

• General Description

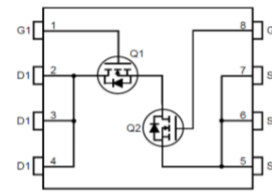
The ZMD68303N combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

• Features

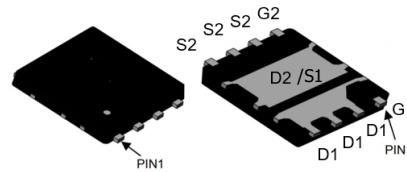
- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Dual DIE in one package

• Application

- DC/DC Converters in Computing
- Isolated DC/DC Converters in Telecom and Industrial

• Product Summary


$V_{DS1} = 30V$
 $V_{DS2} = 30V$
 $R_{DS(ON)1} = 5.3m\Omega$
 $R_{DS(ON)2} = 2.6m\Omega$
 $I_{D1} = 45A$
 $I_{D2} = 86A$



DFN5 x 6

• Ordering Information:

Part NO.	ZMD68303N
Marking	ZMD68303
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

• Absolute Maximum Ratings ($T_c = 25^\circ C$) (Q1)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ TC=25^\circ C$	45	A
	$I_D @ TC=75^\circ C$	34	A
	$I_D @ TC=100^\circ C$	28	A
Pulsed Drain Current ^①	I_{DM}	135	A
Total Power Dissipation	$P_D @ TC=25^\circ C$	60	W
Total Power Dissipation	$P_D @ TA=25^\circ C$	2.0	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy @ $L=0.1mH$	E_{AS}	40	mJ

•Thermal resistance(Q1)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R _{thJC}	-	-	2.1	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	60	° C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	265	° C

•Electronic Characteristics(Q1)

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 =15A		5.3	6.8	mΩ
		V _{GS} =4.5V, I _D =10A		7.2	9.3	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V, I _D =10A		12		s
Source-drain voltage	V _{SD}	I _S =15A			1.28	V

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz	-	754	-	pF
Output capacitance	C _{oss}		-	186	-	
Reverse transfer capacitance	C _{rss}		-	26	-	
Gate Resistance	R _g	f = 1MHz		1.5		Ω
Total gate charge	Q _g	V _{DD} = 15V	-	12	-	nC
Gate - Source charge	Q _{gs}	I _D = 20A	-	1.2	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	2.1	-	
Turn-ON Delay time	t _{D(on)}	V _{DD} = 15V		14		nS
Turn-ON Rise time	t _r	I _D = 20A		21		
Turn-Off Delay time	t _{D(off)}	V _{GS} = 4.5V		26		
Turn-Off Fall time	t _f	R _{G,ext} =2Ω		7.5		
Reverse Recovery Time	t _{rr}	V _R =20V		10		nS
Reverse Recovery Charge	Q _{rr}	I _F =20A, dI/dt=100A/μs		18		nC

**•Absolute Maximum Ratings (T_C =25°C) (Q2)**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _{D@TC=25°C}	86	A
	I _{D@TC=75°C}	65	A
	I _{D@TC=100°C}	54	A
Pulsed Drain Current ^①	I _{DM}	258	A
Total Power Dissipation	P _{D@TC=25°C}	78	W
Total Power Dissipation	P _{D@TA=25°C}	2.5	W
Operating Junction Temperature	T _J	-55 to 150	°C
Storage Temperature	T _{STG}	-55 to 150	°C
Single Pulse Avalanche Energy@L=0.1mH	E _{AS}	100	mJ

•Thermal resistance(Q2)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R _{thJC}	-	-	1.6	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	50	° C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	265	° C

•Electronic Characteristics(Q2)

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		2.6	3.3	mΩ
		V _{GS} =4.5V, I _D =10A		3.2	4.2	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V, I _D =10A		18		s
Source-drain voltage	V _{SD}	I _S =20A			1.28	V

•Dynamic Characteristics(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz, V _{DS} =25V	-	1970	-	pF
Output capacitance	C _{oss}		-	507	-	
Reverse transfer capacitance	C _{rss}		-	12	-	
Gate Resistance	R _g	f = 1MHz		1.5		Ω
Total gate charge	Q _g	V _{DD} = 15V I _D = 5A V _{GS} = 10V	-	29	-	nC
Total gate charge	Q _g (4.5V)		-	16	-	
Gate - Source charge	Q _{gs}		-	4.6	-	
Gate - Drain charge	Q _{gd}		-	4.9	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =10V, V _{DS} =15V R _G =6Ω, I _D =15A		10		ns
Turn-ON Rise time	t _r			5.5		ns
Turn-Off Delay time	t _{D(off)}			32		ns
Turn-Off Fall time	t _f			10		ns
Reverse Recovery Time	t _{RR}	V _{DD} = 20 V, dI _S /dt = 100 A/s, I _S = 30 A		21		ns
Reverse Recovery Charge	Q _{RR}			42		nC

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

• characteristics curve(Q1)

Fig.1 Gate-Charge Characteristics

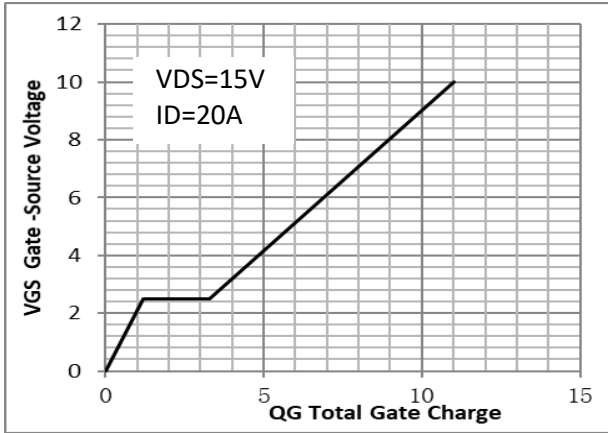


Fig.2 Capacitance Characteristics

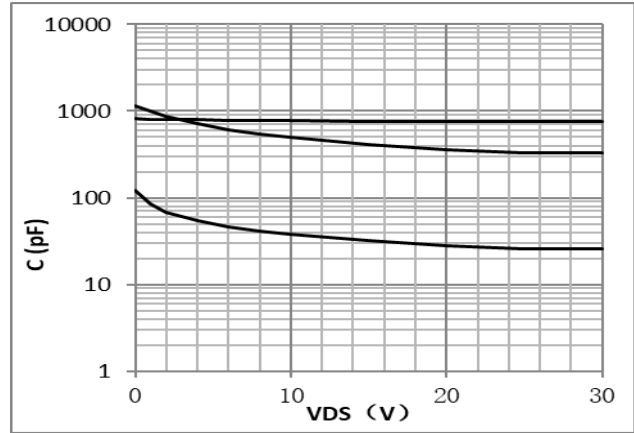


Fig.3 Power Dissipation

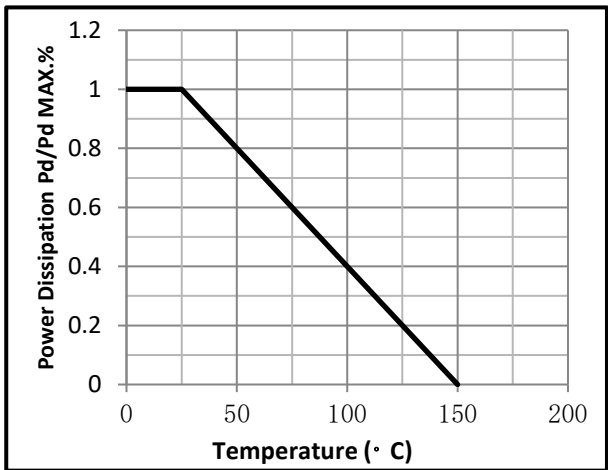


Fig.4 Typical output Characteristics

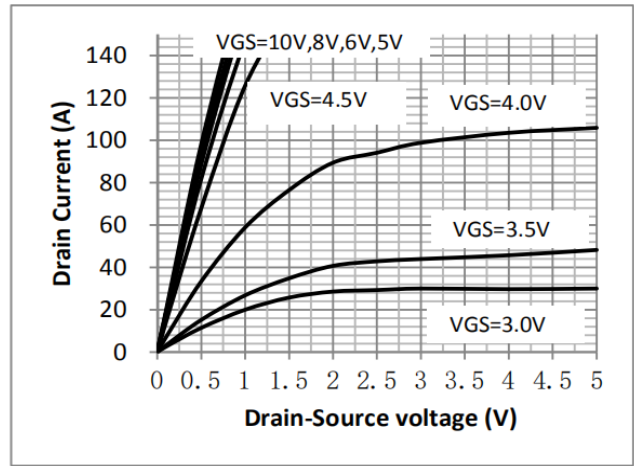


Fig.5 Threshold Voltage V.S Junction Temperature

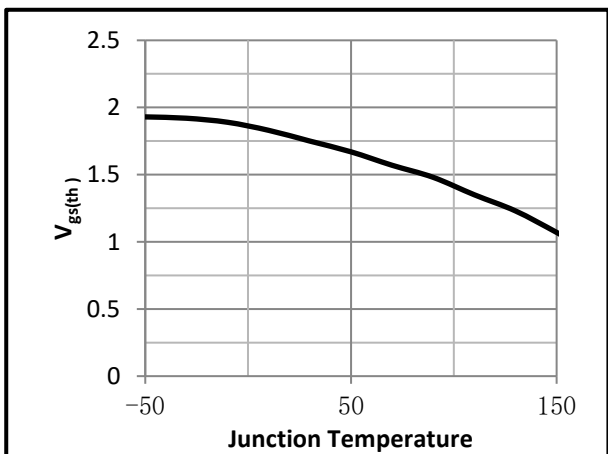


Fig.6 Resistance V.S Drain Current

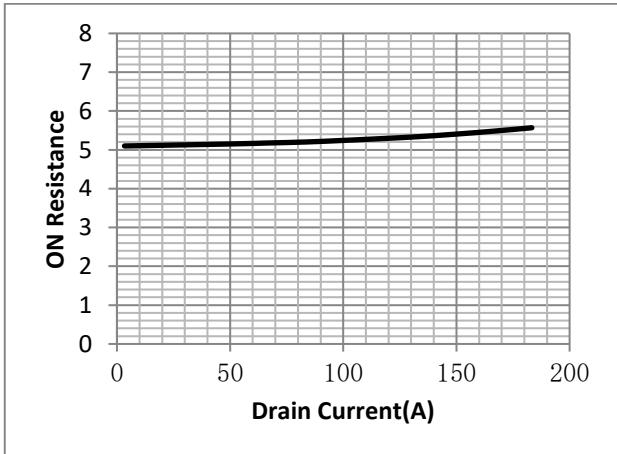


Fig.7 On-Resistance VS Gate Source Voltage

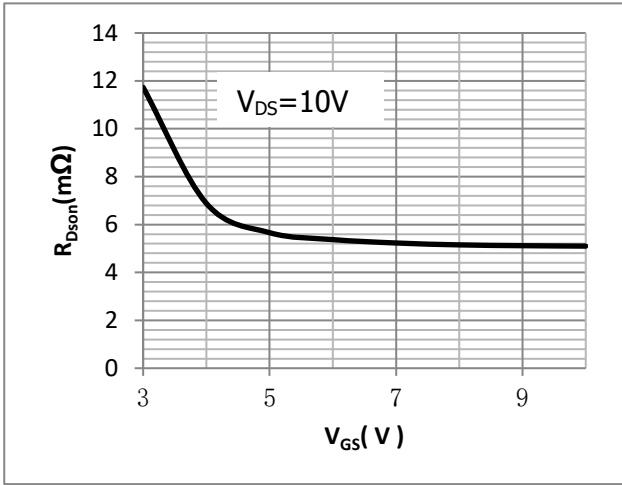


Fig.8 On-Resistance V.S Junction Temperature

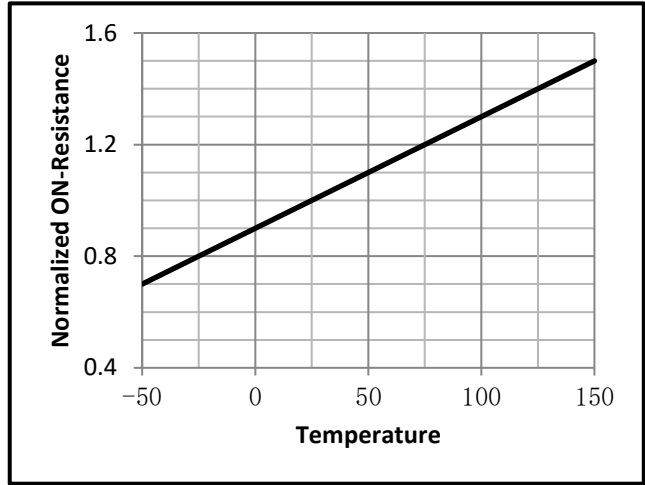


Fig.9 SOA Maximum Safe Operating Area

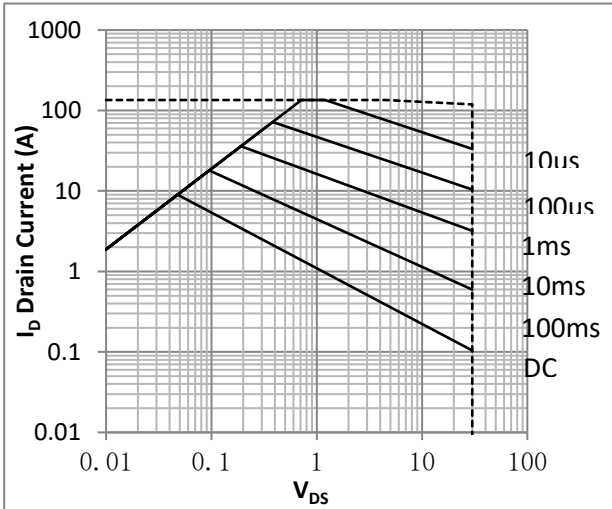
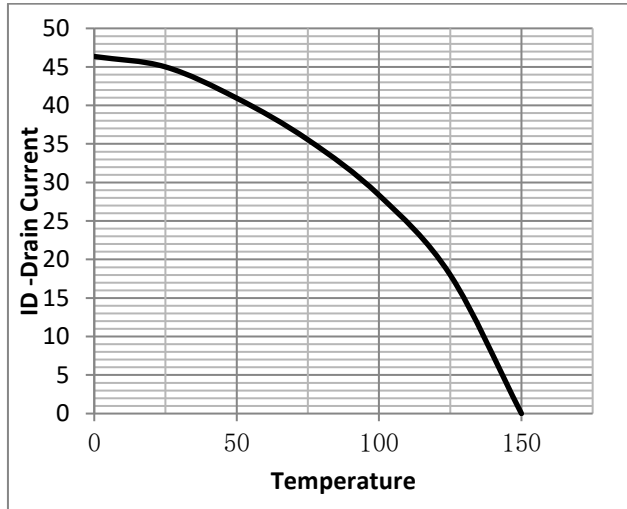


Fig.10 ID-Junction Temperature



• characteristics curve(Q2)

Fig.11 Power Dissipation

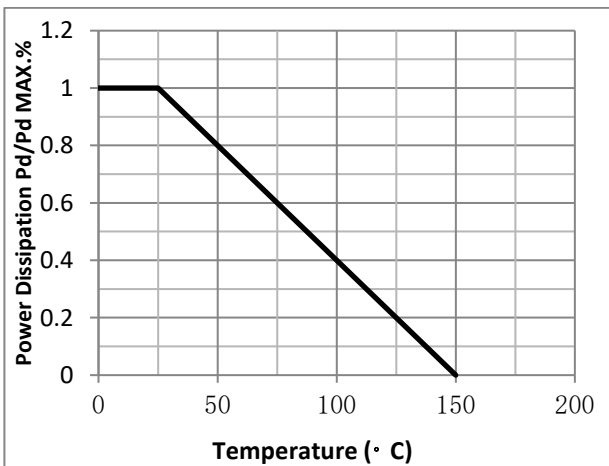


Fig.12 Typical output Characteristics

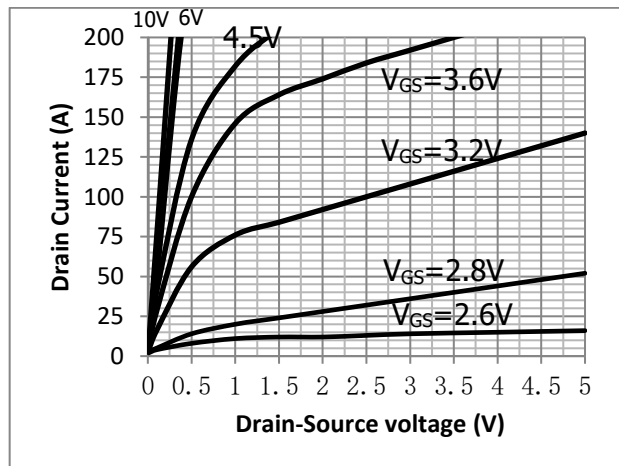


Fig.13 Threshold Voltage V.S Junction Temperature Fig.14 Resistance V.S Drain Current

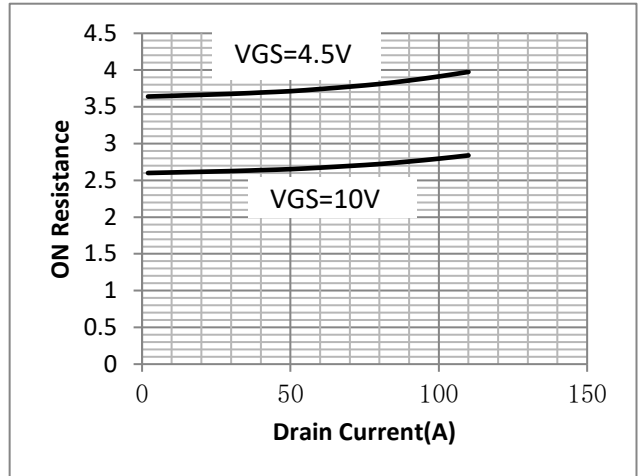
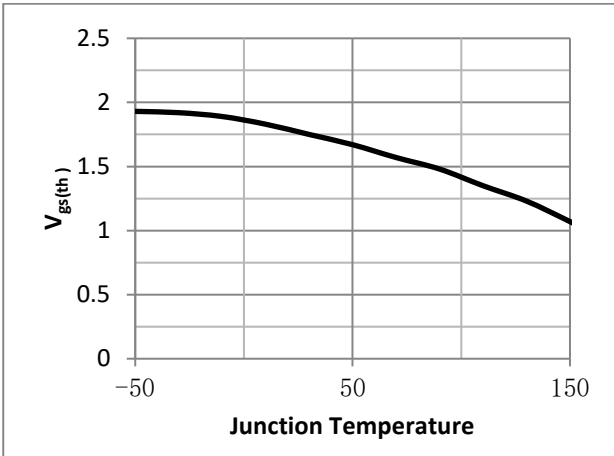


Fig.15 On-Resistance VS Gate Source Voltage Temperature

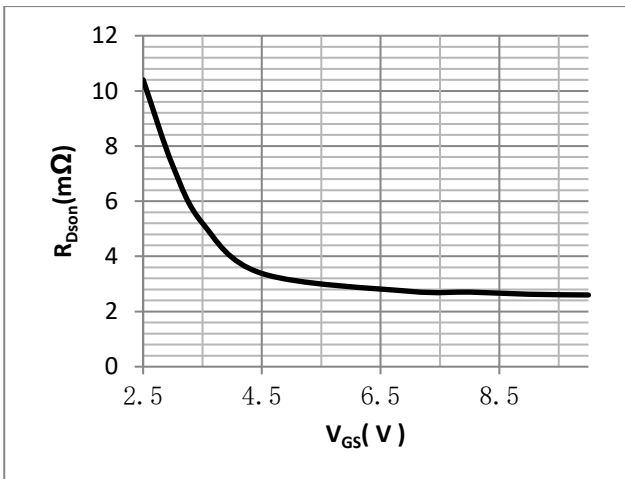


Fig.16 On-Resistance V.S Junction

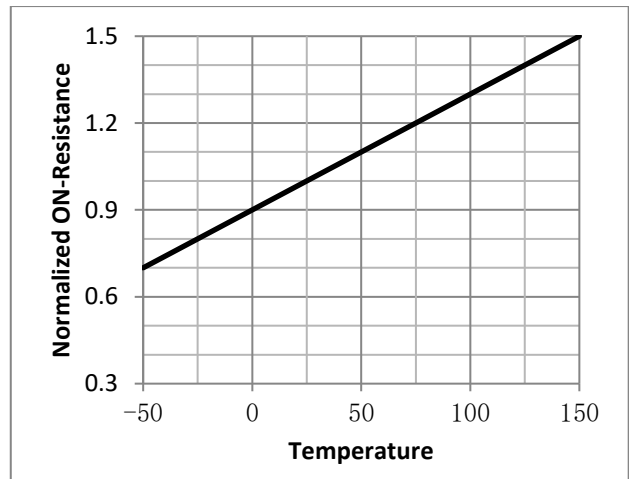


Fig.17 Gate Charge Characteristics

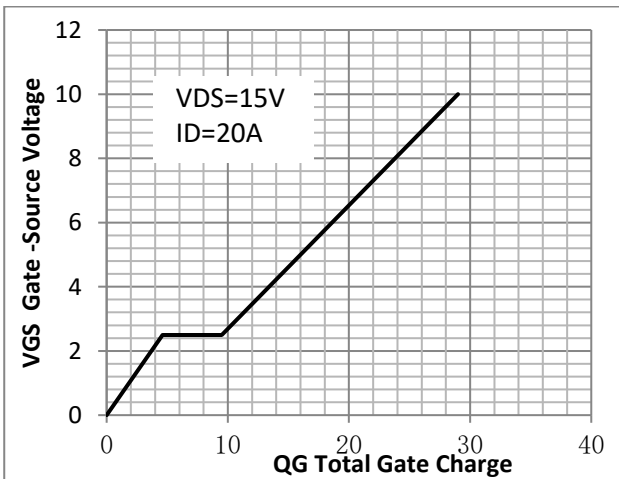


Fig.18 Capacitance vs Vds

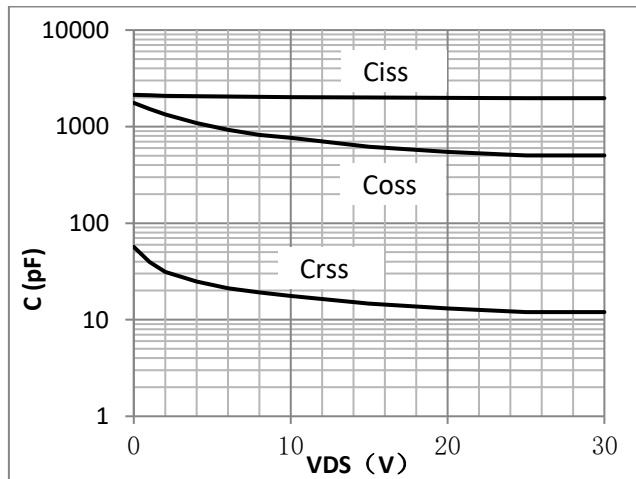


Fig.19 SOA Maximum Safe Operating Area

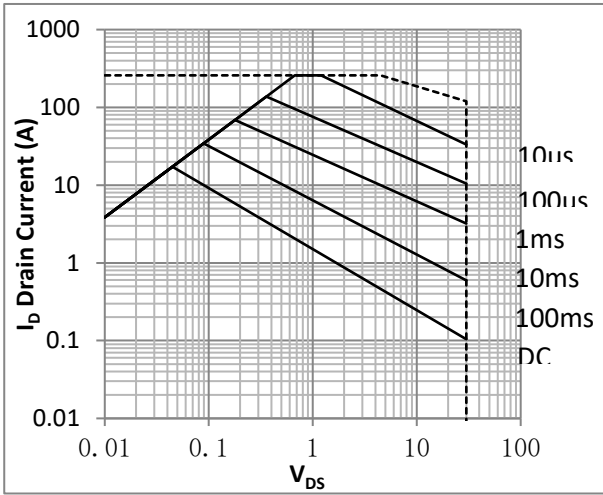


Fig.20 ID-Junction Temperature

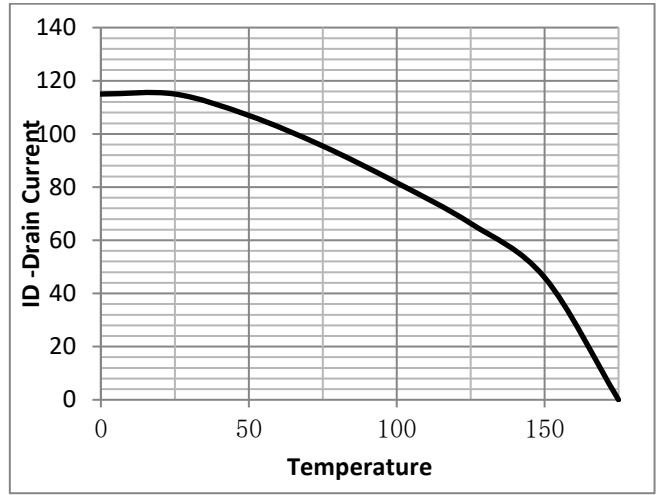


Fig.21 Switching Time Measurement Circuit

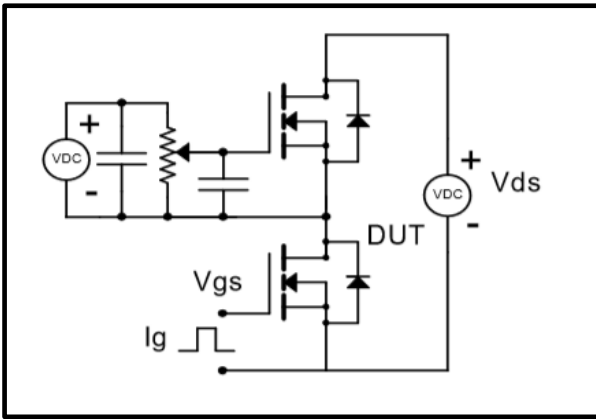


Fig.22 Gate Charge Waveform

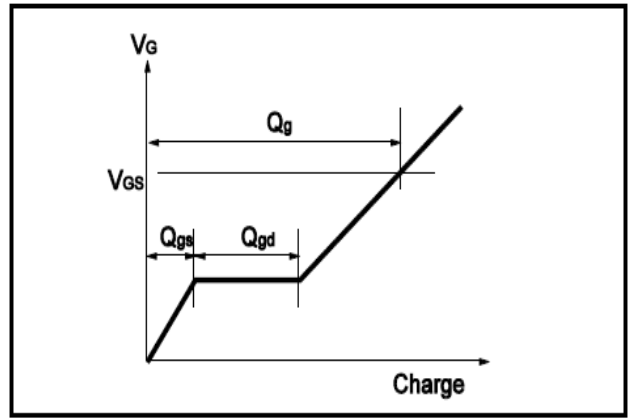


Fig.23 Switching Time Measurement Circuit

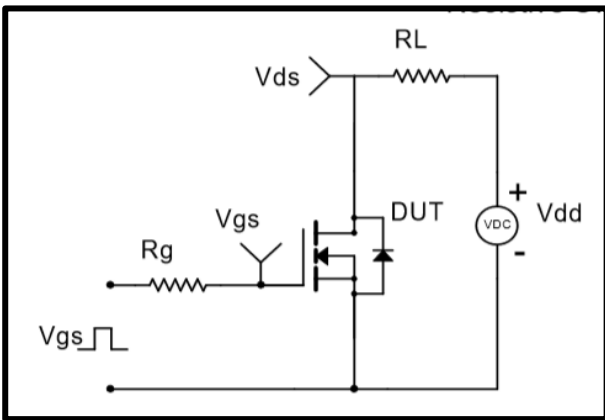


Fig.24 Gate Charge Waveform

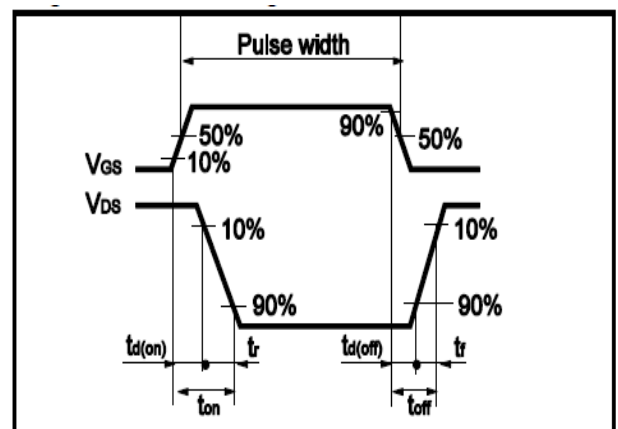


Fig.25 Avalanche Measurement Circuit

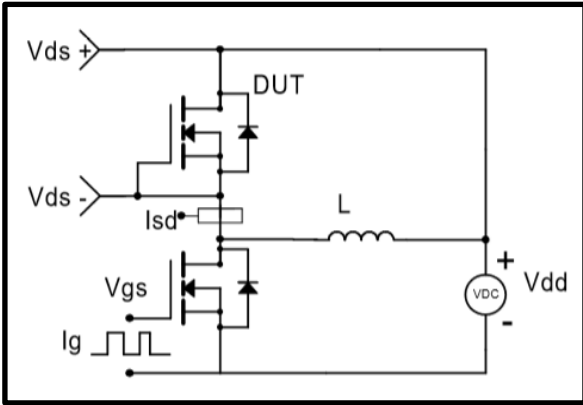
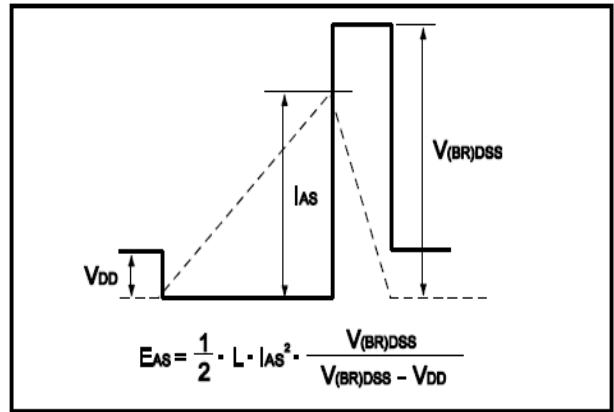
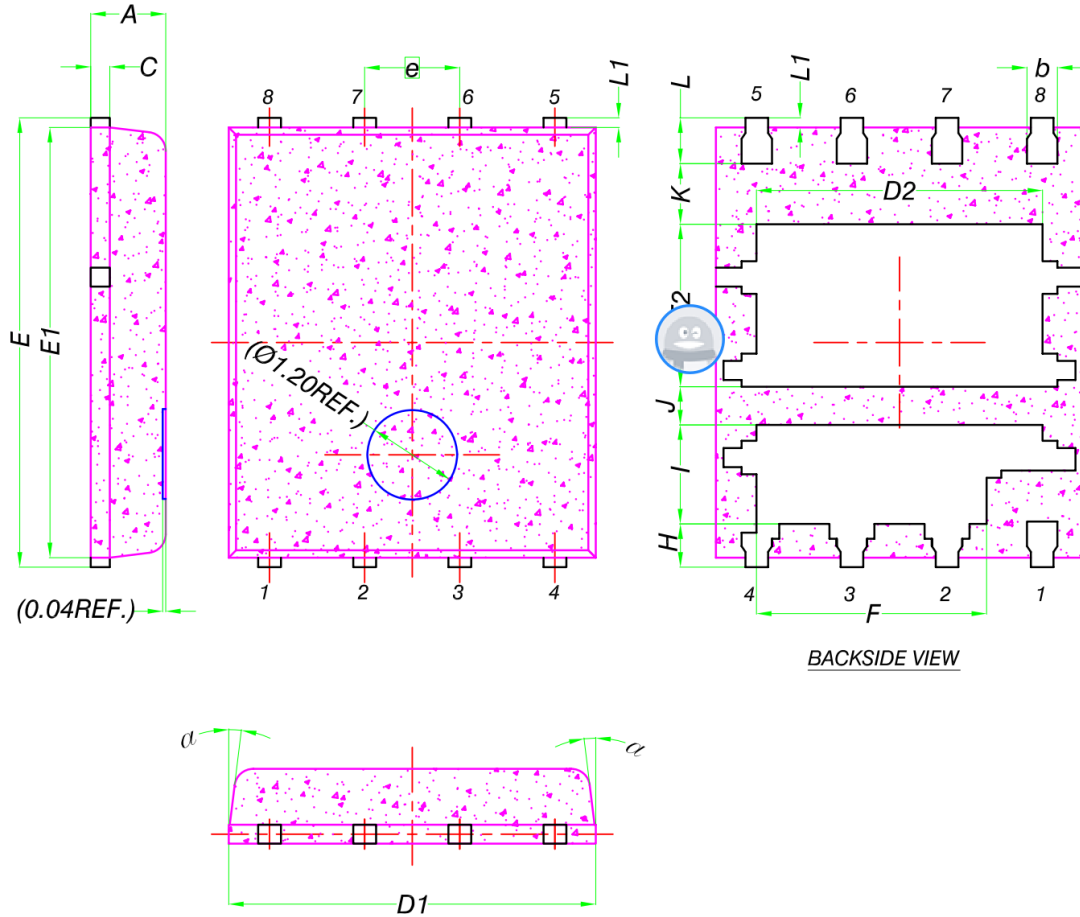


Fig.26 Avalanche Waveform



•Dimensions (DFN5x6)

Unit: mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	2.02	2.17	2.32
e	1.27 BSC		
F	2.87	3.07	3.22
H	0.48	0.58	0.68
I	1.22	1.32	1.42
J	0.40	0.50	0.60
K	0.50	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°