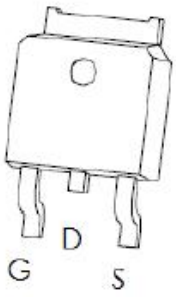
CHONGQING CLOUDCHILD TECHNOLOGY CO., LTD

TO-252-2L Plastic-Encapsulate MOSFETS

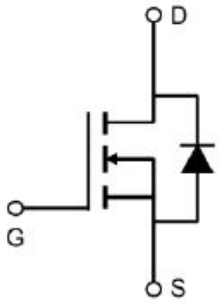
CCM060N04NTF N-Channel Power MOSFET

V_{DSS}	$R_{DS(ON)}$(Typ.)	I_D
40V	4.8mΩ@10V	70A

TO-252-2L



Schematic diagram



DESCRIPTION

The CCM060N04NTF provides excellent $R_{DS(ON)}$ with low gate charge.

It can be used in a wide variety of applications.

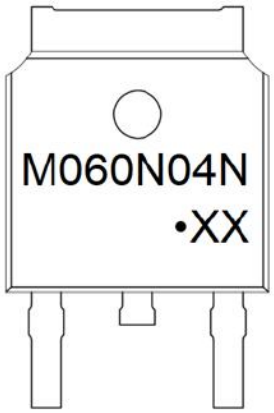
FEATURES

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

APPLICATIONS

- Power switching application

MARKING



M060N04N = Device Code

XX = Date Code

Solid Dot = Green Indicater

ABSOLUTE MAXIMUM RATINGS(T_a=25℃unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	40	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_C = 25℃	I_D	70	A
	T_C = 100℃	I_D	55	A
Pulsed Drain Current[2]		I_{DM}	280	A
Single Pulsed Avalanche Current[3]		I_{AS}	20.5	A
Single Pulsed Avalanche Energy[3]		E_{AS}	105	mJ
Power Dissipation[5]	T_C = 25℃	P_D	42	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	53	℃/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	3	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(Ta=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V			1	μA
Gate - Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics[4]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.7	3.0	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 15A		4.8	6.2	mΩ
		V_{GS} = 4.5V, I_D = 10A		5.6	8.5	
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 5A		36		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 1MHz		3747		pF
Output Capacitance	C_{oss}			238		
Reverse Transfer Capacitance	C_{rss}			210		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		1.9		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 20V, V_{GS} = 10V, I_D = 15A		67		nC
Gate-source Charge	Q_{gs}			9.6		
Gate-drain Charge	Q_{gd}			12		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 20V, V_{GS} = 10V, R_L = 1Ω R_G = 3Ω		7		ns
Turn-on Rise Time	t_r			15		
Turn-off Delay Ttime	$t_{d(off)}$			31		
Turn-off Fall Time	t_f			17		
Source - Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 15A			1.2	V
Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI/dt = 100A/μs		25		ns
Diode Reverse Recovery Charge	Q_{rr}	I_F = 20A, dI/dt = 100A/μs		30		nC

Notes :

1. The maximum current rating is limited by package.And device mounted on a large heatsink.

2. 2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

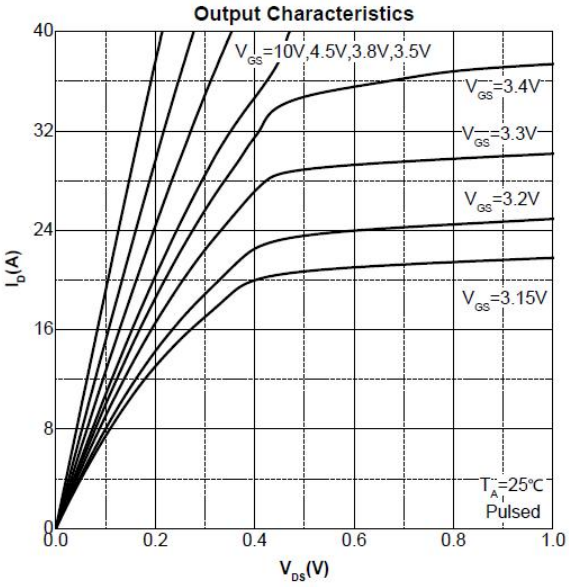
3. EAS condition: VDD = 20V,VGS = 10V, L = 0.5mH, RG = 25Ω Starting TJ = 25°℃.

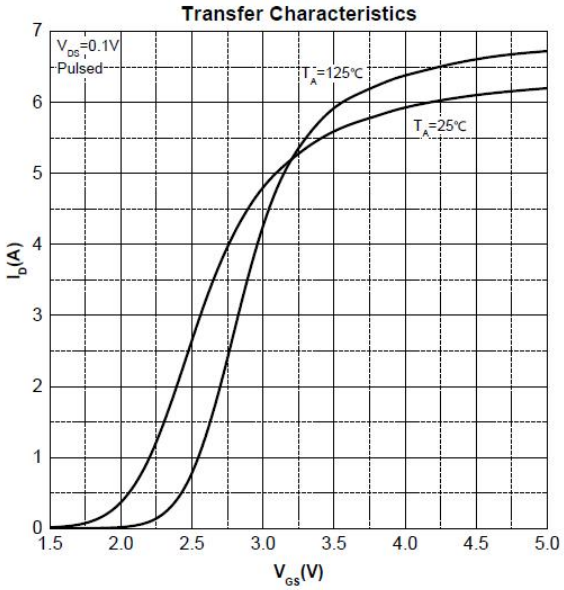
4. Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

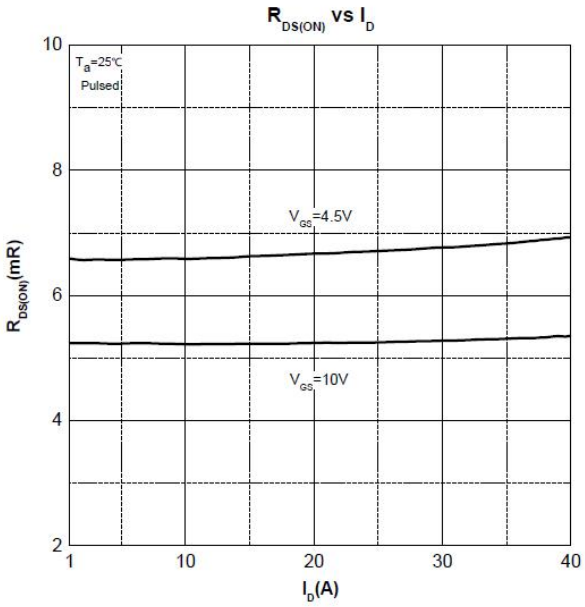
5. The power dissipation PD is limited by TJ(MAX) = 150°C.And device mounted on a large heatsink.

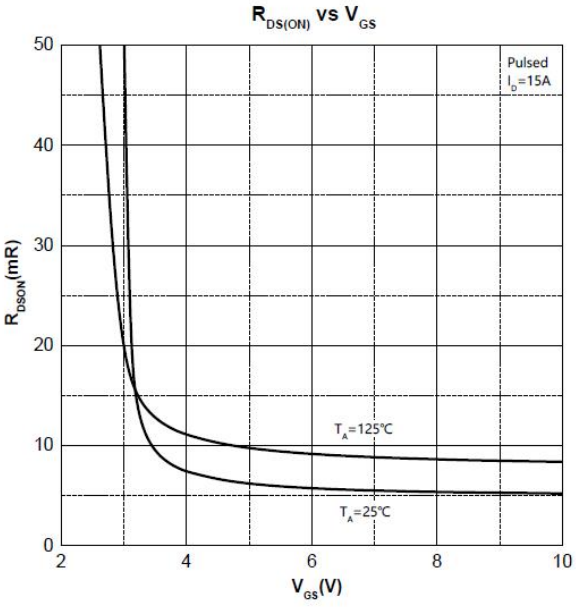
6. Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C.

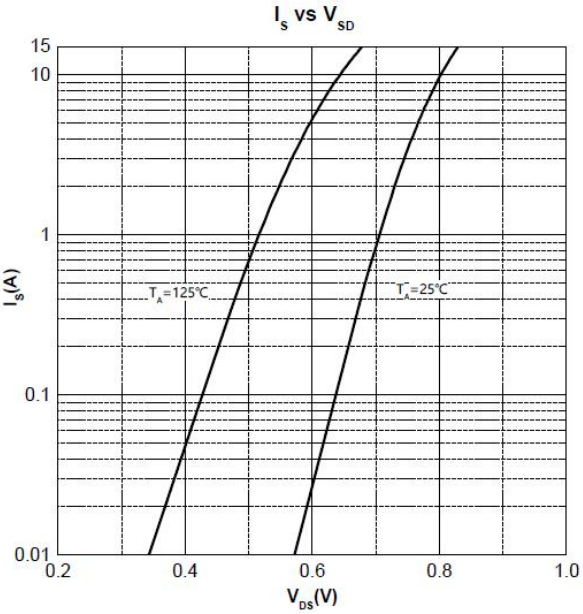
Characteristics Curve：

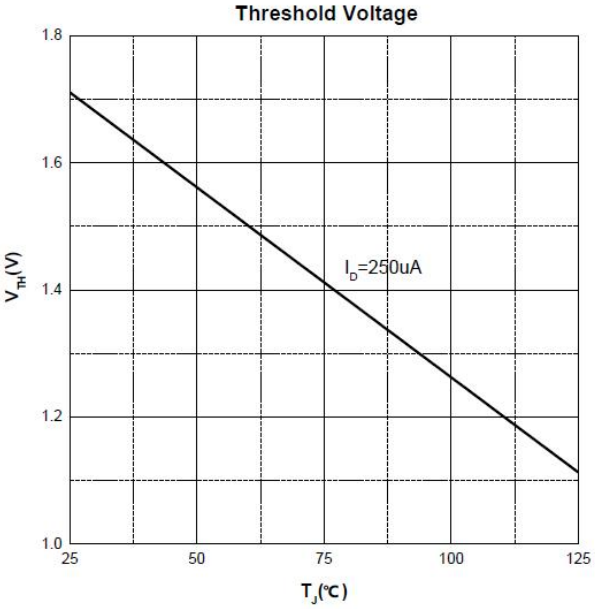


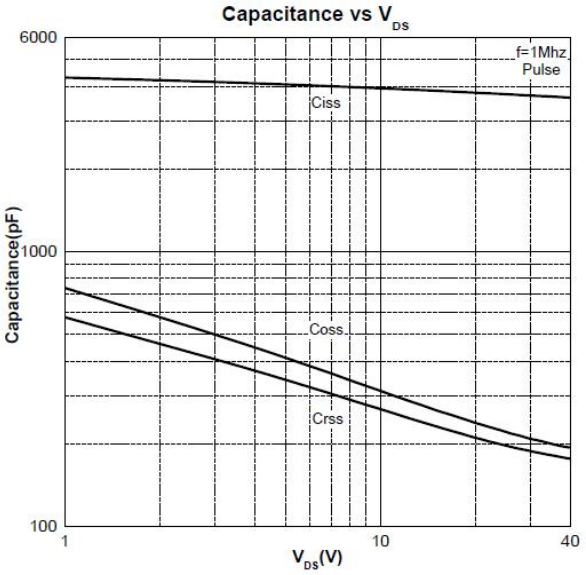


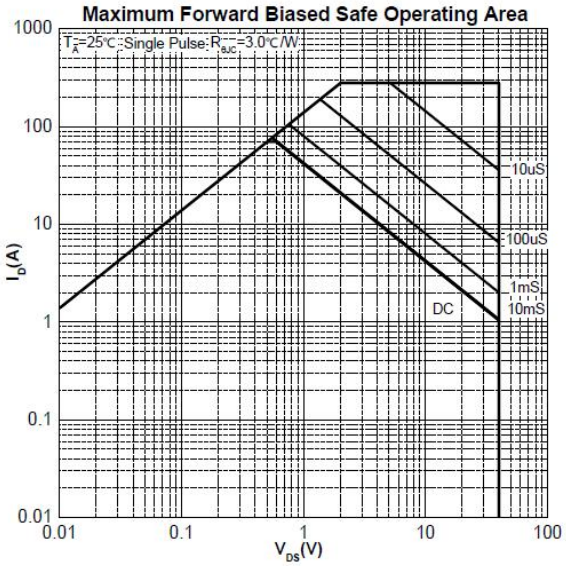


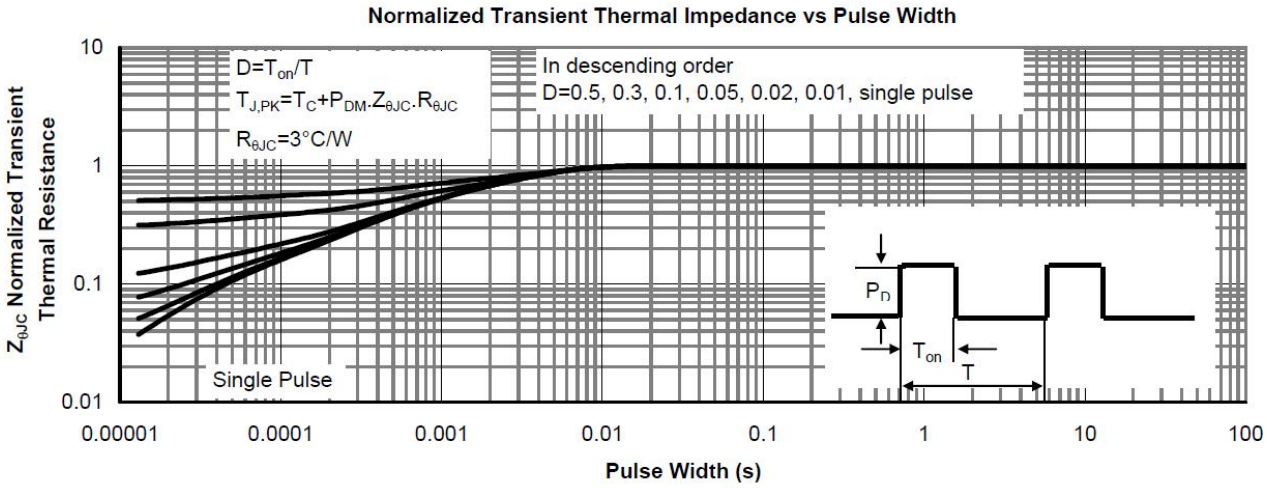




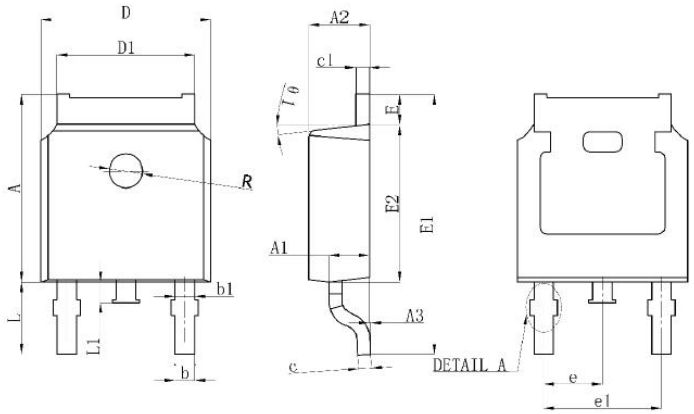


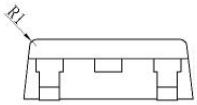

Capacitance vs V_{DS}
f=1Mhz
Pulse
Ciss
Coss
Crss
Capacitance(pF)
6000
1000
100
1
10
40
V_{DS}(V)

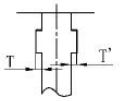

Maximum Forward Biased Safe Operating Area
T_A=25℃;Single Pulse;$R_{\theta JC}$=3.0℃/W
10uS
100uS
1mS
10mS
DC
I_D(A)
1000
100
10
1
0.1
0.01
0.01
0.1
1
10
100
V_{DS}(V)


Normalized Transient Thermal Impedance vs Pulse Width
D=T_{on}/T
$T_{J,PK}$=T_C+P_{DM}.$Z_{\theta JC}$.$R_{\theta JC}$
$R_{\theta JC}$=3°C/W
In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse
Single Pulse
P_D
T_{on}
T
$Z_{\theta JC}$ Normalized Transient Thermal Resistance
10
1
0.1
0.01
0.00001
0.0001
0.001
0.01
0.1
1
10
100
Pulse Width (s)

TO-252 Package Outline Dimensions







0<=T, T' <=0.12
DETAIL A

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	7.050	7.150	0.278	0.281
A1	0.960	1.060	0.038	0.042
A2	2.200	2.400	0.087	0.094
A3	0.000	0.100	0.000	0.004
b	0.760REF		0.030REF	
b1	1.000REF		0.039REF	
c	0.508REF		0.020REF	
c1	0.508REF		0.020REF	
D	6.550	6.650	0.258	0.262
D1	5.100	5.460	0.201	0.215
E	0.950	1.050	0.037	0.041
E1	9.700	10.400	0.382	0.409
E2	6.000	6.200	0.236	0.244
e	2.286BSC		0.090BSC	
e1	4.572REF		0.180REF	
L	2.650	2.950	0.104	0.116
L1	0.700	0.900	0.028	0.035
θ1	7°REF		7°REF	
R	1.300REF		0.051REF	
R1	0.250REF		0.010REF	

Date of change	Rev #	revise content
2023/07/24	A/0	/