

### General Description

The 9N20 combines uses advanced trench technology to provide excellent  $R_{DS(ON)}$ . This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

### Features

- Fast Switching
- 175°C Operating Temperature
- 100% avalanche tested
- Simple Drive Requirements
- RoHS Compliant

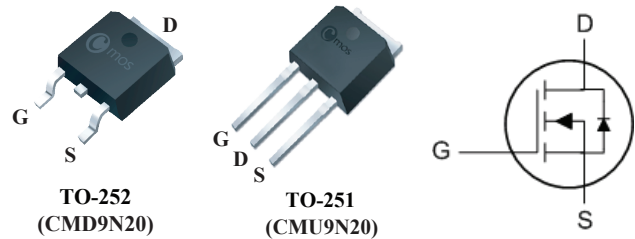
### Product Summary

BVDSS	RDSON	ID
200V	0.4Ω	9A

### Applications

- PWM Motor Controls
- LED TV
- DC-DC Converters

### TO-252/251 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	200	V
$V_{GS}$	Gate-Source Voltage	±20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current	9	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current	6.5	A
$I_{DM}$	Pulsed Drain Current	32	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	94	mJ
$I_{AR}$	Avalanche Current	9	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	50	W
$T_{STG}$	Storage Temperature Range	-55 to 175	°C
$T_J$	Operating Junction Temperature Range	-55 to 175	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction -Case	---	1.83	°C/W

**Electrical Characteristics (T<sub>J</sub>=25°C , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	200	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>1</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =3A	---	0.35	0.4	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2	---	4	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> = 200V , V <sub>GS</sub> =0V	---	---	25	uA
		V <sub>DS</sub> =160V , V <sub>GS</sub> =0V , T <sub>J</sub> =150°C	---	---	250	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance <sup>1</sup>	V <sub>DS</sub> =10V , I <sub>D</sub> =9A	---	10	---	S
Q <sub>g</sub>	Total Gate Charge <sup>1</sup>	V <sub>DS</sub> =160V , V <sub>GS</sub> =10V , I <sub>D</sub> =5.4A	---	35	---	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>1</sup>		---	6.5	---	
Q <sub>gd</sub>	Gate-Drain Charge <sup>1</sup>		---	17	---	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>1</sup>	V <sub>DD</sub> =100V , R <sub>D</sub> = 18Ω , R <sub>G</sub> =13Ω I <sub>D</sub> =5.4A	---	7.9	---	ns
T <sub>r</sub>	Rise Time <sup>1</sup>		---	14	---	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>1</sup>		---	27	---	
T <sub>f</sub>	Fall Time <sup>1</sup>		---	15	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V , V <sub>GS</sub> =0V , f=1MHz	---	550	---	pF
C <sub>oss</sub>	Output Capacitance		---	85	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	25	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	9	A
I <sub>SM</sub>	Pulsed Source Current		---	---	32	A
V <sub>SD</sub>	Diode Forward Voltage <sup>1</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =5.4A , T <sub>J</sub> =25°C	---	---	1.3	V

Note :

1.The data tested by pulsed , pulse width ≤ 400us , duty cycle ≤ 2%

2.Starting T<sub>J</sub> = 25°C , L = 6.5mH , R<sub>G</sub> = 25Ω , I<sub>AS</sub> = 5.4A.

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