

• General Description

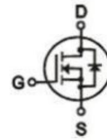
The CH50N04N combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

• Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

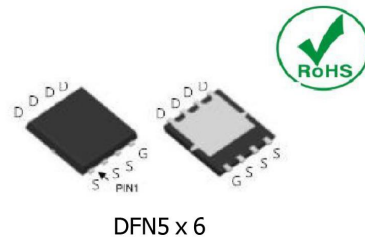
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Product Summary


$V_{DS} = 40V$

$R_{DS(ON)} = 14m\Omega$

$I_D = 30A$


• Ordering Information:

Part NO.	CH50N04N
Marking	CH50N04N
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

• Absolute Maximum Ratings ($T_c = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	20	V
Continuous Drain Current	$I_D@TC=25^\circ C$	30	A
	$I_D@TC=75^\circ C$	15	A
	$I_D@TC=100^\circ C$	10	A
Pulsed Drain Current	I_{DM}	100	A
Total Power Dissipation($TC=25^\circ C$)	$P_D@TC=25^\circ C$	30	W
Total Power Dissipation($TA=100^\circ C$)	$P_D@TC=100^\circ C$	15	W
Operating Junction Temperature	T_J	-55 to 175	$^\circ C$
Storage Temperature	T_{STG}	-55 to 175	$^\circ C$
Single Pulse Avalanche Energy@ $L=0.1mH$	E_{AS}	150	mJ
Avalanche Current@ $L=0.1mH$	I_{AS}	55	A

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R _{thJC}	-	4		°C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	100	°C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	125	°C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250uA	40			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250uA	1	2.1	2.6	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 20V, V _{GS} = 0V			1.0	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V			± 100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 1A		14	16	mΩ
		V _{GS} = 4.5V, I _D = 1A		24	26	mΩ
Forward Transconductance	g _{FS}	V _{DS} = 15V, I _D = 10A		18		S
Source-drain voltage	V _{SD}	I _S = 1A			1.0	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz	-	840	-	pF
Output capacitance	C _{oss}		-	92	-	
Reverse transfer capacitance	C _{rss}		-	60	-	

•Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DS} = 10V	-	20	-	nC
Gate - Source charge	Q _{gs}	I _D = 25A	-	2.5	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	4.5	-	

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

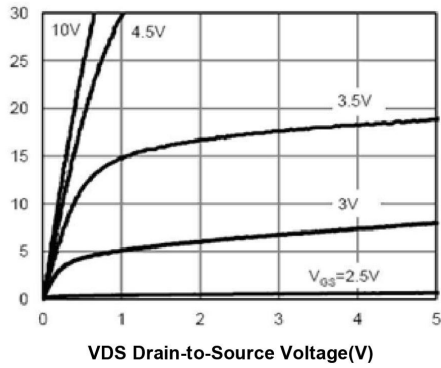
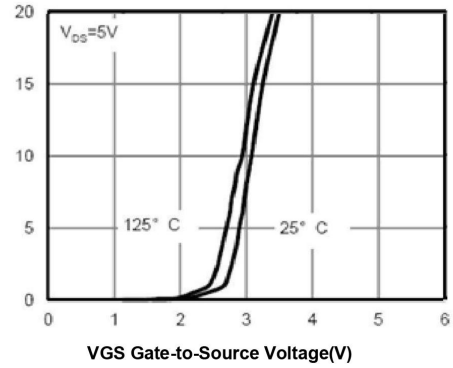
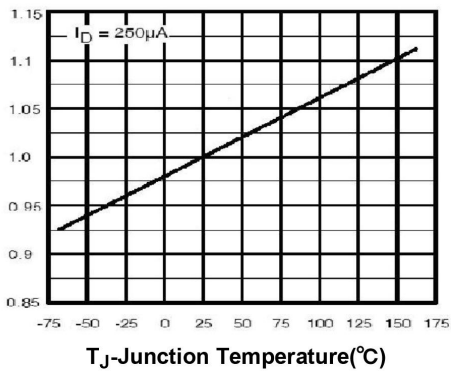
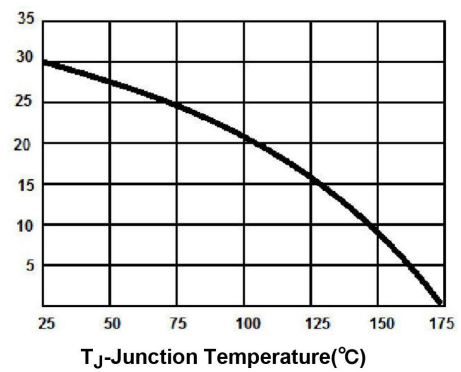
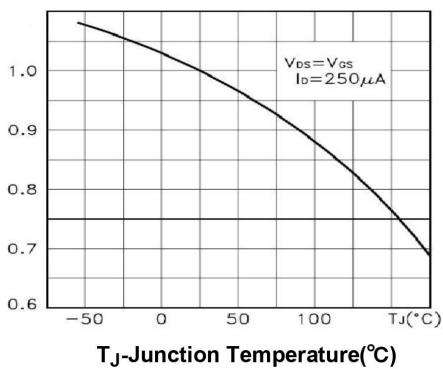
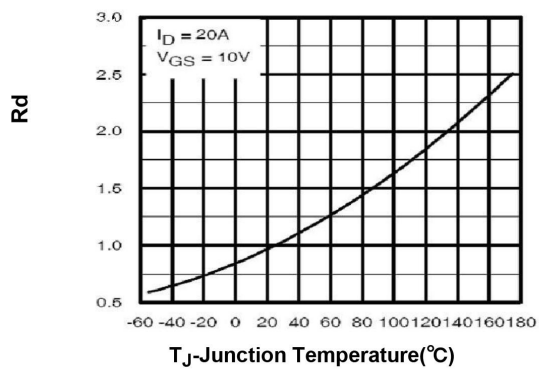
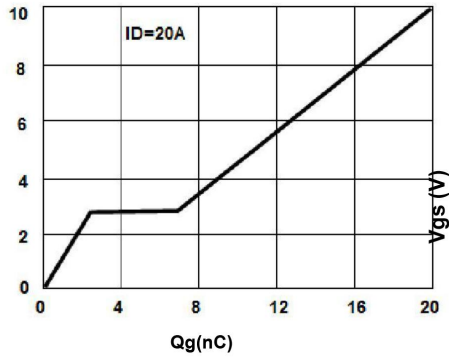
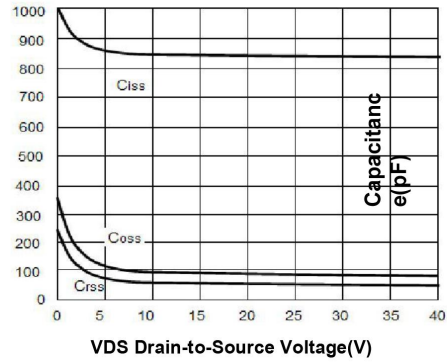
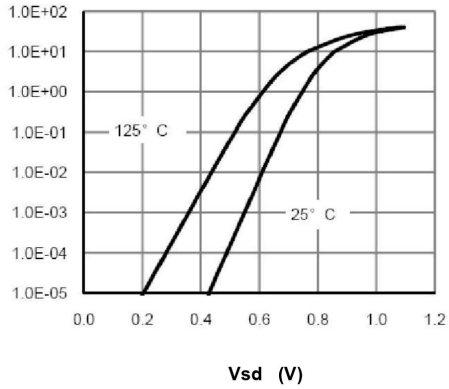
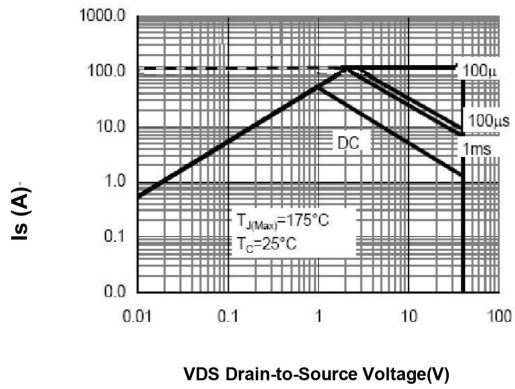
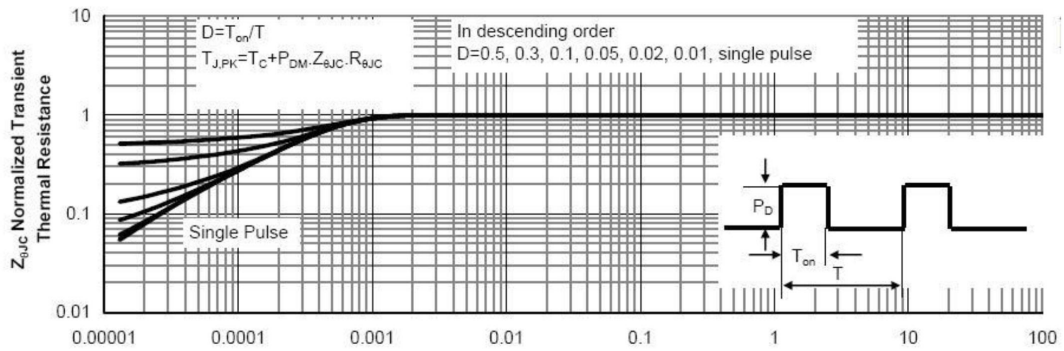
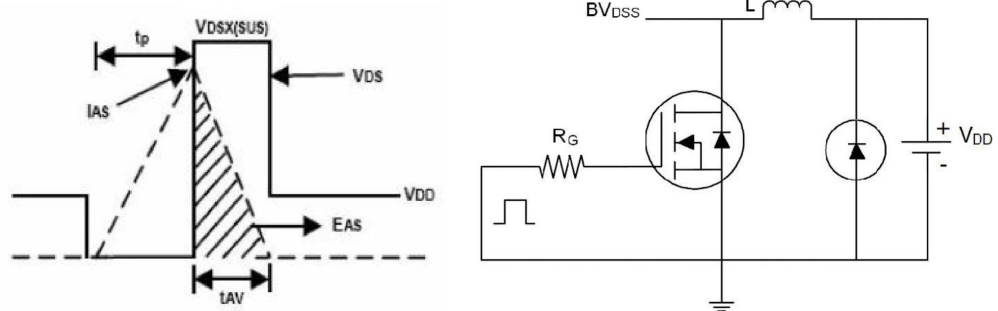
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)
Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. Max BV_{DSS} vs Junction Temperature

Figure 4. Drain Current

Figure 5. $V_{GS(th)}$ vs Junction Temperature

Figure 6. $R_{DS(on)}$ vs Junction Temperature


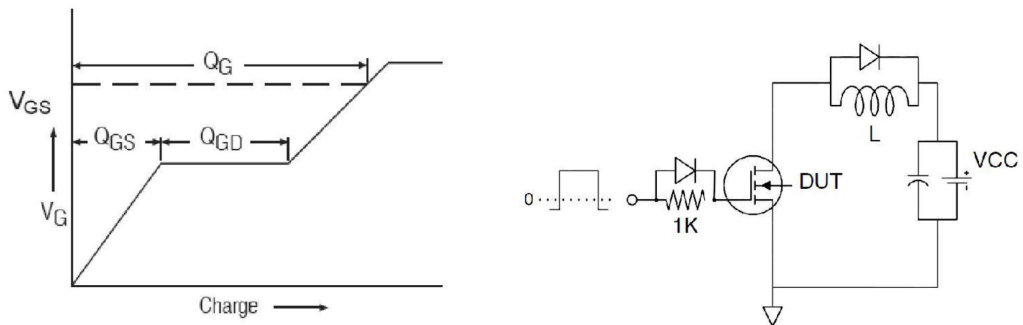
Figure 7. Gate Charge Waveforms

Figure 8. Capacitance

Figure 9. Body-Diode Characteristics

Figure 10. Maximum Safe Operating Area

Figure 11. Normalized Maximum Transient Thermal Impedance


Test Circuit

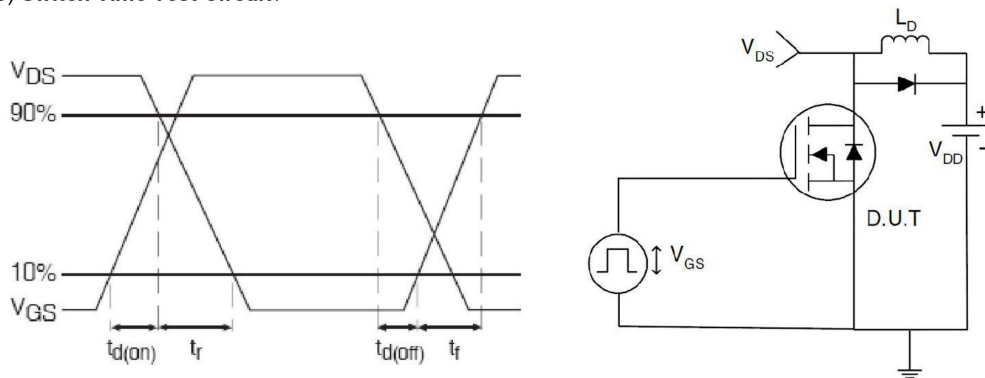
1) EAS Test Circuits



2) Gate Charge Test Circuit:

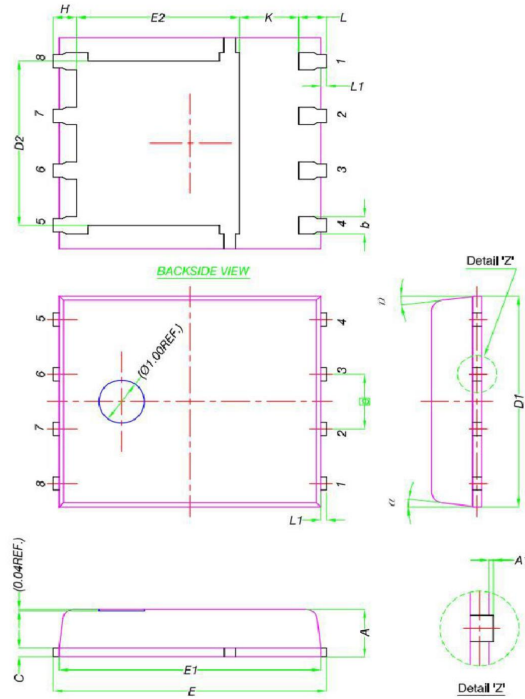


3) Switch Time Test Circuit:



Dimensions (DFN5×6)

Unit: mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°