

• General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

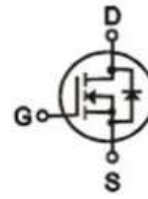
• Features

- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

- SMPS 2nd Synchronous Rectifier
- BLDC Motor driver
- DC/DC

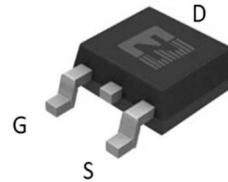
• Product Summary



$$V_{DS} = 100V$$

$$R_{DS(ON)} = 45m\Omega$$

$$I_D = 25A$$



TO-252



• Ordering Information:

Part NO.	ZMS420N10D
Marking	ZMS420N10
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

• Absolute Maximum Ratings ($T_C = 25^\circ C$)

Parameter	Symbol	Conditions	Rating	Unit
Drain-Source Voltage	V_{DS}	$25^\circ C \leq T_J \leq 150^\circ C$	100	V
Gate-Source Voltage	V_{GS}	Pulsed ^①	± 20	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	25	A
	I_D	$T_C = 75^\circ C$	19	A
	I_D	$T_C = 100^\circ C$	15.7	A
Pulsed Drain Current	I_{DM}	pulsed; $t_p \leq 10 \mu s$; $T_{mb} = 25^\circ C$;	75	A
Total Power Dissipation	P_D	$T_C = 25^\circ C$	60	W
Total Power Dissipation	P_D	$T_A = 25^\circ C$	2.2	W
Operating Junction Temperature	T_J	-55 to 150	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	$L = 0.1mH$, $V_{GS} = 10V$, $R_g = 25\Omega$, $T_J = 25^\circ C$	10	mJ
ESD Level (HBM)			Class 1A	

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R _{thJC}	-	-	2.1	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	50	° C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	260	° C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	100			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	1.3		2.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1.0	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A		45	58	mΩ
	R _{DS(ON)}	V _{GS} =4.5V, I _D =6A ^③		64	83	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =4A		4		s
Diode Forward Voltage	V _{FSD}	I _S =10A			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R _g	f = 1MHz		1.9		Ω
Input capacitance	C _{iss}	f = 1MHz V _{DS} =25V	-	275	-	pF
Output capacitance	C _{oss}		-	146	-	
Reverse transfer capacitance	C _{rss}		-	3.7	-	

Gate Charge characteristics(Ta= 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} =25V	-	7	-	nC
Gate - Source charge	Q _{gs}	I _D = 8A	-	2.1	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	1.1	-	

Fig.1 Gate-Charge Characteristics

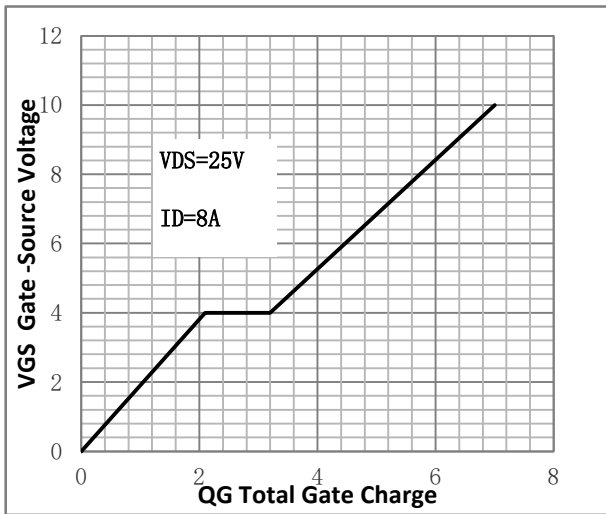


Fig.2 Capacitance Characteristics

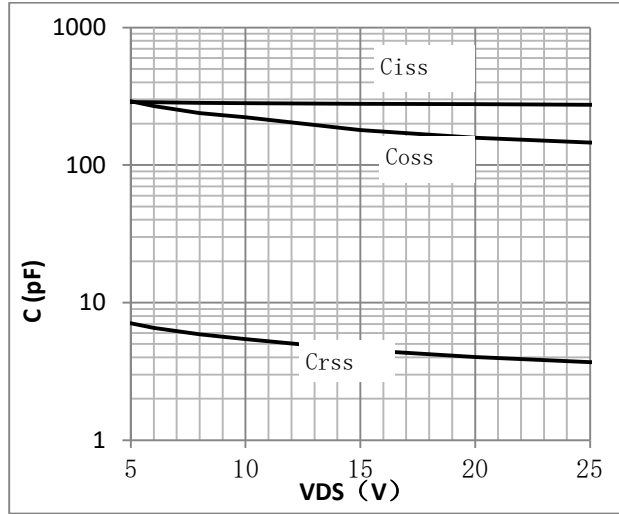


Fig.3 Power Dissipation

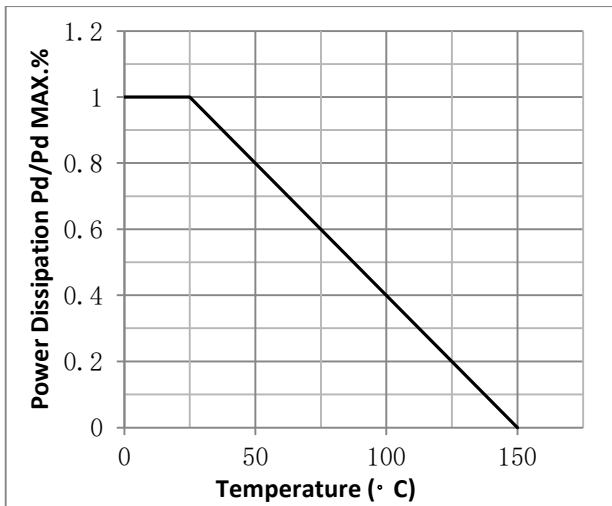


Fig.4 Typical output Characteristics

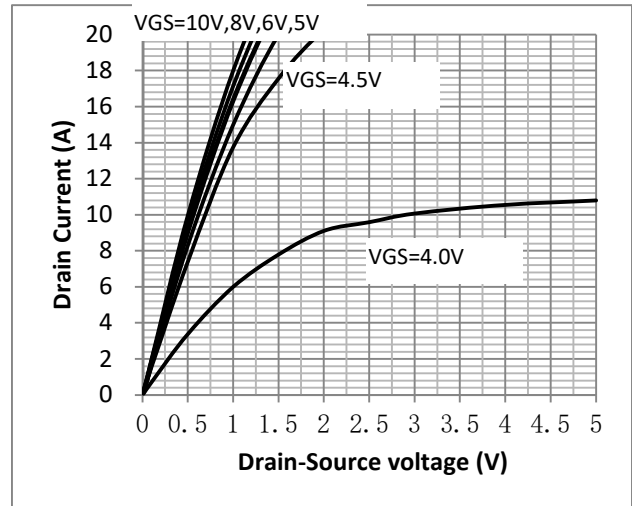


Fig.5 Threshold Voltage V.S Junction Temperature

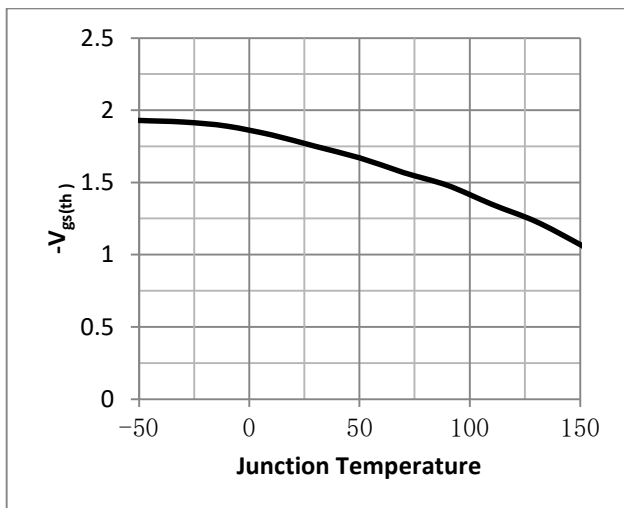


Fig.6 Resistance V.S Drain Current

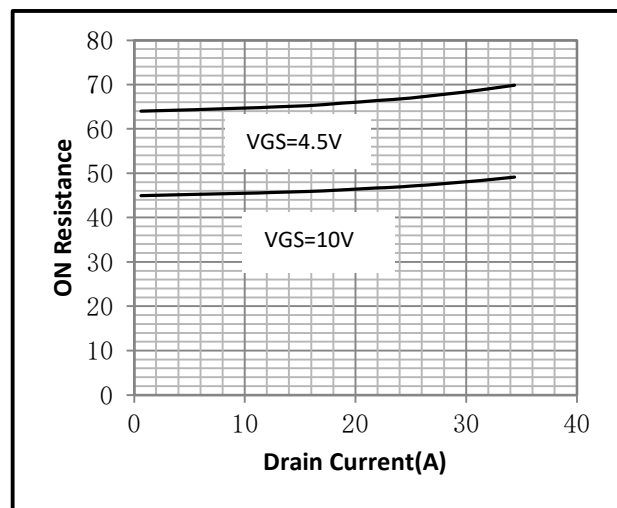


Fig.7 On-Resistance VS Gate Source Voltage

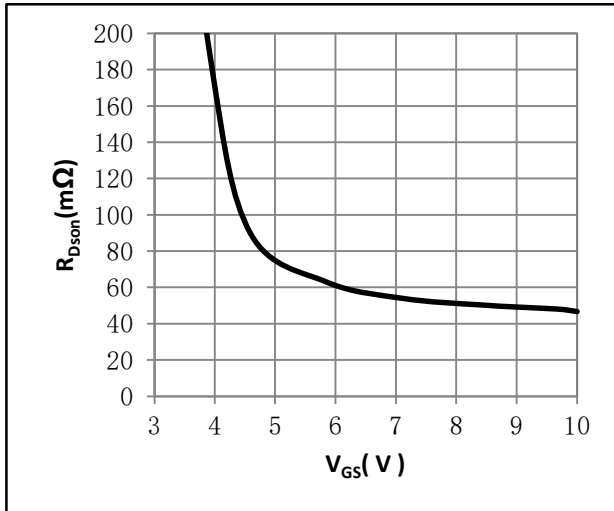


Fig.8 On-Resistance V.S Junction Temperature

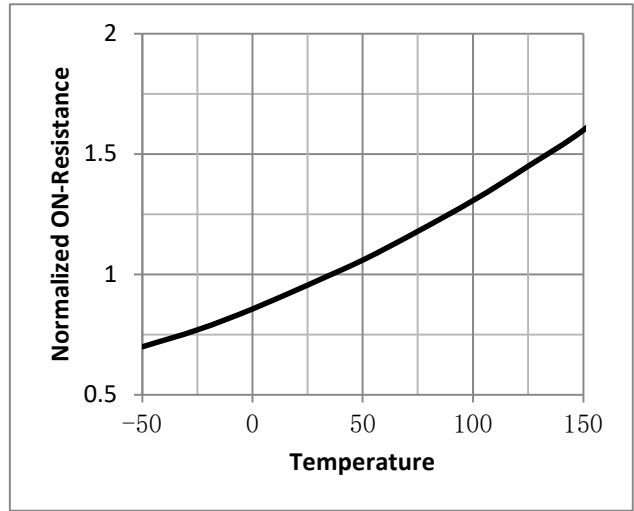


Fig.9 SOA Maximum Safe Operating Area

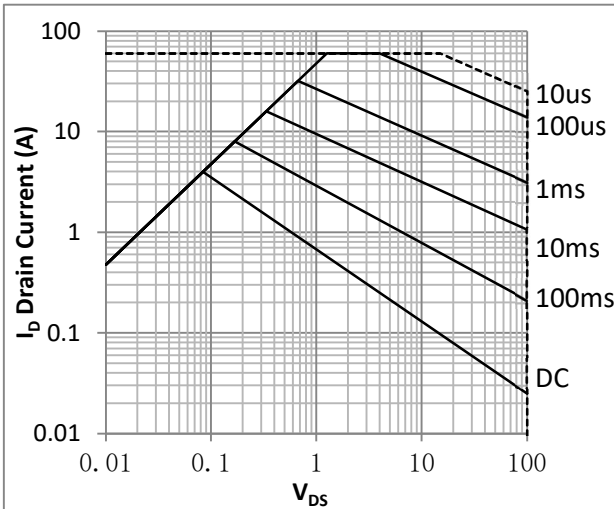


Fig.10 ID-Junction Temperature

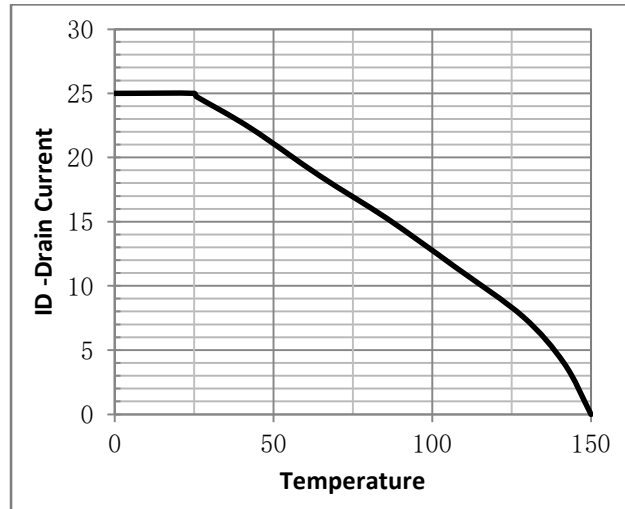


Figure 11. Diode Forward Voltage vs. Current

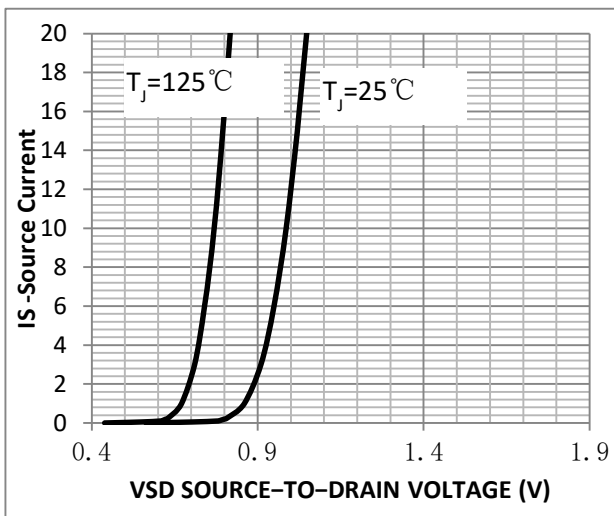


Figure 12. Transfer Characteristics

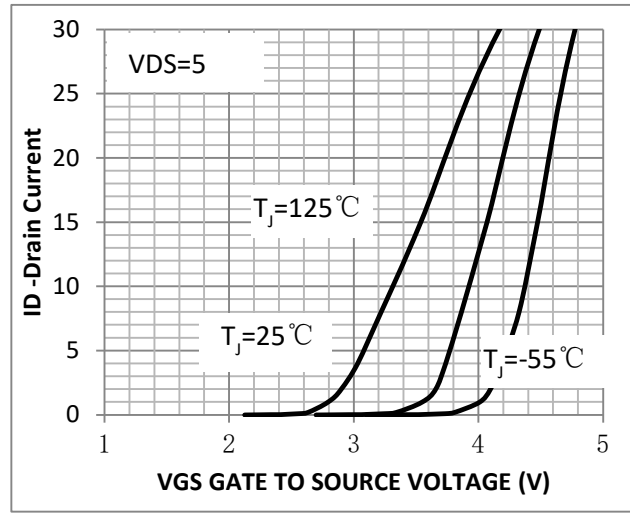


Fig.13 Gate Charge Measurement Circuit

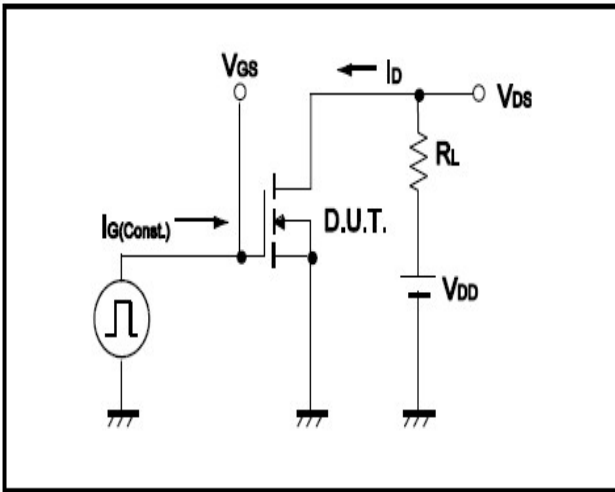


Fig.14 Gate Charge Waveform

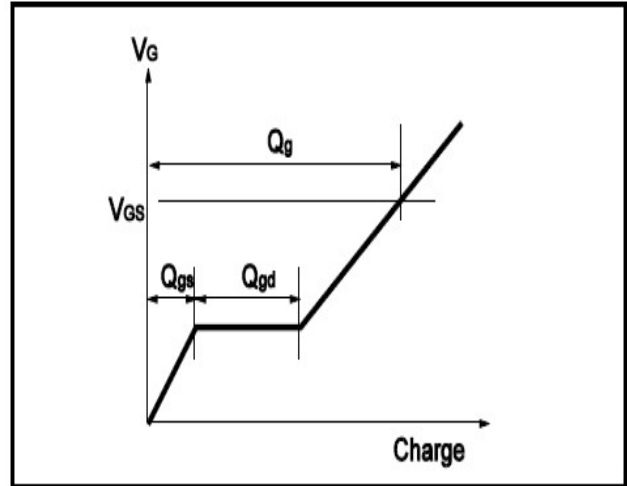


Fig.15 Switching Time Measurement Circuit

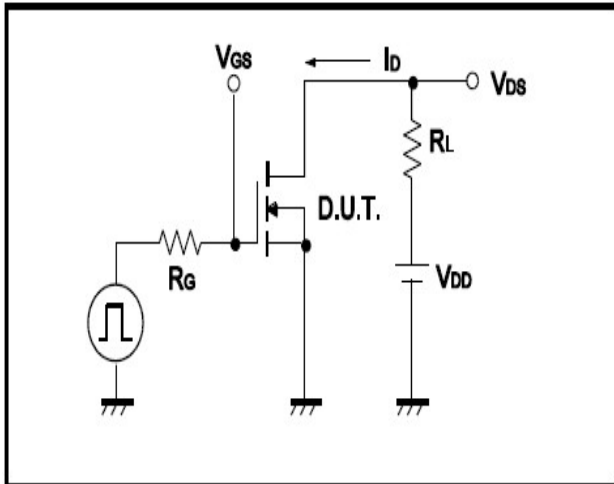
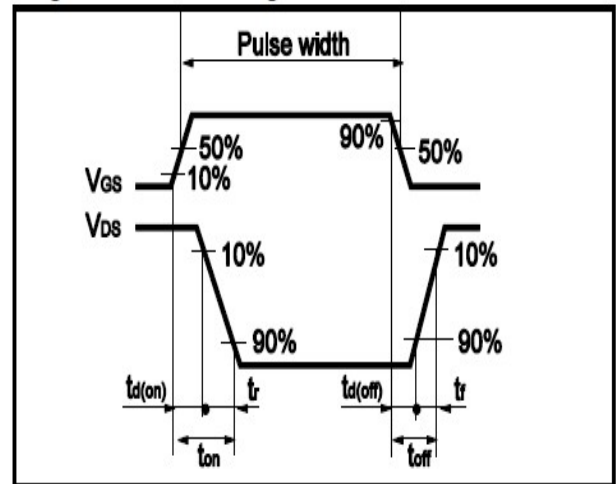
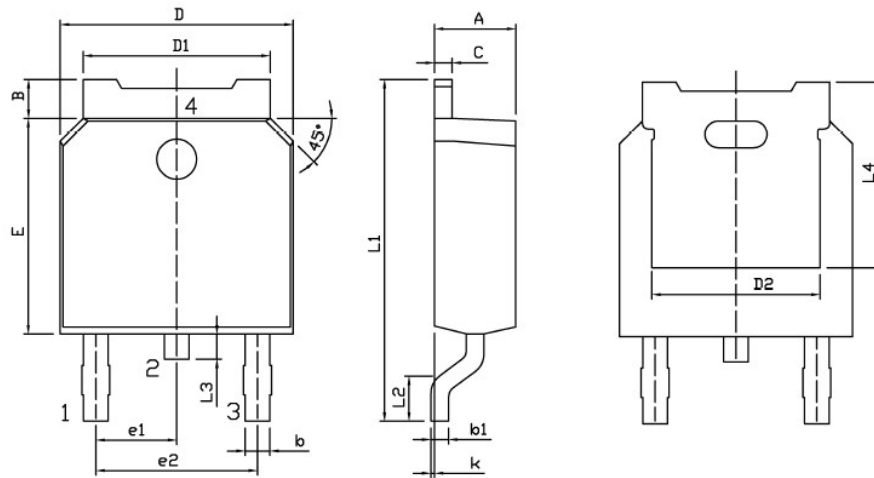


Fig.16 Switching Time Waveform



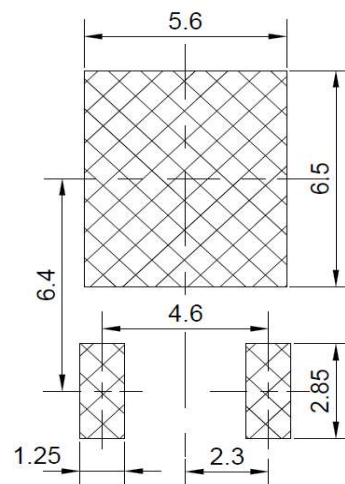


• Dimensions (TO-252)



Land Pattern
(Only for Reference)

Dimensions In Millimeters					
Symbol	MIN	MAX	Symbol	MIN	MAX
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.70	2.00
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	L4	5.05	
D2	4.85		k	0.00	0.10





Note: ① Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

③ $V_{gs} \geq 4.5\text{V}$ is required for practical application.

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