

• General Description

The ZMC88301S combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. It combine one N Channel MOSFET and one P channel MOSFET.

• Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Dual DIE in one package

• Application

- Power Management in Notebook Computer
- BLDC Motor driver

• Ordering Information:

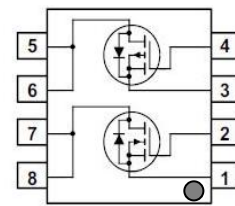
Part NO.	ZMC88301S
Marking	ZMC88301
Packing Information	REEL TAPE
Basic ordering unit (pcs)	4000

• Thermal resistance

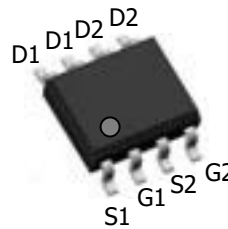
Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	34	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	180	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	15	A
	$I_D @ T_C = 75^\circ C$	11.4	A
	$I_D @ T_C = 100^\circ C$	9.5	A

• Product Summary


$V_{DS1} = 30V$
 $V_{DS2} = -30V$
 $R_{DS(ON)1} = 8.5m\Omega$
 $R_{DS(ON)2} = 16m\Omega$
 $I_{D1} = 15A$
 $I_{D2} = -8A$



SOP8



Pulsed Drain Current ①	I_{DM}	45	A
Total Power Dissipation	$P_D@T_C=25^\circ\text{C}$	3.6	W
Total Power Dissipation	$P_D@T_A=25^\circ\text{C}$	0.69	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$
Single Pulse Avalanche Energy	E_{AS}	75	mJ

•P Channel Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D@T_C = 25^\circ\text{C}$	-8	A
	$I_D@T_C = 75^\circ\text{C}$	-6.1	A
	$I_D@T_C = 100^\circ\text{C}$	-5	A
Pulsed Drain Current ①	I_{DM}	-24	A
Total Power Dissipation	$P_D@T_C=25^\circ\text{C}$	3.6	W
Total Power Dissipation	$P_D@T_A=25^\circ\text{C}$	0.69	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$
Single Pulse Avalanche Energy	E_{AS}	75	mJ

•N Channel Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu\text{A}$	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	1.2	1.6	2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 20A$		8.5	11	m Ω
		$V_{GS} = 4.5V, I_D = 10A$		12.5	16	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 25V, I_D = 10A$		9		s
Source-drain voltage	V_{SD}	$I_S = 20A$			1.28	V

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

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V _{DS} =25V	-	1630	-	pF
Output capacitance	Coss		-	212	-	
Reverse transfer capacitance	Crss		-	165	-	
Total gate charge	Qg	V _{DD} = 25V	-	31	-	nC
Gate - Source charge	Qgs	I _D = 5A	-	4.2	-	
Gate - Drain charge	Qgd	V _{GS} = 10V	-	8.7	-	

•P Channel Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-1.2		-2.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-30V, 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		16	20	mΩ
		V _{GS} =-4.5V, I _D =-10A		26	35	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-5A		6		s

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz V _{DS} =25V	-	1490	-	pF
Output capacitance	Coss		-	141	-	
Reverse transfer capacitance	Crss		-	105	-	
Total gate charge	Qg	V _{DD} =25V	-	25	-	nC
Gate - Source charge	Qgs	I _D = 6A	-	3.9	-	
Gate - Drain charge	Qgd	V _{GS} = 10V	-	5.5	-	

•N Channel characteristics curve

Fig.1 Power Dissipation

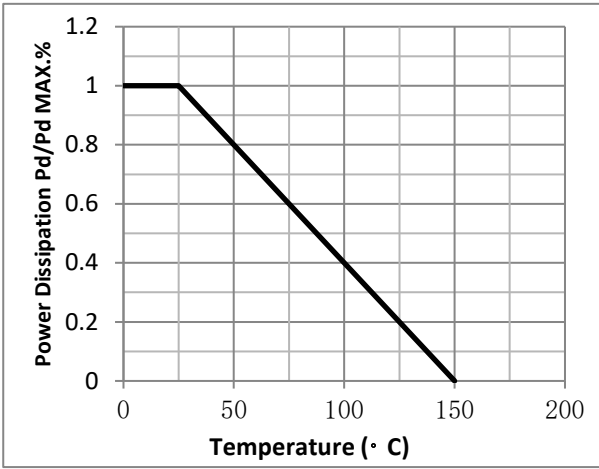


Fig.2 Typical output Characteristics

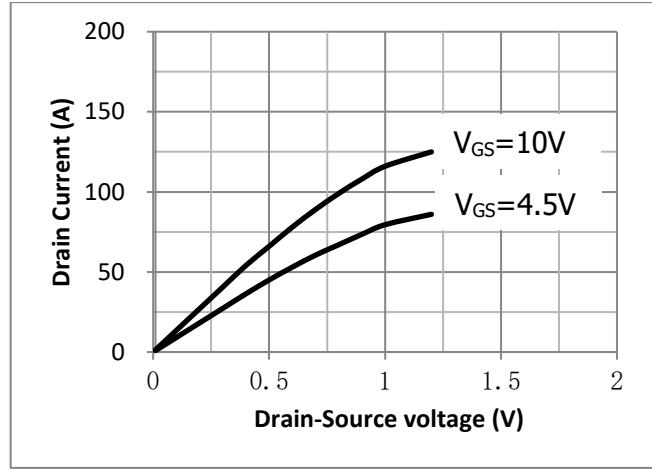


Fig.3 Threshold Voltage V.S Junction Temperature

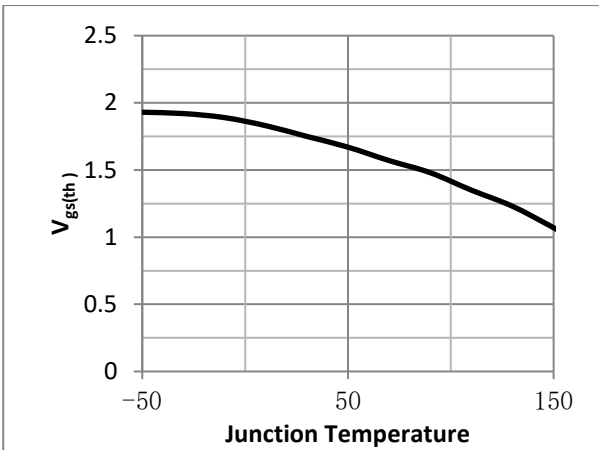


Fig.4 Resistance V.S Drain Current

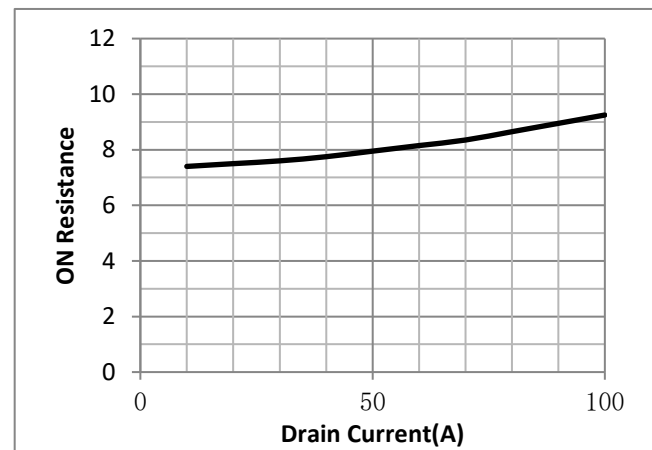


Fig.5 On-Resistance VS Gate Source Voltage

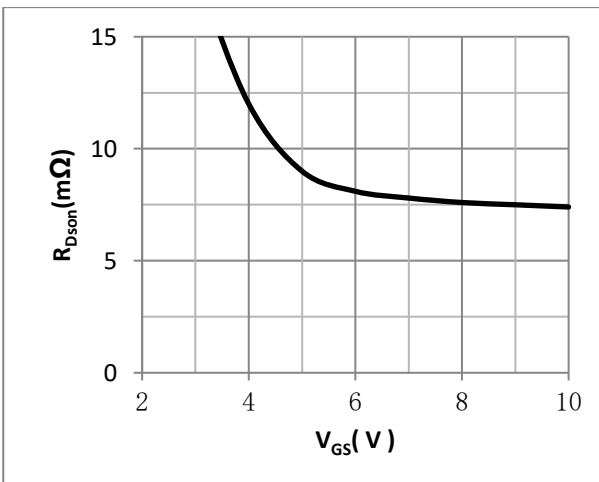
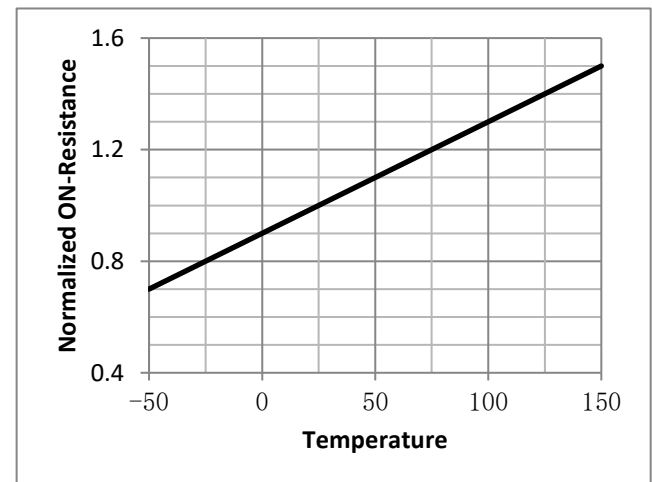


Fig.6 On-Resistance V.S Junction Temperature



•P Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

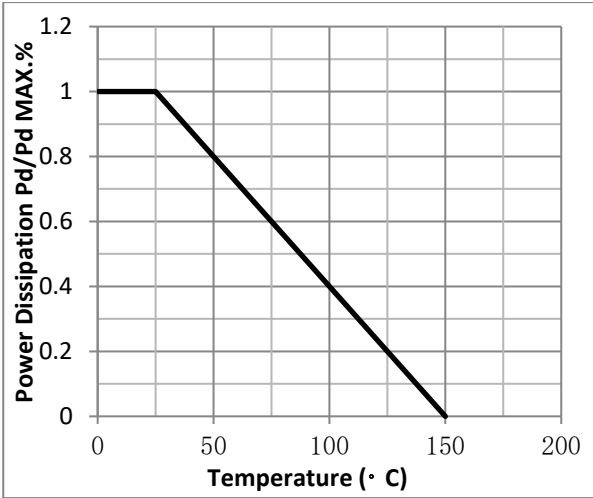


Fig.2 Typical output Characteristics

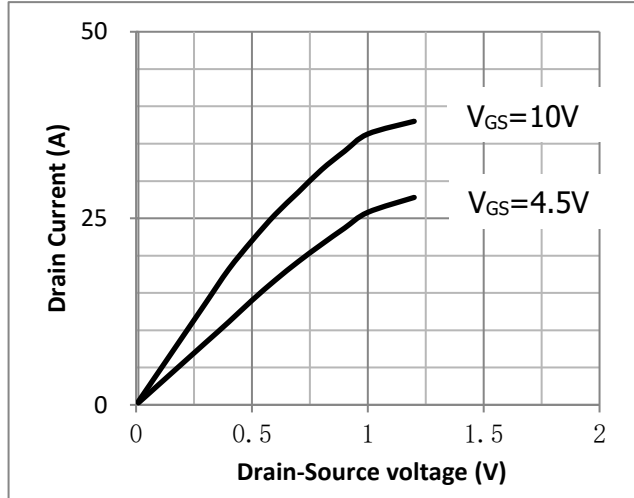


Fig.3 Threshold Voltage V.S Junction Temperature

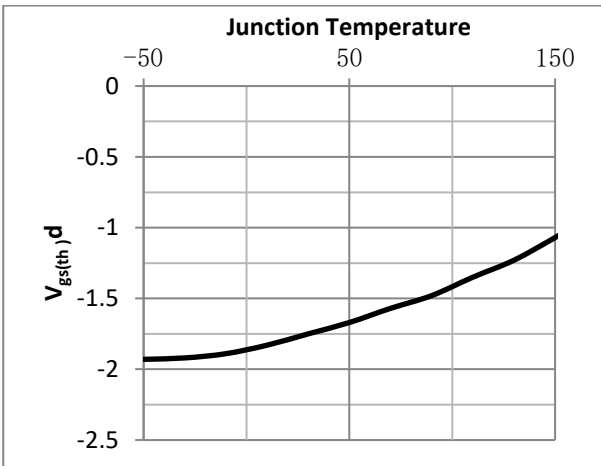


Fig.4 Resistance V.S Drain Current

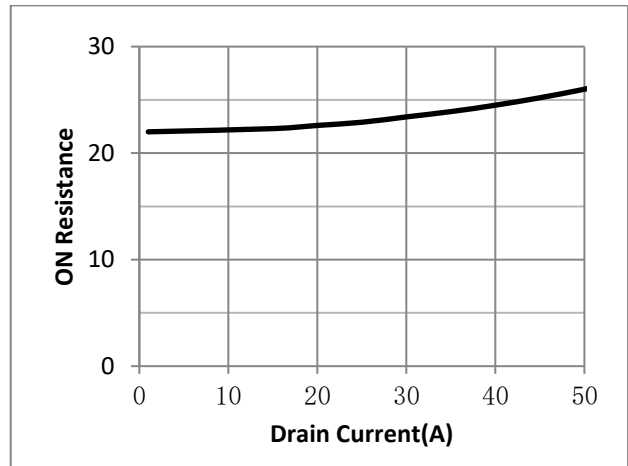


Fig.5 On-Resistance VS Gate Source Voltage

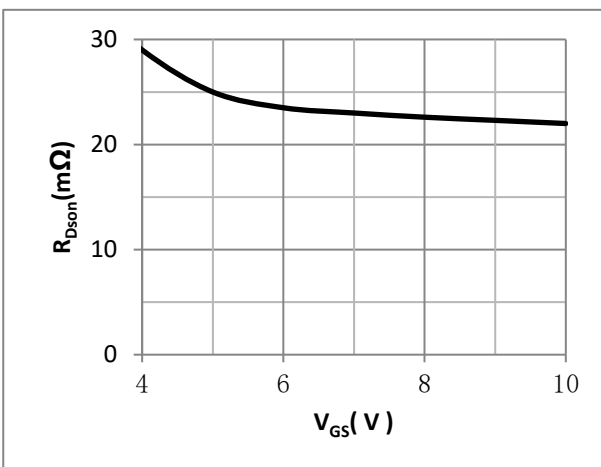
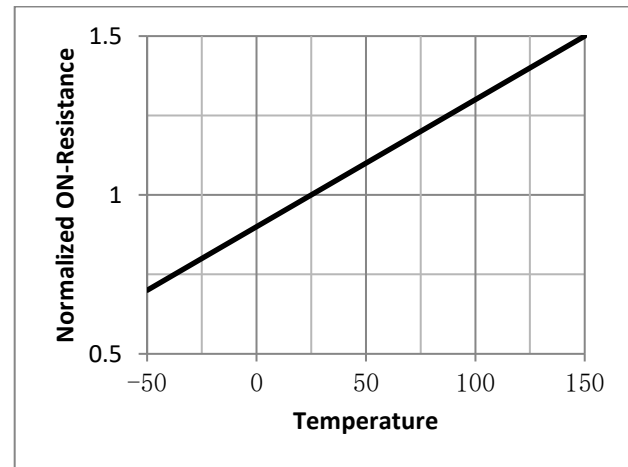


Fig.6 On-Resistance V.S Junction Temperature



•Test Circuit CHANNEL-N

Fig.1 Switching Time Measurement Circuit

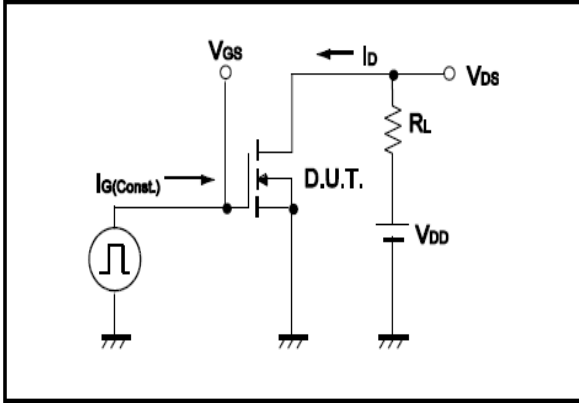


Fig.2 Gate Charge Waveform

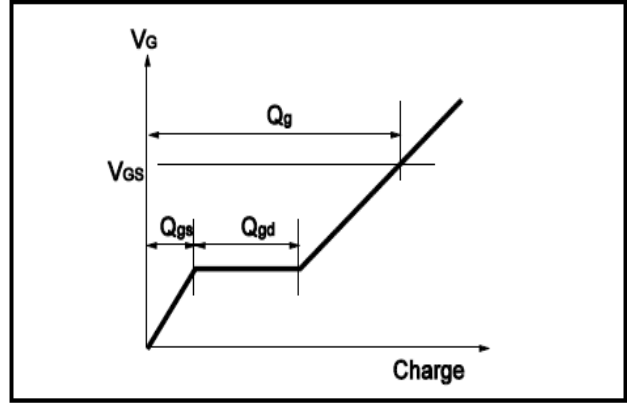


Fig.3 Switching Time Measurement Circuit

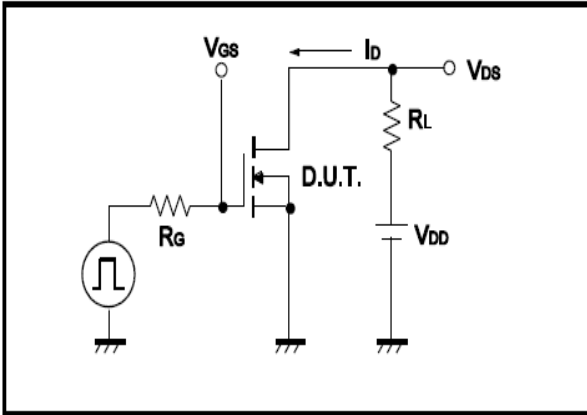


Fig.4 Gate Charge Waveform

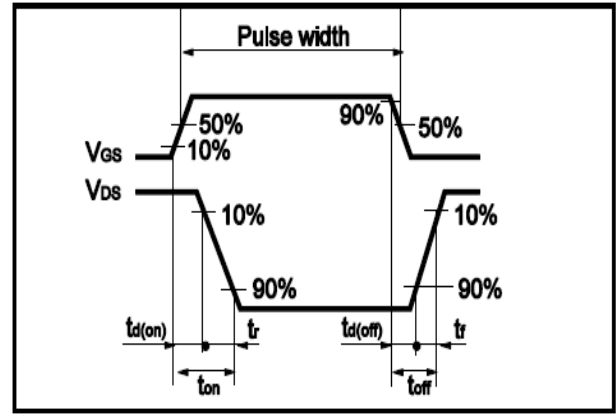


Fig.5 Avalanche Measurement Circuit

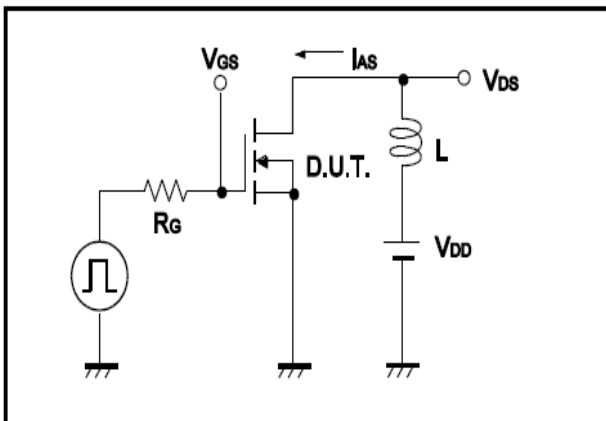
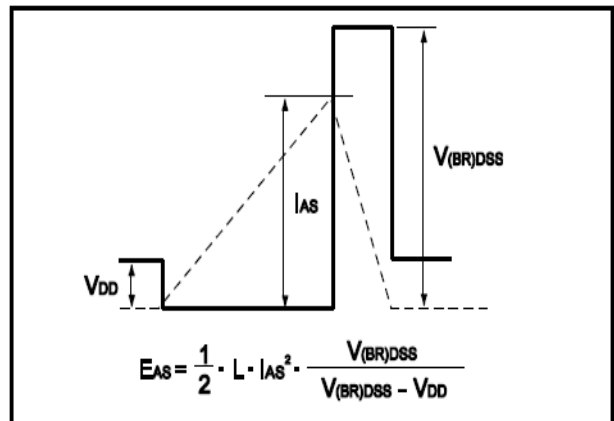


Fig.6 Avalanche Waveform



•Test Circuit CHANNEL-P

Fig.7 Switching Time Measurement Circuit

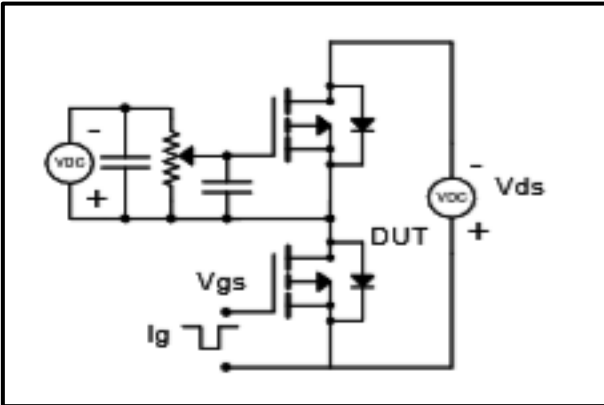


Fig.8 Gate Charge Waveform

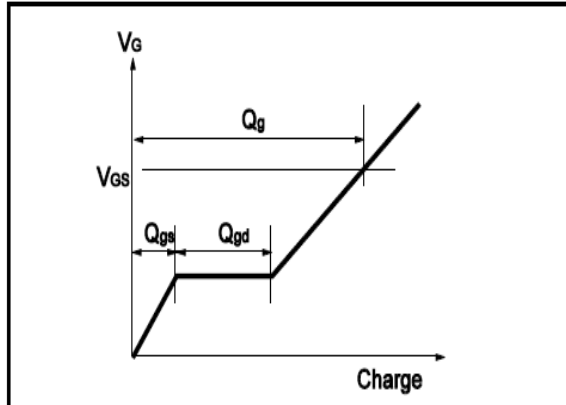


Fig.9 Switching Time Measurement Circuit

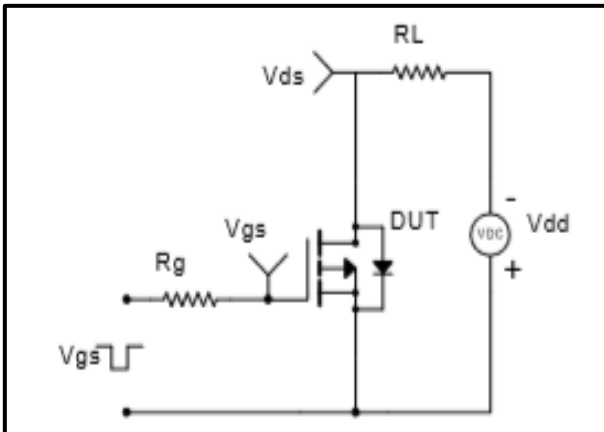


Fig.10 Gate Charge Waveform

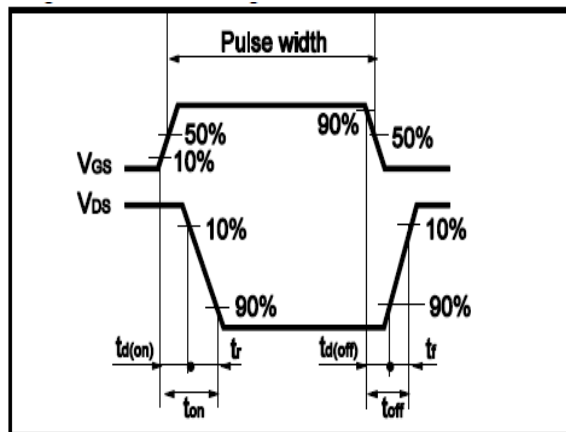


Fig.11 Avalanche Measurement Circuit

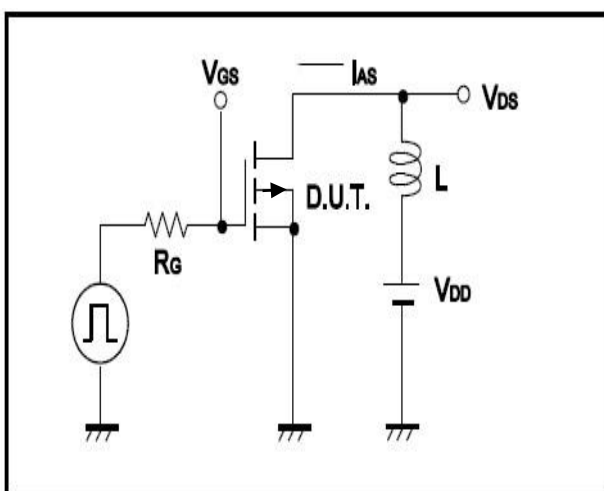
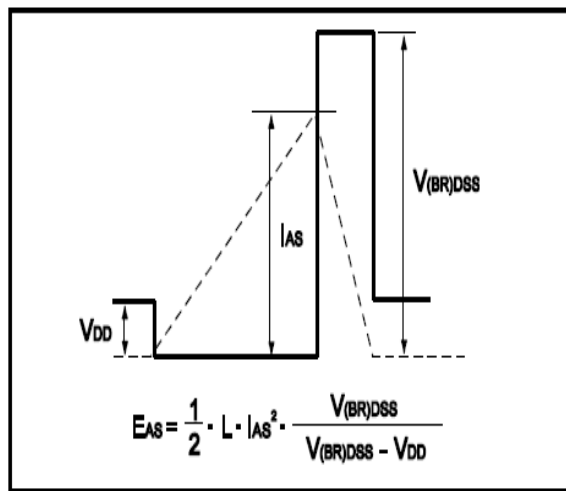


Fig.12 Avalanche Waveform



●Dimensions(SOP8)

Unit: mm

SYMBOL	min	TYP	max	SYMBOL	min		max
A	4.80		5.25	C	1.30		1.75
A1	0.37		0.49	C1	0.55		0.75
A2		1.27		C2	0.55		0.65
A3		0.41		C3	0.05		0.20
B	5.80		6.20	C4	0.10	0.20	0.23
B1	3.80		4.10	D		1.05	
B2		5.00		D1	0.40		0.62

