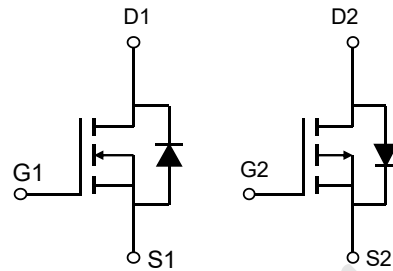


### Description

#### Features

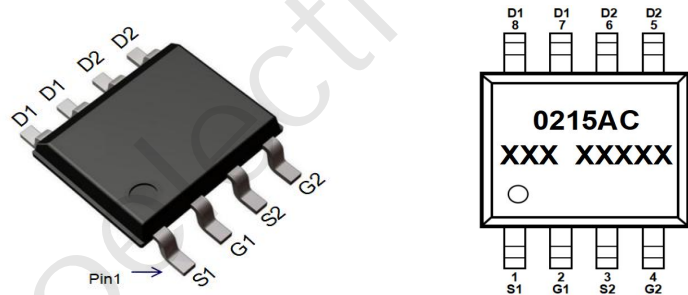
- 20V, 9A  
 $R_{DS(ON)}$  Typ = 12.2m $\Omega$  @  $V_{GS}$  = 4.5V  
 $R_{DS(ON)}$  Typ = 15.7m $\Omega$  @  $V_{GS}$  = 2.5V
- -20V, -6A  
 $R_{DS(ON)}$  Typ = 25.2m $\Omega$  @  $V_{GS}$  = -4.5V  
 $R_{DS(ON)}$  Typ = 32.7m $\Omega$  @  $V_{GS}$  = -2.5V
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free
- 100% UIS TESTED!



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)
CRMPTU0215AC	0215AC	SOP-8	TAPING	13"	4000	40000

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

Symbol	Parameter	N Value	P Value	Units
$V_{DS}$	Drain-to-Source Voltage	20	-20	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	$\pm 12$	V
$I_D$	Continuous Drain Current	$T_A = 25^\circ\text{C}$	9	A
		$T_A = 100^\circ\text{C}$	5.4	A
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	36	-24	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(2)</sup>	16	10.6	mJ
$P_D$	Power Dissipation	$T_A = 25^\circ\text{C}$	2	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <sup>(3)</sup>	62.5	62.5	$^\circ\text{C/W}$
$T_J, T_{STG}$	Junction & Storage Temperature Range	-55 to 150		$^\circ\text{C}$

### Electrical Characteristics ( $T_J = 25^\circ\text{C}$ 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	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 20V, 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> = ±12V	-	-	±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	0.4	0.65	1	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(4)</sup>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3A	-	12.2	16	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2A	-	15.7	20	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 10V, f = 1MHz	-	760	-	pF
C <sub>oss</sub>	Output Capacitance		-	105	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	89	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to 4.5V V <sub>DS</sub> = 10V, I <sub>D</sub> = 3A	-	9	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	1.5	-	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		-	2.5	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> = 4.5V, V <sub>DD</sub> = 10V I <sub>D</sub> = 3A, R <sub>GEN</sub> = 3Ω	-	5	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	16	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	23	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current	V <sub>GS</sub> = 0V, I <sub>S</sub> = 3A	-	-	9	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage		-	-	1.2	V
trr	Body Diode Reverse Recovery Time		-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		I <sub>F</sub> = 3A, di/dt = 100A/us	-	2	-

### Electrical Characteristics ( $T_J = 25^\circ\text{C}$ 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	-20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -20V, 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> = ±12V	-	-	±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	-0.4	-0.6	-1	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(4)</sup>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A	-	25.2	33	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -2A	-	32.7	42	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = -10V, f = 1MHz	-	613	-	pF
C <sub>oss</sub>	Output Capacitance		-	108	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	86	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to -4.5V V <sub>DS</sub> = -10V, I <sub>D</sub> = -5A	-	15	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	1.8	-	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		-	2.8	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> = -4.5V, V <sub>DD</sub> = -10V I <sub>D</sub> = -5A, R <sub>GEN</sub> = 6Ω	-	4.5	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	9.2	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	18.7	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	3.3	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current	V <sub>GS</sub> = 0V, I <sub>S</sub> = -3A	-	-	-6	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-24	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage		-	-	-1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time		-	4	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	24.5	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2.  $E_{AS}$  condition: Starting  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 10\text{V}$ ,  $V_G = 10\text{V}$ ,  $R_G = 25\Omega$ ,  $L = 0.5\text{mH}$ ,  $I_{AS} = 8\text{A}$   
 $E_{AS}$  condition: Starting  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = -10\text{V}$ ,  $V_G = -10\text{V}$ ,  $R_G = 25\Omega$ ,  $L = 0.5\text{mH}$ ,  $I_{AS} = -6.5\text{A}$
  3.  $R_{\theta JA}$  is measured with the device mounted on a  $1\text{inch}^2$  pad of 2oz copper FR4 PCB
  4. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$ .

## Test Circuit

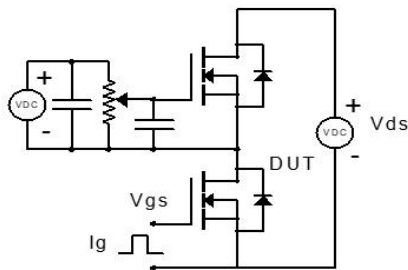


Figure 1: Gate Charge Test Circuit & Waveform

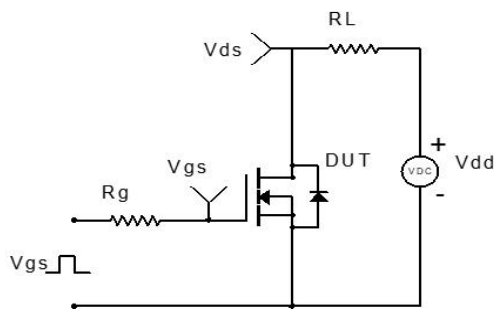


Figure 2: Resistive Switching Test Circuit & Waveform

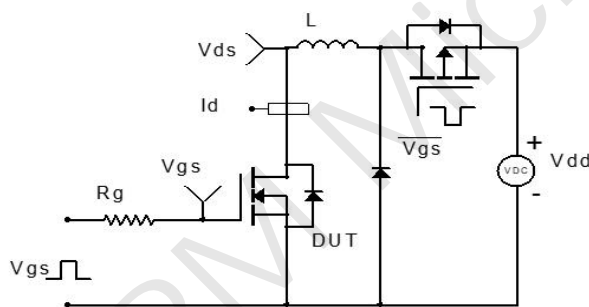


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

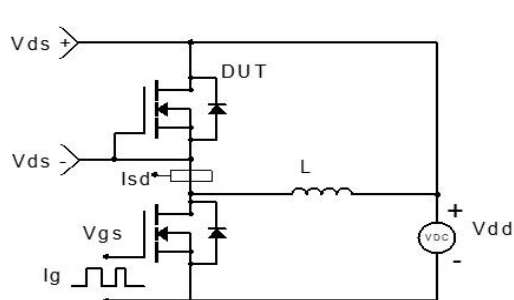
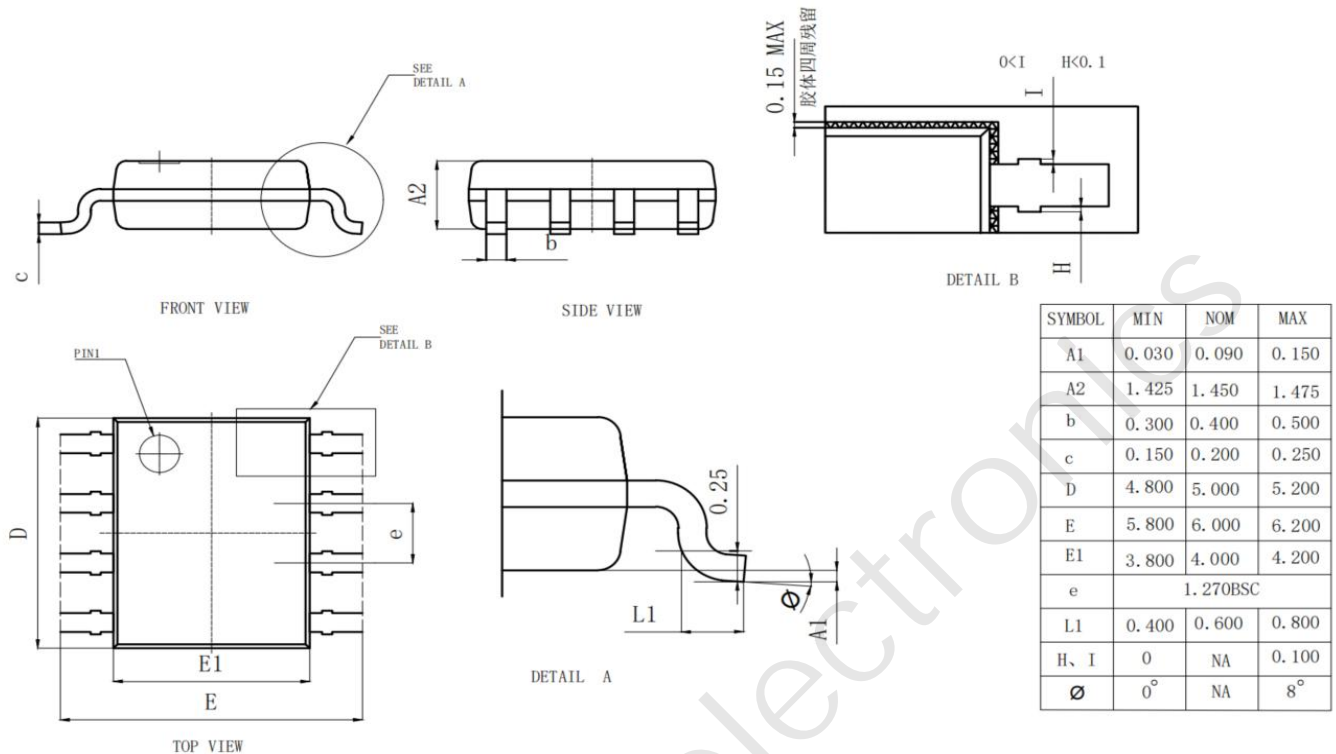


Figure 4: Diode Recovery Test Circuit & Waveform

### Package Mechanical Data(SOP-8)



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