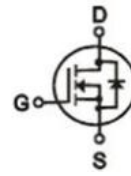## ● General Description

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

● Features

■ Advance device constructure

■ Low $R_{DS(ON)}$ to minimize conduction loss

■ Low Gate Charge for fast switching
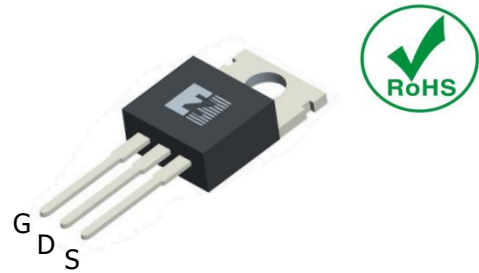
■ Low Thermal resistance

● Application

■ Synchronous Rectification for AC-DC/DC-DC converter

■ Power Tools

● Product Summary

$V_{DS} = 60V$

$R_{DS(ON)} = 5.2m\Omega$

$I_D = 80A$

TO-220

● Ordering Information:

Part NO.	ZMS052N06P
Marking	ZMS052N06
Packing Information	TUBE
Basic ordering unit (pcs)	1000

● Absolute Maximum Ratings ($T_C = 25℃$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D@TC=25℃	80	A
	I_D@TC=75℃	61	A
	I_D@TC=100℃	50	A
Pulsed Drain Current [①]	I_{DM}	240	A
Total Power Dissipation	P_D@TC=25℃	125	W
Total Power Dissipation	P_D@TA=25℃	3.4	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	280	mJ

●**Thermal resistance**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}			1.0	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	37	°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	60			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.5		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, 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		5.2	6.5	mΩ
		V_{GS}=4.5V, I_D=5A		6.8	8.5	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=10A		16		s
Source-drain voltage	V_{SD}	Is=10A			1.28	V

●**Electronic Characteristics**

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V_{DS}=25V	-	1910	-	pF
Output capacitance	Coss		-	1070	-	
Reverse transfer capacitance	Crss		-	22	-	

●**Gate Charge characteristics**(T_a = 25℃)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Qg	V_{DD} = 25V	-	24	-	nC
Gate - Source charge	Qgs	I_D = 8A	-	5	-	
Gate - Drain charge	Qgd	V_{GS} = 10V	-	3.3	-	

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;
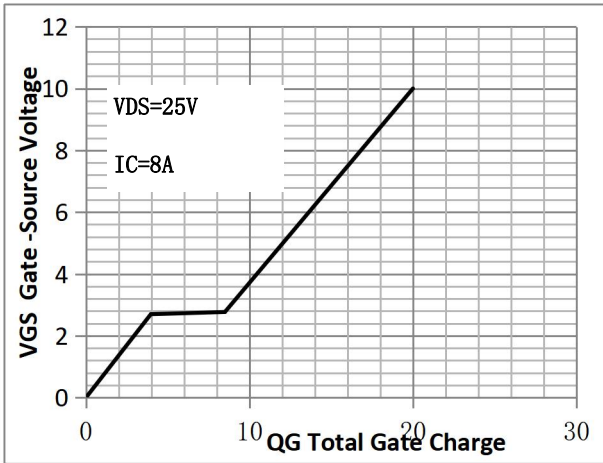
Fig.1 Gate-Charge Characteristics

VDS=25V

IC=8A

VGS Gate -Source Voltage

QG Total Gate Charge

Fig.2   Capacitance Characteristics

Ciss

Coss

Crss

C (pF)

VDS（V）

Fig.3 Power Dissipation
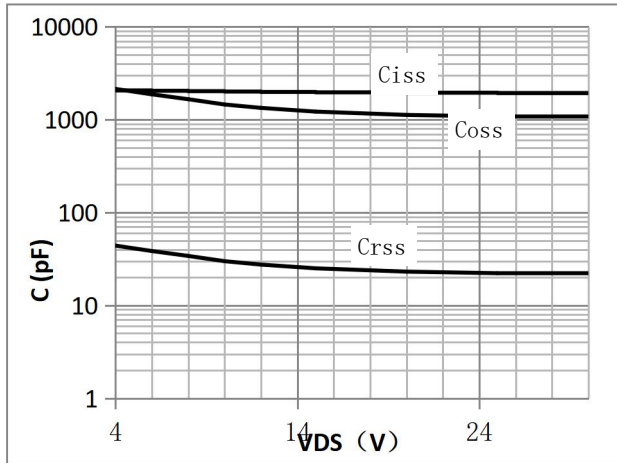
Power Dissipation Pd/Pd MAX.%
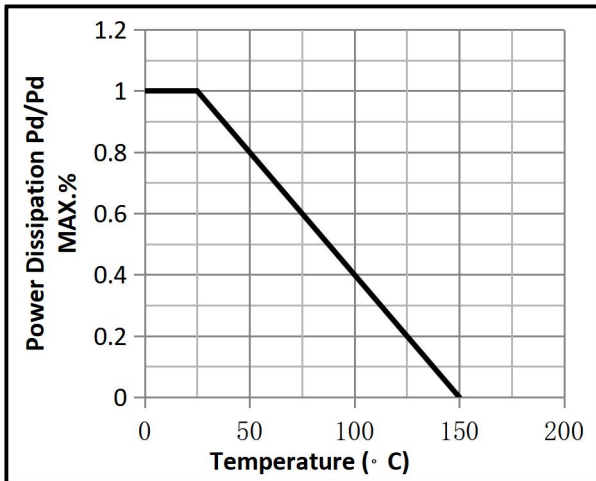
Temperature (°C)

Fig.4 Typical output Characteristics

V_{GS}=10V

V_{GS}=4.5V

Drain Current (A)

Drain-Source voltage (V)
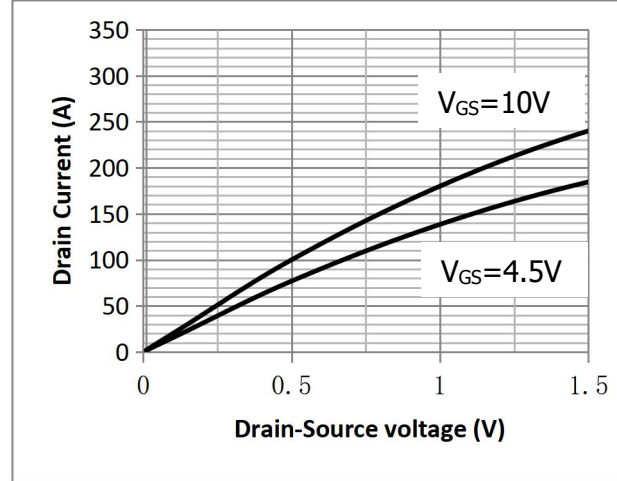
Fig.5 Threshold Voltage V.S Junction Temperature

$V_{gs(th)}$

Junction Temperature
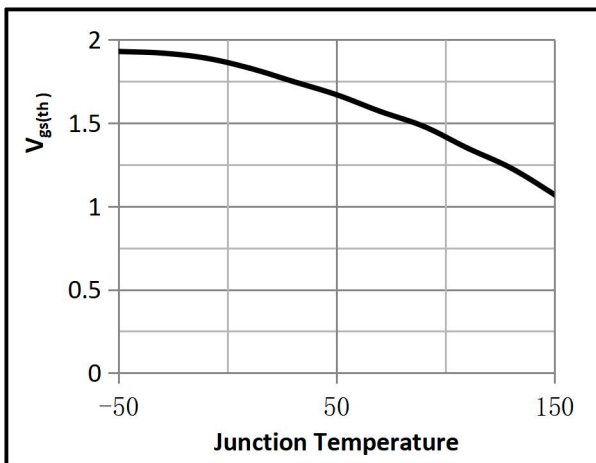
Fig.6 Resistance V.S Drain Current

ON Resistance

Drain Current(A)
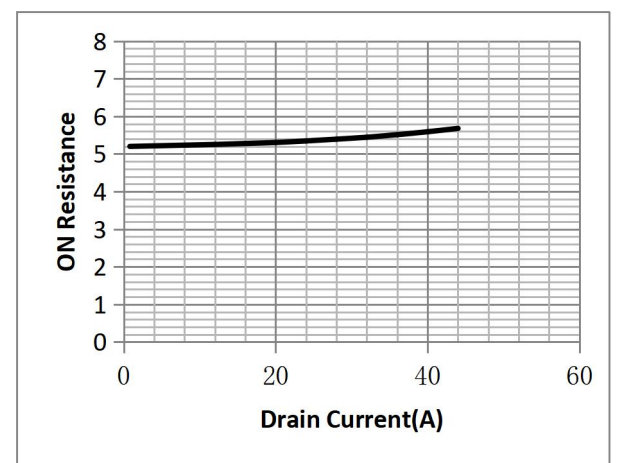
Fig.7 On-Resistance VS Gate Source Voltage
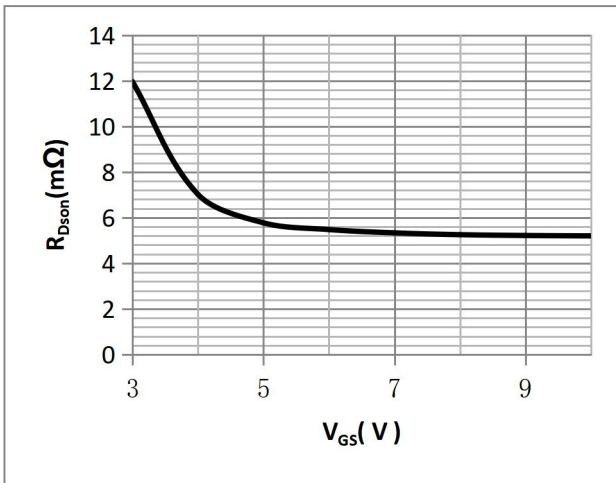
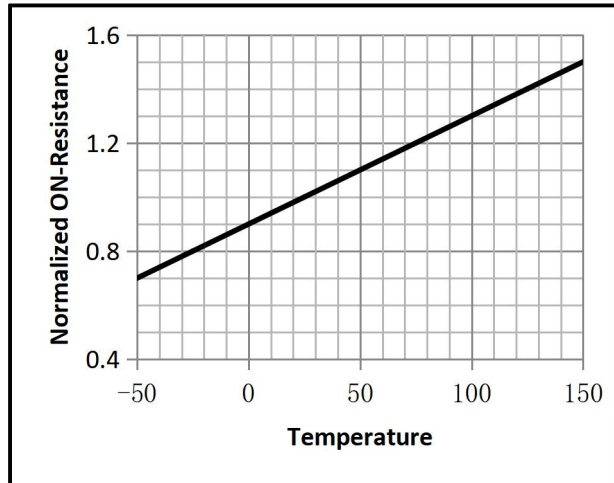Fig.8 On-Resistance V.S Junction Temperature

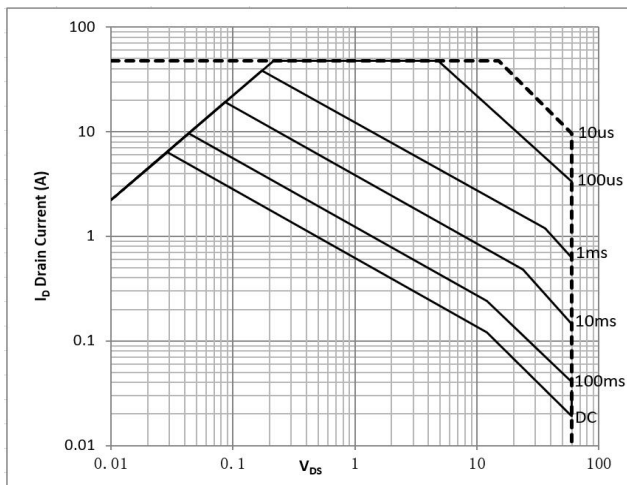Fig.9 SOA Maximum Safe Operating Area

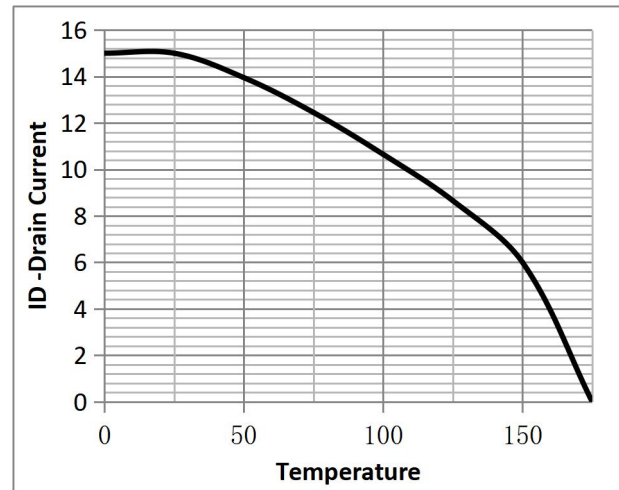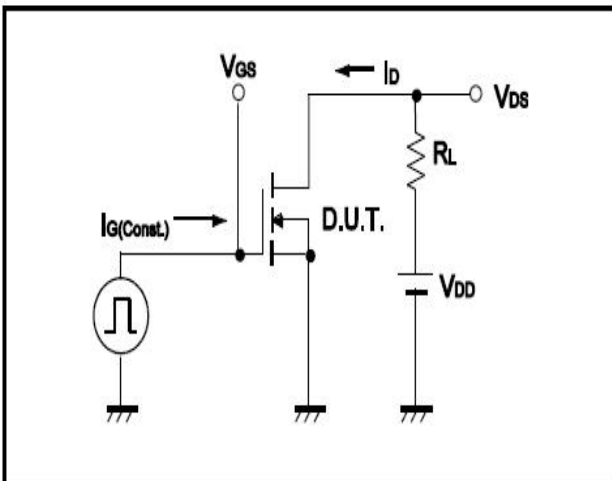Fig.10 ID-Junction Temperature

Fig.11 Switching Time Measurement Circuit
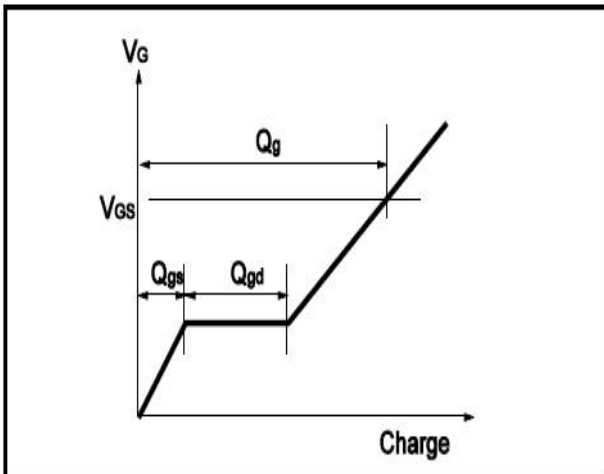

Fig.12 Gate Charge Waveform

Fig.13 Switching Time Measurement Circuit

Fig.14 Gate Charge Waveform

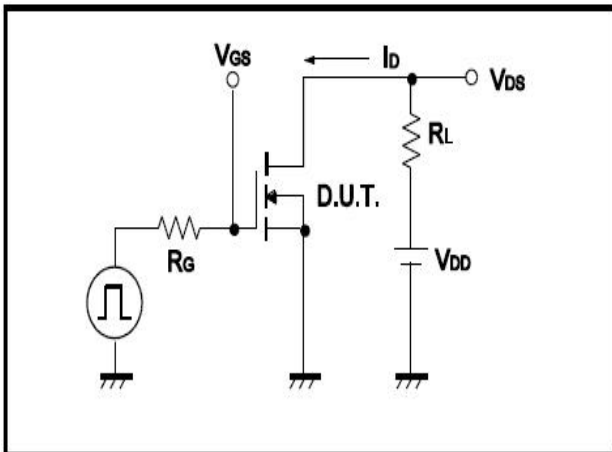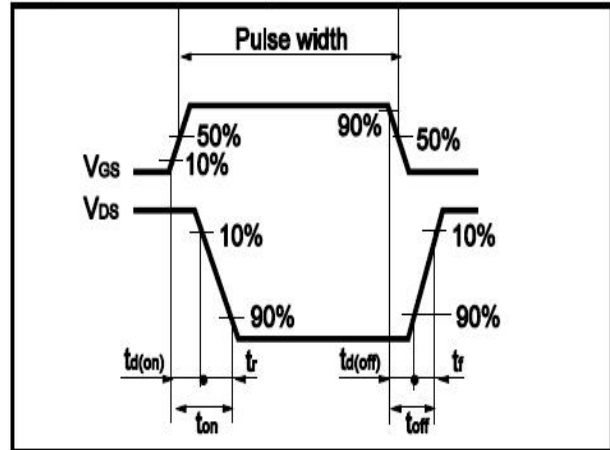● Dimensions (TO-220)

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