

### • General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

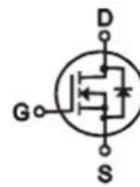
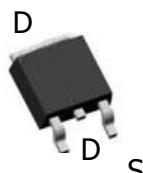
### • Features

- Multi-Epi process SJ-FET
- Low RDS(ON) to minimize conduction loss
- Ultra Low Gate Charge
- 100% UIS and RG Tested

### • Application

- SMPS 2<sup>nd</sup> Synchronous Rectifier
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

### • Product Summary


 $V_{DS} = 200V$ 
 $R_{DS(ON)} = 540m\Omega$ 
 $I_D = 5A$ 


TO-252

### • Ordering Information:

Part NO.	CH5N200D
Marking	CH5N200D
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D @ T_c = 25^\circ C$	5	A
	$I_D @ T_c = 75^\circ C$	10	A
	$I_D @ T_c = 100^\circ C$	5.6	A
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	20	A
Continuous Body Diode Current IS	$I_S$	2	A
Pulsed Diode Forward Current	$I_{SM}$	28	A
Total Power Dissipation	$P_D @ T_c = 25^\circ C$	46	W
Total Power Dissipation	$P_D @ T_a = 25^\circ C$	2.25	W
Operating Junction Temperature	$T_J$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C
Single Pulse Avalanche Energy	$E_{AS}$	190	mJ

**•Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R <sub>thJC</sub>	-	-	2.7	° C/W
Thermal resistance, junction - ambient	R <sub>thJA</sub>	-	-	60	° C/W
Soldering temperature, wavesoldering for 10s	T <sub>sold</sub>	-	-	265	° C

**•Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	200			V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0		2.0	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V			1.0	uA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V			±100	nA
Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4.0A		540	600	mΩ

**•Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C <sub>iss</sub>	DS=25V, V <sub>GS</sub> =0, =1.0MHz	-	228	-	pF
Output capacitance	C <sub>oss</sub>		-	48	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	17	-	

**•Dynamic Characteristics**

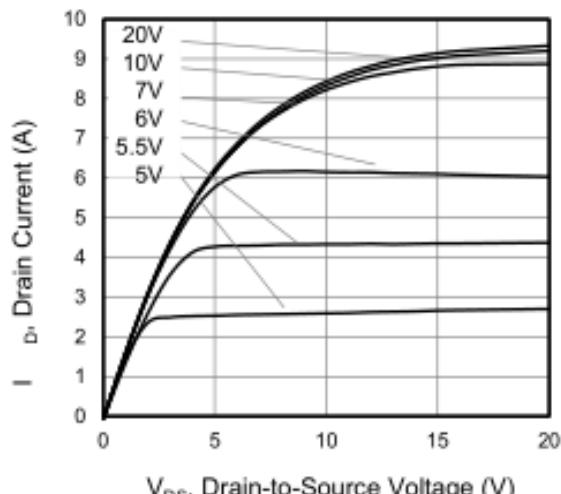
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R <sub>g</sub>	f = 1MHz  V <sub>DS</sub> =160V, I <sub>D</sub> =3.5A, V <sub>GS</sub> =10V		10		Ω
Total gate charge	Q <sub>g</sub>		-	36	-	nC
Gate - Source charge	Q <sub>gs</sub>		-	3.0	-	
Gate - Drain charge	Q <sub>gd</sub>		-	12.5	-	
Turn-ON Delay time	t <sub>D(on)</sub>	V <sub>DD</sub> = 100V I <sub>D</sub> =5A R <sub>G</sub> = 25Ω		10		nS
Turn-ON Rise time	t <sub>r</sub>			19		
Turn-Off Delay time	t <sub>D(off)</sub>			43		
Turn-Off Fall time	t <sub>f</sub>			32		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	V <sub>R</sub> = 200V I <sub>F</sub> = I <sub>S</sub>		160		nS

Body Diode Reverse Recovery Charge	$Q_{rr}$	$dI_f/dt = 100A/\mu s$		1.5		UC
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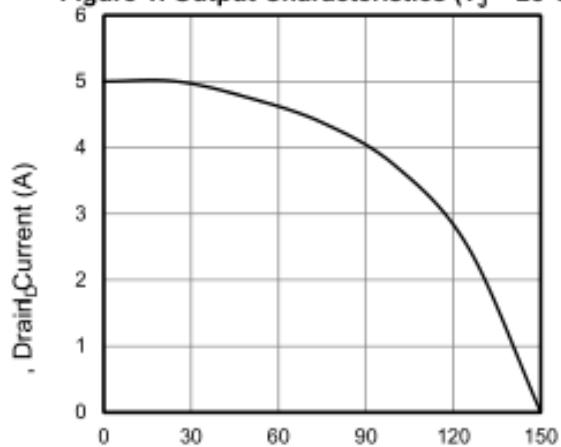
### Diode Characteristics

Source-drain voltage	$V_{SD}$	$V_{GS}=0V, I_s=7A$			1.40	V
Body Diode Reverse Recovery Time	$t_{rr}$	$V_R=400V, I_F=3.5A,$ $di/dt=100A/us$		160		nS
Body Diode Reverse Recovery Charge	$Q_{rr}$			1.5		nC

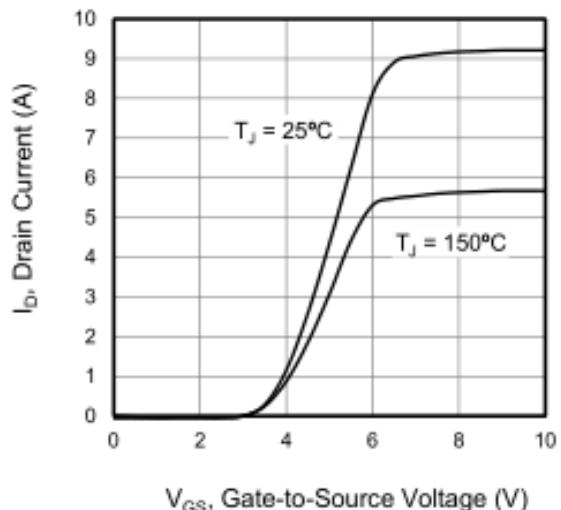
### Typical Characteristics



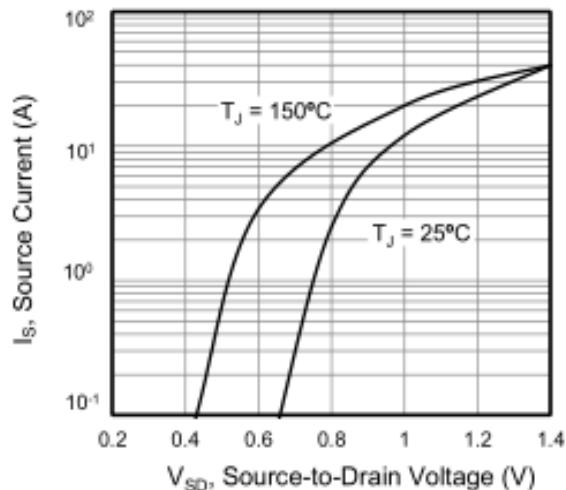
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



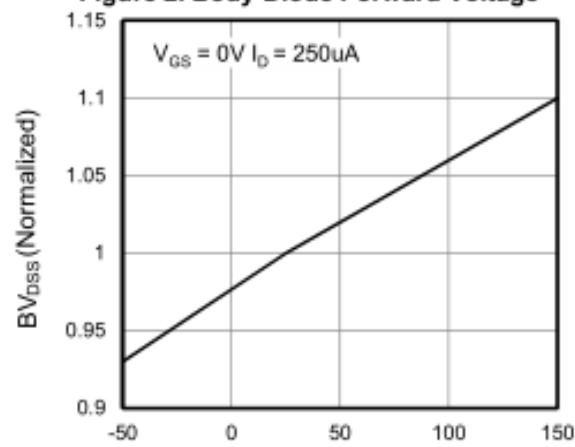
**Figure 3. Drain Current vs. Temperature**



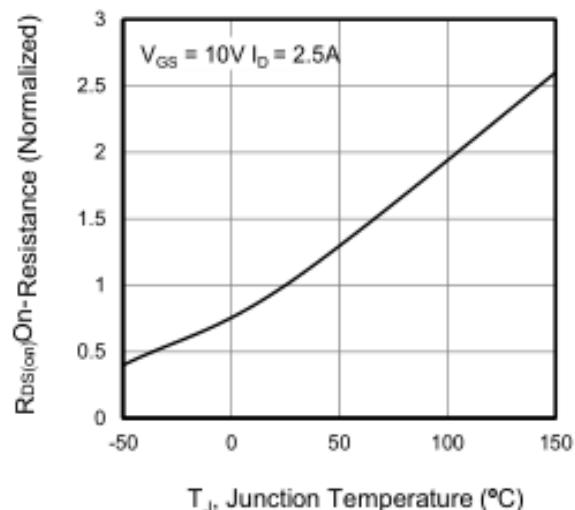
**Figure 5. Transfer Characteristics**



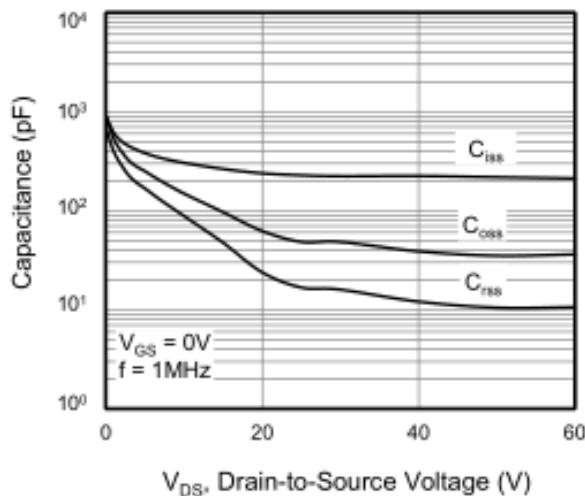
**Figure 2. Body Diode Forward Voltage**



**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**

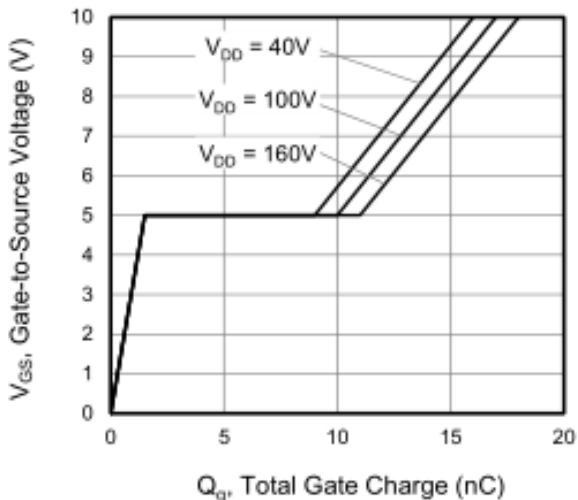


**Figure 6. On-Resistance vs. Temperature**



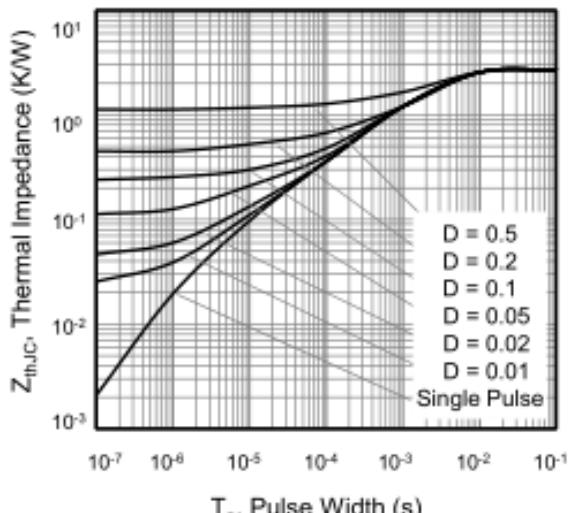
V<sub>DS</sub>, Drain-to-Source Voltage (V)

Figure 7. Capacitance



$Q_g$ , Total Gate Charge (nC)

Figure 8. Gate Charge



$T_p$ , Pulse Width (s)

Figure 10. Transient Thermal Impedance

**•Dimensions (TO-252)**

Unit: mm

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			

