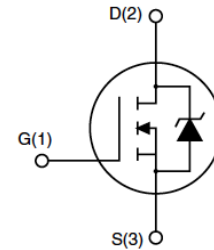


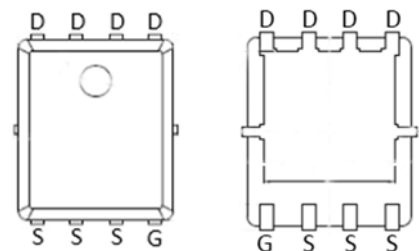
## Feature

- 100V,100A  
 $R_{DS(ON)} < 4.2m\Omega @ V_{GS}=10V$
- Low FOM  $R_{DS(ON)} \times Q_G$
- Ultra-low on-resistance
- Halogen-free
- RoHS compliant
- $T_{jmax}=175^\circ C$



## Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch
- Motor Drivers



PDFN5X6

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G040N10G	APG040N10G	PDFN5X6	-	-	5000

## ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_a = 25^\circ C$ )	$I_D$	100	A
Continuous Drain Current ( $T_a = 100^\circ C$ )	$I_D$	80	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	440	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	317	mJ
Power Dissipation	$P_D$	214	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.7	$^\circ C/W$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	54	$^\circ C/W$
Junction Temperature	$T_J$	175	$^\circ C$
Storage Temperature	$T_{STG}$	-55~ +175	$^\circ C$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

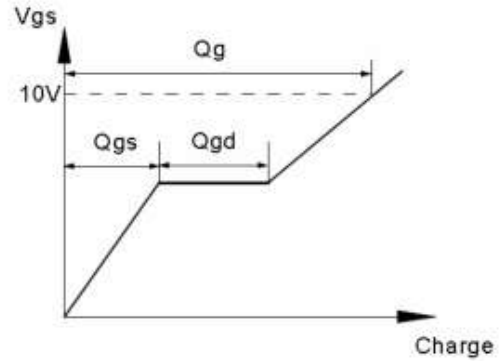
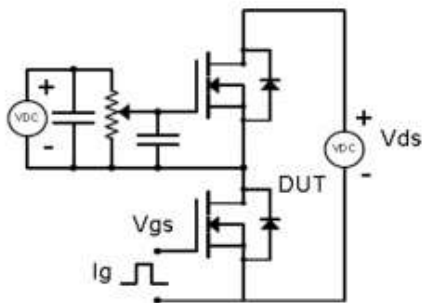
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	100	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	3.7	4.2	mΩ
Gate Resistance	R <sub>G</sub>	f=1MHZ	-	1.6	-	Ω
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f =1MHz	-	4270	-	pF
Output Capacitance	C <sub>oss</sub>		-	1280	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	63	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, R <sub>L</sub> =2.5Ω, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω	-	24	-	ns
Turn-on rise time	t <sub>r</sub>		-	35	-	
Turn-off delay time	t <sub>d(off)</sub>		-	53	-	
Turn-off fall time	t <sub>f</sub>		-	31	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	66	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	17	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	16	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	0.7	1.2	V
Maximum Continuous Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	100	A
Maximum Pulsed Diode Forward current <sup>(4)</sup>	I <sub>SM</sub>		-	-	440	A
Reverse recovery time	T <sub>rr</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	67	-	ns
Reverse recovery charge	Q <sub>rr</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	117	-	nC
Peak Reverse recovery Current	I <sub>RRM</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	3.1	-	A

**Notes:**

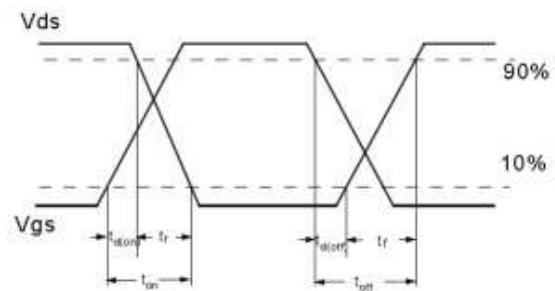
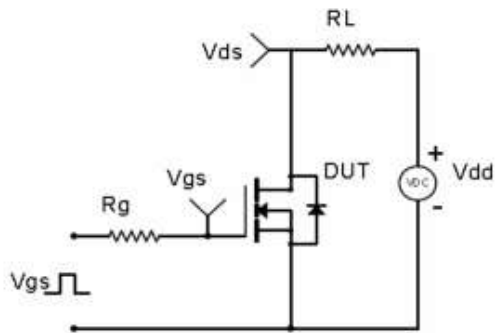
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, R<sub>G</sub>=25 Ω, L=0.5mH
3. Pulse Test: pulse width ≤300μs, duty cycle ≤2%
4. Surface Mounted on FR4 Board, t ≤10 sec

**Test Circuit & Waveform**

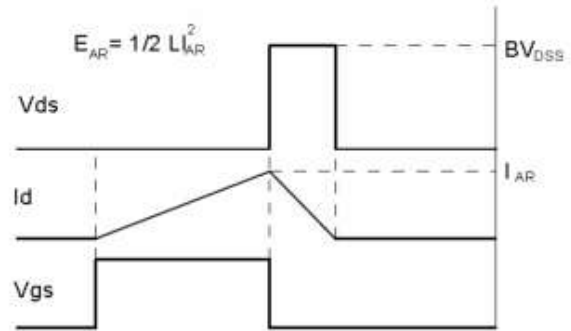
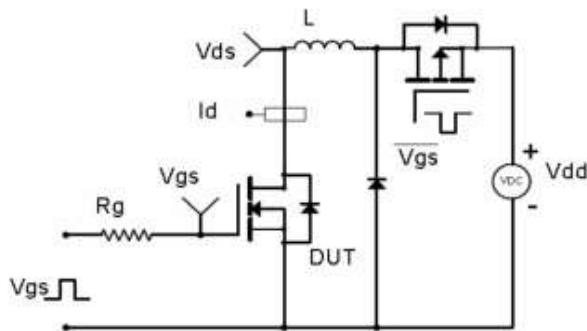
Gate Charge Test Circuit & Waveform



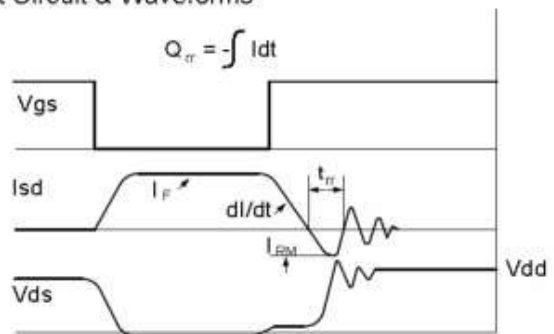
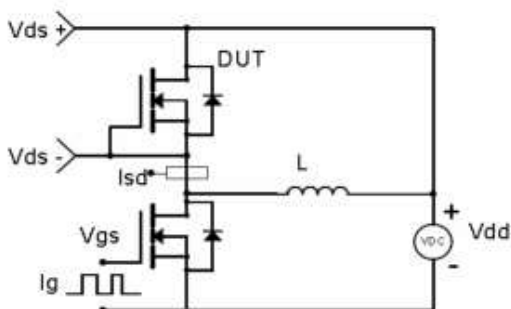
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Electrical Characteristics Diagrams**

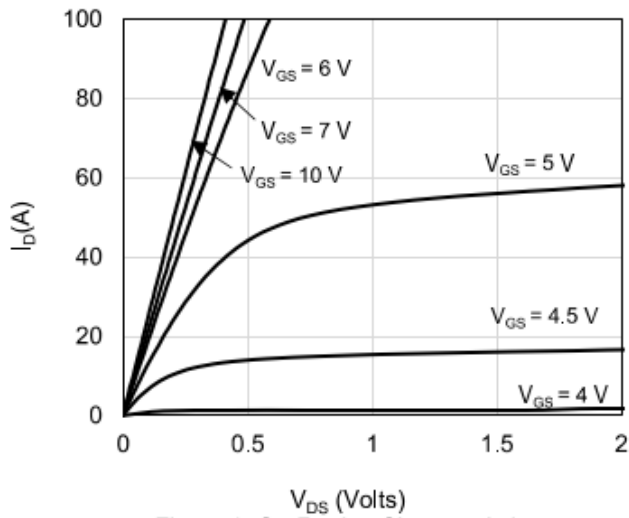


Figure 1: On-Region Characteristics

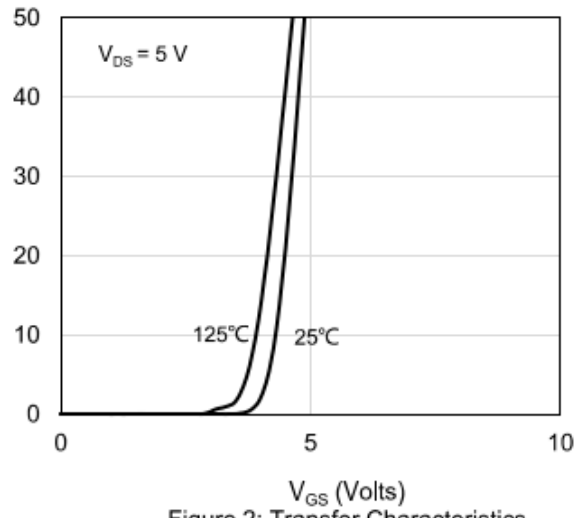


Figure 2: Transfer Characteristics

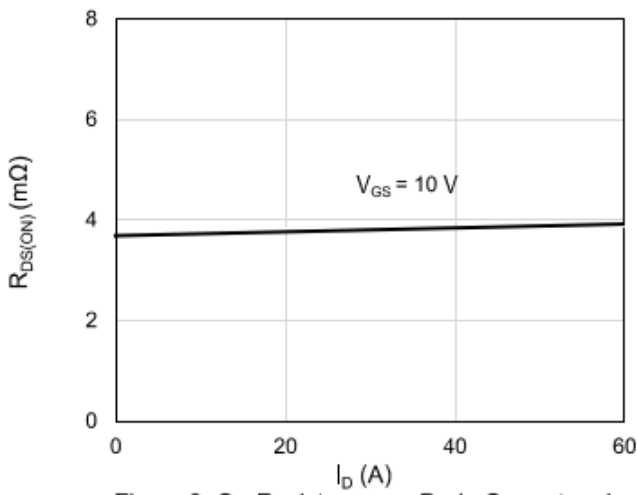


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

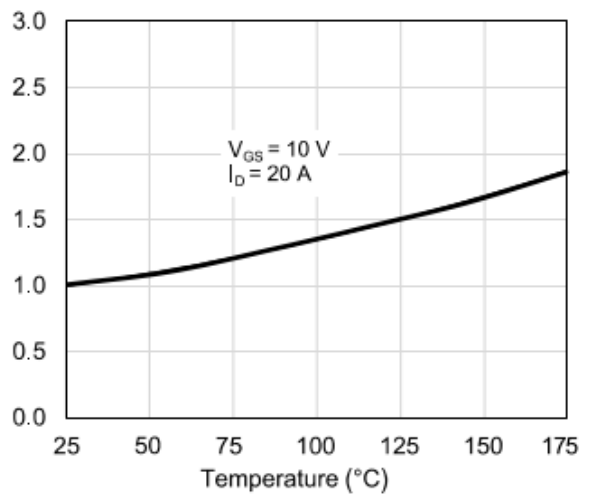


Figure 4: On-Resistance vs. Junction Temperature

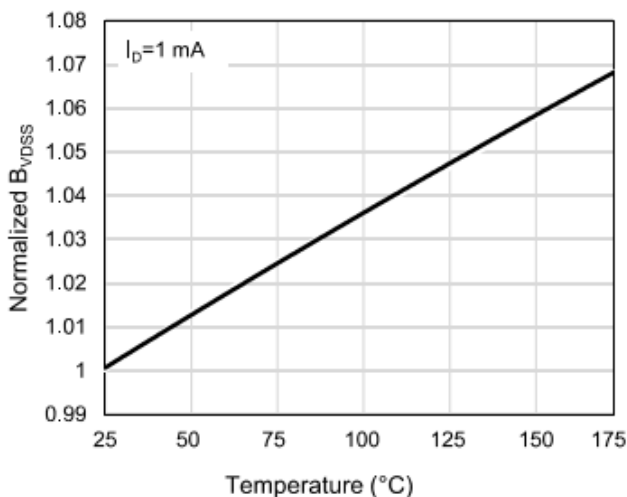


Figure 5: Breakdown Voltage vs. Junction Temperature

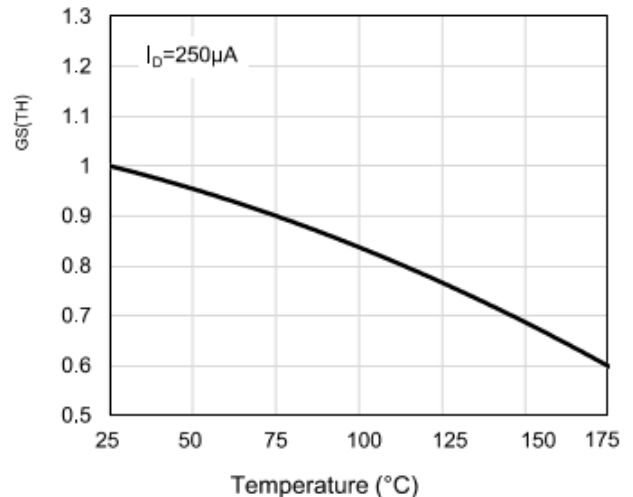
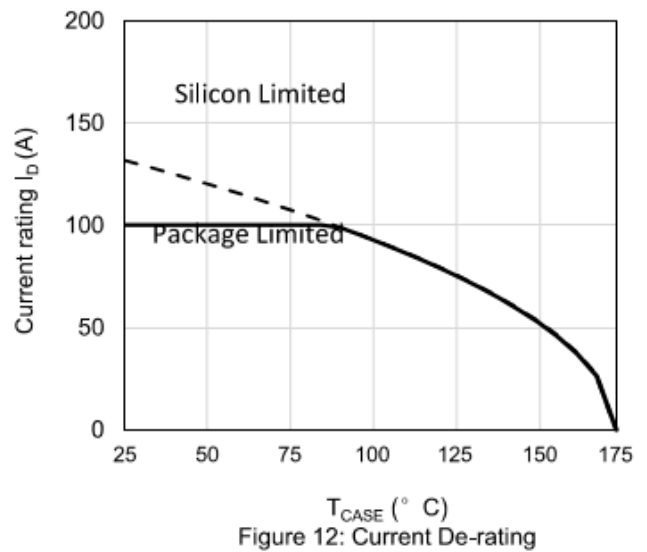
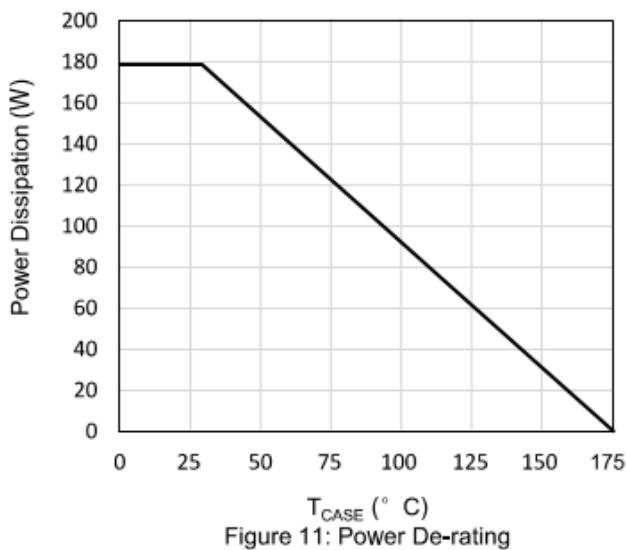
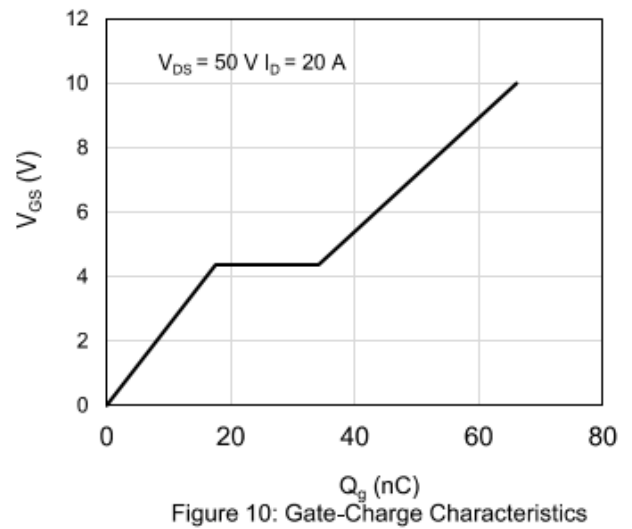
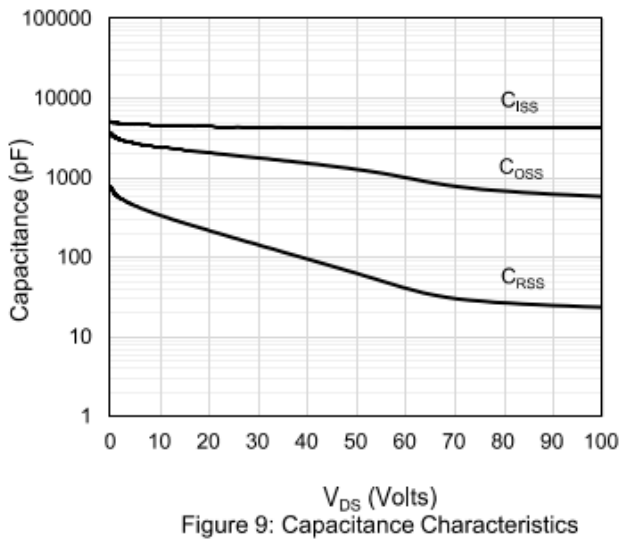
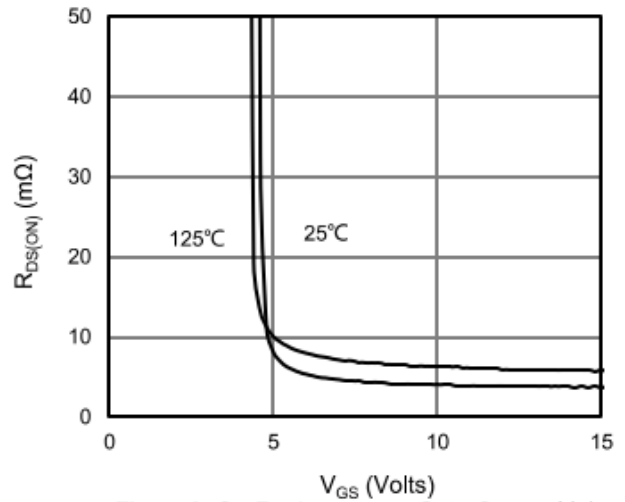
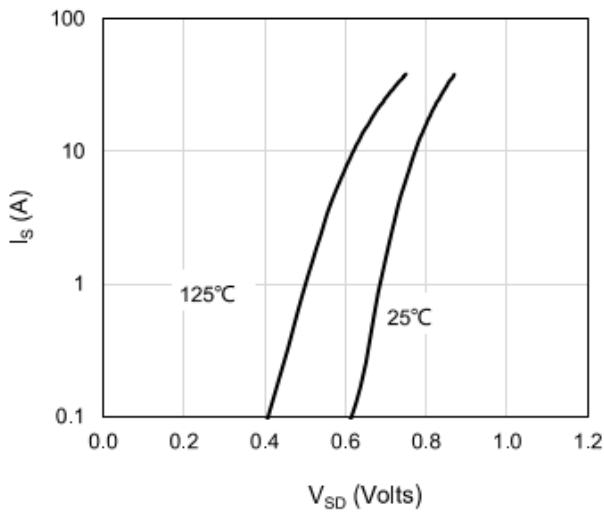


Figure 6: Threshold Voltage vs. Junction Temperature



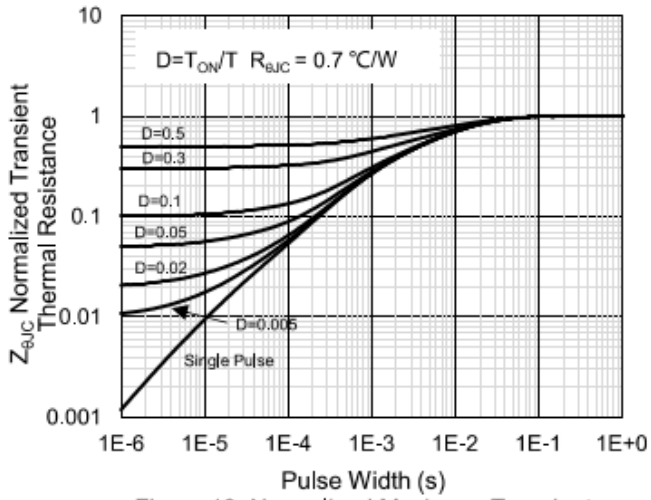


Figure 13: Normalized Maximum Transient Thermal Impedance

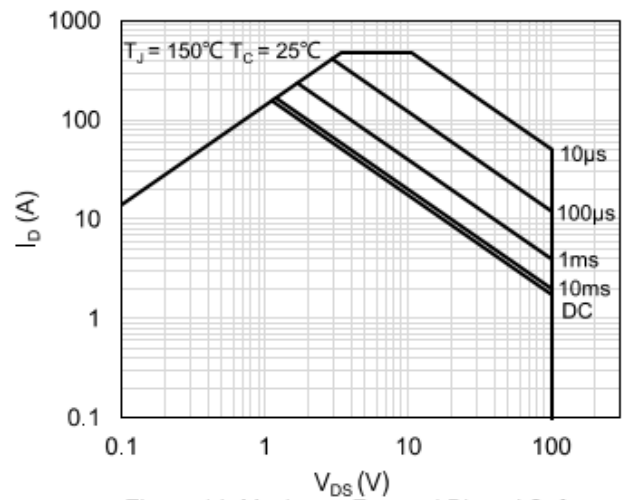
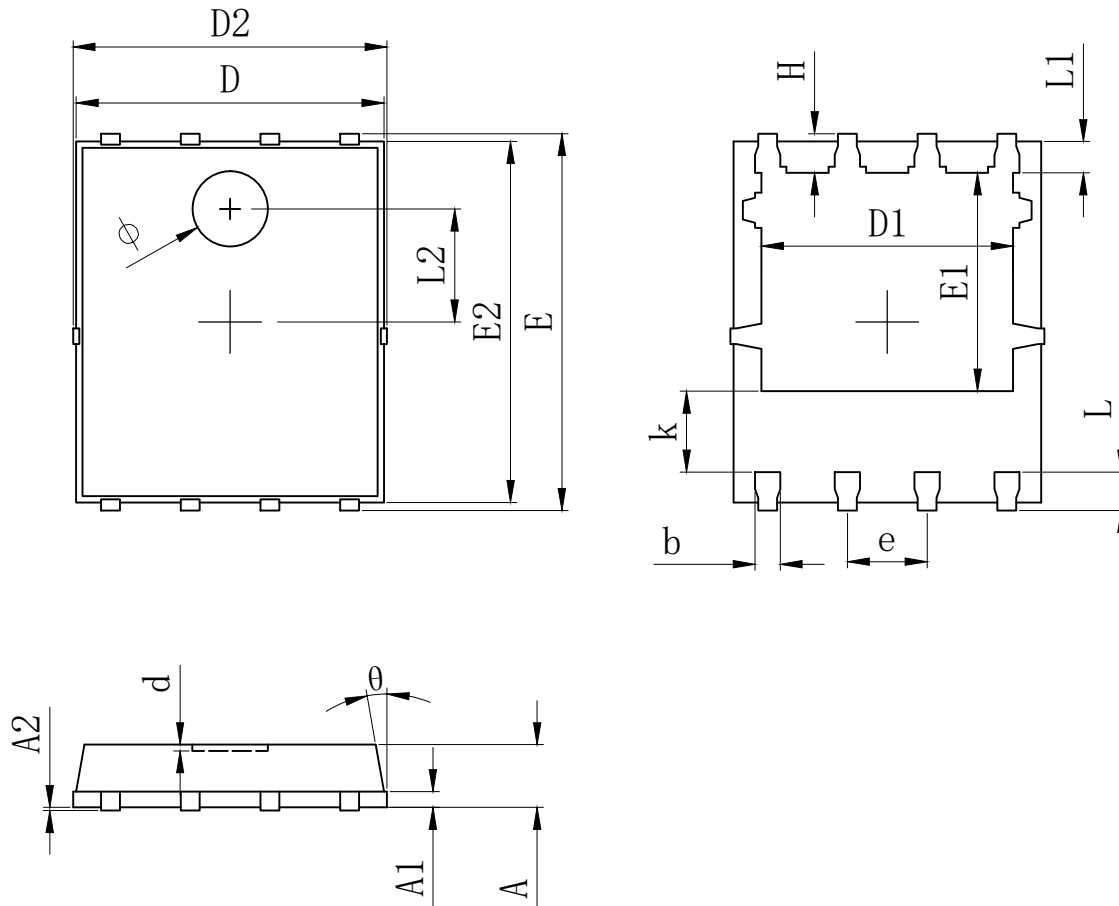


Figure 14: Maximum Forward Biased Safe Operating Area

**PDFN5X6 Package Information**



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0 <sup>~</sup> 0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
$\theta$	8°	10°	12°
$\phi$	1.100	1.200	1.300
d			0.100