W3MS250N220B

Split Gate Trench Power MOSFET

Rev.01 - 23 October 2026 Product data sheet

1. General description

W3MS250N220B is a medium voltage N-channel MOSFET in TO263 package, which utilizes the split gate technology to provide superior FOM $R_{DS(on)}$*Q_g among silicon based MOSFETs. It is particularly suitable for applications require extreme high efficiency and power density.

2. Features and benefits

- High-speed switching
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- 100% avalanche tested
- Qualified according to JEDEC criteria

3. Applications

- High-Efficiency DC-DC Converters
- High-Frequency Switching and Synchronous Rectification
- Motor Drivers

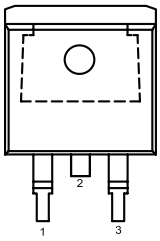
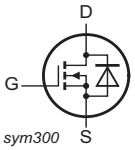
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{DS}	drain-source voltage			250			V
V_{GS}	gate-source voltage	static		±20			V
I_D	continuous drain current	T_C = 25 °C		82			A
P_{tot}	power dissipation	T_C = 25 °C		360			W
T_j	junction temperature			-55 to 150			°C
Symbol	**Parameter**	**Conditions**	**Notes**	**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = 10 V, I_D = 50 A		-	16	22	mΩ
Dynamic characteristics							
$Q_{G(tot)}$	total gate charge	I_D = 50 A; V_{DS} = 125 V; V_{GS} = 10 V		-	68	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate		
2	D	drain		
3	S	source		
mb	D	mounting base; connected to drain		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
W3MS250N220B	TO263	W3MS250N220BJ	Reel	800	TO263O	11-Feb-2026

7. Marking

Table 4. Marking codes

Type number	Marking codes
W3MS250N220B	W3MS 250N220B

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8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DS}	drain-source voltage			250	V
V_{GS}	gate-source voltage	static		±20	V
I_D	continuous drain current	T_C = 25 °C		80	A
		T_C = 100 °C		50	A
I_{DM}	pulsed drain current	T_C = 25 °C		320	A
P_{tot}	power dissipation	T_C = 25 °C		360	W
E_{AS}	single pulse drain−to-source avalanche	I_{AS} = 27.5 A; R_{GS} = 25 Ω; V_{DD} = 50 V; T_j = 25 °C		190	mJ
I_{AS}	avalanche current, single pulse			27.5	A
T_{stg}	storage temperature			-55 to 150	°C
T_j	junction temperature			-55 to 150	°C

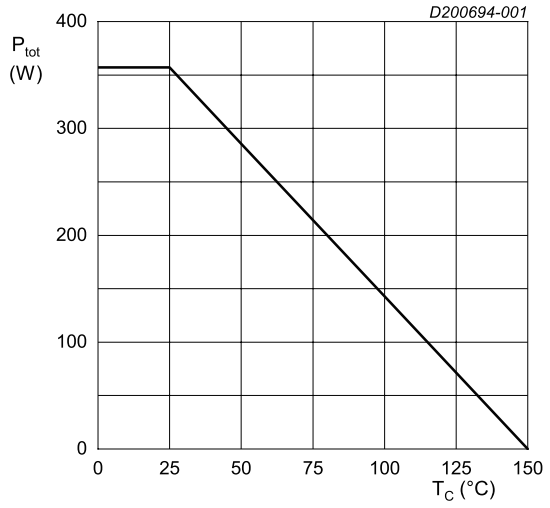


Fig. 1. Total power dissipation as a function of case temperature

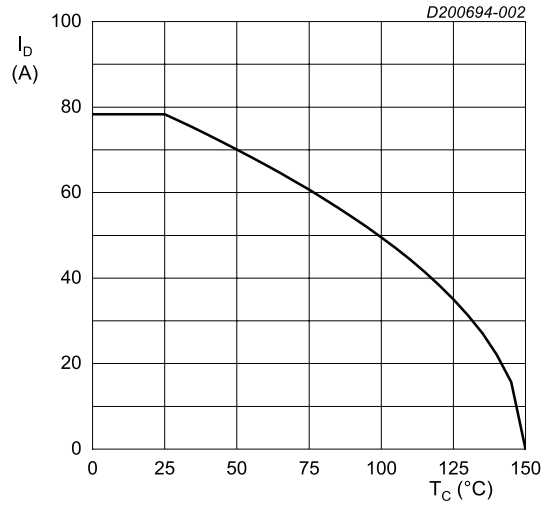


Fig. 2. Continuous Drain Current as a function of case temperature

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9. Thermal & Mechanical characteristics

Table 6. Thermal & Mechanical characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-c)}$	thermal resistance from junction to case			-	0.25	0.35	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	45	-	K/W

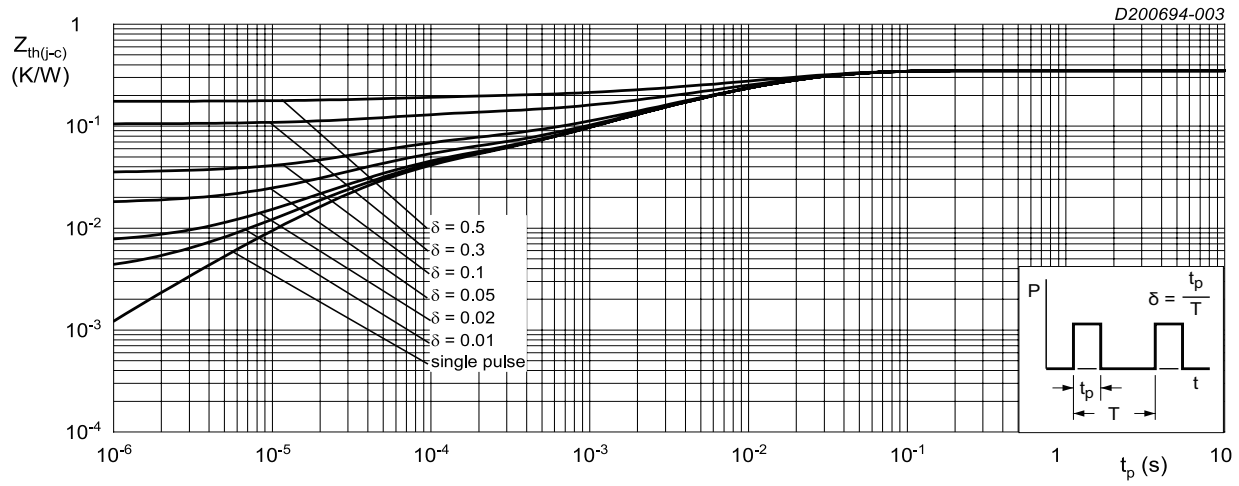


Fig. 3. Transient thermal impedance from junction to case as a function of pulse duration; maximum values

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10. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise noted

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = 250 µA; V_{GS} = 0 V		250	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	I_D = 250 µA; V_{DS} = V_{GS}		2.0	3.0	4.0	V
I_{DSS}	drain leakage current	V_{DS} = 250 V; V_{GS} = 0 V		-	-	1	µA
		V_{DS} = 250 V; V_{GS} = 0 V; T_j = 125 °C		-	20	-	µA
I_{GSS}	gate leakage current	V_{GS} = ±20 V; V_{DS} = 0 V		-	-	±100	nA
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = 10 V; I_D = 50 A		-	16	22	mΩ
R_G	gate resistance	f = 1 MHz		-	3.7	-	Ω
g_{fs}	transconductance	V_{DS} = 5 V; I_D = 20 A; T_j = 25 °C		-	44	-	S
Dynamic characteristics							
$Q_{G(tot)}$	total gate charge	I_D = 50 A; V_{DS} = 125 V; V_{GS} = 10 V		-	68	-	nC
Q_{GS}	gate-source charge			-	25	-	nC
Q_{GD}	gate-drain charge			-	8	-	nC
C_{iss}	input capacitance	V_{DS} = 125 V; V_{GS} = 0 V; f = 250 kHz		-	5595	-	pF
C_{oss}	output capacitance			-	307	-	pF
C_{rss}	reverse transfer capacitance			-	7	-	pF
$t_{d(on)}$	turn-on delay time	V_{DS} = 125 V; V_{GS} = 10 V; R_G = 10 Ω; I_D = 20 A		-	18	-	ns
t_r	rise time			-	23	-	ns
$t_{d(off)}$	turn-off delay time			-	36	-	ns
t_f	fall time			-	13	-	ns
Source-drain diode							
V_{SD}	source-drain voltage	V_{GS} = 0 V; I_S = 50 A		-	0.84	1.2	V
I_S	body-diode continuous current	T_C = 25 °C		-	-	80	A
t_{rr}	reverse recovery time	V_R = 75 V; I_F = 100 A; dI_F/dt = 125 A/µs		-	152	-	ns
Q_{rr}	reverse recovered charge			-	850	-	nC

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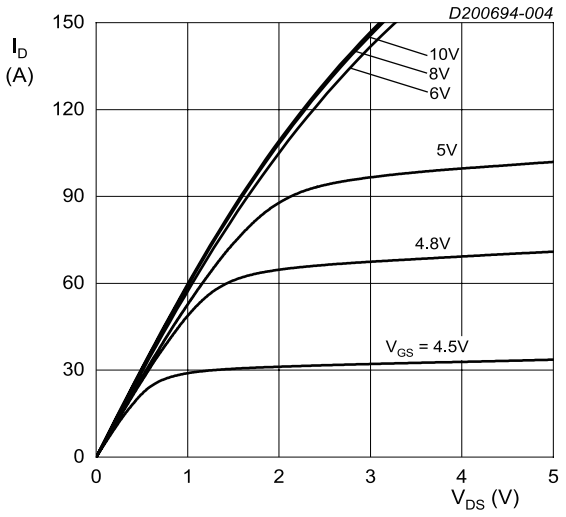
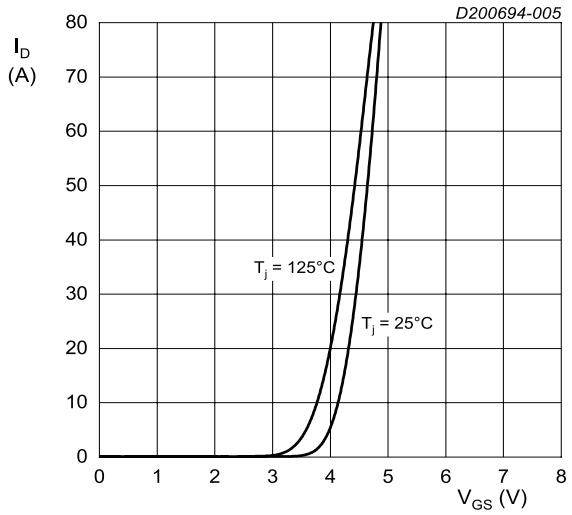
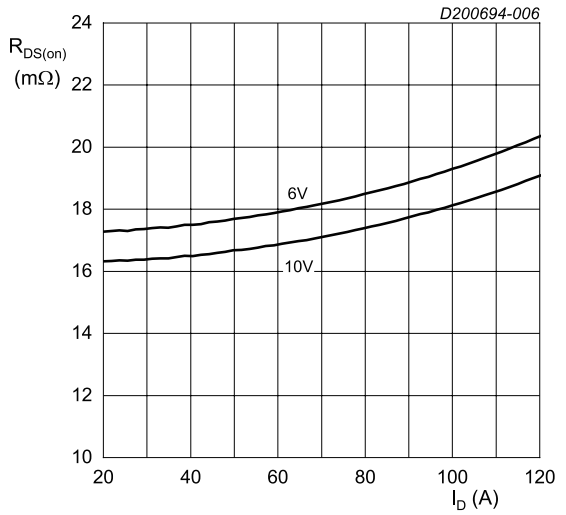


Fig. 4. Drain current as a function of drain-source voltage; typical values



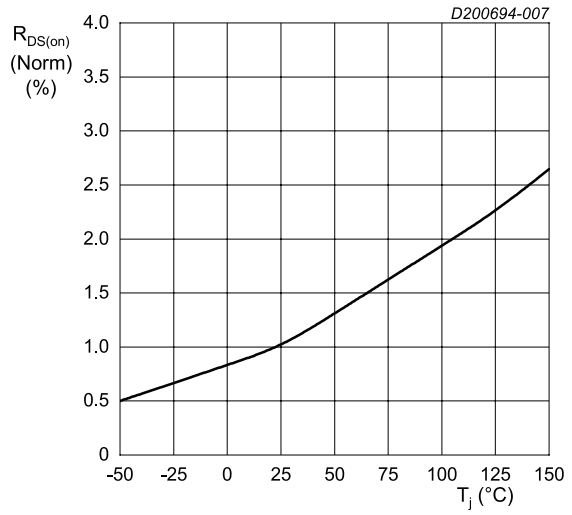
V_{DS} = 5 V

Fig. 5. Drain current as a function of gate-source voltage; typical values



V_{GS} = 6 V; V_{GS} = 10 V

Fig. 6. Drain-source on-state resistance as a function of drain current; typical values

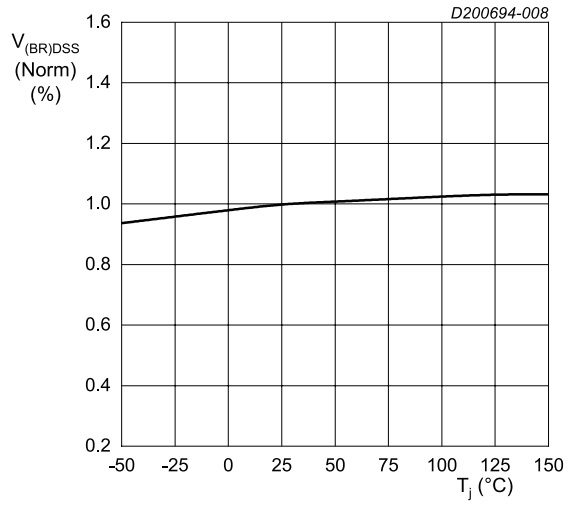


V_{GS} = 10 V; I_D = 50 A

Fig. 7. Normalized drain-source on-state resistance as a function of junction temperature

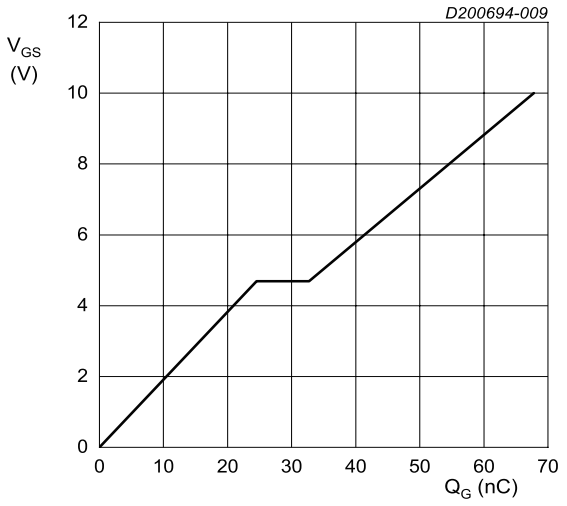
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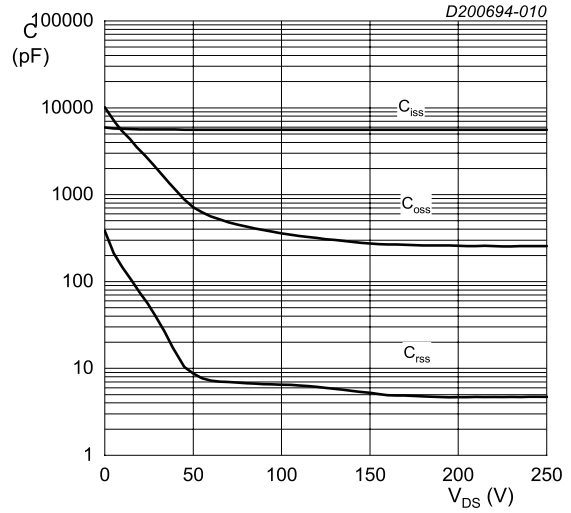
I_D = 1 mA

Fig. 8. Normalized drain-source breakdown voltage as a function of junction temperature



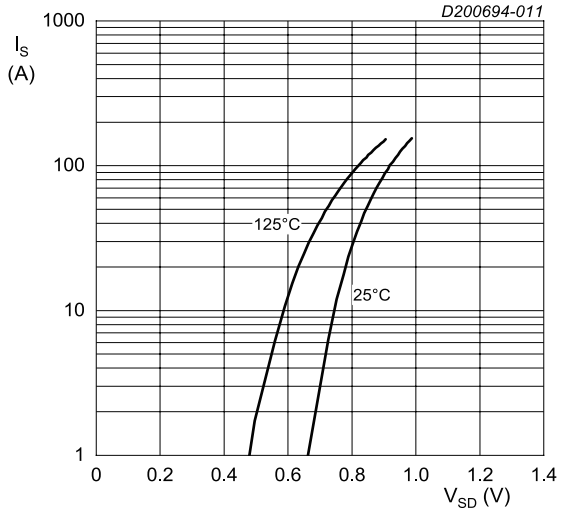
I_D = 50 A; V_{DS} = 125 V

Fig. 9. Gate-source voltage as a function of gate charge; typical values



V_{GS} = 0 V; f = 250 kHz

Fig 10. Capacitances as a function of drain-source voltage; typical values



V_{GS} = 0 V

Fig 11. Source current as a function of source-drain voltage; typical values

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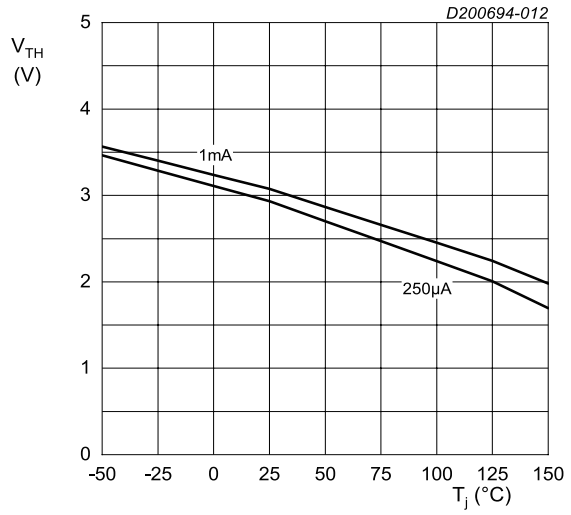
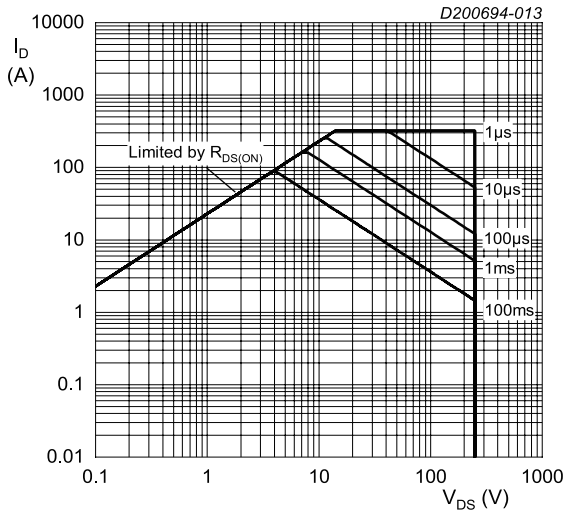


Fig. 12. Gate threshold voltage as a function of junction temperature



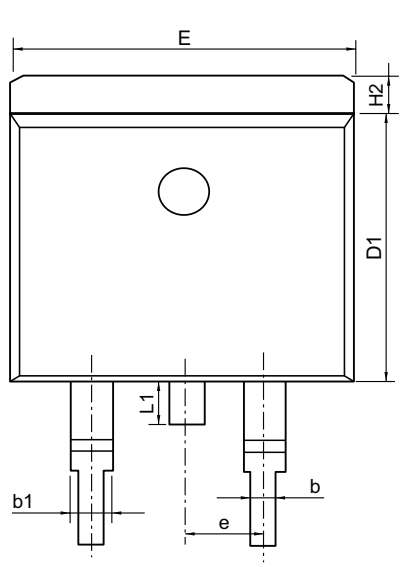
T_C = 25 °C

Fig. 13. Safe operating area

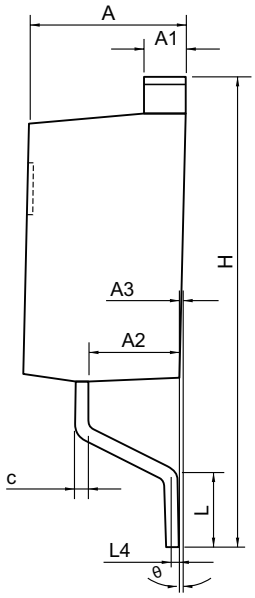
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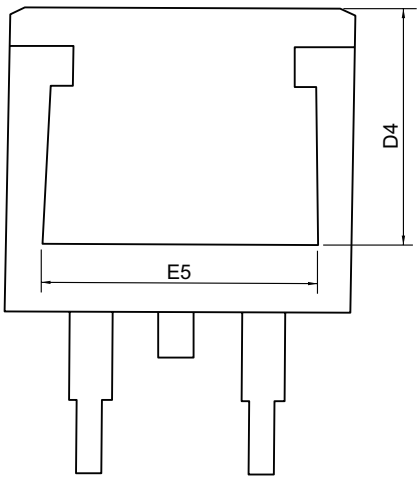
11. Package outline



TOP VIEW



SIDE VIEW



BOTTOM VIEW

UNIT		A	A1	A2	A3	b	b1	c	D1	D4	E	E5	e	H	H2	L	L1	L4	θ
mm	MAX	4.77	1.42	2.89	0.25	0.96	1.47	0.53	8.90	-	10.36	-		15.50	1.47	2.60	1.70		9°
	NOM	4.57	1.27	2.69	0.13	0.81	1.27	0.38	8.70	-	10.16	-	2.54	15.10	1.27	2.30	1.55	0.25	5°
	MIN	4.37	1.22	2.49	0.00	0.70	1.17	0.30	8.50	6.60	9.86	7.06		14.70	1.07	2.00	1.40		0°

Note:

1. All dimensions do not include mold flash & gate remain.

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