

General Description

The CH20NP04H combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. It combines one N channel MOSFET and one P channel MOSFET.

Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Dual DIE in one package

Application

- Power Management in Notebook Computer
- BLDC Motor driver

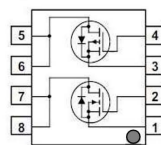
Ordering Information:

Part NO.	CH20NP04H
Marking	CH20NP04H
Packing Information	REEL TAPE
Basic ordering unit (pcs)	4000

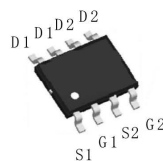
Channel Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	9	A
Pulsed Drain Current $\square$	I_{DM}	18	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	$P_D @ T_C = 25^\circ\text{C}$	2.2	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	$P_D @ T_A = 25^\circ\text{C}$	0.69	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$
Single Pulse Avalanche Energy	E_{AS}	35	mJ

Product Summary



$V_{DS1} = 40\text{V}$
 $V_{DS2} = -40\text{V}$
 $R_{DS(ON)1} = 12\text{m}\Omega$
 $R_{DS(ON)2} = 34\text{m}\Omega$
 $I_{D1} = 10\text{A}$
 $I_{D2} = -7\text{A}$



SOP-8



Channel Absolute Maximum Ratings (T_c = 25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	-40	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current(TC=25°C)	I _D	-5	A
Pulsed Drain Current □	I _{DM}	-10	A
Total Power Dissipation	P _D @TC=25°C	2.2	W
Total Power Dissipation	P _D @TA=25°C	0.69	W
Operating Junction Temperature	T _J	-55 to 150	°C
Storage Temperature	T _{STG}	-55 to 150	°C
Single Pulse Avalanche Energy	E _{AS}	35	mJ

Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R _{thJC}	-	-	56	°C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	180	°C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	265	°C

Channel 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	1.6	2.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 40V, V _{GS} = 0V			1.0	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
Static Drain-source On Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 6A		12	18	mΩ
		V _{GS} = 4.5V, I _D = 4A		16	24	mΩ
Forward Transconductance	g _{FS}	V _{DS} = 25V, I _D = 5A		2		s

Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz V _{DS} = 25V	-	1150	-	pF
Output capacitance	C _{oss}		-	290	-	
Reverse transfer capacitance	C _{rss}		-	205	-	

Gate Charge characteristics (T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} = 25V	-	16	-	nC
Gate - Source charge	Q _{gs}	I _D = 6A	-	6	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	8	-	

Channel Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250μA	-40			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250μA	-1.2		-2.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -40V, V _{GS} = 0V			-1.0	μA
Gate - Source Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			± 100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D = -3A		34	38	mΩ
		V _{GS} = -4.5V, I _D = -2A		38	49	mΩ
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -4A			1.2	S

Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz V _{DS} = -25V	-	1250	-	pF
Output capacitance	C _{oss}		-	300	-	
Reverse transfer capacitance	C _{rss}		-	215	-	

Gate Charge characteristics (T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} = -25V	-	16	-	nC
Gate - Source charge	Q _{gs}	I _D = -8A	-	6	-	
Gate - Drain charge	Q _{gd}	V _{GS} = -10V	-	8	-	

Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

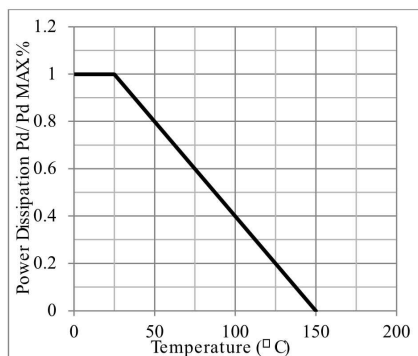


Fig.2 Typical output Characteristics

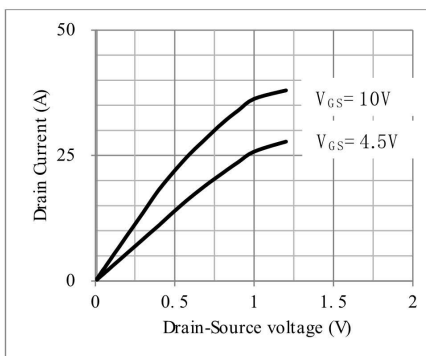


Fig.3 Threshold Voltage V.S Junction Temperature Fig.4 Resistance V.S Drain Current

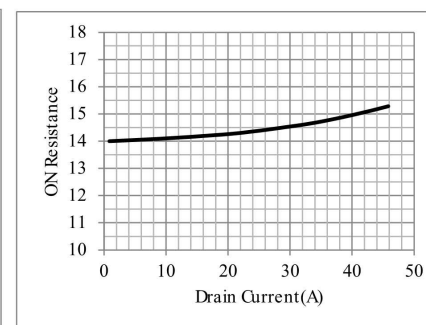
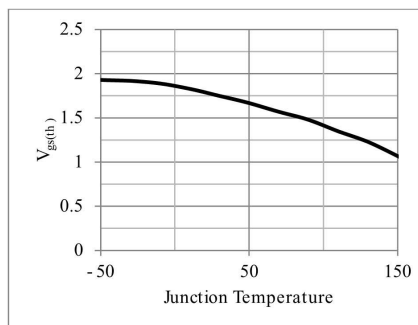


Fig.5 On-Resistance VS Gate Source Voltage

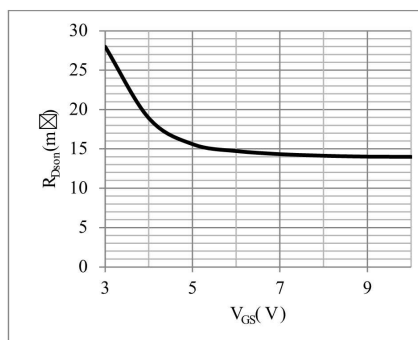
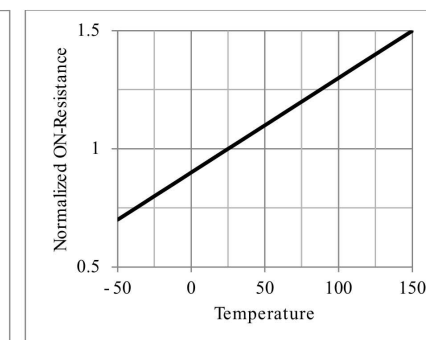


Fig.6 On-Resistance V.S Junction Temperature



Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

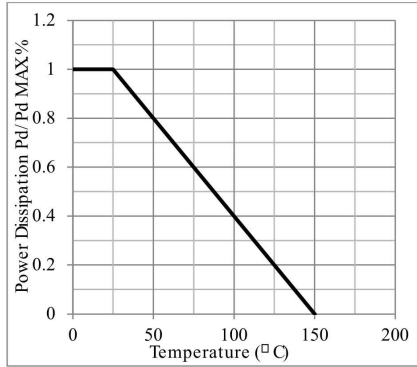


Fig.2 Typical output Characteristics

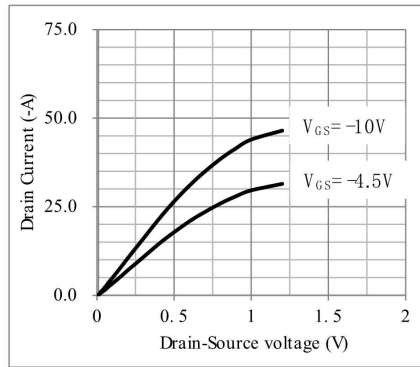


Fig.3 Threshold Voltage V.S Junction Temperature Fig.4 Resistance V.S Drain Current

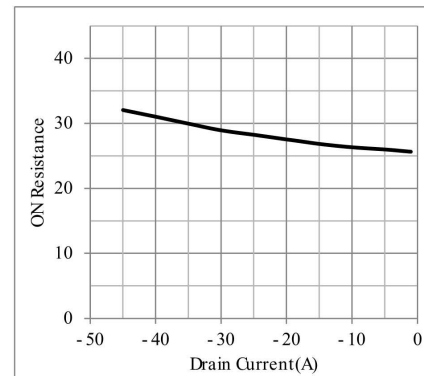
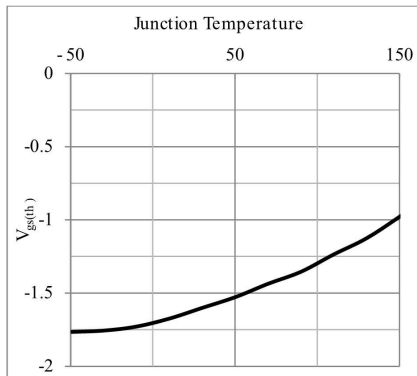


Fig.5 On-Resistance VS Gate Source Voltage

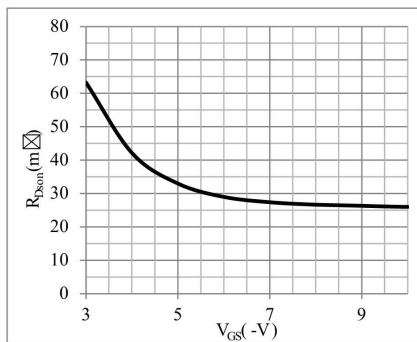
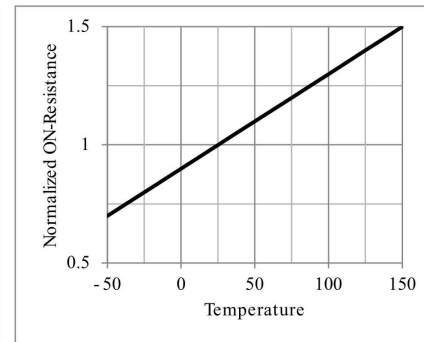


Fig.6 On-Resistance V.S Junction Temperature



testCircuit

Fig.1 Switching Time Measurement Circuit

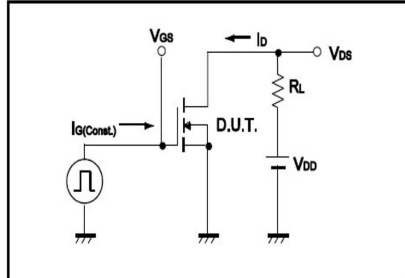


Fig.2 Gate Charge Wave form

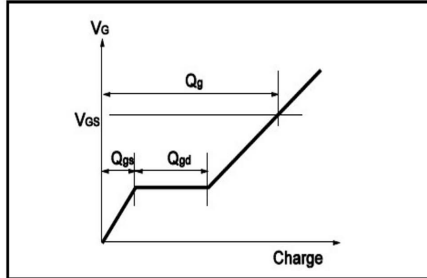


Fig.3 Switching Time Measurement Circuit

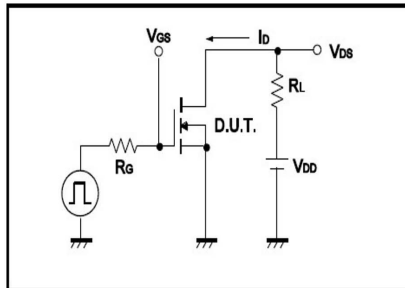


Fig.4 Gate Charge Wave form

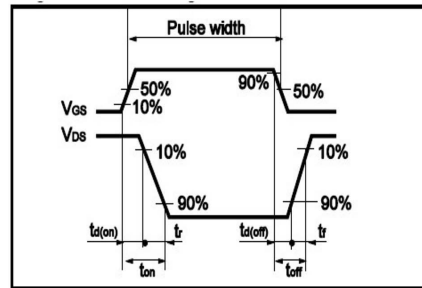


Fig.5 Avalanche Measurement Circuit

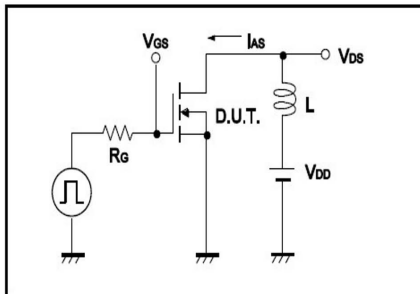
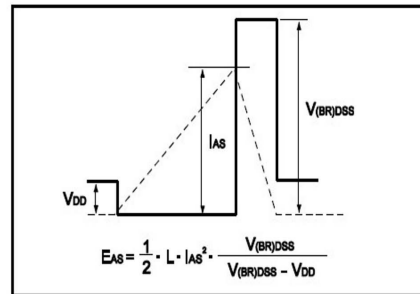


Fig.6 Avalanche Wave form



Dimensions (SOP8)

Unit: mm

SYMBOL	min	TYP	max	SYMBOL	min		max
A	4.80		5.00	C	1.30		1.50
A1	0.37		0.47	C1	0.55		0.75
A2		1.27		C2	0.55		0.65
A3		0.41		C3	0.05		0.20
B	5.80		6.20	C4	0.19	0.20	0.23
B1	3.80		4.00	D		1.05	
B2		5.00		D1	0.40		0.62

