

## General Description

The WSR80N08 is the highest performance trench N-ch MOSFET with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the synchronous buck converter applications.

The WSR80N08 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent  $CdV/dt$  effect decline
- 100% EAS Guaranteed
- Green Device Available

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
80V	8.4m $\Omega$	80A

## Applications

- Power Management
- DC/DC Converter
- Load Switch

## TO-220AB Pin Configuration

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	80	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	$T_C = 25^\circ\text{C}$ Continuous Drain Current. Lead current limit.	80	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	75	A
$I_{AR}$	$T_C = 25^\circ\text{C}$ , Avalanche Current.	320	A
$E_{AR}$	$T_C = 25^\circ\text{C}$ , Single Pulse Avalanche Energy <sup>3</sup>	30	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$ , Single Pulse Avalanche Energy <sup>3</sup>	1.0	J
$P_D$	$T_C = 25^\circ\text{C}$ , Total Power Dissipation <sup>4</sup>	230	W
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$
$T_{JM}$	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
$T_J$	MAX Junction Temperature Range	175	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	0.65	$^\circ\text{C}/\text{W}$

**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> =250μA	80	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.096	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =40A.	---	8.4	9.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	2.0	---	4.0	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-5.5	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =55V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	50	μA
		V <sub>DS</sub> =55V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C	---	---	1000	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =40A	35	55	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	1.8	3.8	Ω
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =60V, V <sub>GS</sub> =10V, I <sub>D</sub> =40A.	---	180	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	42	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	75	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =60V, V <sub>GS</sub> =10V, R <sub>G</sub> =2.5Ω, I <sub>D</sub> =40A.	---	50	---	ns
T <sub>r</sub>	Rise Time		---	75	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	95	---	
T <sub>f</sub>	Fall Time		---	31	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	4800	---	pF
C <sub>oss</sub>	Output Capacitance		---	1670	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	590	---	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>GS</sub> =0V,	---	---	80	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,6</sup>	pulse width limited by T <sub>JM</sub>	---	---	320	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =I <sub>F</sub> . Note2	---	---	1.5	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =25A, d <sub>i</sub> /d <sub>t</sub> =100A/μs.	---	200	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	500	---	nC

Note :

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, t<sub>c</sub>≤10sec.
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V<sub>DS</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=25A
4. The power dissipation is limited by 150°C junction temperature
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

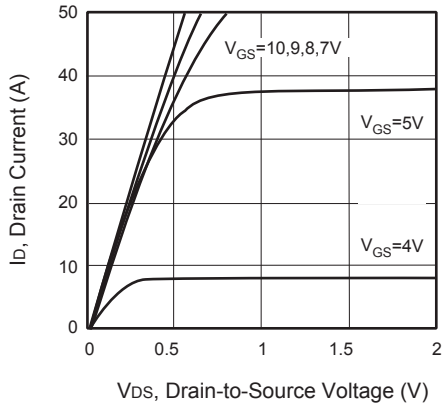


Figure 1. Output Characteristics

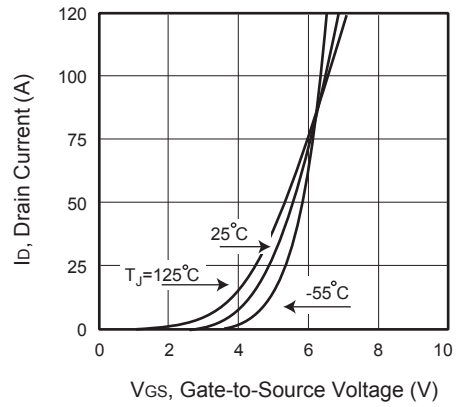


Figure 2. Transfer Characteristics

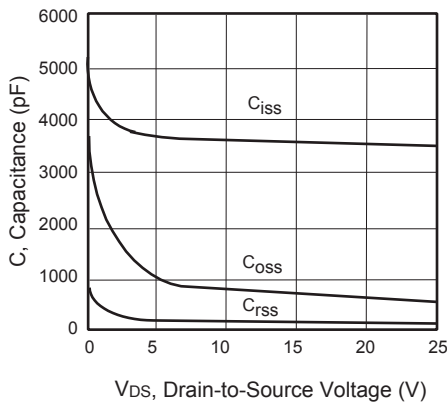


Figure 3. Capacitance

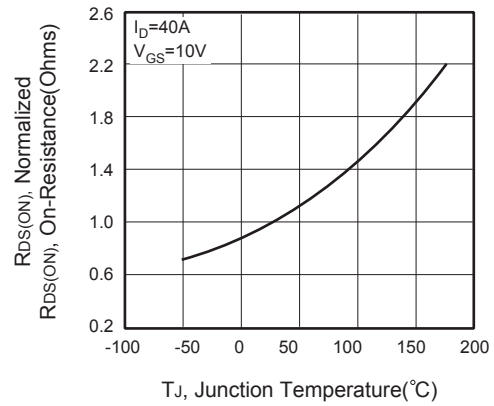


Figure 4. On-Resistance Variation with Temperature

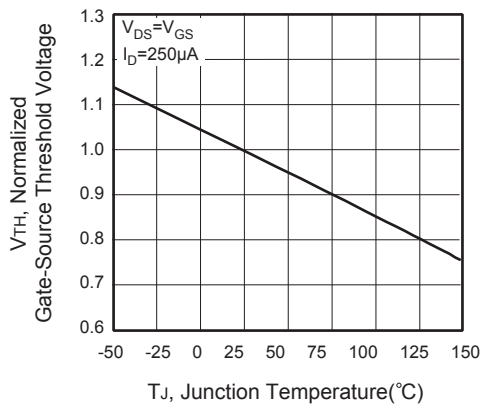


Figure 5. Gate Threshold Variation with Temperature

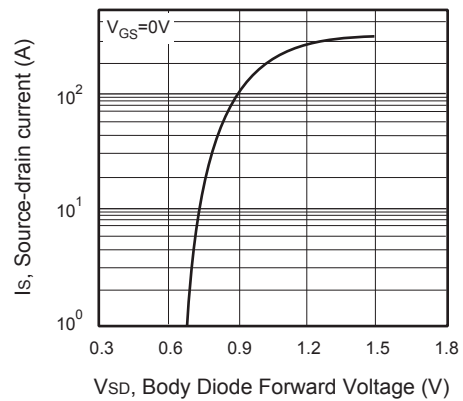


Figure 6. Body Diode Forward Voltage Variation with Source Current

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

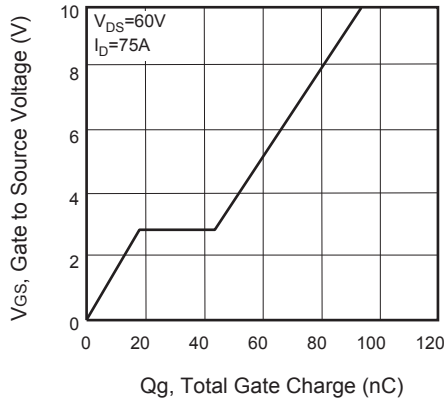


Figure 7. Gate Charge

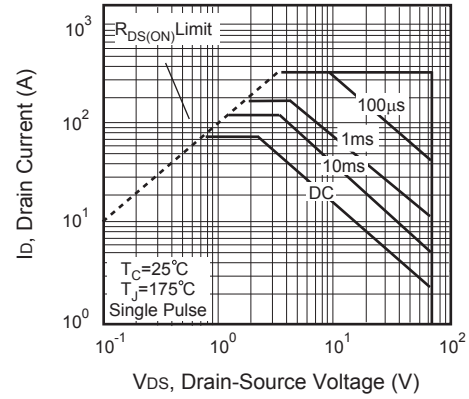


Figure 8. Maximum Safe Operating Area

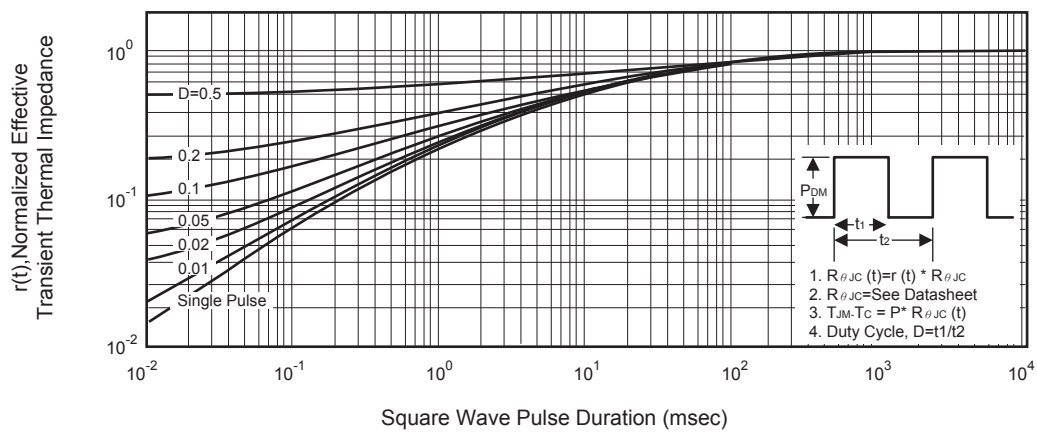


Figure 9. Normalized Thermal Transient Impedance Curve



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