

General Description

The WSR80N10D use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable to use in.

Features

Low RDS(on) & FOM Extremely low switching loss
Excellent stability and uniformity or Invertors

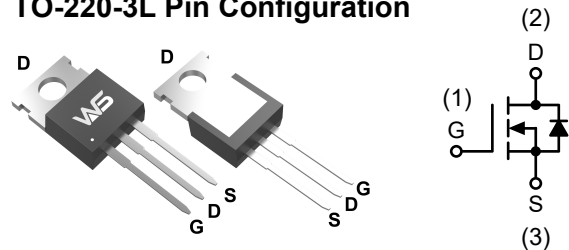
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	9mΩ	60A

Applications

Consumer electronic power supply Motor control
Synchronous-rectification Isolated DC
Synchronous-rectification applications

TO-220-3L Pin Configuration



Absolute Maximum Ratings at $T_J=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Unit
V_{DS}	Drain source voltage	100	V
V_{GS}	Gate source voltage	±20	V
I_D	Continuous drain current ¹⁾	TC=25 °C 60	A
$I_{D, pulse}$	Pulsed drain current ²⁾	TC=25 °C 180	A
P_D	Power dissipation ³⁾	TC=25 °C 107	W
E_{AS}	Single pulsed avalanche energy ⁴⁾	183.8	mJ
T_{stg}, T_j	Operation and storage temperature	-55 to 150	°C
$R_{\theta JC}$	Thermal resistance, junction-case	1.17	°C/W
$R_{\theta JA}$	Thermal resistance, junction-ambient ⁴⁾	62	°C/W

Electrical Characteristics at $T_J=25\text{ }^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-source breakdown voltage	$V_{GS}=0\text{ V}$, $I_D=250\text{ }\mu\text{A}$	100	-	-	V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=V_{GS}$, $I_D=250\text{ }\mu\text{A}$	1.5	-	2.5	V
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=10\text{ V}$, $I_D=20\text{ A}$	-	9	10.0	m Ω
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=4.5\text{ V}$, $I_D=12\text{ A}$	-	12	14.0	m Ω
I_{GSS}	Gate-source leakage current	$V_{GS}=20\text{ V}$	-	-	100	nA
		$V_{GS}=-20\text{ V}$	-	-	-100	
I_{DSS}	Drain-source leakage current	$V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$	-	-	1	μA
R_G	Gate resistance	$f=1\text{ MHz}$, Open drain	-	5.5	-	Ω
C_{iss}	Input capacitance	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=100\text{ kHz}$ $V_{GS}=10\text{ V}$,	-	1999	-	pF
C_{oss}	Output capacitance		-	322	-	pF
C_{rss}	Reverse transfer capacitance		-	7.1	-	pF
$t_{d(on)}$	Turn-on delay time		-	22.1	-	ns
t_r	Rise time		$V_{DS}=50\text{ V}$,	-	5.2	-
$t_{d(off)}$	Turn-off delay time	$R_G=2\text{ }\Omega$,	-	44	-	ns
t_f	Fall time	$I_D=25\text{ A}$ $I_D=25\text{ A}$, $V_{DS}=50\text{ V}$, $V_{GS}=10\text{ V}$ $V_{GS}<V_{th}$	-	8.4	-	ns
Q_g	Total gate charge		-	28.9	-	nC
Q_{gs}	Gate-source charge		-	6	-	nC
Q_{gd}	Gate-drain charge		-	6.8	-	nC
$V_{plateau}$	Gate plateau voltage		-	3.7	-	V
I_S	Diode forward current	$I_S=20\text{ A}$, $V_{GS}=0\text{ V}$	-	-	60	A
I_{SP}	Pulsed source current		-	-	180	A
V_{SD}	Diode forward voltage		-	-	1.3	V
t_{rr}	Reverse recovery time	$I_S=25\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$	-	102.9	-	ns
Q_{rr}	Reverse recovery charge		-	379	-	nC
I_{rrm}	Peak reverse recovery current		-	6.4	-	A

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=50\text{ V}$, $R_G=25\text{ }\Omega$, $L=0.3\text{ mH}$, starting $T_J=25\text{ }^\circ\text{C}$.
- 5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.

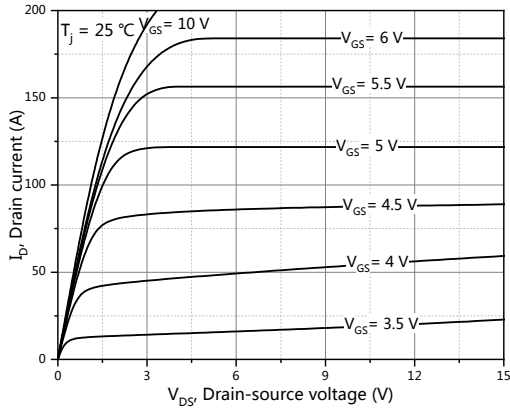


Figure 1, Typ. output characteristics

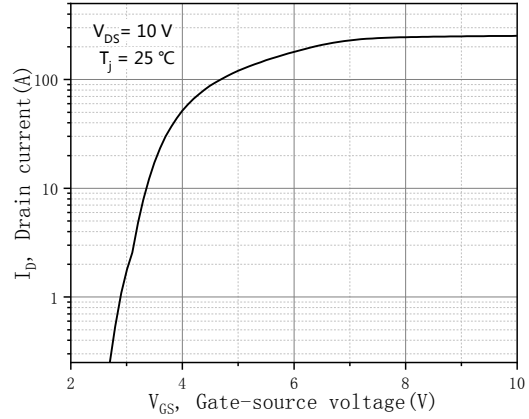


Figure 2, Typ. transfer characteristics

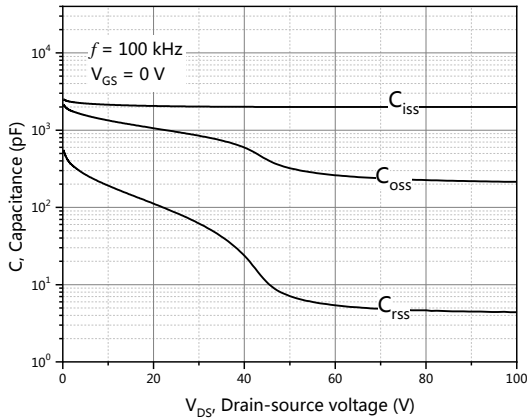


Figure 3, Typ. capacitances

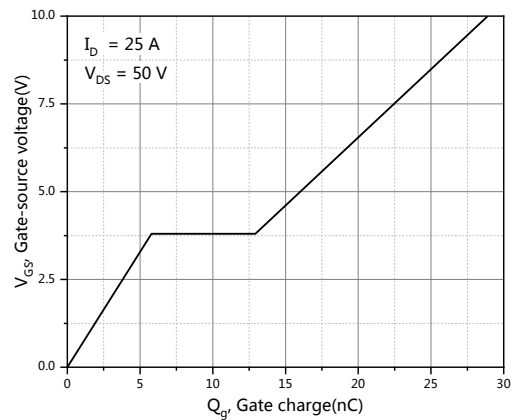


Figure 4, Typ. gate charge

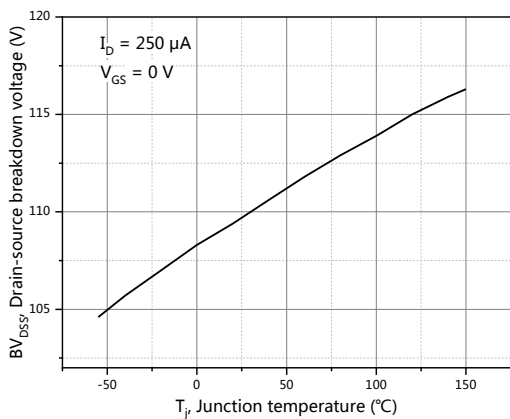


Figure 5, Drain-source breakdown voltage

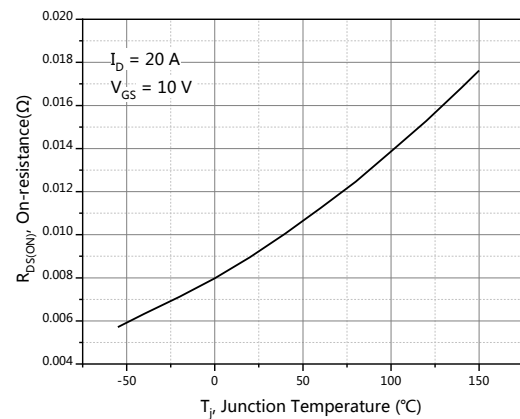


Figure 6, Drain-source on-state resistance

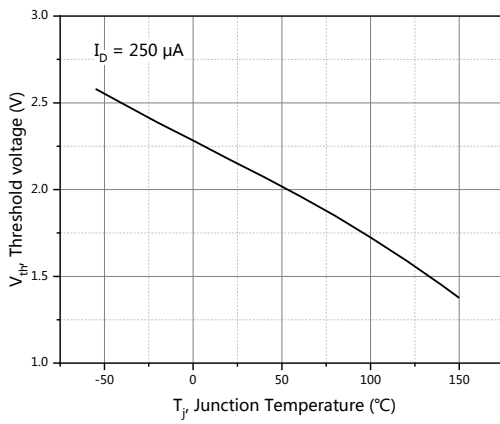


Figure 7, Threshold voltage

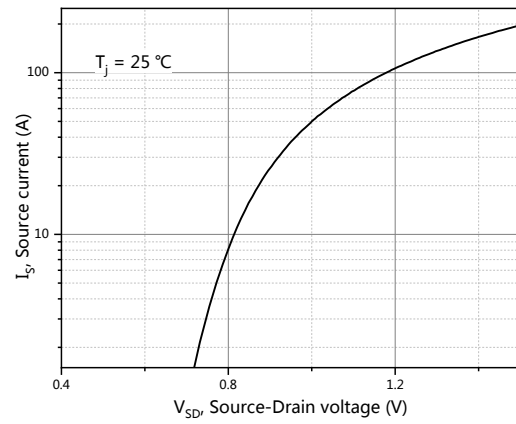


Figure 8, Forward characteristic of body diode

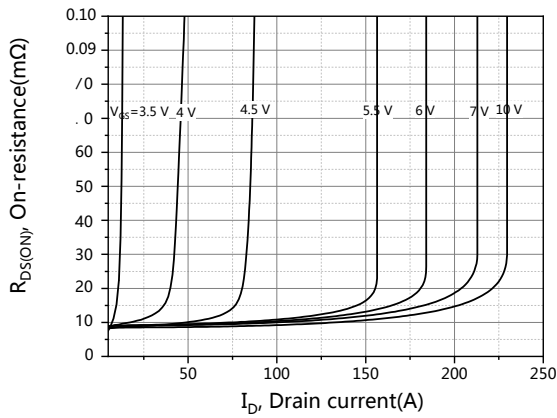


Figure 9, Drain-source on-state resistance

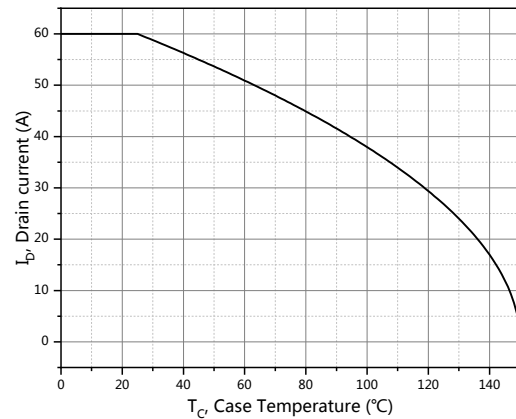


Figure 10, Drain current

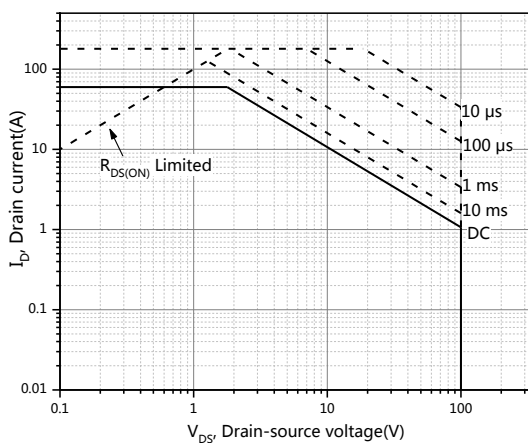
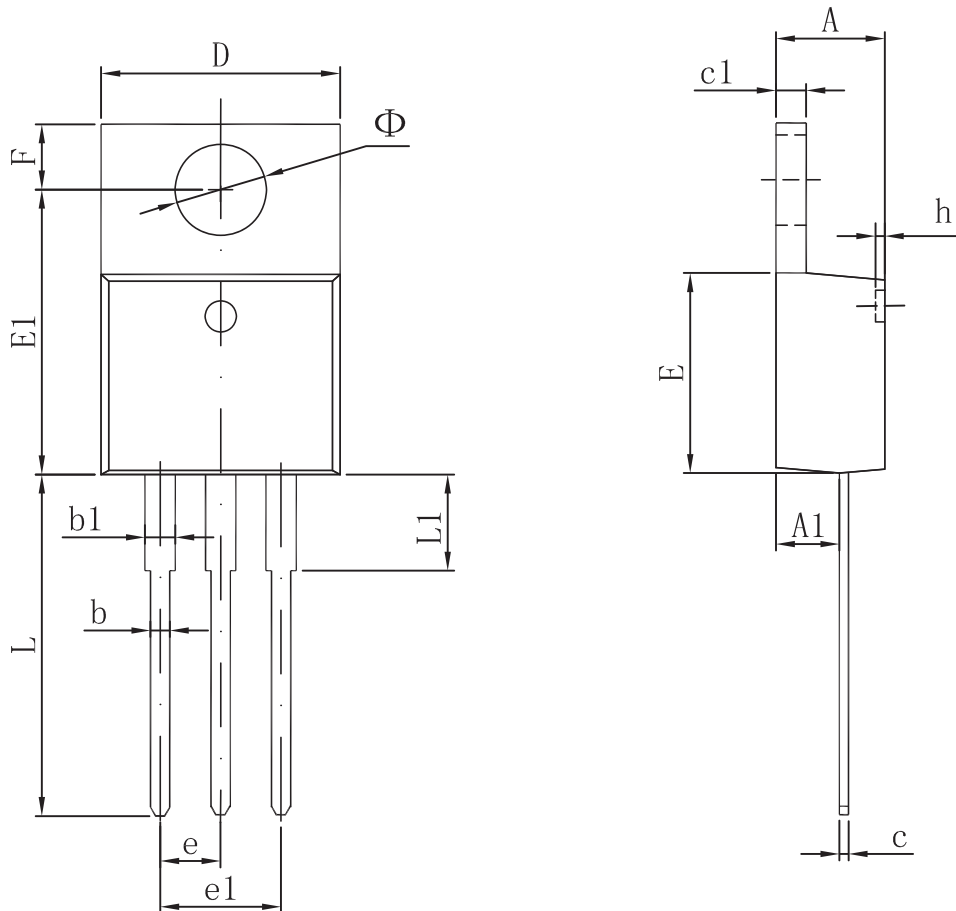


Figure 11, Safe operation area $T_C=25\text{ }^\circ\text{C}$

Packaging information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155



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