

• General Description

It 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.

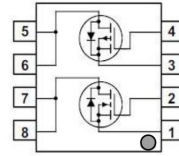
• Features

- 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

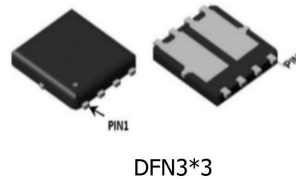
• Application

- Power Management in Notebook Computer
- BLDC Motor driver

• Product Summary



$V_{DS1} = 30V$
 $V_{DS2} = -30V$
 $R_{DS(ON)1} = 12m\Omega$
 $R_{DS(ON)2} = 19m\Omega$
 $I_{D1} = 30A$
 $I_{D2} = -25A$



DFN3*3

• Ordering Information:

Part NO.	CH60NP03SN
Marking	CH60NP03SN
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

• Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	8.0	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_c = 25^\circ C$	30	A
	$I_D @ T_c = 75^\circ C$	20	A
	$I_D @ T_c = 100^\circ C$	15	A

Pulsed Drain Current ^①	I _{DM}	60	A
Total Power Dissipation	P _{D@T_C=25°C}	25	W
Total Power Dissipation	P _{D@T_A=25°C}	2.0	W
Operating Junction Temperature	T _J	-55 to 150	°C
Storage Temperature	T _{STG}	-55 to 150	°C
Single Pulse Avalanche Energy	E _{AS}	20	mJ

●P Channel Absolute Maximum Ratings (T_C = 25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D@T_C = 25^\circ C$	-25	A
	$I_D@T_C = 75^\circ C$	-20	A
	$I_D@T_C = 100^\circ C$	-16	A
Pulsed Drain Current ^①	I_{DM}	-100	A
Total Power Dissipation	$P_D@T_C = 25^\circ C$	25	W
Total Power Dissipation	$P_D@T_A = 25^\circ C$	2.0	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	97	mJ

•N Channel Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2		2.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=12A$		10	12	m Ω
		$V_{GS}=4.5V, I_D=10A$		15.5	19	m Ω
Forward Trans conductance	g_{FS}	$V_{DS}=25V, I_D=30A$		30		S
Source-drain voltage	V_{SD}	$I_S=23A$			1.28	V

- **Dynamic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
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Input capacitance	Ciss	f = 1MHz V _{DS} =15V	-	496	-	pF
Output capacitance	Coss		-	98	-	
Reverse transfer capacitance	Crss		-	84	-	
Total gate charge	Qg	V _{DD} = 15V I _D = 10A V _{GS} = 10V	-	14	-	nC
Gate - Source charge	Qgs		-	4.2	-	
Gate - Drain charge	Qgd		-	3.2	-	

•P Channel Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250uA	-30			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250uA	-1.0		-2.0	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -30V, 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 = -9A		15	19	mΩ
		V _{GS} = -4.5V, I _D = -7A		21	25	mΩ
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -5A		20		s

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V _{DS} = -15V	-	2183	-	pF
Output capacitance	Coss		-	260	-	
Reverse transfer capacitance	Crss		-	240	-	
Total gate charge	Qg	V _{DD} = -15V I _D = -15A V _{GS} = -10V	-	42	-	nC
Gate - Source charge	Qgs		-	6.1	-	
Gate - Drain charge	Qgd		-	9.2	-	

●N Channel characteristics curve

Figure 1: Output Characteristics

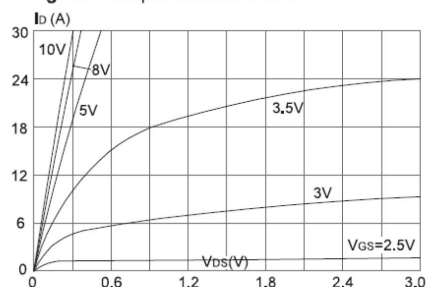


Figure 2: Typical Transfer Characteristics

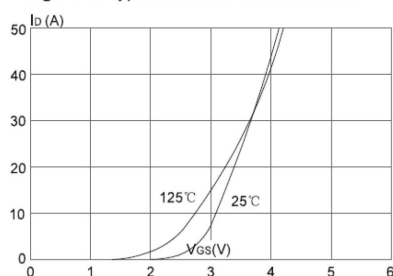


Figure 3: On-resistance vs. Drain Current

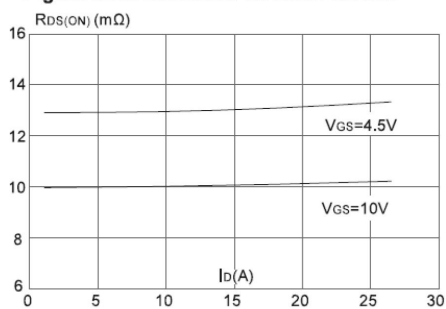


Figure 4: Body Diode Characteristics

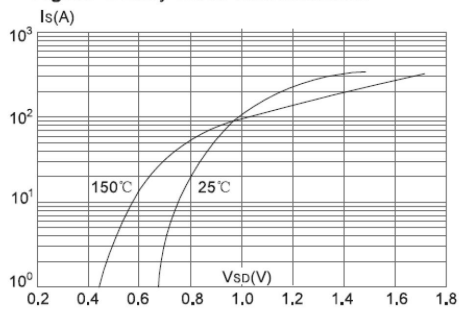


Figure 5: Gate Charge Characteristics

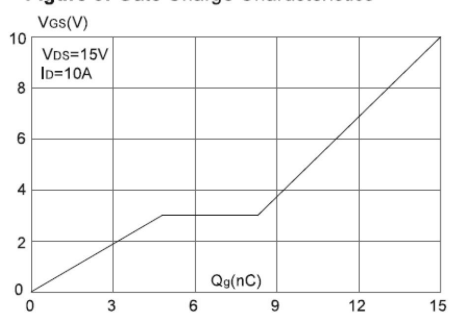
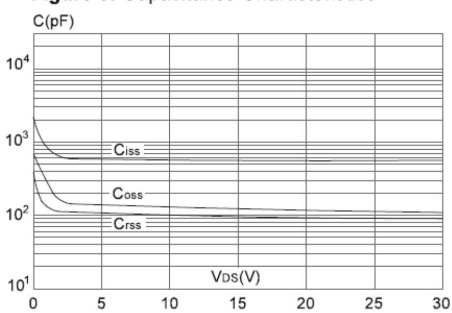


Figure 6: Capacitance Characteristics



•N Channel characteristics curve

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

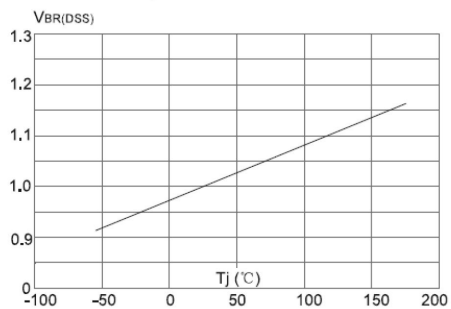


Figure 8: Normalized on Resistance vs. Junction Temperature

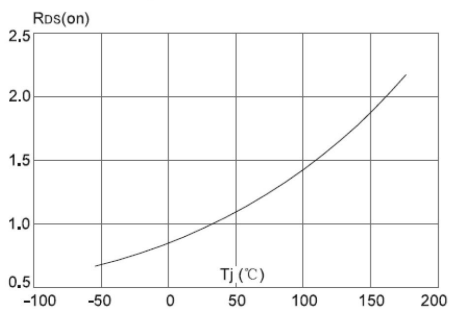
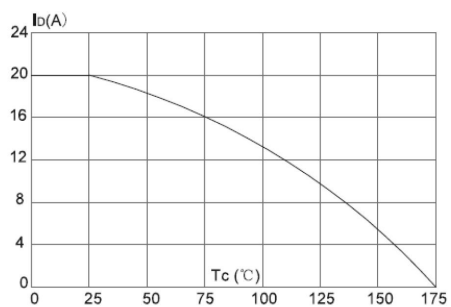


Figure 9: Maximum Continuous Drain Current VS. Case Temperature



•N Channel characteristics curve

Fig.10 Safe Operating Area

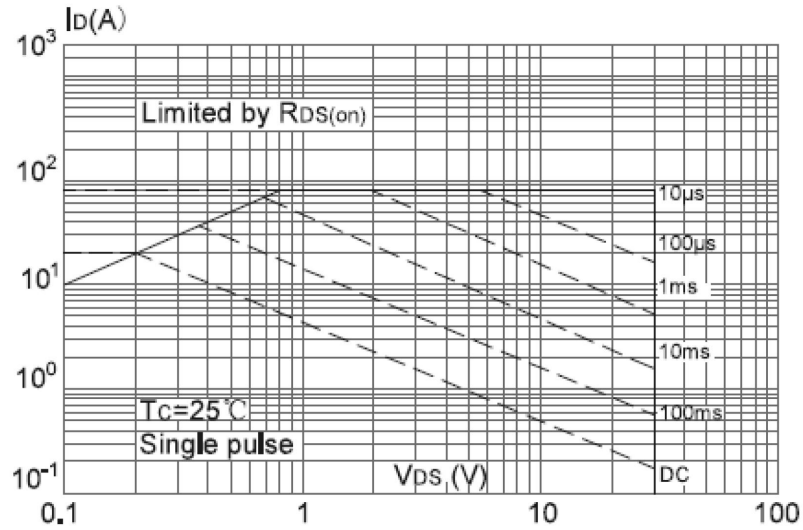
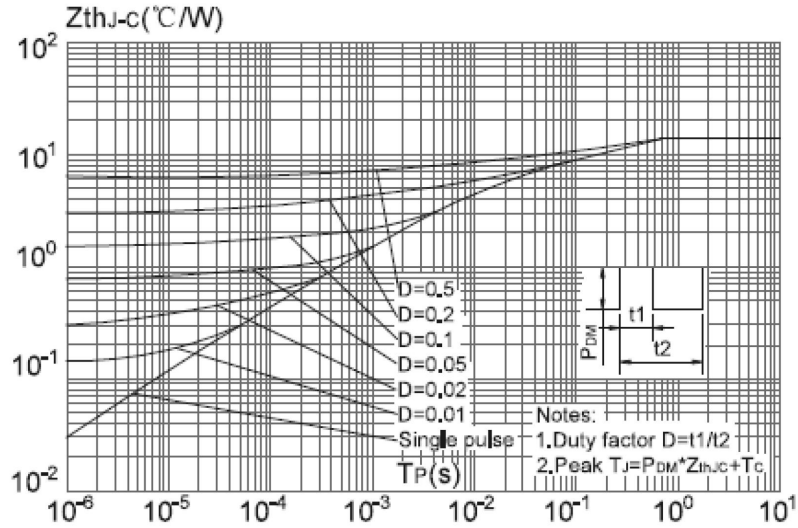


Fig. 11 Transient Thermal Response Curve



P Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

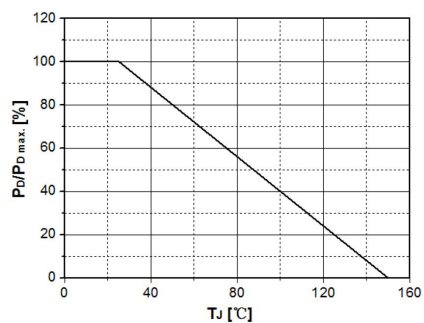


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

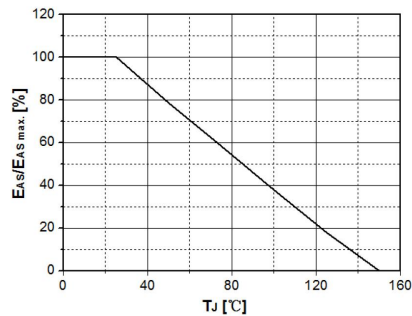


Fig.3 Typical Output Characteristics

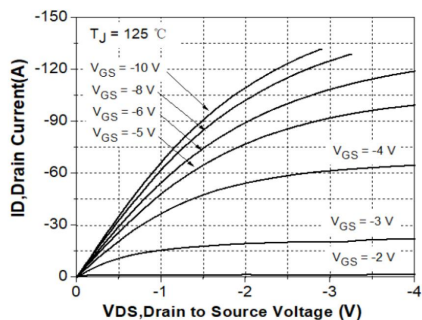


Fig. 4 Transconductance vs. Drain Current

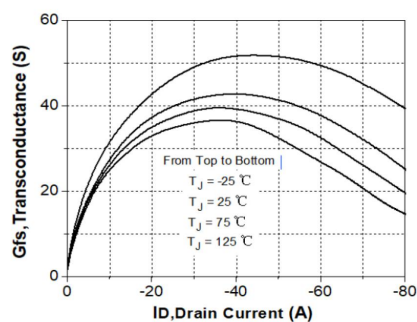


Fig.5 Typical Transfer Characteristics

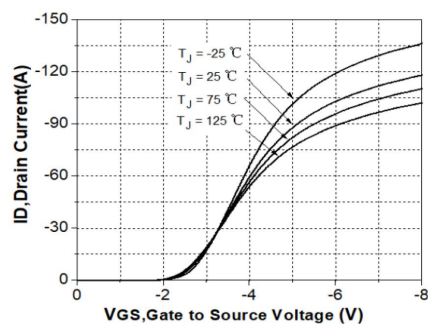


Fig. 6 State Resistance vs. Drain Current @-25°C

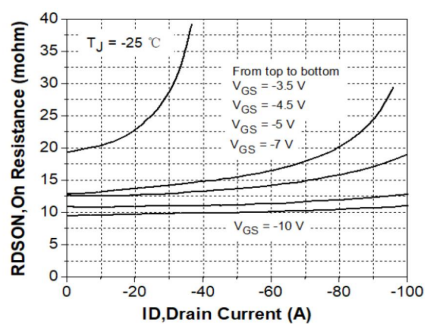


Fig.7 State Resistance vs. Drain Current
@25°C

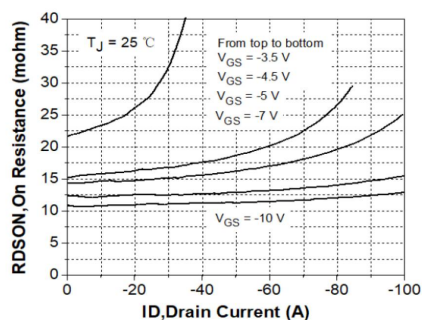


Fig. 8 State Resistance vs. Drain Current
@125°C

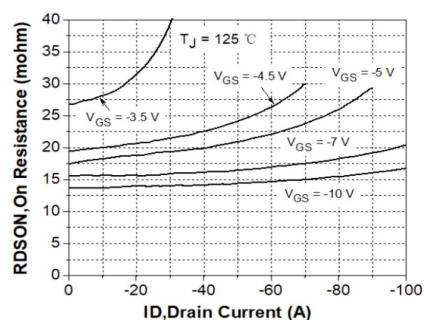


Fig.9 Typical Capacitance vs. Drain Source
Voltage

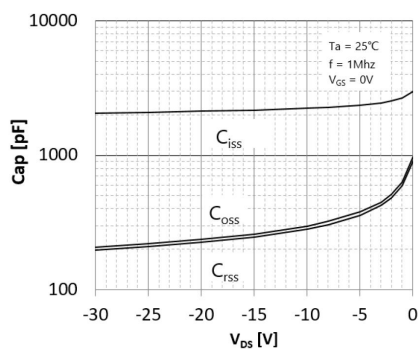


Fig.10 Dynamic Input Characteristics

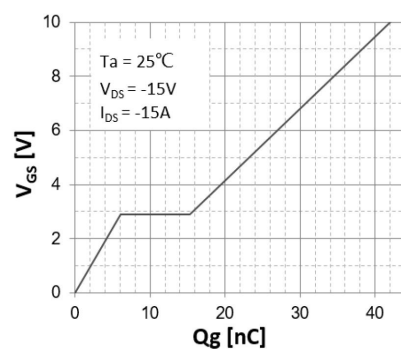


Fig.11 Breakdown Voltage
vs. Junction Temperature

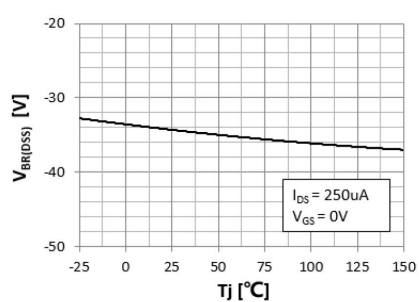


Fig. 12 Gate Threshold Voltage
vs. Junction Temperature

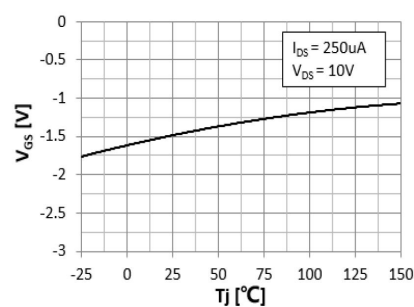


Fig.13 On-Resistance Variation vs. Junction Temperature

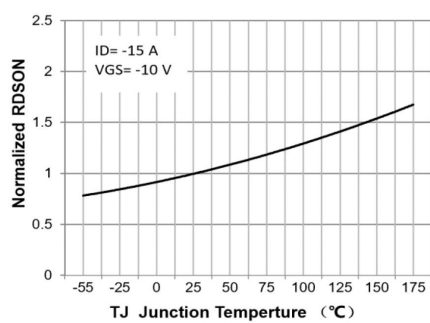


Fig.14 Maximum Drain Current vs. Case Temperature

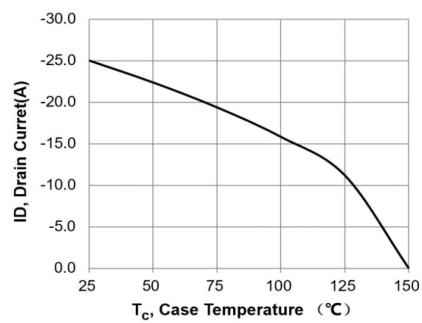
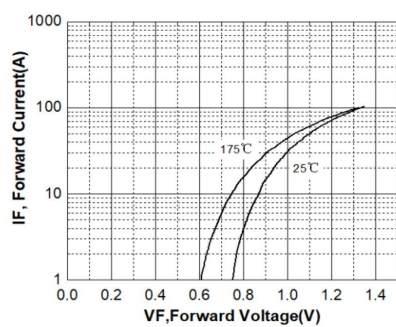
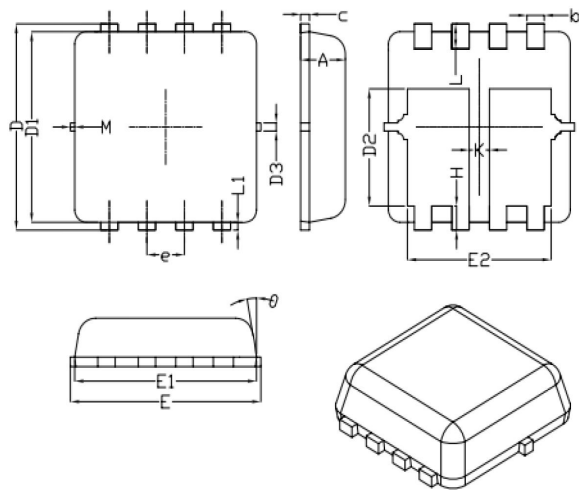


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current



•Dimensions (DFN3×3)

Unit: mm



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
K	0.30	---	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			