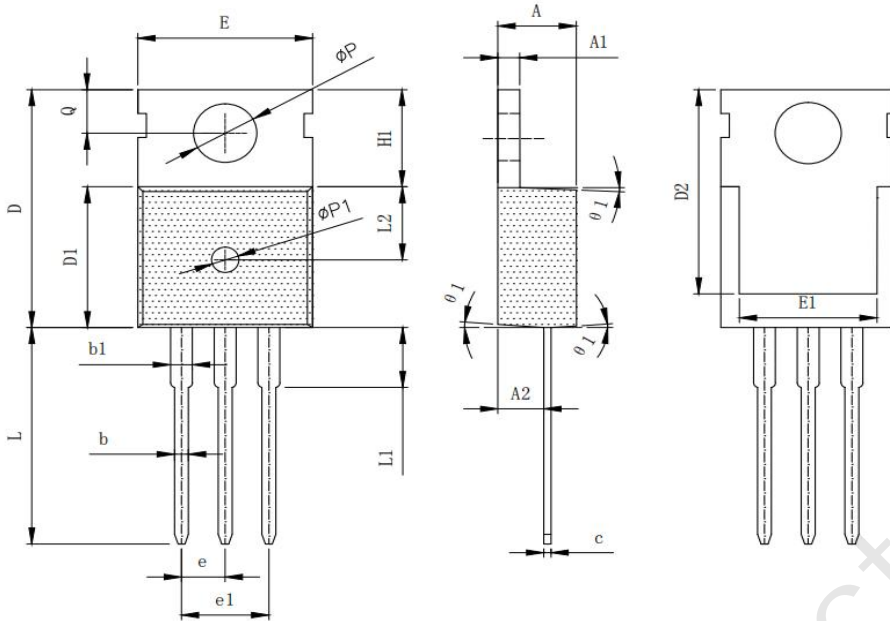


Figure 4: Diode Recovery Test Circuit & Waveform



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



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.25	1.30	1.35
A2	2.30	2.40	2.50
b	0.70	0.80	0.90
b1	1.25	1.35	1.45
c	0.40	0.50	0.60
D	15.50	15.80	16.10
D1	9.10	9.20	9.30
D2	12.73	12.83	12.93
E	9.70	9.90	10.20
E1	7.60	8.00	8.40
e	2.54 (BSC)		
e1	5.08 (BSC)		
H1	6.30	6.50	6.80
L	12.75	13.08	13.50
L1	--	--	3.10
L2	4.30	4.60	4.90
$\phi P$	3.50	3.60	3.70
$\phi P1$	1.40	1.50	1.60
Q	2.70	--	2.90
$\theta 1$	2°	4°	6°

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