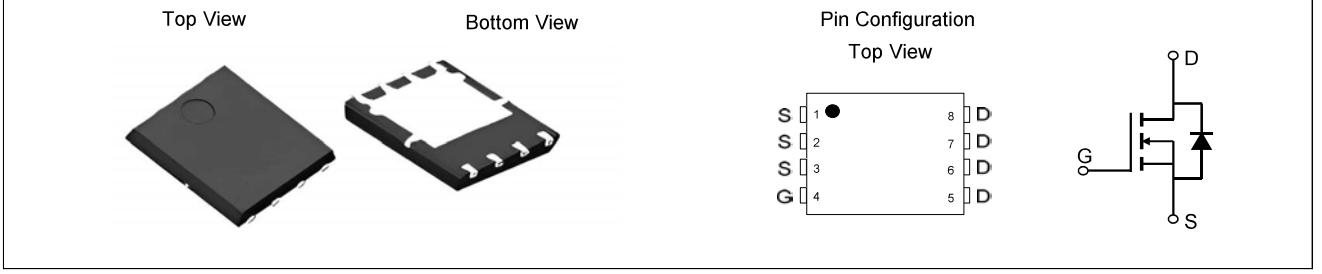
Feature

- ✧ Low $R_{DS(ON)}$
- ✧ Low Gate Charge
- ✧ High current Capability
- ✧ Green product RoHS compliant, lead free
- ✧ AEC-Q101 qualified

Product Summary

V_{DS}	40	V
$V_{GS(th)\_Typ}$	3	V
$R_{DS(ON)\_Typ}$ (@ V_{GS} =10V)	1.1	mΩ
I_D (at V_{GS} =10V) (1)	209	A

Type	Package	Marking	Outline	Media	Quantity (pcs)
FM16AGS04KVB	PDFN5x6-8L	M16AGS04VB	Tape	13" Reel	5000



Absolute Maximum Ratings (Rating at Tc=25°C unless otherwise noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	Tc=25 ℃	I_D	209	A
	Tc=100 ℃		148	
Pulsed Drain Current (2)		I_{DM}	837	A
Body-Diode Continuous Current		I_S	209	A
Avalanche Current (3)		I_{AS}	20	A
Avalanche Energy (3)		E_{AS}	1314	mJ
Power Dissipation (4)	Tc=25 ℃	P_D	125	W
	Tc=100 ℃		63	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +175	℃

Electrical Characteristics (Rating at T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V	-	-	1	μA
		T_J=55℃	-	-	5	
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V, V_{GS} =±20V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	2	3	4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=30A	-	1.1	1.6	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=30A	-	63	-	S
V_{SD}	Diode Forward Voltage	I_S=30A, V_{GS}=0V	-	0.78	1.2	V
DYNAMIC PARAMETERS (5)						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, f=1MHz	-	5540	11000	pF
C_{oss}	Output Capacitance		-	1968	4000	pF
C_{rss}	Reverse Transfer Capacitance		-	14.7	45	pF
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	18.5	-	Ω
SWITCHING PARAMETERS (5)						
Q_g	Total Gate Charge	V_{GS}=0~10V, V_{DS}=20V, I_D=50A	-	70	110	nC
Q_{gs}	Gate Source Charge		-	28.5	45	nC
Q_{gd}	Gate Drain Charge		-	12.8	20	nC
$t_{D(on)}$	Turn-On Delay Time	V_{GS}=10V,V_{DD}=20V,R_L=0.4Ω, R_g=2.5Ω	-	12.8	25	ns
t_r	Turn-On Rise Time		-	48	100	ns
$t_{D(off)}$	Turn-Off Delay Time		-	62	120	ns
t_f	Turn-Off Fall Time		-	42	85	ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=50A, di/dt=100A/μs	-	71.5	150	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=50A, di/dt=100A/μs	-	146	300	nC

Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal resistance from junction to ambient	-	1.2	℃ /W
$R_{\theta JA}$	Thermal resistance from junction to ambient	-	45	℃ /W

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
3. This single-pulse measurement was taken under the following condition [L=10mH, VGS=10V, VDS=30V] while its value is limited by T_{J_Max}=175°C.
4. The power dissipation P_D is based on T_{J_Max}=175℃.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical and Thermal Characteristics

Figure 1: Saturation Characteristics

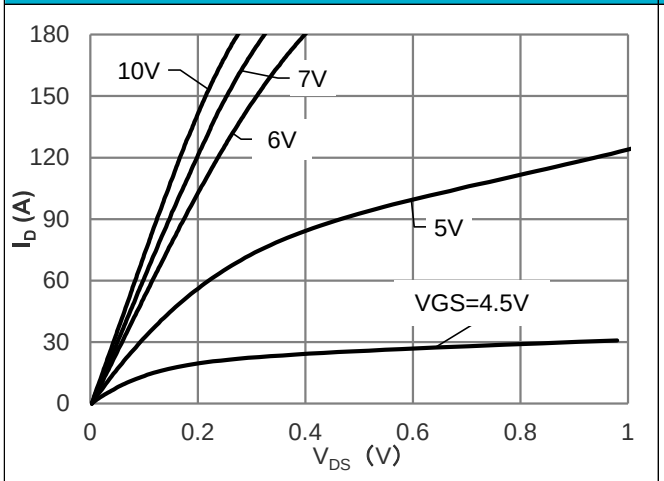


Figure 2: Transfer Characteristics

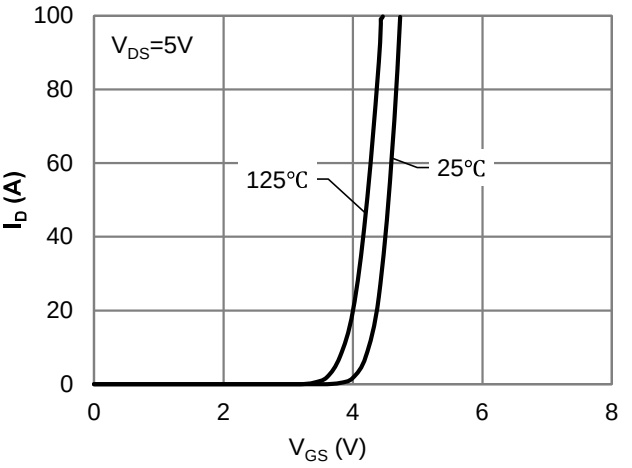


Figure 3: $R_{DS(ON)}$ vs. Drain Current

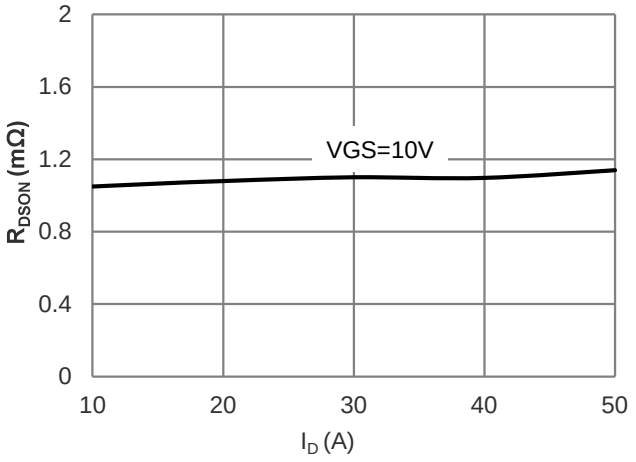


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

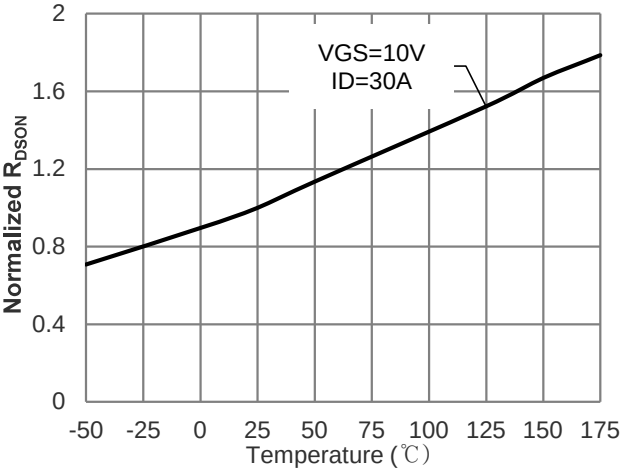


Figure 5: $R_{DS(ON)}$ vs. Gate-Source Voltage

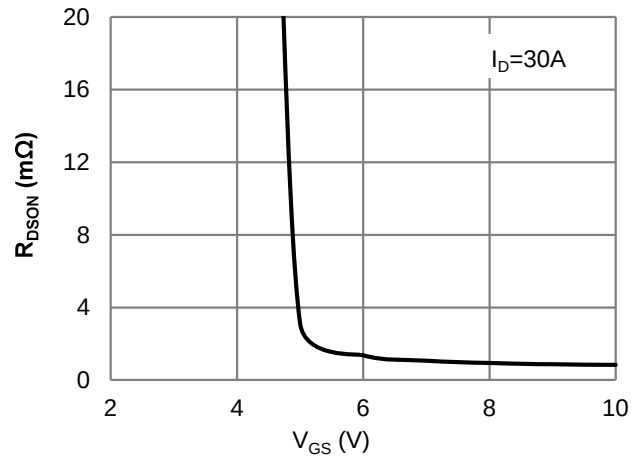
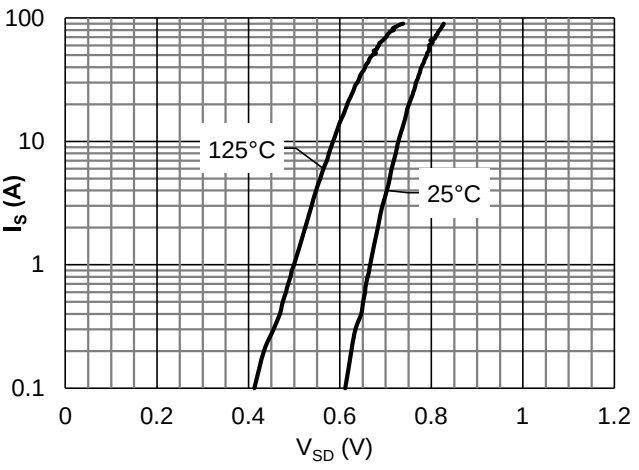


Figure 6: Body-Diode Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Gate-Charge characteristics

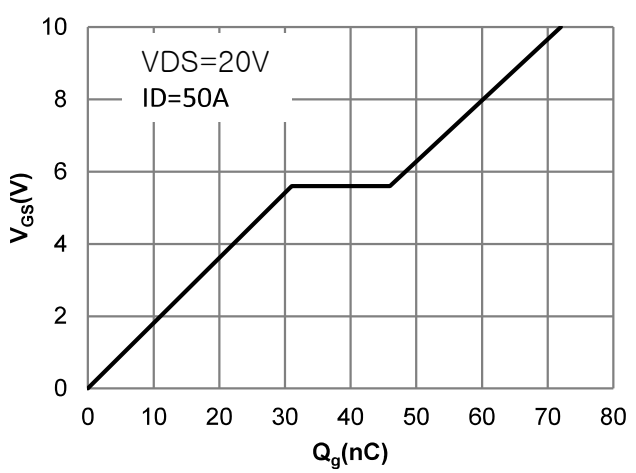


Figure 8: Capacitance characteristics

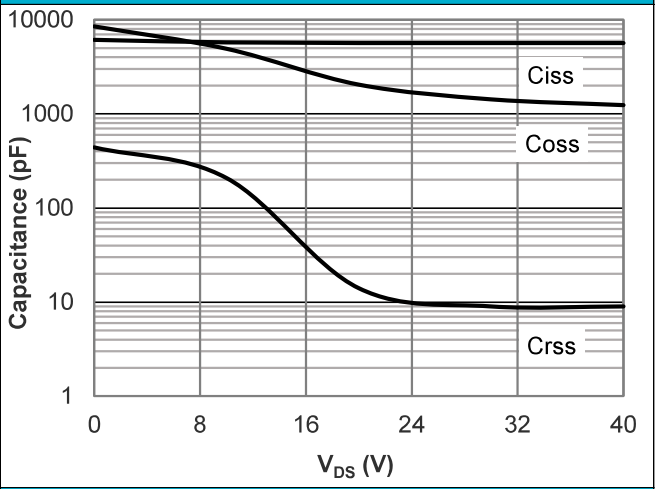


Figure 9: Current De-rating

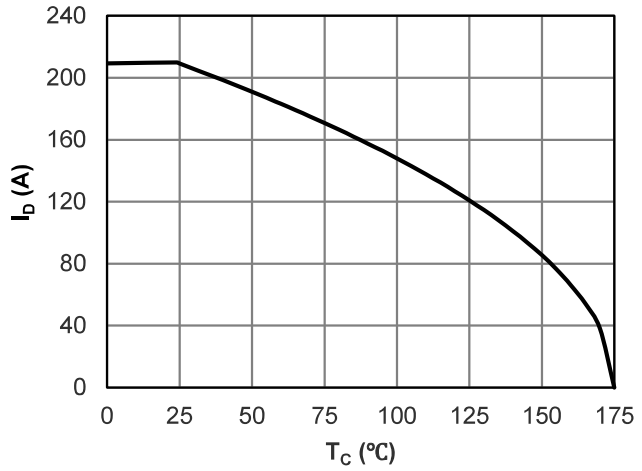


Figure 10: Power De-rating

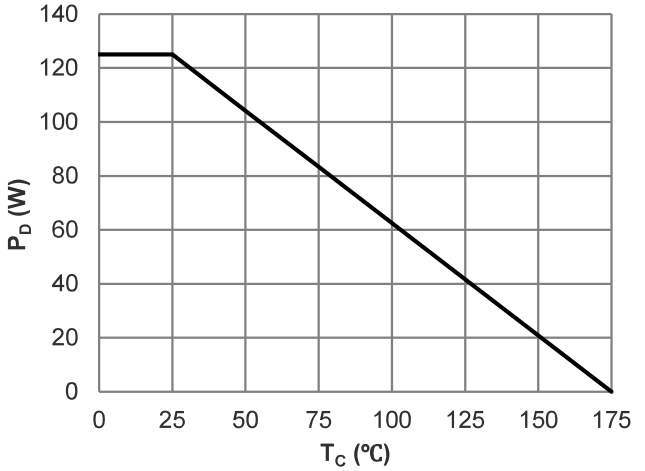


Figure 11: Maximum Safe Operating Area

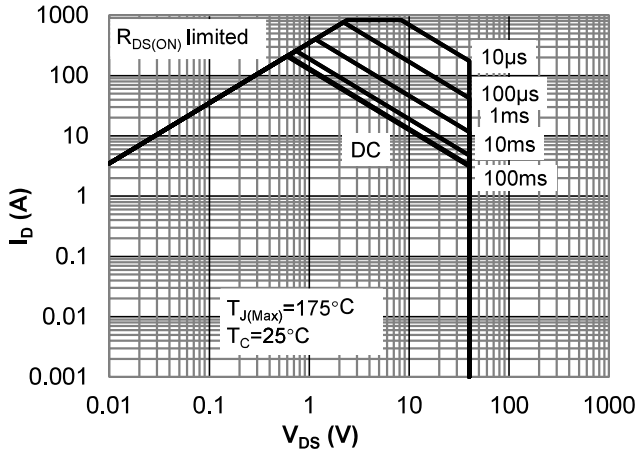
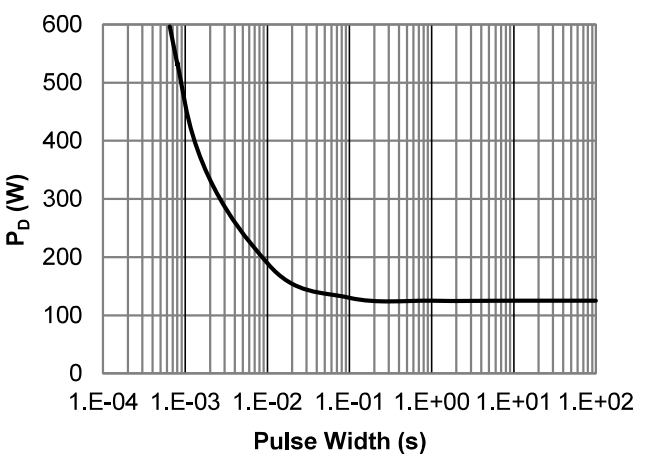
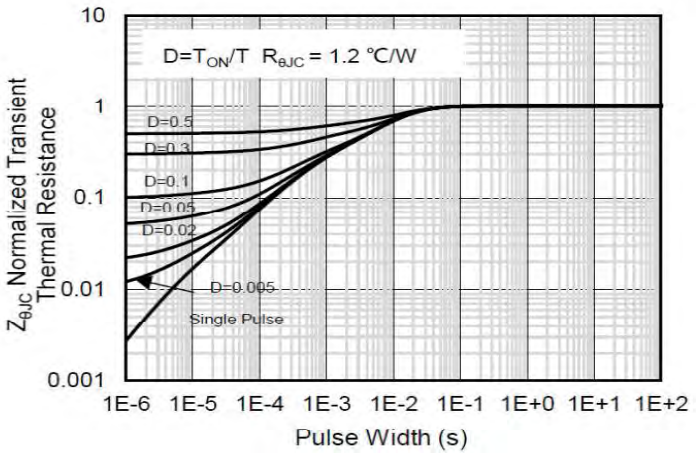


Figure 12: Single Pulse Power Rating, Junction-to-Case



Typical Electrical and Thermal Characteristics

Figure 13: Normalized Maximum Transient Thermal Impedance



Test Circuit

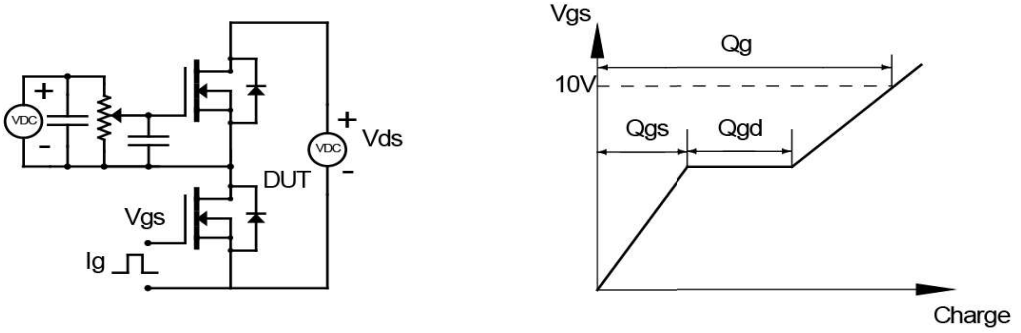


Figure1: Gate Charge Test Circuit & Waveforms

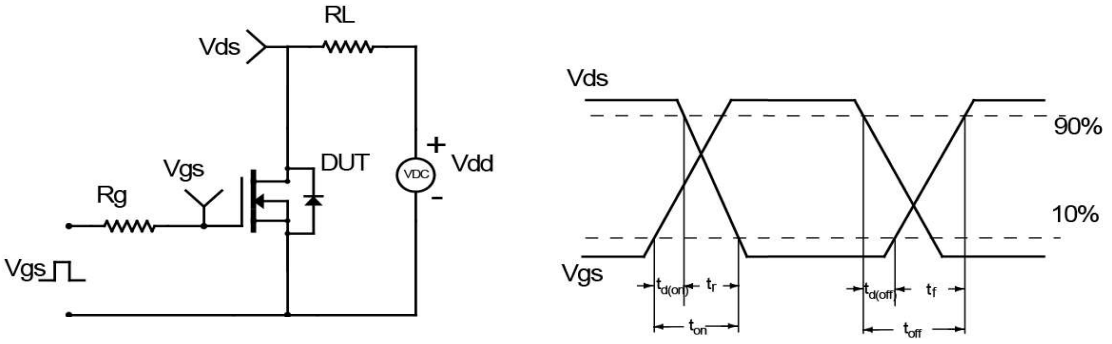


Figure2: Resistive Switching Test Circuit & Waveforms

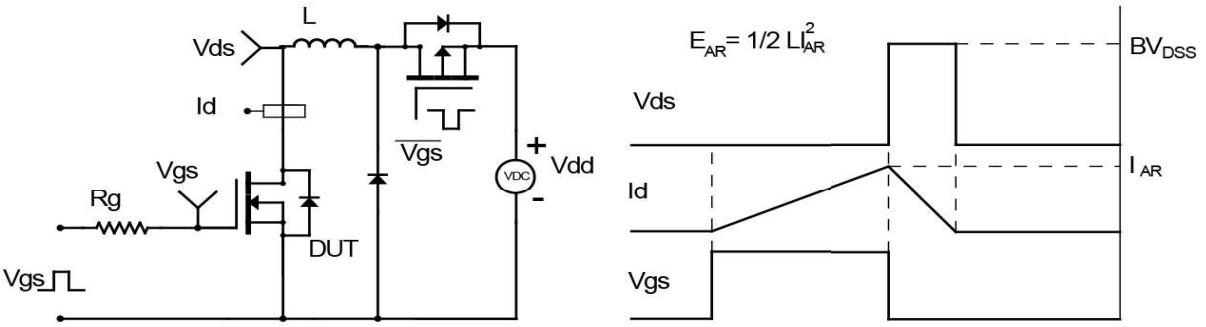


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

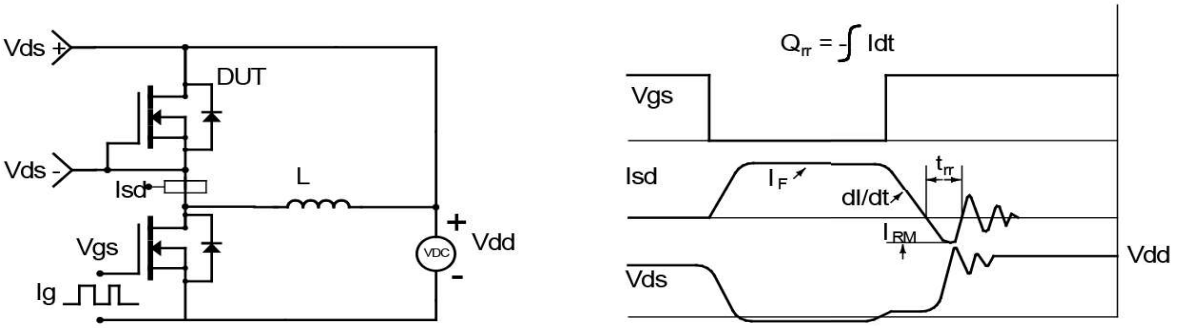
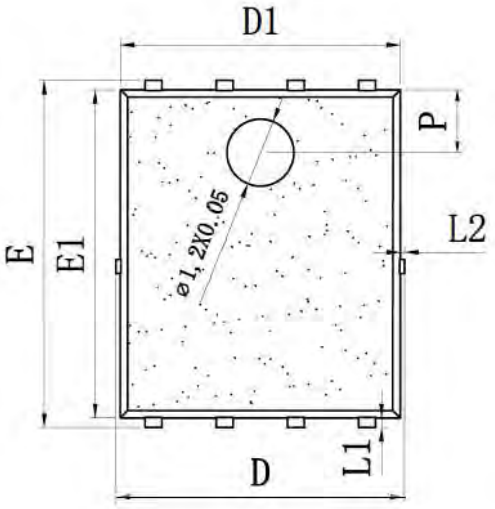
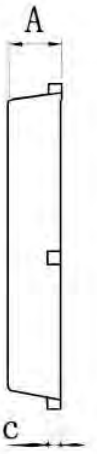


Figure4: Diode Recovery Test Circuit & Waveforms

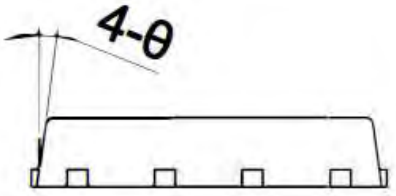
PDFN5x6-8L Package Information



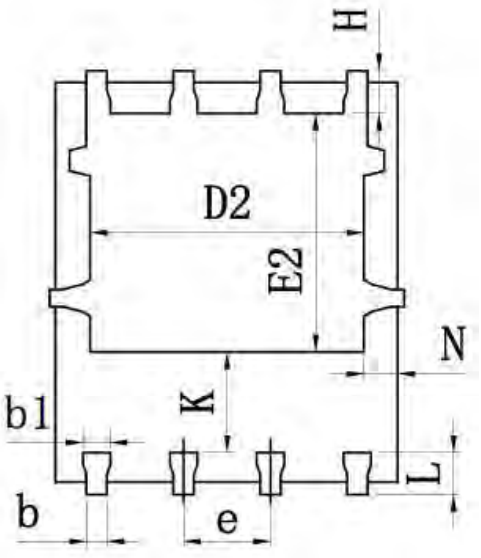
TOP VIEW



SIDE VIEW



SIDE VIEW



BOTTOM VIEW

SYMBOL	mm		
	MIN	NOM	MAX
*A	0.95	1.00	1.05
*b	0.25	0.30	0.35
*b1	0.30	0.40	0.50
*c	0.20	0.25	0.30
D	5.15BSC		
*D1	4.90	5.00	5.10
D2	3.90	4.01	4.20
*e	1.17	1.27	1.37
E	6.15BSC		
*E1	5.75	5.85	5.95
E2	3.35	3.50	3.65
H	0.51	0.61	0.71
K	1.10	1.35	1.50
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	-	-	0.12
N	0.40	0.50	0.60
P	0.95	1.10	1.25
θ	9°	11°	13°