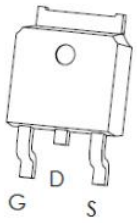
CHONGQING CLOUDCHILD TECHNOLOGY CO., LTD

TO-252 Plastic-Encapsulate MOSFETS

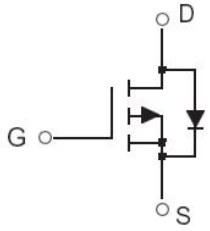
CC40P04D P-Channel Power MOSFET

V_{DSS}	$R_{DS(ON)}$(Typ.)	I_D
-40V	11mΩ@-10V	-40A

TO-252



Schematic diagram



DESCRIPTION

The CC40P04D provides excellent $R_{DS(ON)}$ with low gate charge.

It can be used in a wide variety of applications.

FEATURES

- High density cell design for ultra low R_{DS}(on)
- Excellent package for good heat dissipation
- AEC-Q101 Qualified

APPLICATIONS

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

MARKING

U40P04 = Device Code
XX = Date Code

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	I_D	-40	A
Pulsed Drain Current	I_{DM}	-160	A
Single Pulsed Avalanche Energy(1)	E_{AS}	544	mJ
Power Dissipation	P_D	68	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.2	℃/W
Junction Temperature	T_J	175	℃
Storage Temperature	T_{STG}	-55~ +175	℃

(1).E_{AS} condition: V_{DD} = -20V,L = 1mH, R_G = 25Ω, Starting T_J = 25°C。

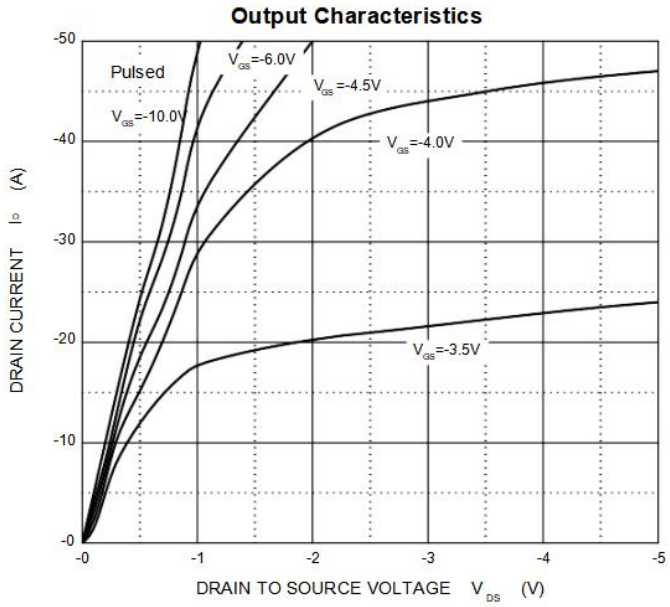
MOSFET ELECTRICAL CHARACTERISTICS(Ta=25℃ unless otherwise noted)

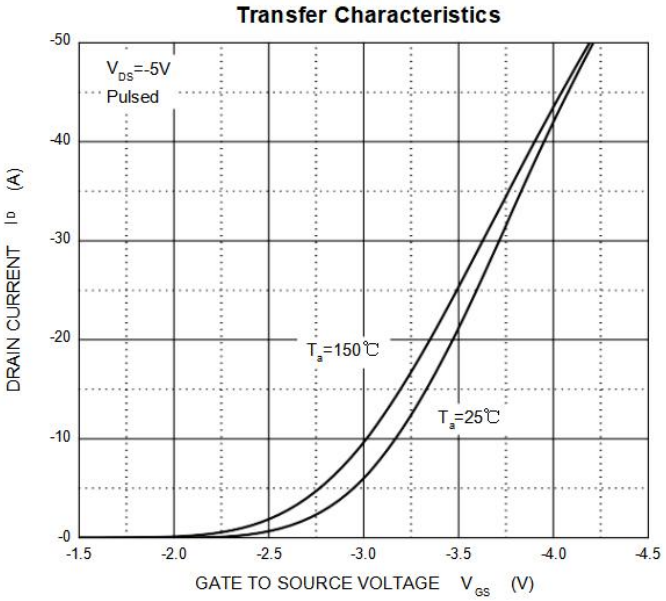
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -40V,V_{GS} = 0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics[1]						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D = -250μA	-1	-2	-3	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -12A		11	17	mΩ
Forward transconductance	g_{FS}	V_{DS} =-5V, I_D =-12A	24			S
Dynamic characteristics[2]						
Input Capacitance	C_{iss}	V_{DS} = -20V,V_{GS} = 0V,f = 1MHz		4100		pF
Output Capacitance	C_{oss}			320		
Reverse Transfer Capacitance	C_{rss}			290		
Switching Characteristics[2]						
Total Gate Charge	Q_g	V_{DS} = -20V,V_{GS} = -10V,I_D = -12A		83		nC
Gate-Source Charge	Q_{gs}			18		
Gate-Drain Charge	Q_{gd}			14		
Turn-on delay time	$t_{d(on)}$	V_{DD} = -20V, I_D = -20A V_{GS} = -10V,R_G = 3Ω,		11		ns
Turn-on rise time	t_r			19		
Turn-off delay time	$t_{d(off)}$			40		
Turn-off fall time	t_f			26		
Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V , I_S = -10A			-1.2	V

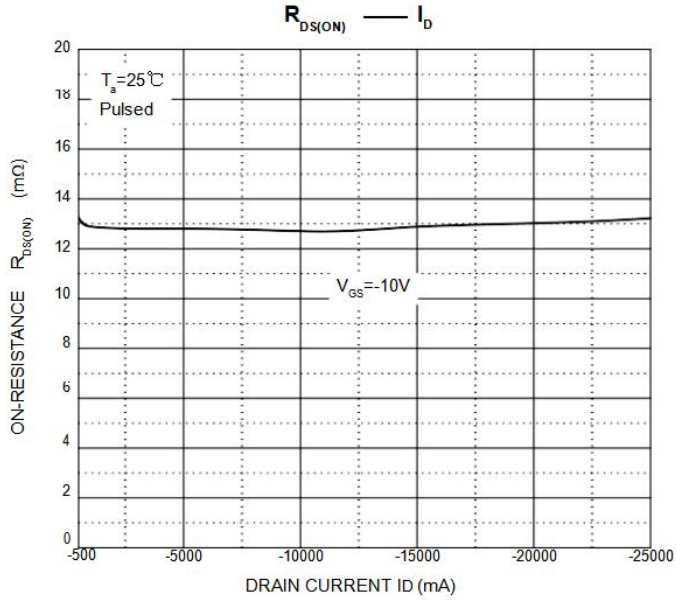
Note :

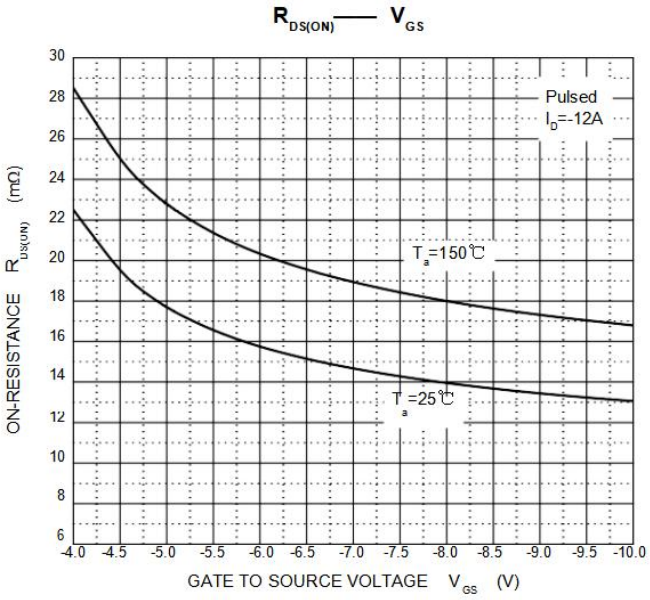
1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Guaranteed by design, not subject to production.

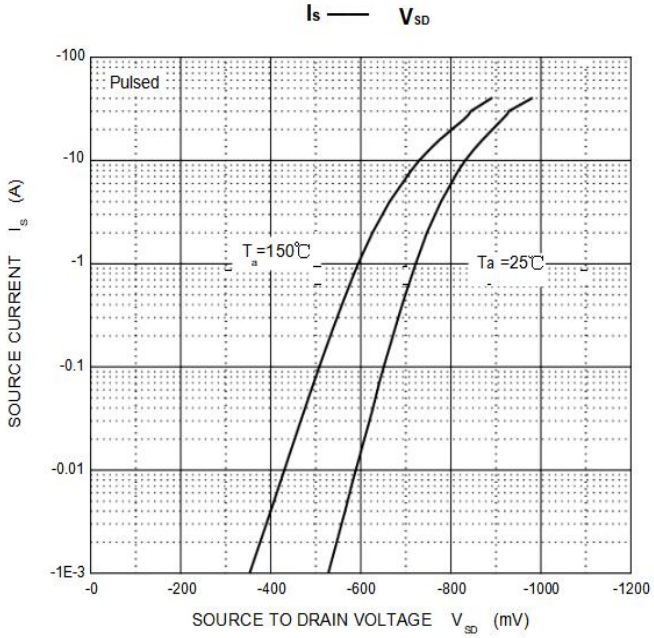
Characteristics Curve：

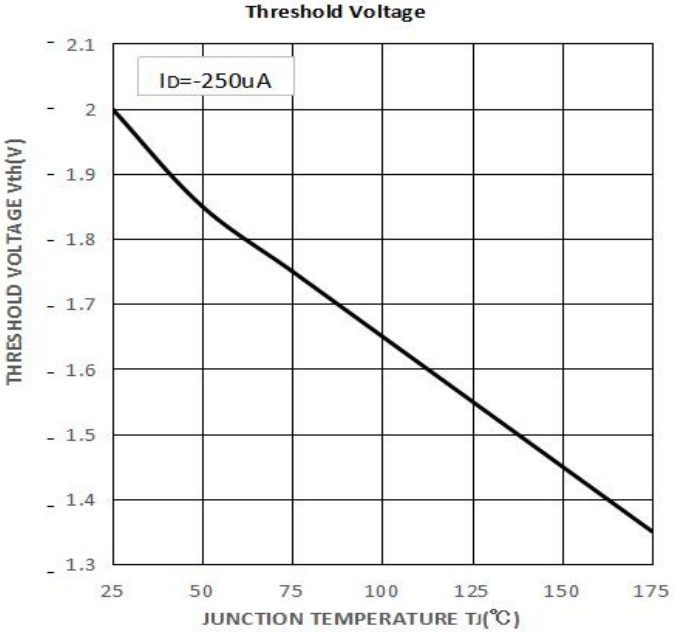


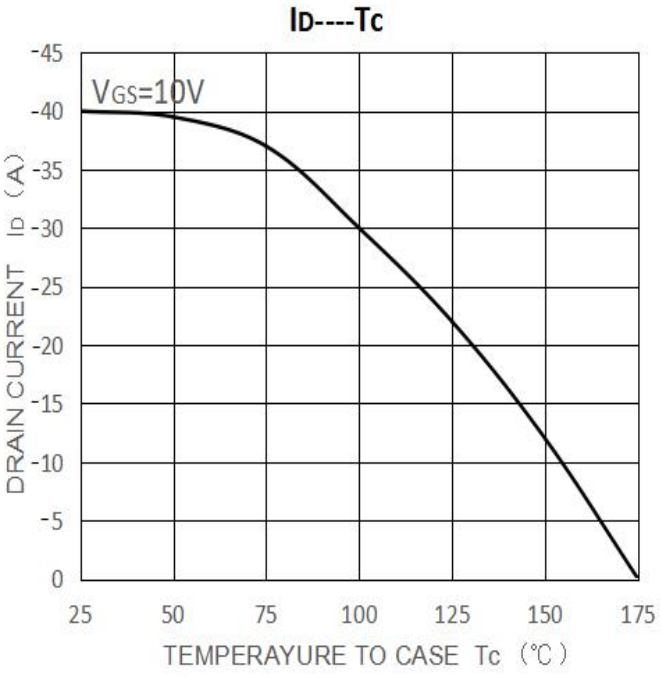


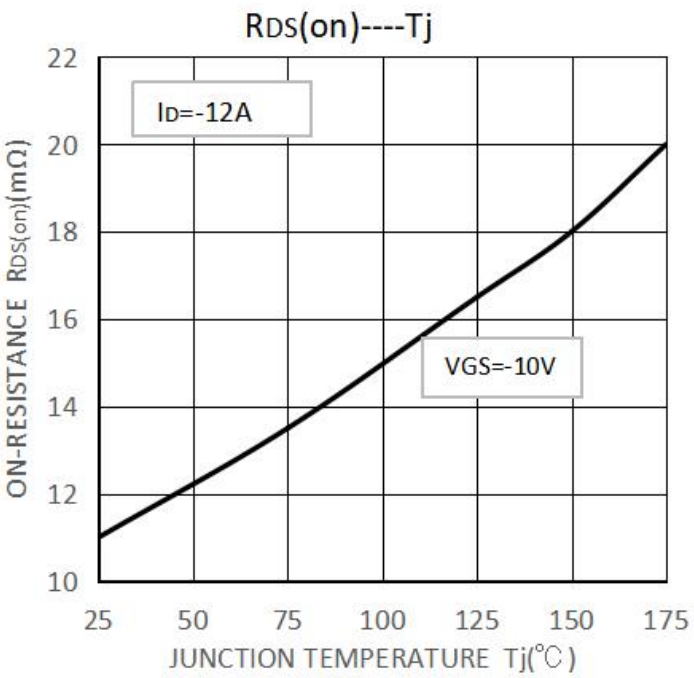


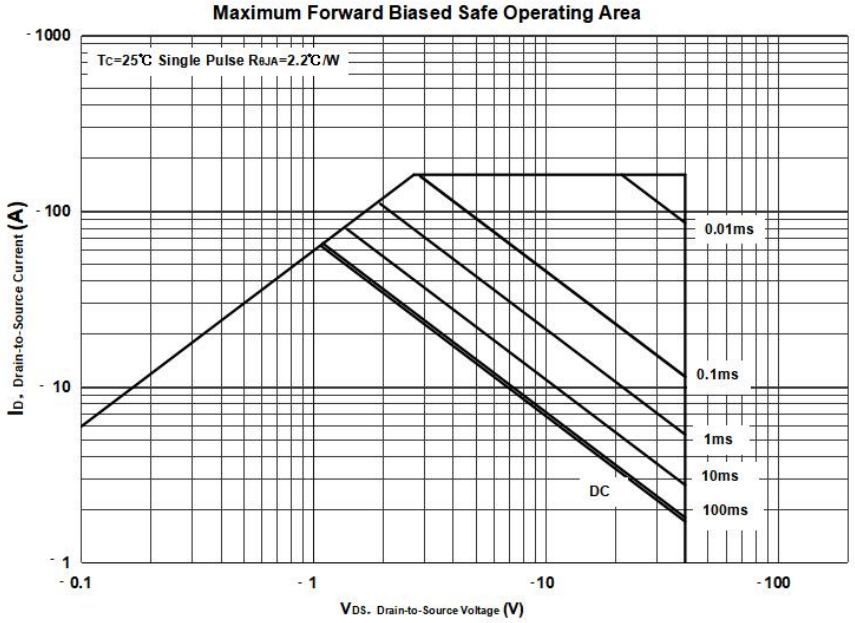


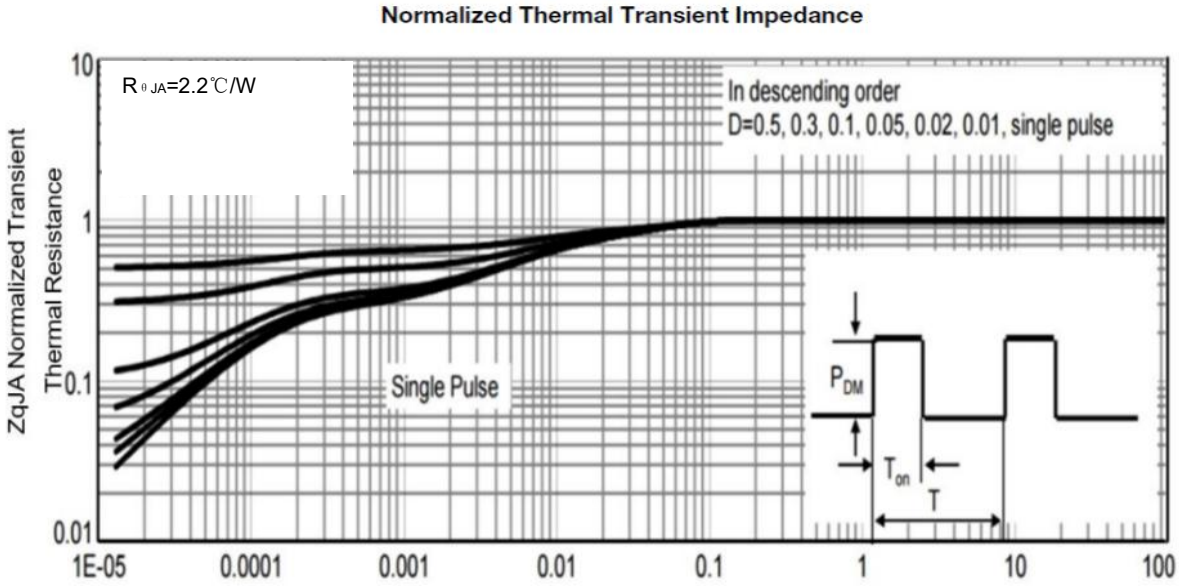




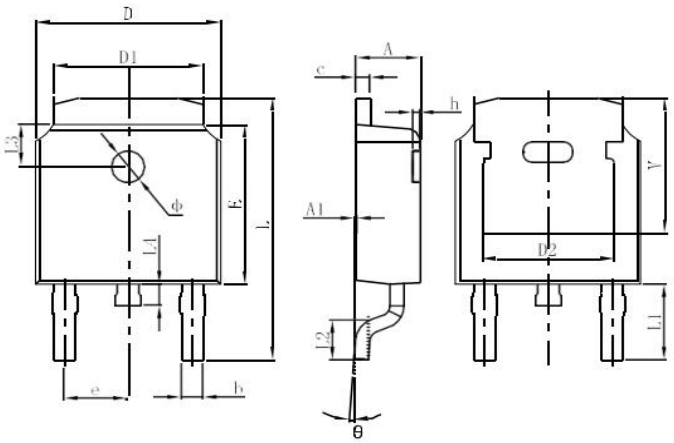

ID----Tc
VGS=10V
DRAIN CURRENT ID (A)
-45
-40
-35
-30
-25
-20
-15
-10
-5
0
25
50
75
100
125
150
175
TEMPERAYURE TO CASE Tc (℃)


RDS(on)----Tj
ID=-12A
VGS=-10V
ON-RESISTANCE RDS(on)(mΩ)
22
20
18
16
14
12
10
25
50
75
100
125
150
175
JUNCTION TEMPERATURE Tj(℃)


Maximum Forward Biased Safe Operating Area
Tc=25℃ Single Pulse RθJA=2.2℃/W
ID, Drain-to-Source Current (A)
1000
100
10
1
0.1
1
10
100
VDS, Drain-to-Source Voltage (V)
0.01ms
0.1ms
1ms
10ms
100ms
DC

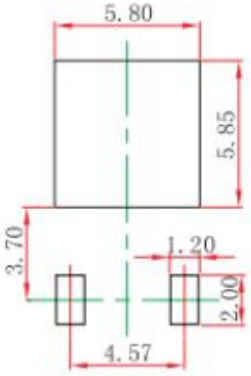

Normalized Thermal Transient Impedance
RθJA=2.2℃/W
In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse
ZqJA Normalized Transient
Thermal Resistance
10
1
0.1
0.01
Single Pulse
PDM
Ton
T
1E-05
0.0001
0.001
0.01
0.1
1
10
100

TO-252 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

TO-252 Suggested Pad Layout



Note:
1. Controlling dimension：in millimeters.
2. General tolerance:0.5mm.
3. The pad layout is for reference purposes only.

Date of change	Rev #	revise content
2023/03/07	A/0	/