CRMCTL0403B

N-Channel 40V, 2.35mΩ Typ. Power MOSFET

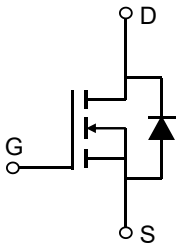
Description

Features

- 40V, 175A

  $R_{DS(ON)}$ Typ = 2.35mΩ @ V_{GS} = 10V

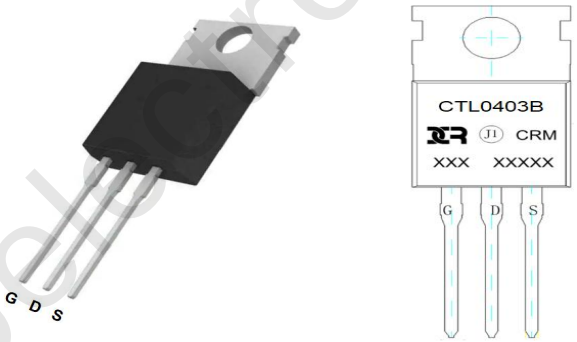
  $R_{DS(ON)}$ Typ = 3.1mΩ @ V_{GS} = 4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS TESTED!
- 100% ΔVds TESTED!



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power Management



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	TUBE (pcs)	Inner Box (pcs)	Per Carton (pcs)
CRMCTL0403B	CRMCTL0403B	TO-220C-3L	TUBE	50	1000	5000

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	175	A
		T_C = 100°C	105	A
I_{DM}	Pulsed Drain Current (1)		700	A
E_{AS}	Single Pulsed Avalanche Energy (2)		420	mJ
P_D	Power Dissipation	T_C = 25°C	156	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.8	°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	1.8	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 20A	-	2.35	3	mΩ
		V_{GS} = 4.5V, I_D = 15A	-	3.1	4	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	10523	-	pF
C_{oss}	Output Capacitance		-	675	-	pF
C_{rss}	Reverse Transfer Capacitance		-	503	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 20V, I_D = 20A	-	90	-	nC
Q_{gs}	Gate Source Charge		-	17	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	21	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V I_D= 20A, R_{GEN} = 3Ω	-	25	-	ns
t_r	Turn-On Rise Time		-	36	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	45	-	ns
t_f	Turn-Off Fall Time		-	30	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	175	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	700	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 20A, di/dt = 100A/us	-	40	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	58	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25°C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=41A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

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Test Circuit

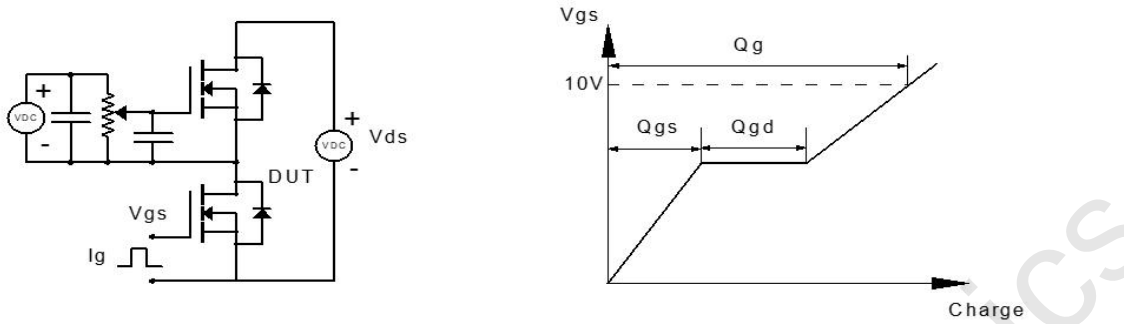

Figure 1: Gate Charge Test Circuit & Waveform

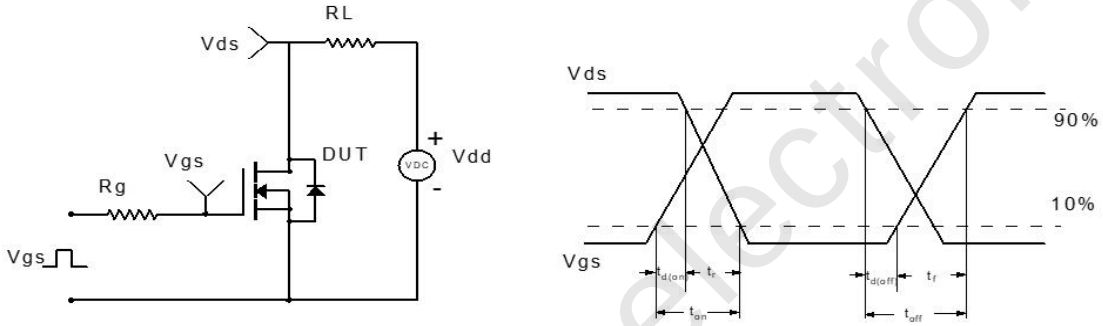

Figure 2: Resistive Switching Test Circuit & Waveform

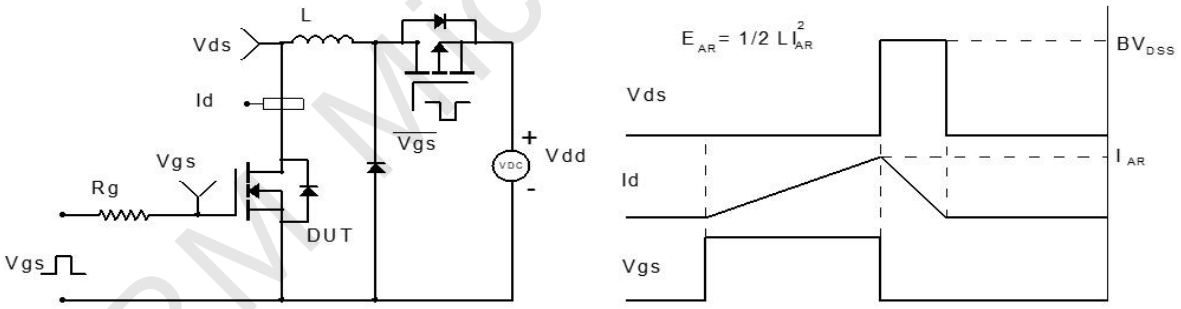

Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

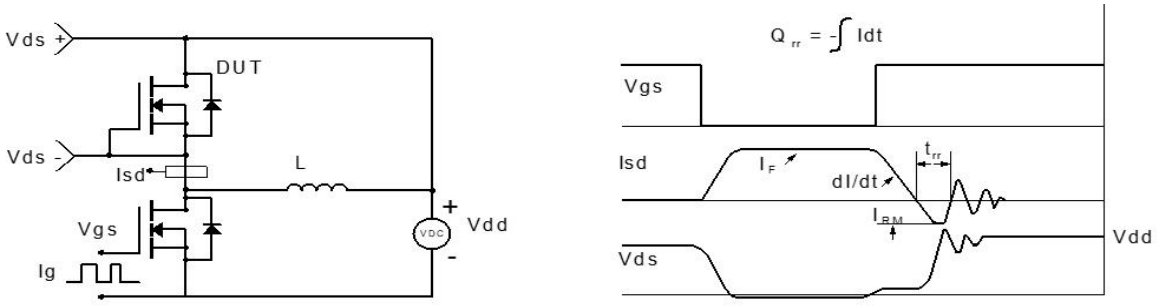

Figure 4: Diode Recovery Test Circuit & Waveform

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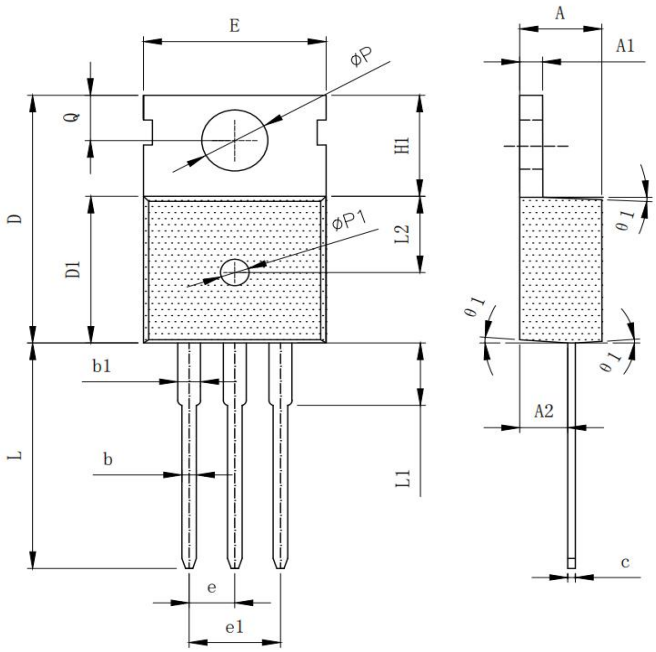
Package Mechanical Data(TO-220C-3L)



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
ΦP	3.50	3.60	3.70
ΦP1	1.40	1.50	1.60
Q	2.70	--	2.90
θ1	2°	4°	6°

NOTES:1. PKG ▨ SURFACE IS MATTE Ra1.2~1.4;
OTHERS IS POLISHED Ra0.15;

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