

Description

N-channel Enhancement Mode Power MOSFET

Features

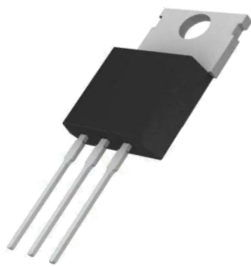
- 100V, 20A
 $R_{DS(ON)} < 48m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 55m\Omega @ V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

Applications

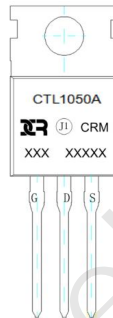
- Load Switch
- PWM Application
- Power Management



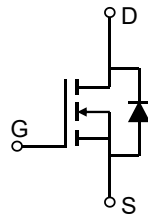
100% UIS TESTED!
100% ΔV_{ds} TESTED!



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)
CRMCTL1050A	CRMCTL1050A	TUBE	TO-220C-3L	50	1000	5000

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	
I_{DM}	Pulsed Drain Current ⁽¹⁾	80	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	56	mJ
P_D	Power Dissipation	$T_C = 25^\circ C$	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.0	$^\circ C/W$
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ C$



Electrical Characteristics ($T_J = 25^\circ\text{C}$ 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	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, 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	1.5	2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = 10V, I _D = 10A	-	37	48	mΩ
		V _{GS} = 4.5V, I _D = 6A	-	39	55	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz	-	1990	-	pF
C _{oss}	Output Capacitance		-	90	-	pF
C _{rss}	Reverse Transfer Capacitance		-	80	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 4.5V V _{DS} = 80V, I _D = 20A	-	20	-	nC
Q _{gs}	Gate Source Charge		-	3.1	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	14	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 4.5V, V _{DD} = 20V I _D = 20A, R _{GEN} = 3.1Ω	-	11	-	ns
t _r	Turn-On Rise Time		-	91	-	ns
t _{d(off)}	Turn-Off DelayTime		-	40	-	ns
t _f	Turn-Off Fall Time		-	71	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	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	-	64	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	152	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 30\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = 15\text{A}$
 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Test Circuit

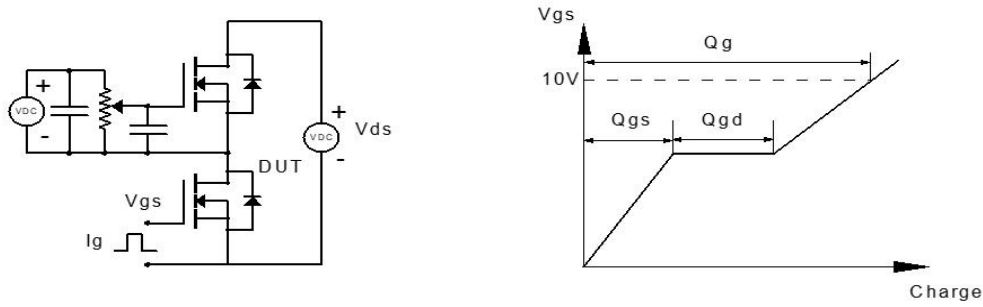


Figure 1: Gate Charge Test Circuit & Waveform

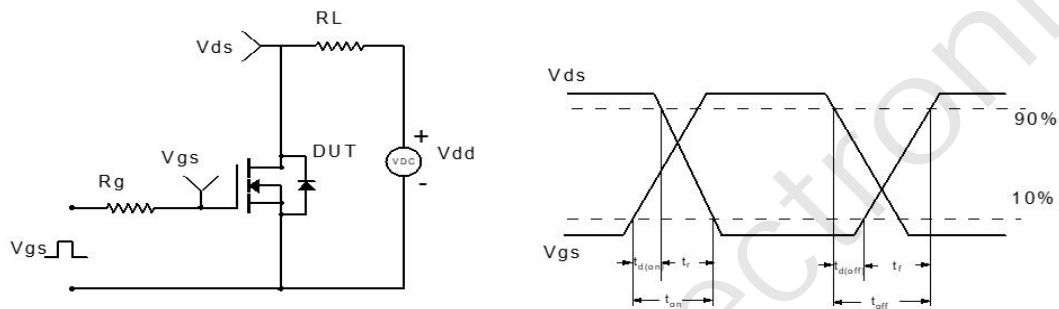


Figure 2: Resistive Switching Test Circuit & Waveform

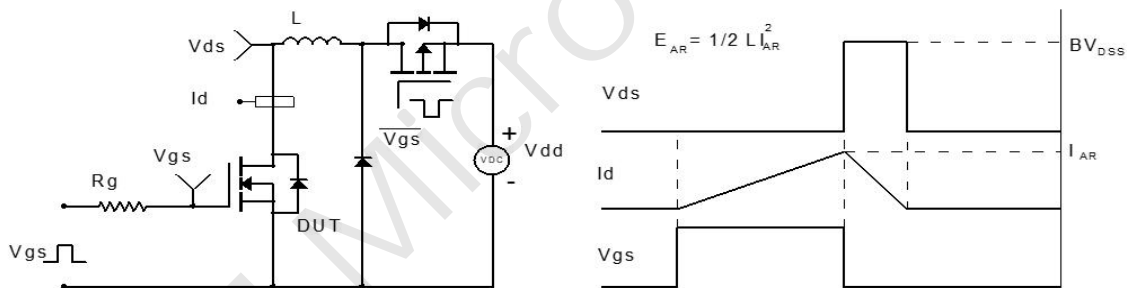


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

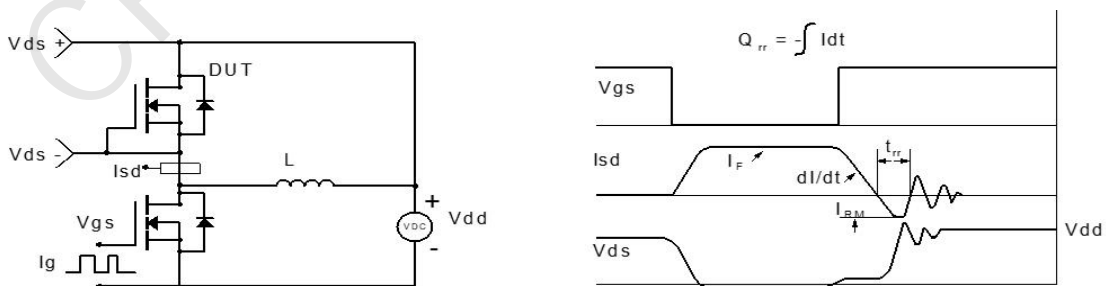
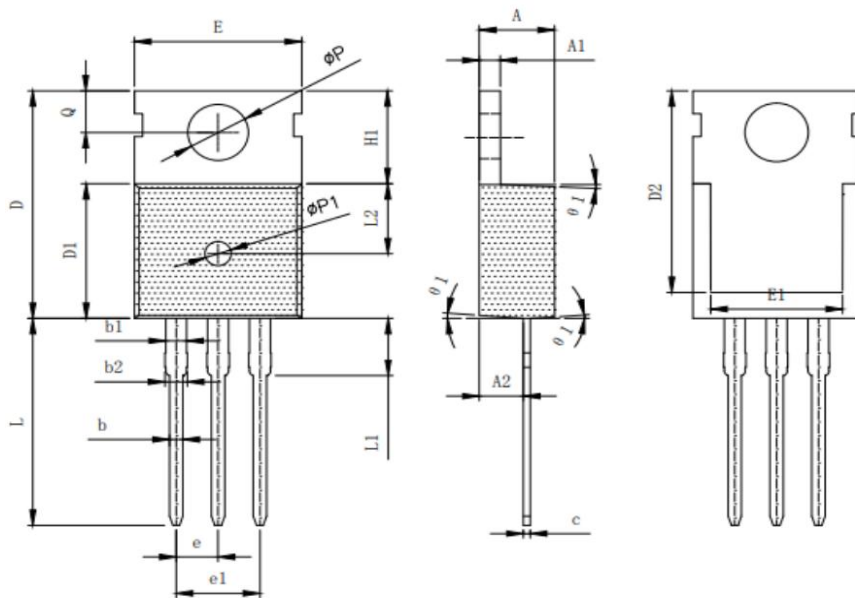


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(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	1.21	1.27	1.40
b2	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	13.14	13.24	13.70
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
$\phi P1$	1.40	1.50	1.60
Q	2.70	—	2.90
$\theta 1$	1°	3°	5°

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