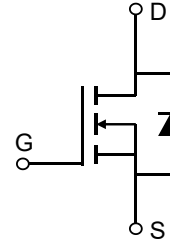


Description

Features

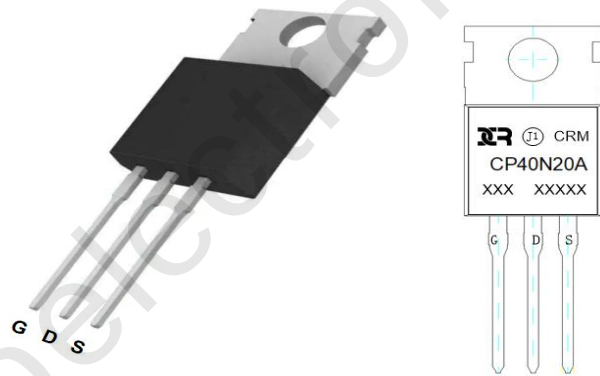
- 200V, 40A
 $R_{DS(ON)}$ Typ = 50mΩ @ $V_{GS} = 10V$
- Fast Switching
- Improved dv/dt Capability
- 100% UIS TESTED!
- 100% ΔV_d s TESTED!



Schematic Diagram

Application

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	TUBE(pcs)	Inner Box (pcs)	Per Carton (pcs)
CRMCP40N20A	CRMCP40N20A	TO-220C-3L	TUBE	50	2000	8000

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

Symbol	Parameter	Value	Units	
V _{DS}	Drain-to-Source Voltage	200	V	
V _{GS}	Gate-to-Source Voltage	±20	V	
I _D	Continuous Drain Current	T _C = 25°C	40	A
		T _C = 100°C	24	A
I _{DM}	Pulsed Drain Current ⁽¹⁾	160	A	
E _{AS}	Single Pulsed Avalanche Energy ⁽²⁾	484	mJ	
P _D	Power Dissipation	T _C = 25°C	250	W
R _{θJC}	Thermal Resistance, Junction to Case	0.5	°C/W	
T _J , T _{STG}	Junction & Storage Temperature Range	-55 to 150	°C	

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
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Off Characteristics

$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	200	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200\text{V}, V_{GS} = 0\text{V}$	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2	2.8	4	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance ⁽³⁾	$V_{GS} = 10\text{V}, I_D = 20\text{A}$	-	50	65	mΩ

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V},$ $f = 1\text{MHz}$	-	2894	-	pF
C_{oss}	Output Capacitance		-	333	-	pF
C_{rss}	Reverse Transfer Capacitance		-	95	-	pF
Q_g	Total Gate Charge	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 160\text{V}, I_D = 40\text{A}$	-	112	-	nC
Q_{gs}	Gate Source Charge		-	11	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	51	-	nC

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 15\text{V}, V_{DD} = 100\text{V}$ $I_D = 40\text{A}, R_{GEN} = 5\Omega$	-	30	-	ns
t_r	Turn-On Rise Time		-	40	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	480	-	ns
t_f	Turn-Off Fall Time		-	110	-	ns

Drain-Source Diode Characteristics and Max Ratings

I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	40	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	160	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = 20\text{A}$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$	-	1.45	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	1.1	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 50\text{V}$, $V_G = 10\text{V}$, $R_G = 25\Omega$, $L = 0.5\text{mH}$, $I_{AS} = 44\text{A}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Test Circuit

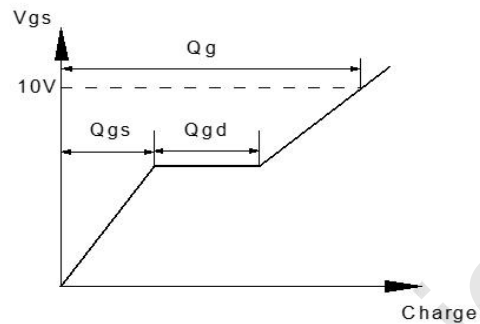
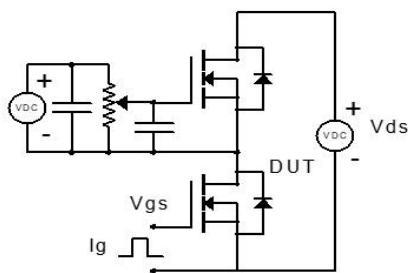


Figure 1: Gate Charge Test Circuit & Waveform

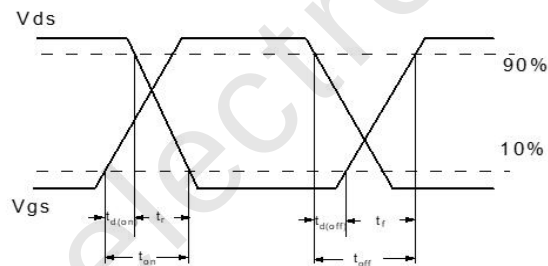
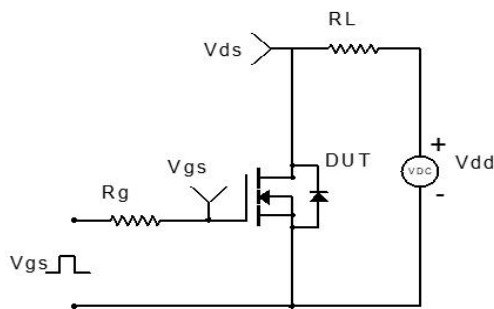


Figure 2: Resistive Switching Test Circuit & Waveform

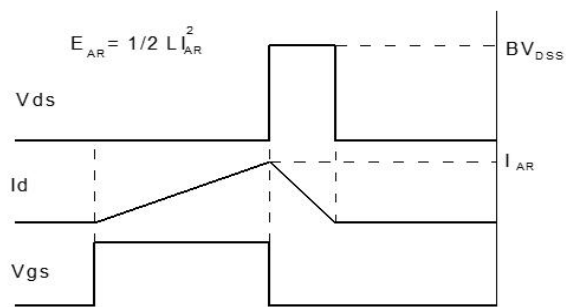
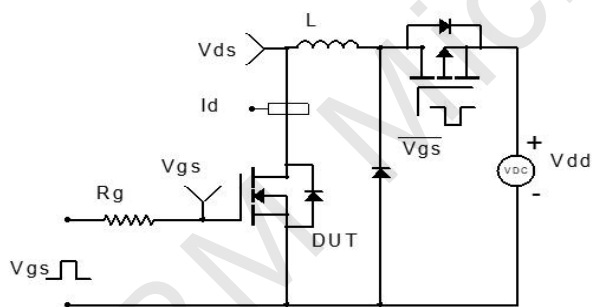


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

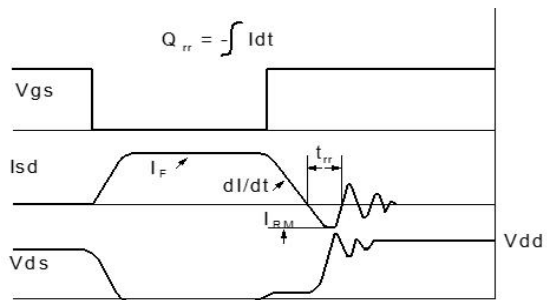
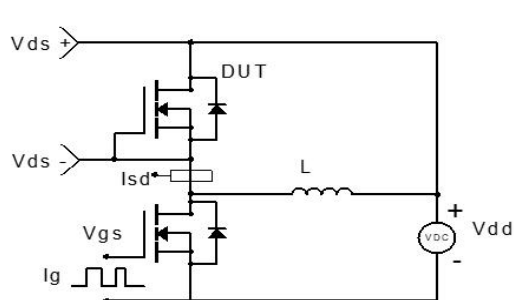
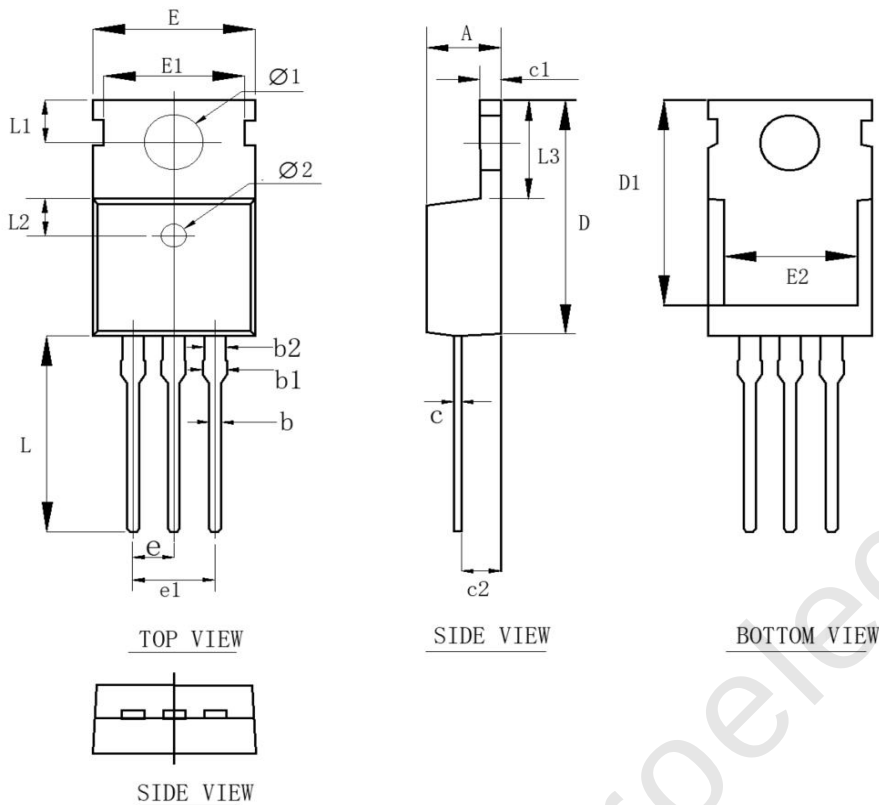


Figure 4: Diode Recovery Test Circuit & Waveform

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



COMMON DIMENSIONS (UNITS OF MEASURE=mm)			
SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
b	0.70	0.80	0.90
b1	—	—	1.42
b2	1.17	1.27	1.37
c	0.40	0.50	0.60
c1	1.25	1.30	1.35
c2	2.20	2.40	2.60
D	15.45	15.65	15.85
D1	13.20	13.40	13.60
E	9.80	10.00	10.20
E1	8.60	8.70	8.80
E2	7.80	8.00	8.20
e1	4.88	5.08	5.28
L	12.95	13.15	13.35
L1	2.70	2.80	2.90
L2	2.40	2.50	2.60
L3	6.30	6.50	6.70
Ø1	3.50	3.60	3.70
Ø2	1.35	1.50	1.65
e	2.54BSC		

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