• General Description

The CH90N04D 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

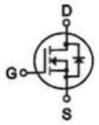
■MB/VGA Vcore

■SMPS 2nd Synchronous Rectifier

■POL application

■BLDC Motor driver

• Product Summary

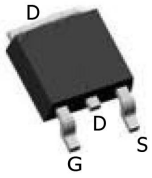


V_{DS} =40V

I_D =90A

$R_{DS(ON)}$ Typ = 4.2mΩ

@ V_{GS} = 10V



TO-252

•Ordering Information:

Part NO.	CH90N04D
Marking	CH90N04D
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

•Absolute Maximum Ratings (T_C =25℃)

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℃	90	A
	$I_{D@}$TC=75℃	50	A
	$I_{D@}$TC=100℃	48	A
Pulsed Drain Current ①	I_{DM}	320	A
Total Power Dissipation(TC=25℃)	P_D@TC=25℃	60	W
Total Power Dissipation(TA=25℃)	P_D@TA=25℃	5.0	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy@L=0.1mH	E_{AS}	140	mJ
Avalanche Current@L=0.1mH	I_{AS}	50	A

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	1.67	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	75	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°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	1.6	2.5	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=20A		4.2	5.0	mΩ
		V_{GS}=4.5V, I_D=10A		5.9	7.0	mΩ
Forward Transconductance	g_{FS}	V_{DS} =15V, I_D=10A				s
Source-drain voltage	V_{SD}	Is=20A			1.2	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz	-	4600	-	pF
Output capacitance	C_{oss}		-	264	-	
Reverse transfer capacitance	C_{rss}		-	200	-	

•Gate Charge characteristics(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	V_{Ds} =15V	-	73	-	nC
Gate - Source charge	Q_{gs}	I_D = 30A	-	15	-	
Gate - Drain charge	Q_{gd}	V_{GS} = 20V	-	16	-	

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

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

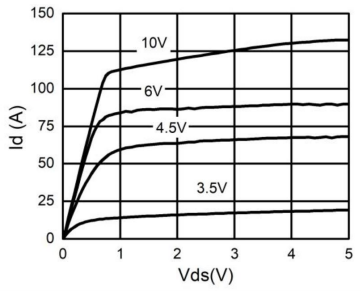


Figure 2. Transfer Characteristics

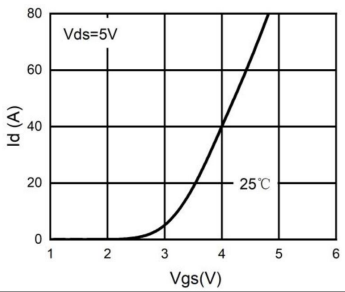


Figure 3. Power Dissipation

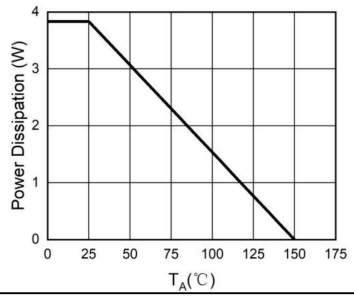


Figure 4. Drain Current

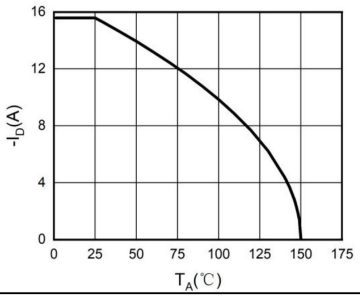


Figure 5. BV_{DSS} vs Junction Temperature

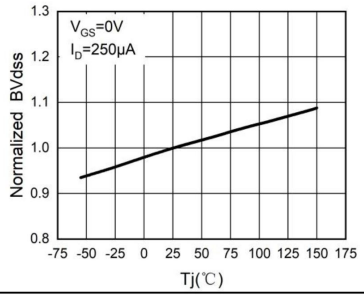


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

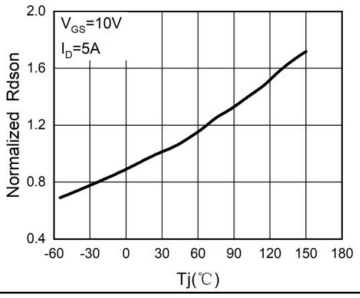


Figure7. Safe Operation Area

Figure8. Switching wave

Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

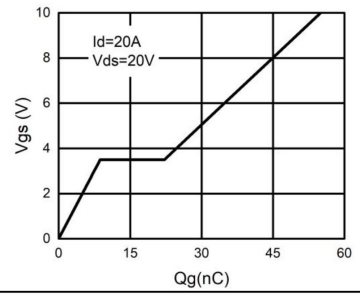


Figure 8. Capacitance

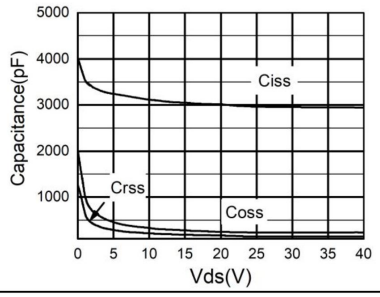


Figure 9. Body-Diode Characteristics

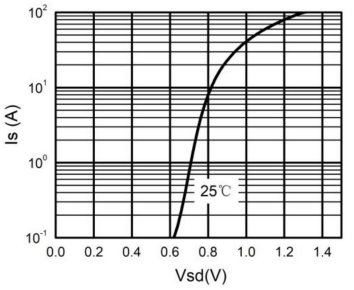
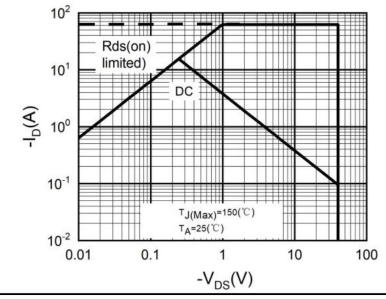
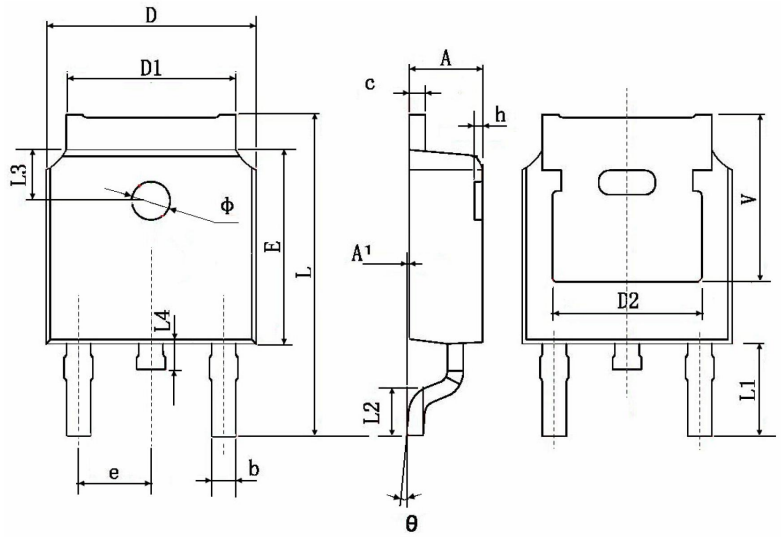


Figure 10. Maximum Safe Operating Area



●Dimensions(TO-252)



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	0.660	0.860	0.026	0.034
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 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
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	5.350 TYP.		0.211 TYP.	