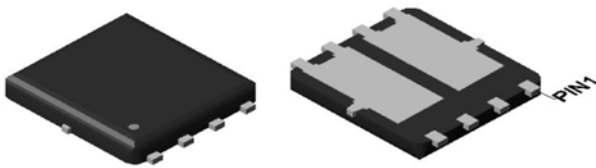


Features

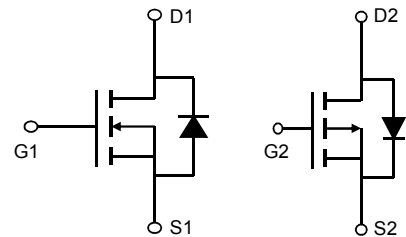
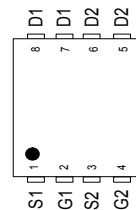
- N+P Channel
- Enhancement mode
- Very low on-resistance
- Fast Switching
- Pb-free lead plating; RoHS compliant

V_{DS}	30	-30	V
$R_{DS(on),TYP} V_{GS}=10V$	12	14.5	mΩ
$R_{DS(on),TYP} V_{GS}=4.5V$	16	18	mΩ
I_D	16	-18	A

PDFN5X6



Top View



Part ID	Package Type	Marking	Tape and reel information
TF32324	PDFN5x6	TF32324	5000pcs/Reel

Absolute Maximum ratings, at $T_j=25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter		Rating		Unit
			NMOS	PMOS	
V _{GS}	Gate-Source Voltage		±20	±20	V
V _{(BR)DSS}	Drain-Source Breakdown Voltage		30	-30	V
T _{STG} T _J	Storage and operating temperature range		-55 to 175		°C
I _S	Diode Continuous Forward Current	T _C =25°C	16	-18	A
Mounted on Large Heat Sink					
I _{DM}	Pulse Drain Current Tested②	T _C =25°C	50	-60	A
I _D	Continuous Drain Current	T _C =25°C	16	-18	A
		T _C =100°C	12	-14	
P _D	Power dissipation for Dual Operation	T _C =25°C	18		W
R _{θJC}	Thermal Resistance-Junction to Case		4.5		°C/W
R _{θJA}	Thermal Resistance Junction-Ambient		30		°C/W
Drain-Source Avalanche Ratings					
EAS	Avalanche Energy, Single Pulsed		25	32	mJ

N Channel Electronic Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _j = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V,V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T _j =125℃)	V _{DS} =30V,V _{GS} =0V	--	--	100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V,V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =250μA	1.0	1.5	2.0	V
R _{DS(ON)}	Drain-Source On-State Resistance②	V _{GS} =10V, I _D =12A	--	12	14	mΩ
		V _{GS} =4.5V, I _D =10A	--	16	18	mΩ
Dynamic Electrical Characteristics @ T _j = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =15V,V _{GS} =0V, f=1MHz	--	625	--	pF
C _{oss}	Output Capacitance		--	88.3	--	pF
C _{rss}	Reverse Transfer Capacitance		--	72.5	--	pF
Q _g	Total Gate Charge	V _{DS} =15V,I _D =10A, V _{GS} =10V	--	15	--	nC
Q _{gs}	Gate Source Charge		--	3.3	--	nC
Q _{gd}	Gate Drain Charge		--	2.1	--	nC
Switching Characteristics						
t _{d(on)}	Turn on Delay Time	V _{DD} =15V, I _D =3.5A, R _G =3.3Ω, V _{GS} =10V	--	5	--	nS
t _r	Turn on Rise Time		--	12	--	nS
t _{d(off)}	Turn Off Delay Time		-	21	--	nS
t _f	Turn Off Fall Time		--	6	--	nS
Source Drain Diode Characteristics@ T _j = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _{SD} =12A,V _{GS} =0V	--	0.9	1.2	V
t _{rr}	Reverse Recovery Time	T _j =25℃,I _{sd} =12A, V _{GS} =0V	--	11	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/μs	--	9	--	nC

P Channel Electronic Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V,V _{GS} =0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(T _J =125°C)	V _{DS} =-30V,V _{GS} =0V	--	--	-100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V,V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =-250μA	-1.2	-1.7	-2.2	V
R _{DS(ON)}	Drain-Source On-State Resistance②	V _{GS} =-10V, I _D =-15A	--	14.5	16	mΩ
		V _{GS} =-4.5V, I _D =-10A	--	18	20	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-15V,V _{GS} =0V, f=1MHz	--	1716	--	pF
C _{oss}	Output Capacitance		--	227	--	pF
C _{rss}	Reverse Transfer Capacitance		--	195	--	pF
Q _g	Total Gate Charge	V _{DS} =-15V,I _D =-5A, V _{GS} =-10V	--	37	--	nC
Q _{gs}	Gate Source Charge		--	6.2	--	nC
Q _{gd}	Gate Drain Charge		--	5.9	--	nC
Switching Characteristics						
t _{d(on)}	Turn on Delay Time	V _{DD} =-15V, I _D =-15A, R _G =3.3Ω, V _{GS} =-10V	--	17	--	ns
t _r	Turn on Rise Time		--	45	--	ns
t _{d(off)}	Turn Off Delay Time		-	32	--	ns
t _f	Turn Off Fall Time		--	37	--	ns
Source Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _{SD} =-15A,V _{GS} =0V	--	-0.92	-1.2	V
t _{rr}	Reverse Recovery Time	T _J =25°C,I _{sd} =-15A, V _{GS} =0V	--	35	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/μs	--	23	--	nC

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 300μs; duty cycles ≤ 2%

③ Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 13A, V_{GS} = 10V. Part not recommended for use above this value

④ Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = -15A, V_{GS} = -10V. Part not recommended for use above this

N Channel characteristics curve

Fig.1 Power Dissipation

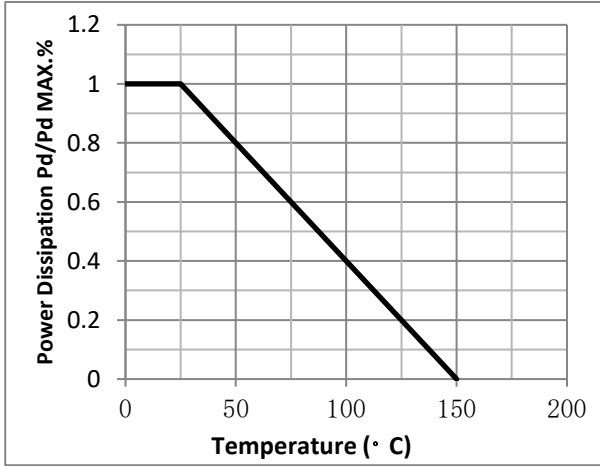


Fig.2 Typical output Characteristics

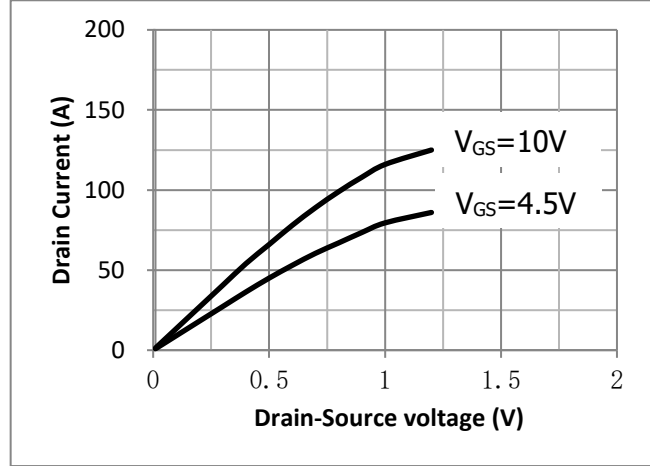


Fig.3 Threshold Voltage V.S Junction Temperature

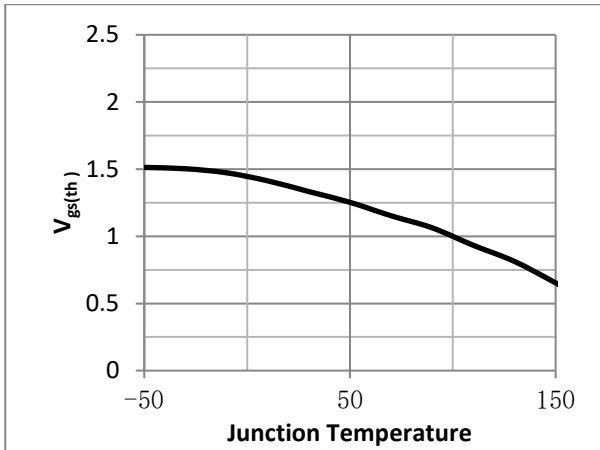


Fig.4 Resistance V.S Drain Current

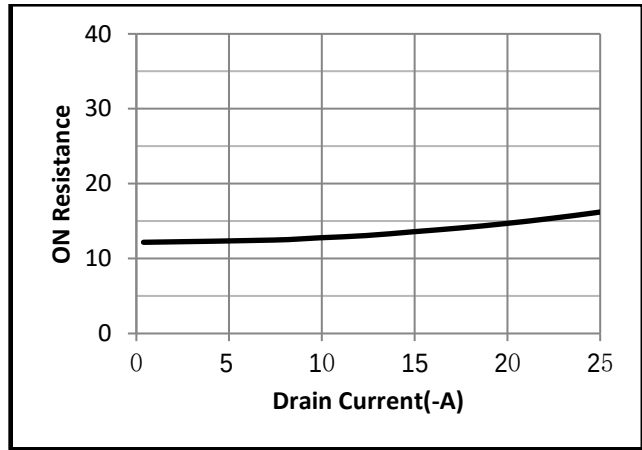


Fig.5 On-Resistance VS Gate Source Voltage

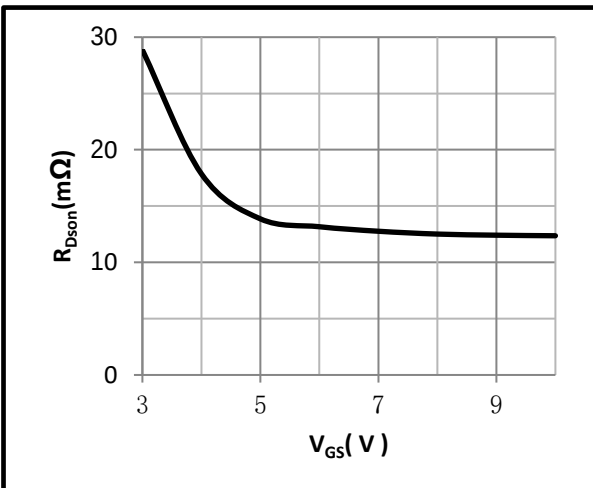
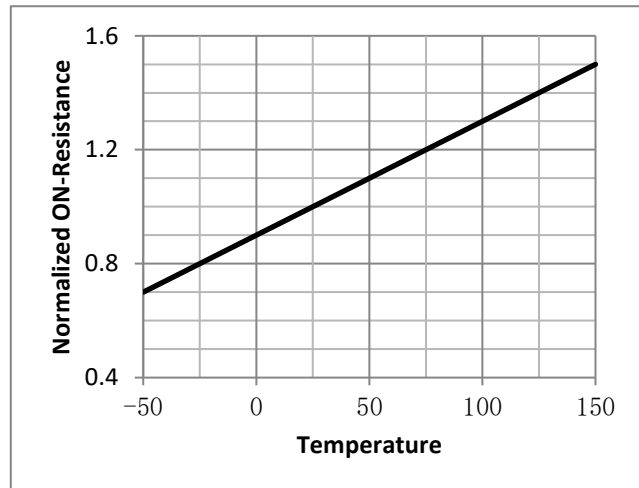


Fig.6 On-Resistance V.S Junction Temperature



P Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

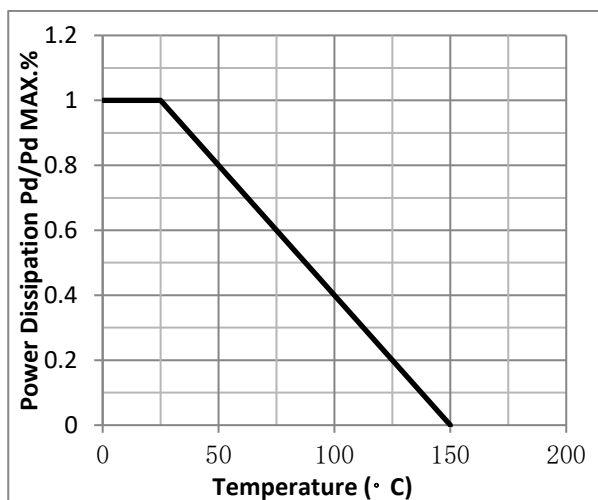


Fig.2 Typical output Characteristics

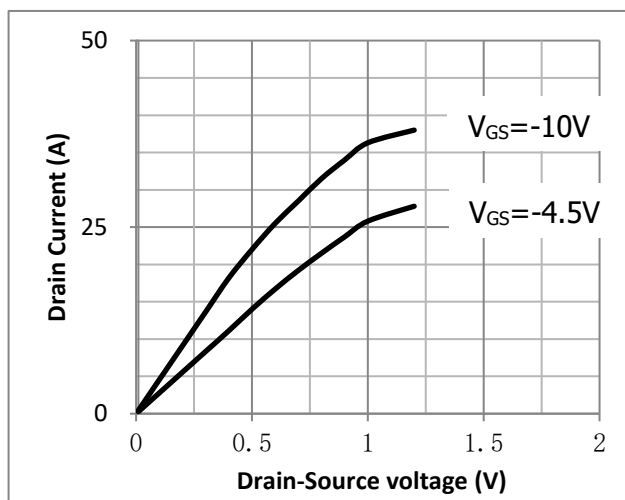


Fig.3 Threshold Voltage V.S Junction Temperature

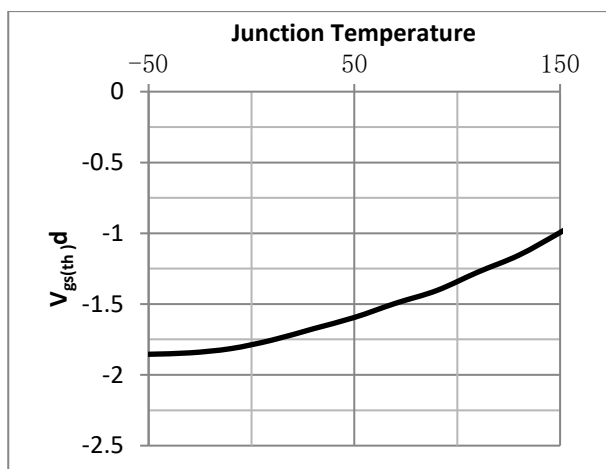


Fig.4 Resistance V.S Drain Current

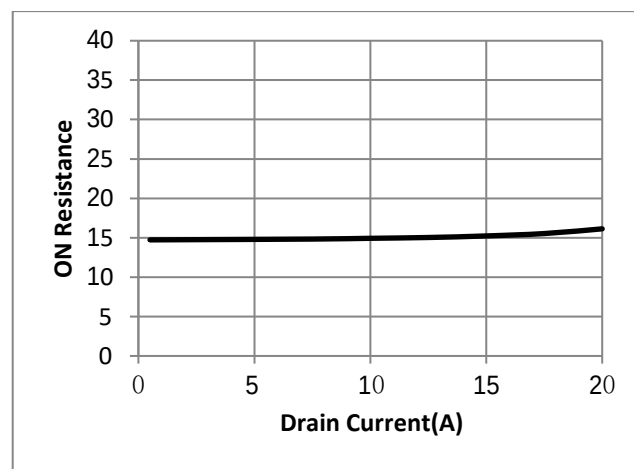


Fig.5 On-Resistance VS Gate Source Voltage

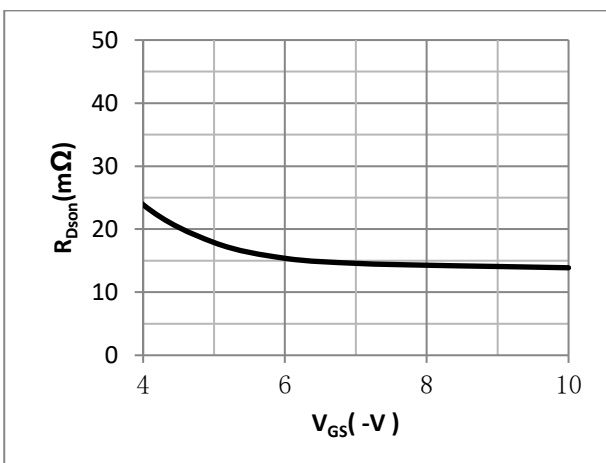
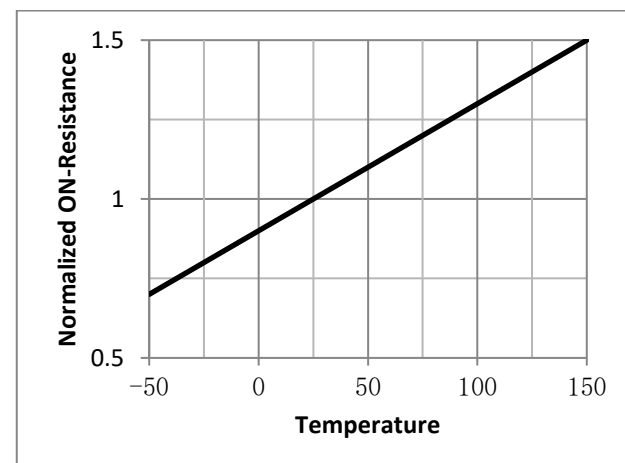


Fig.6 On-Resistance V.S Junction Temperature



Test Circuit

Fig.1 Switching Time Measurement Circuit

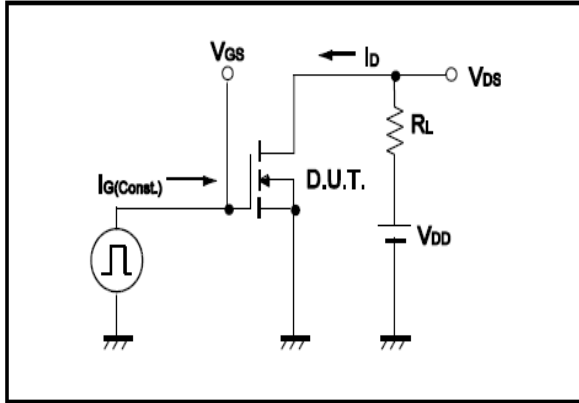


Fig.2 Gate Charge Waveform

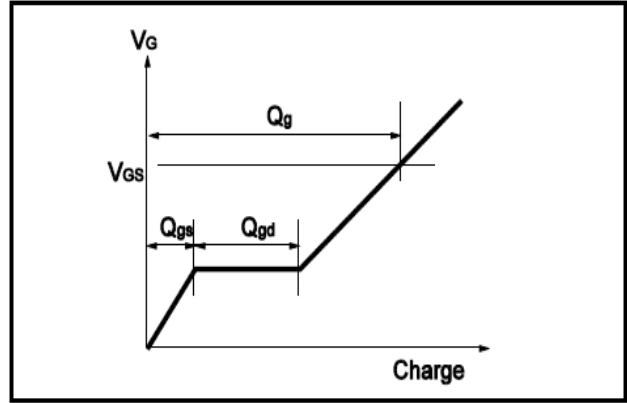


Fig.3 Switching Time Measurement Circuit

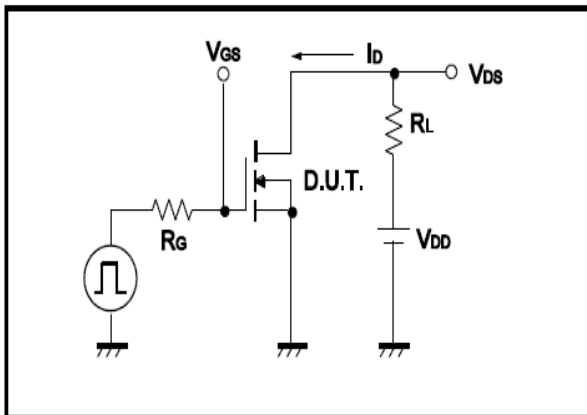


Fig.4 Gate Charge Waveform

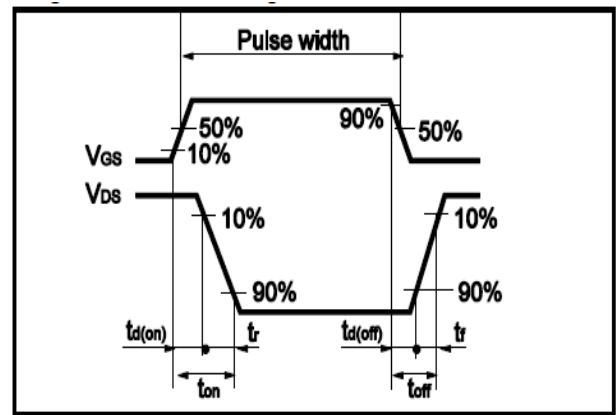


Fig.5 Avalanche Measurement Circuit

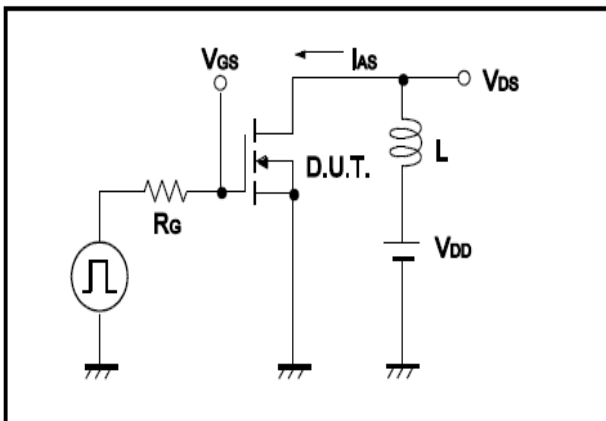
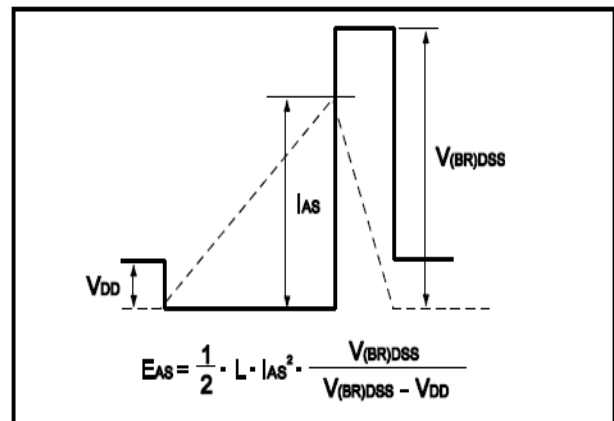
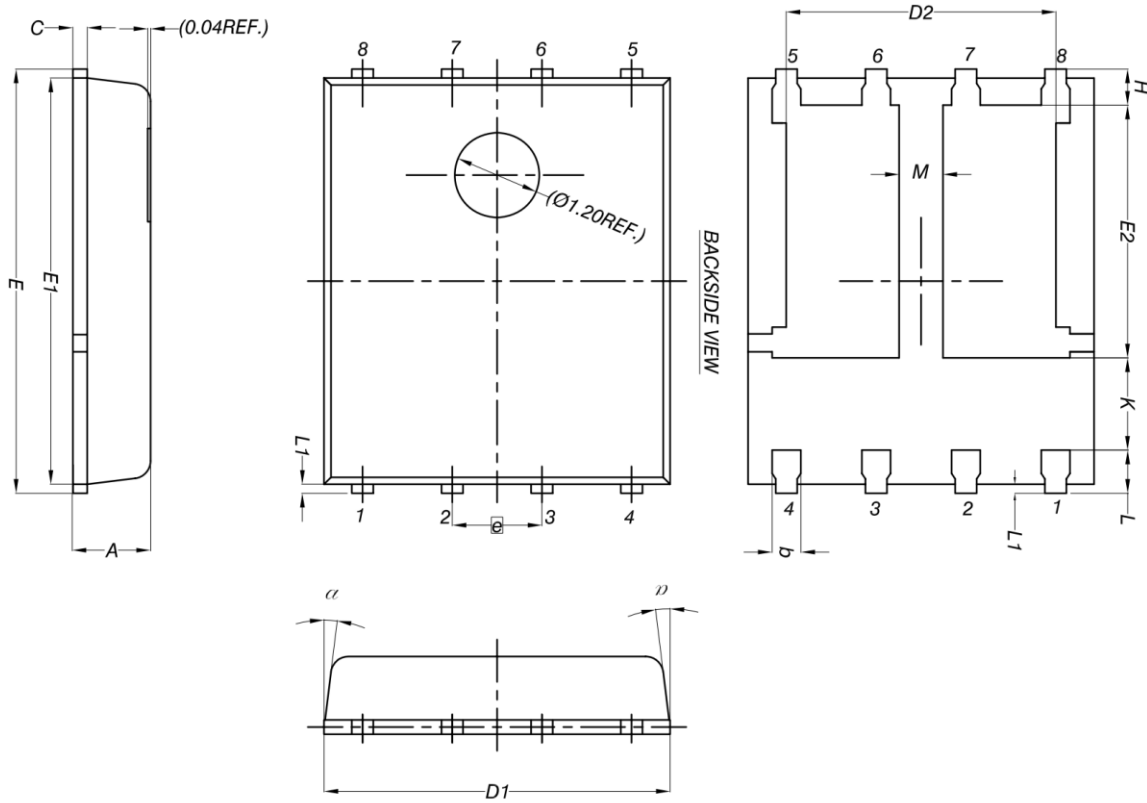


Fig.6 Avalanche Waveform



PDFN5*6 Package Outline Data

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	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	-	-
α	0°	-	12°

Land Pattern
(Only for Reference)

