

• General Description

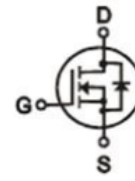
It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

• Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

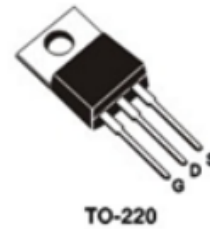
- SMPS 2nd Synchronous Rectifier
- BLDC Motor driver

• Product Summary


$V_{DS} = 150V$

$R_{DS(ON)} = 6.0m\Omega$

$I_D = 103A$


• Ordering Information:

Part NO.	ZMS060N15HP
Marking	ZMS060N15H
Packing Information	TUBE
Basic ordering unit (pcs)	500

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_{D@TC=25^\circ C}$	103	A
	$I_{D@TC=75^\circ C}$	78	A
	$I_{D@TC=100^\circ C}$	65	A
Pulsed Drain Current ^①	I_{DM}	309	A
Total Power Dissipation($TC=25^\circ C$)	$P_D@TC=25^\circ C$	245	W
Total Power Dissipation($TA=25^\circ C$)	$P_D@TA=25^\circ C$	3.1	W
Operating Junction Temperature	T_J	-55 to 175	$^\circ C$
Storage Temperature	T_{STG}	-55 to 175	$^\circ C$
Single Pulse Avalanche Energy@ $L=0.1mH$	E_{AS}	720	mJ

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R _{thJC}	-	-	0.51	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	40	° C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	265	° C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	150			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	2	3	4	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =150V, 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 =20A		6.0	8.0	mΩ
Source-drain voltage	V _{SD}	I _S =20A			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz	-	5480	-	pF
Output capacitance	C _{oss}		-	400	-	
Reverse transfer capacitance	C _{rss}		-	6.5	-	

•Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} =75V	-	69	-	nC
Gate - Source charge	Q _{gs}	I _D =20A	-	24	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	10	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =10V, V _{DS} =75V, I _D =20A R _g =10Ω		25		
Turn-ON Rise time	t _r			20		
Turn-Off Delay time	t _{D(off)}			36		
Turn-Off Fall time	t _f			13		
Body Diode Reverse Recovery Time	t _{rr}			76		

Body Diode Reverse Recovery Charge	Qrr	VR=75V, I _F =20A, dI/dt=100A/μs	155		
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Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

Fig.1 Maximum Safe Operating Area

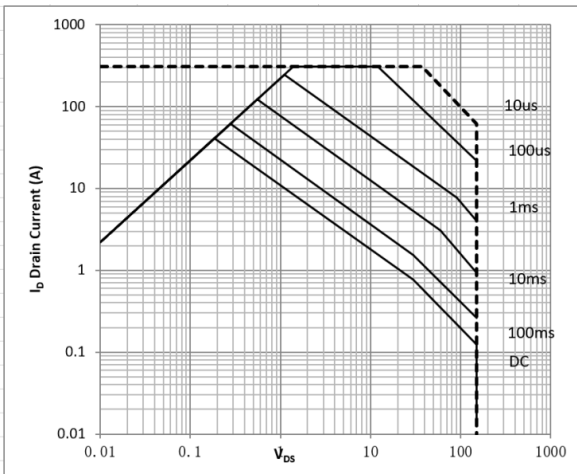


Fig.2 Capacitance Characteristics

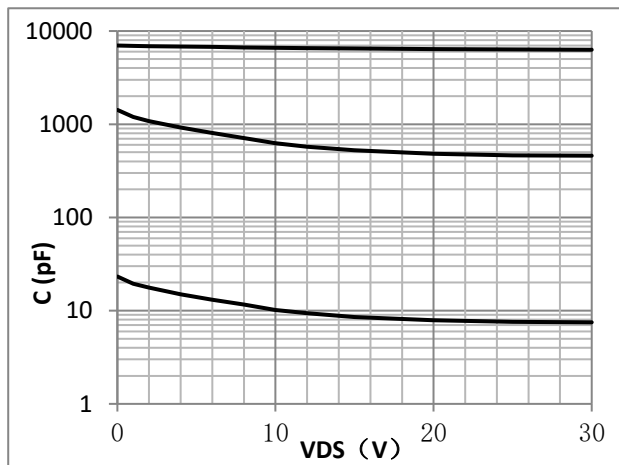


Fig.3 Power Dissipation Derating Curve

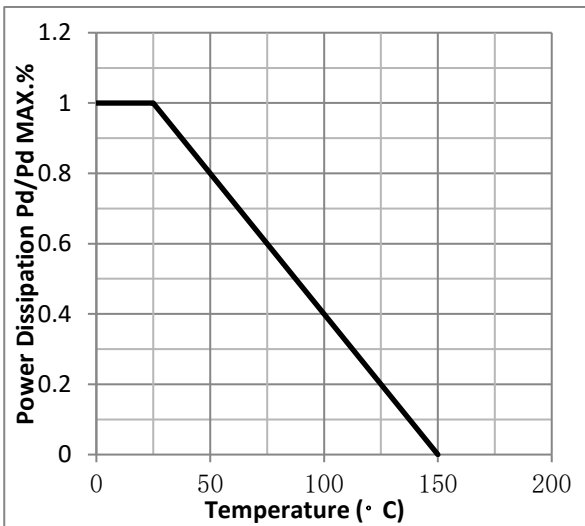


Fig.4 Typical output Characteristics

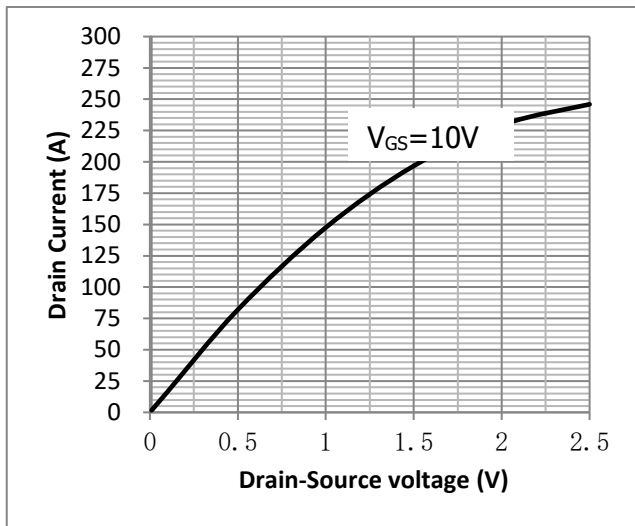


Fig.5 Threshold Voltage V.S Junction Temperature Fig.6 Resistance V.S Drain Current

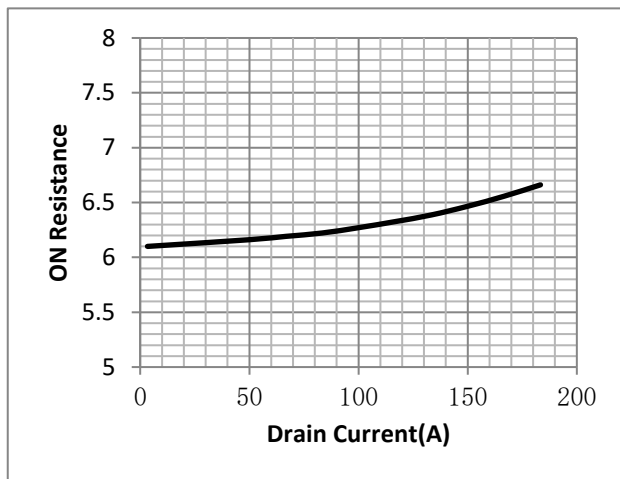
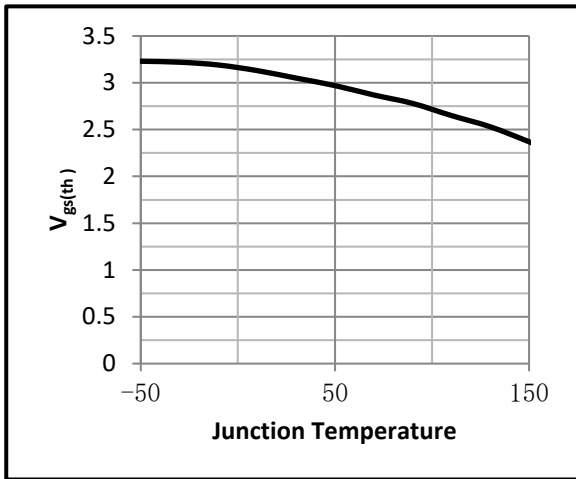


Fig.7 On-Resistance VS Gate Source Voltage

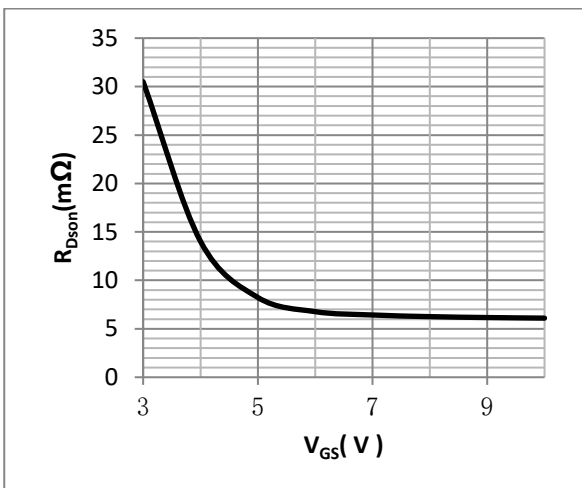


Fig.8 On-Resistance V.S Junction Temperature

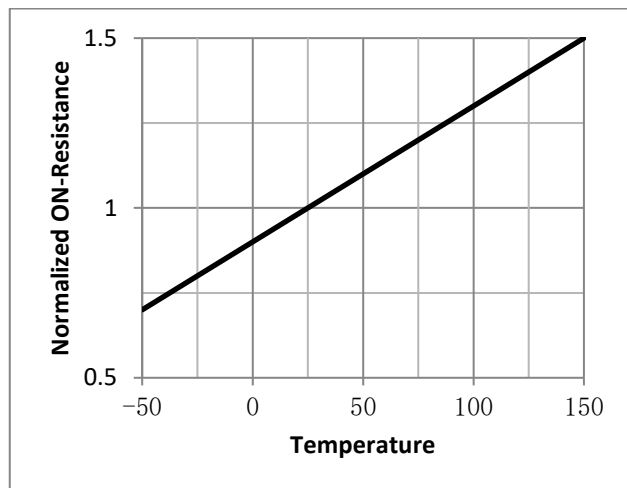


Fig.7 Switching Time Measurement Circuit

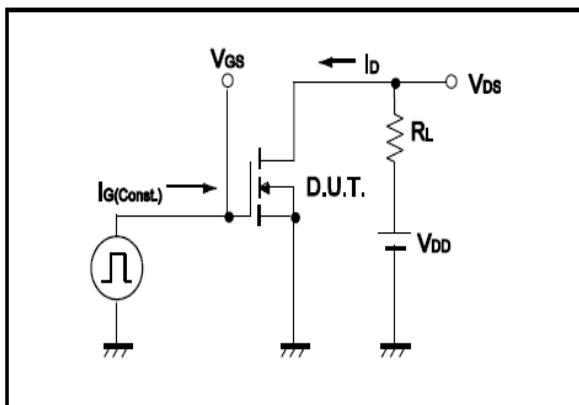


Fig.8 Gate Charge Waveform

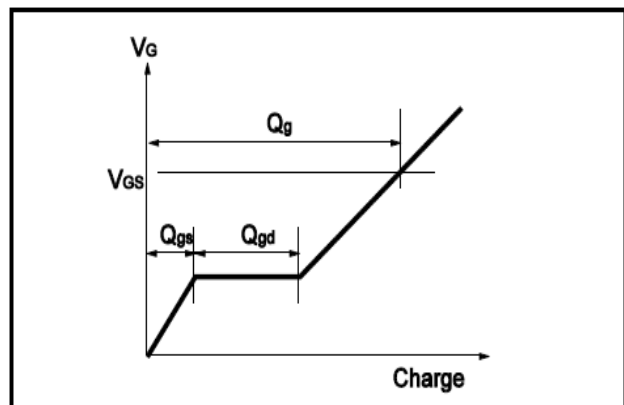


Fig.9 Switching Time Measurement Circuit

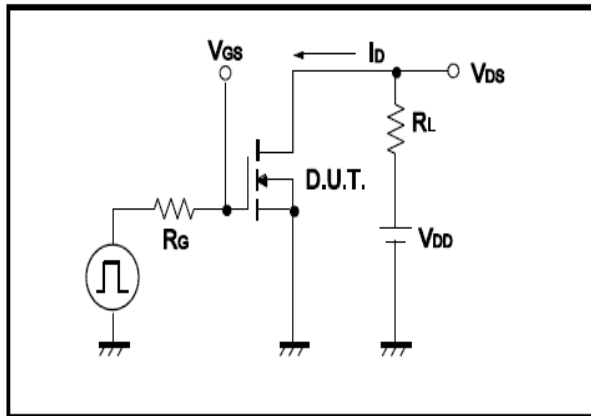


Fig.10 Gate Charge Waveform

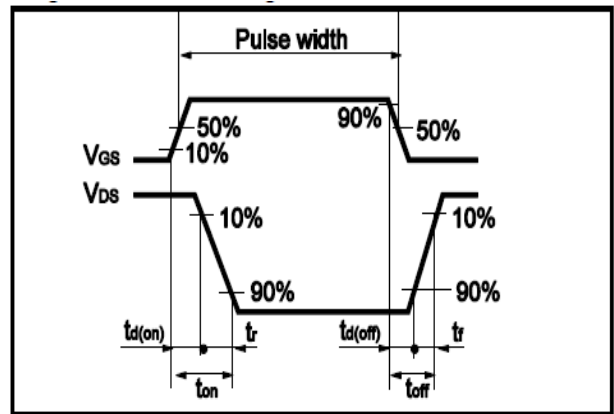


Fig.11 Avalanche Measurement Circuit

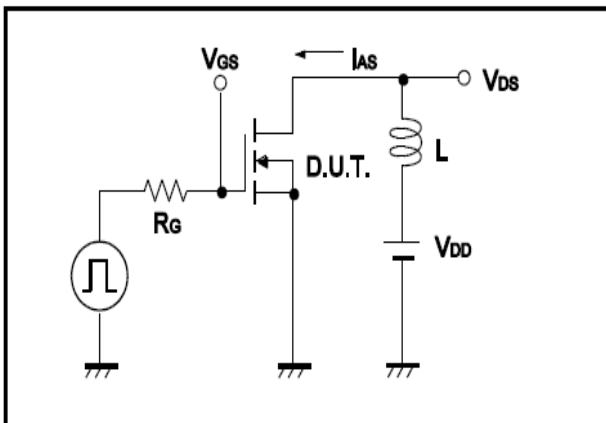
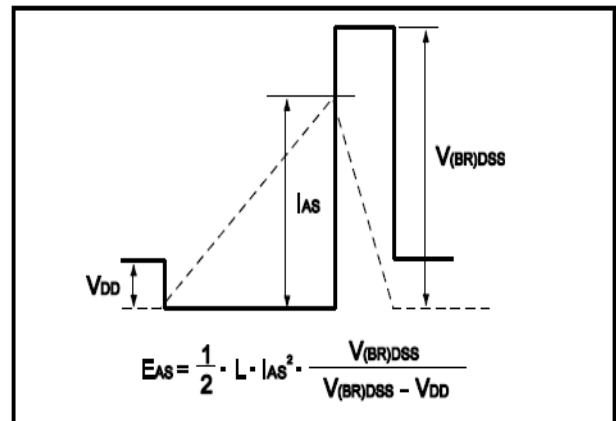


Fig.12 Avalanche Waveform



•Dimensions (TO-220)

Unit: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.00		4.80	E	9.90		10.70
B	1.20		1.50	e		2.54	
B1	1.00		1.40	F	1.10		1.45
b1	0.65		1.00	L	12.50		14.50
c	0.35		0.75	L1	3.00	3.50	4.00
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		3.00
				ΦP	3.60		3.90

