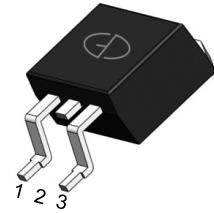


## N-Channel 100V (D-S) Power MOSFET

### Features

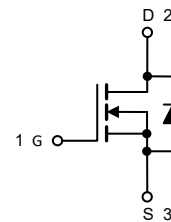
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM  $R_{ds(on)} \cdot Q_g$
- Halogen Free, Pb-Free
- RoHS Compliant



TO-263AB (D<sup>2</sup>PAK)

### Applications

- DC/DC
- Motors, lamps
- Power switching



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

Parameter	Symbol	Value	Unit
Drain Source Voltage	$V_{DS}$	100	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current, Continuous $V_{GS}=10\text{V}$	$I_D$	$T_C=25^\circ\text{C}$	131
		$T_C=100^\circ\text{C}$	83
Drain Current, Pulsed (Note 1)	$I_{DM}$	524	A
Single Avalanche Energy (Note 2)	$E_{AS}$	625	mJ
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	167
		$T_C=100^\circ\text{C}$	67
Operating Junction/ Storage Temperature Range	$T_J/ T_{STG}$	-55 to +150	$^\circ\text{C}$

Note 1: Single Pulse;  $t_p \leq 1\mu\text{s}$ .

Note 2:  $V_{DD} = 50\text{V}$ ,  $V_{GS} = 10\text{V}$ ,  $L = 0.5\text{mH}$ ,  $R_G = 25\Omega$ , starting  $T_J = 25^\circ\text{C}$ .

### Thermal Characteristics

Parameter	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{thJC}$	0.75	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 3)	$R_{thJA}$	62.5	$^\circ\text{C/W}$

Note 3: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a  $25^\circ\text{C}$  still air environment.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1	uA
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	2	--	4	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
Drain-Source On-state Resistance (Note 4)	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	--	3.7	4.2	mΩ
Total Gate Charge	Q <sub>g</sub>	V <sub>GS(off)</sub> =0V, V <sub>GS(on)</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =20A	--	56.6	--	nC
Gate Source Charge	Q <sub>gs</sub>		--	14.7	--	
Gate Drain Charge	Q <sub>gd</sub>		--	8	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =20A, R <sub>G</sub> =10Ω	--	24	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	12	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	15	--	
Turn-off Fall Time	t <sub>f</sub>		--	50	--	
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, f=1MHz, open drain	--	2	--	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=250kHz	--	4240	--	pF
Output Capacitance	C <sub>oss</sub>		--	1720	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	29.5	--	

### Reverse Diode Characteristics (T<sub>J</sub> =25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Current, Continuous	I <sub>SD</sub>	T <sub>C</sub> =25°C	--	--	150	A
Diode Forward Voltage (Note 4)	V <sub>SD</sub>	I <sub>F</sub> =20A, V <sub>GS</sub> =0V	--	--	1.2	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>R</sub> =50V, I <sub>F</sub> =20A, di/dt=100A/μs	--	60	--	ns
Reverse Recovery Charge	Q <sub>rr</sub>		--	82	--	nC

Note 4: Pulse test; pulse width ≤ 380μs, duty cycle ≤ 1%.

## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 - Output Characteristics

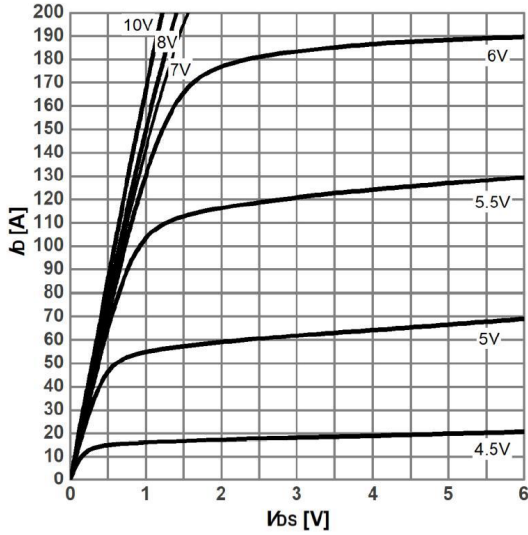


Fig.2 - Transfer Characteristics

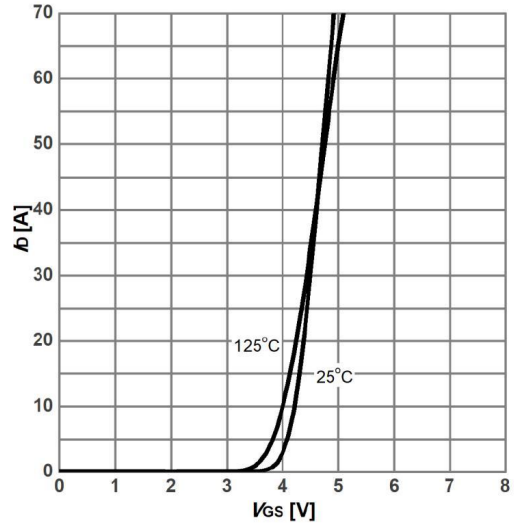


Fig.3 - Drain-Source On-Resistance

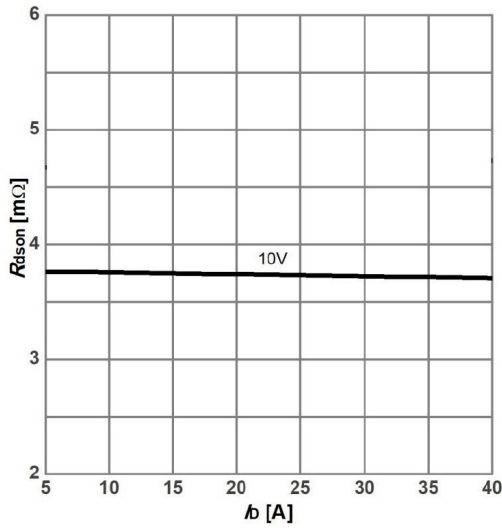


Fig.4 - Drain-Source On-Resistance

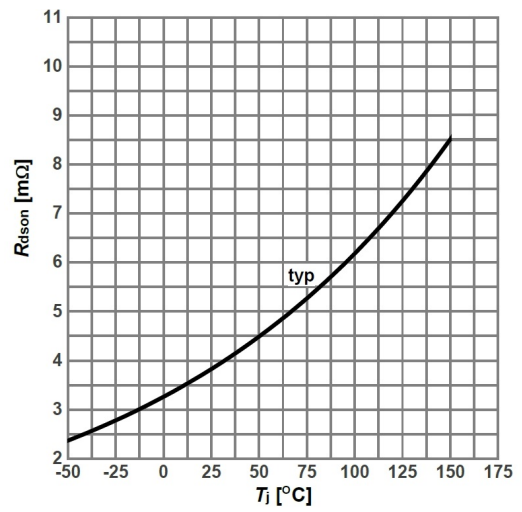


Fig.5 - Drain-Source On-Resistance

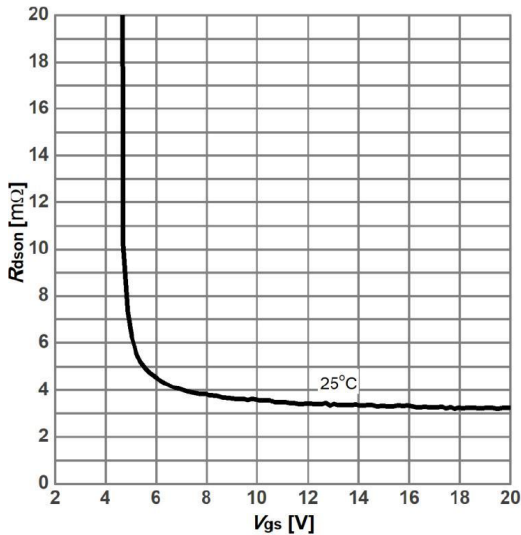
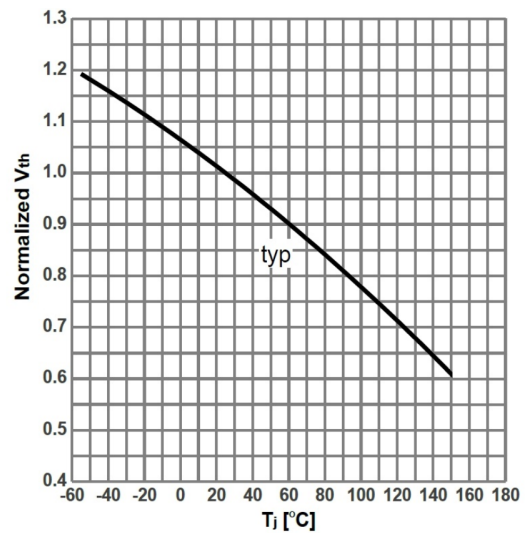


Fig.6 - Normalized Threshold Voltage



## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Fig.7 - Capacitance

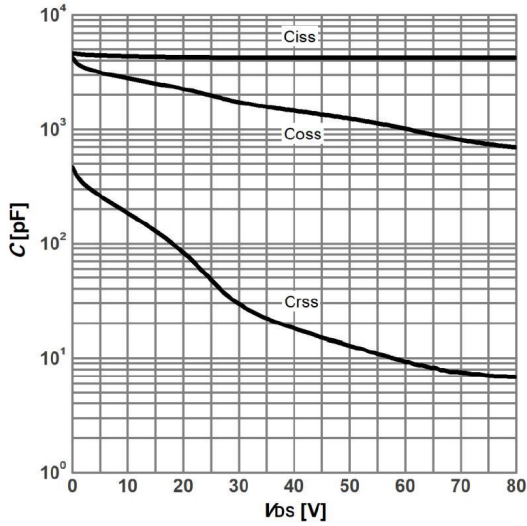


Fig.8 - Gate charge

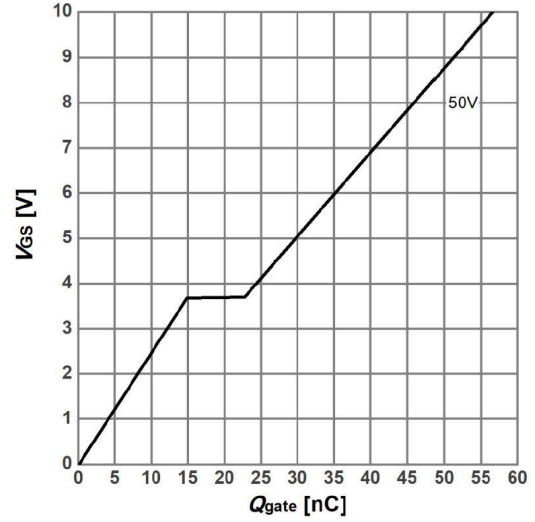


Fig.9 - Forward Characteristic

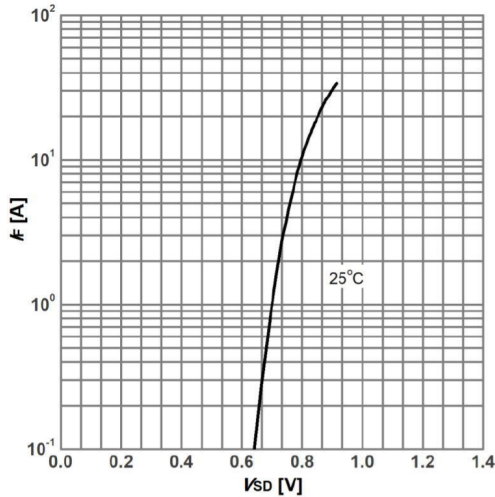


Fig.10 - Safe Operating Area

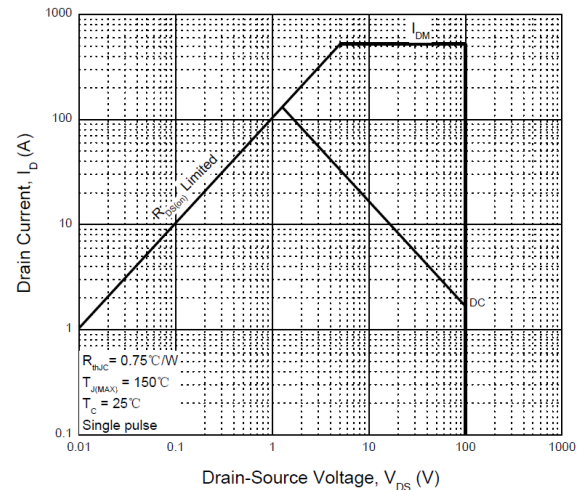


Fig.11 - Thermal Impedance, Junction-Case

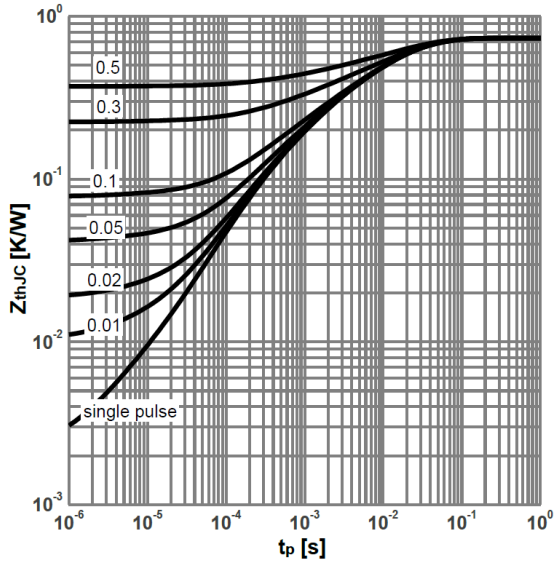
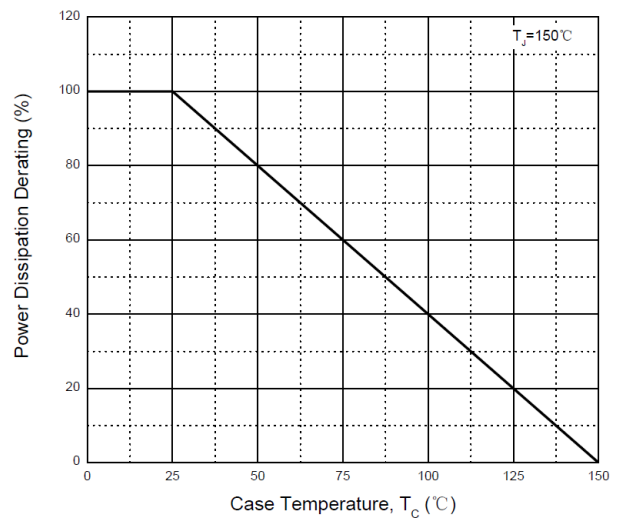
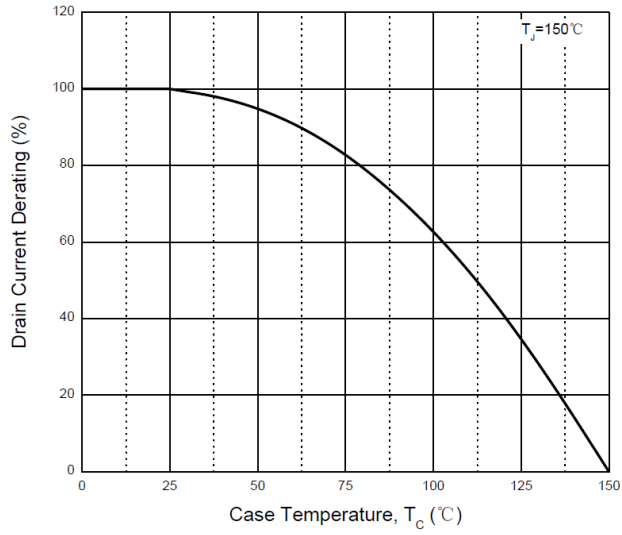


Fig.12 - Power Derating



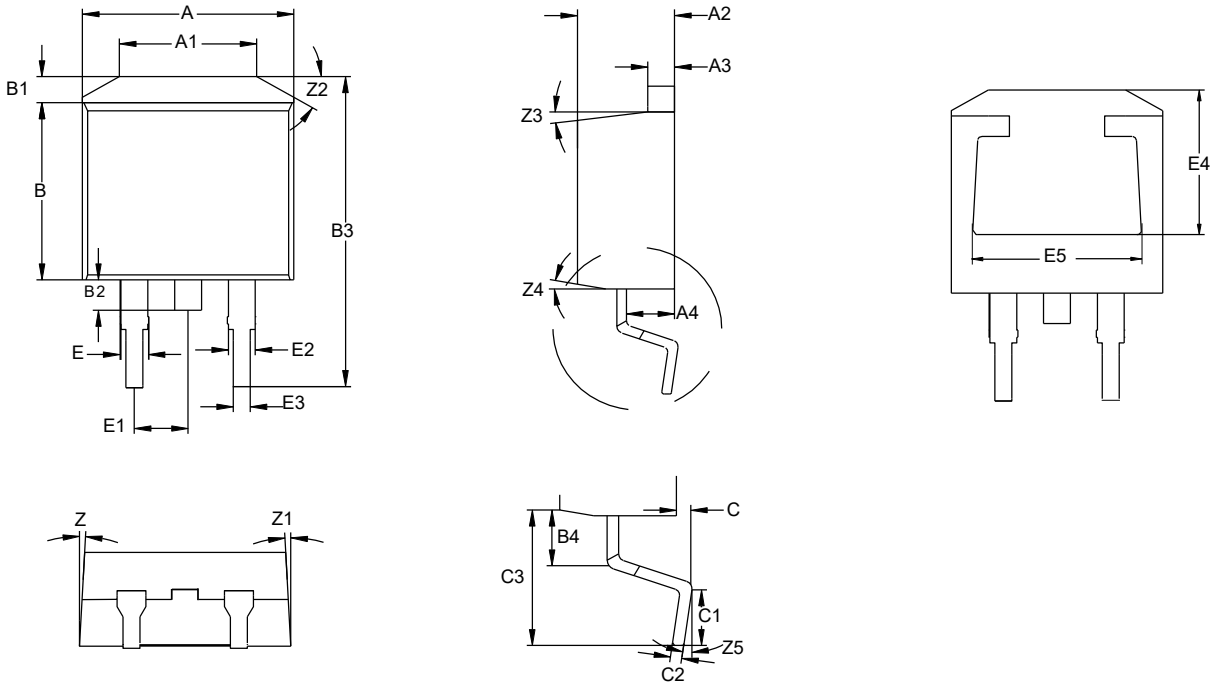
**Typical Characteristics Curves** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Fig.13 - Drain Current Derating



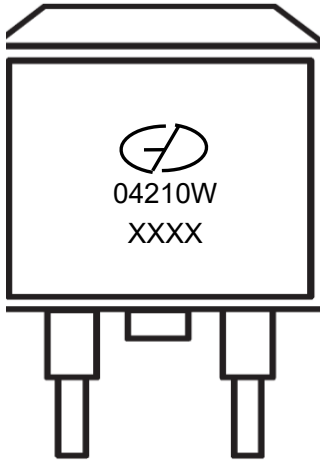
**Package Outline Dimensions** (Unit: millimeters)

**TO-263**




TO-263AB							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	9.8	10	10.2	C3	5	5.3	5.6
A1	6.5	-	-	E	1.17	1.37	1.57
A2	4.4	4.6	4.8	E1	2.44	2.54	2.64
A3	1.17	1.27	1.37	E2	1.17	1.27	1.37
A4	2.37	2.67	2.97	E3	0.7	0.8	0.9
B	8.5	8.7	8.9	E4	-	7.1	-
B1	1.07	1.27	1.47	E5	-	8.7	-
B2	1.2	1.5	1.8	Z	-	3°	-
B3	15	15.3	15.6	Z1	-	3°	-
B4	1.8	2	2.2	Z2	-	30°	-
C	0	-	0.25	Z3	-	7°	-
C1	2.34	2.54	2.74	Z4	-	7°	-
C2	0.3	0.45	0.6	Z5	0°	-	8°

**Marking Outline**



Part Name: GMN04210W

1. Logo Mark: 
2. P/N Mark: 04210W
3. Date Code: XXXX

**Revision History**

Version	Date	Major Changes
Rev.A	2024.10.25	Official Release

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