

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
60V	23mΩ@10V	20A
	30mΩ@4.5V	
-60V	30mΩ@-10V	-35A
	35mΩ@-4.5V	

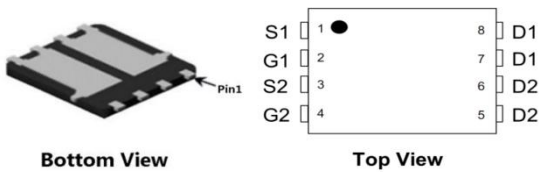
### Feature

- TrenchFET Power MOSFET
- Excellent  $R_{DS(on)}$  and Low Gate Charge
- Fast Switching Speed

### Application

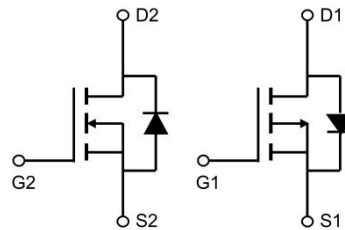
- Motor Control
- DC-DC Converters
- Power Management

### Package

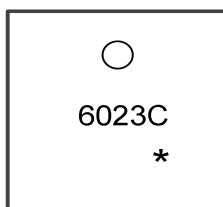


PDFN5×6-8L

### Circuit diagram



### Marking



**6023C** = Device code

**\*** = Month Code

**Absolute maximum ratings (Ta=25°C unless otherwise noted)**

Parameter	Symbol	Value		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	$V_{DS}$	60	-60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current	$I_D$	20	-35	A
Power Dissipation	$P_D$	85	50	W
Single pulsed avalanche energy Note 1	$E_{AS}$	40	115	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	1.47	2.5	$^{\circ}C/W$
Junction Temperature	$T_J$	150		$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150		$^{\circ}C$

**N-Channel Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 0.1$	$\mu A$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2A$	-	23	29	m $\Omega$
		$V_{GS} = 4.5V, I_D = 1A$	-	30	40	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$	-	1640	-	pF
Output Capacitance	$C_{oss}$		-	120	-	
Reverse Transfer Capacitance	$C_{rss}$		-	126	-	
<b>Switching Characteristics</b>						
Total gate charge	$Q_g$	$V_{DS} = 48V, V_{GS} = 4.5V, I_D = 10A$	-	42	-	nC
Gate-source charge	$Q_{gs}$		-	8	-	
Gate-drain charge	$Q_{gd}$		-	11.5	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, V_{GS} = 10V, RG = 3.3W, I_D = 10A$	---	9	-	ns
Turn-on rise time	$t_r$		---	10.5	-	
Turn-off delay time	$t_{d(off)}$		---	36	-	
Turn-off fall time	$t_f$		---	5	-	
<b>Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 1A, T_J = 25^{\circ}C$	-	-	1.2	V

**P-Channel Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

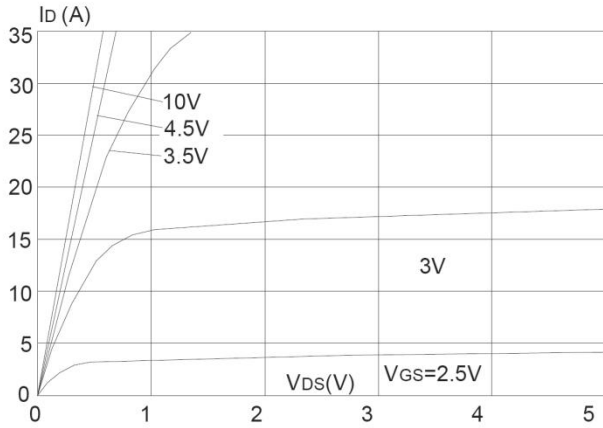
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-60	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -80V, V <sub>GS</sub> = 0V	-	-	-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1	-1.7	-2.5	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2A	-	30	38	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1A	-	36	48	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V, f = 1MHz	-	2417	-	pF
Output Capacitance	C <sub>oss</sub>		-	179	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	120	-	
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -30V, R <sub>L</sub> = 4.7Ω V <sub>GEN</sub> = -10V, R <sub>GEN</sub> = 3Ω	-	9.8	-	ns
Turn-on rise time	t <sub>r</sub>		-	6.1	-	
Turn-off delay time	t <sub>d(off)</sub>		-	44	-	
Turn-off fall time	t <sub>f</sub>		-	12.7	-	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -6.2A	-	46.5	-	nC
Gate-source charge	Q <sub>gs</sub>		-	9.1	-	
Gate-drain charge	Q <sub>gd</sub>		-	9.2	-	
<b>Source-Drain Diode Characteristics</b>						
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V	-	-	-1.2	V

Note:

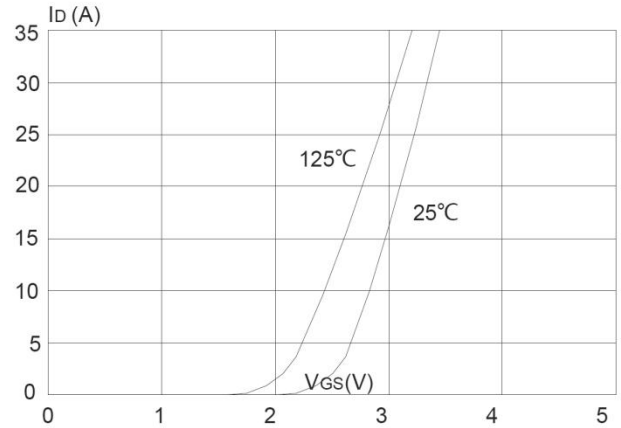
1. E<sub>AS</sub> is tested at starting T<sub>j</sub> = 25°C, V<sub>DD</sub> = 30V, V<sub>GS</sub> = 10V, L = 0.1mH, R<sub>g</sub> = 25mΩ;

**N-Channel Typical Characteristics**

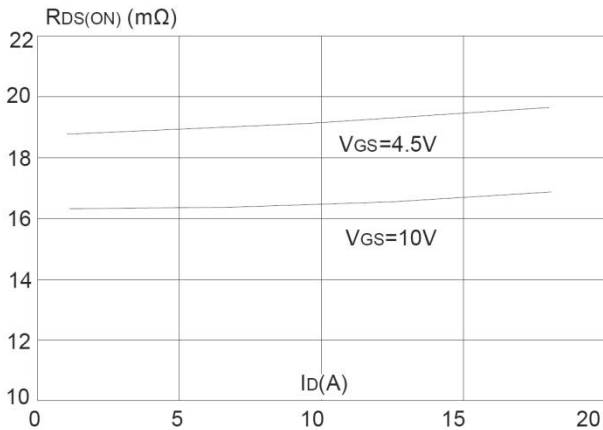
Output Characteristics



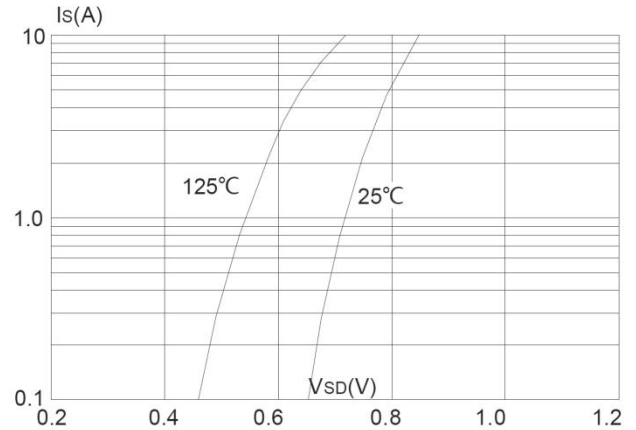
Typical Transfer Characteristics



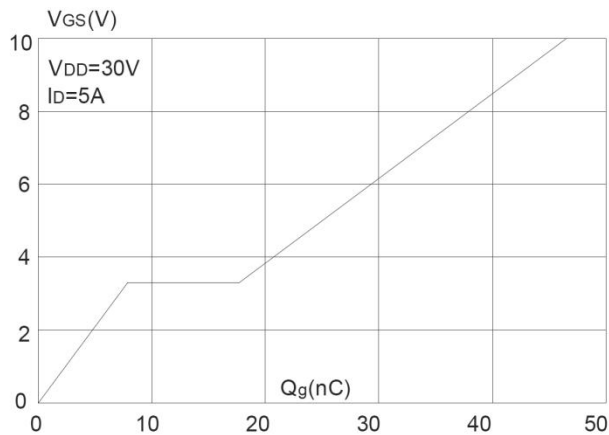
On-resistance vs. Drain Current



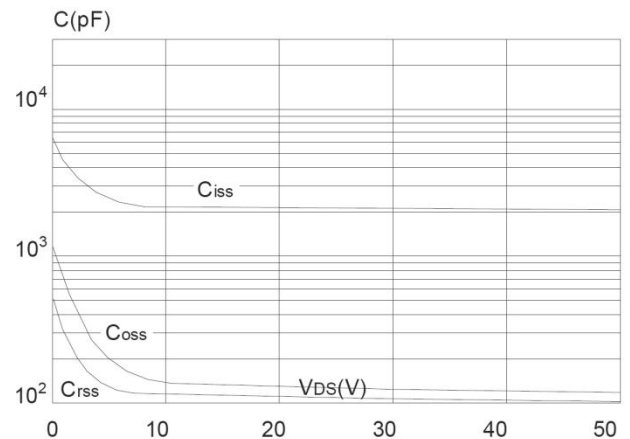
Body Diode Characteristics



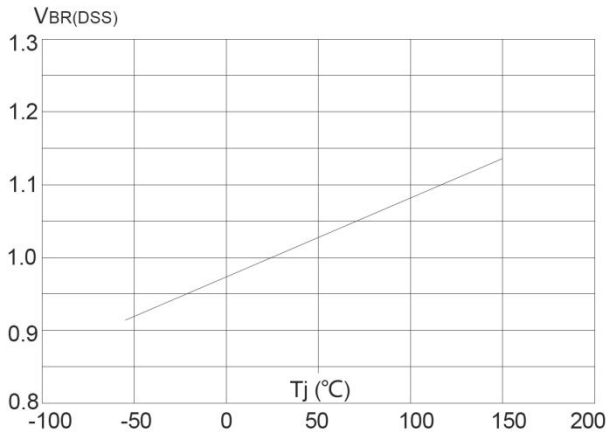
Gate Charge Characteristics



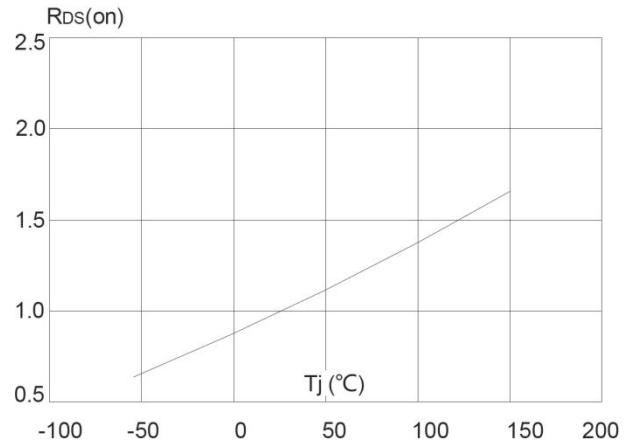
Capacitance Characteristics



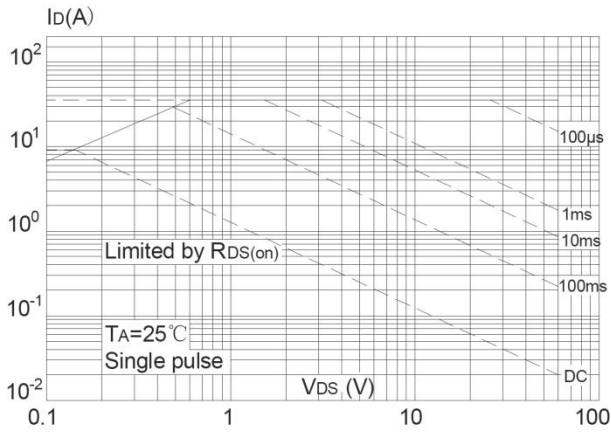
Normalized Breakdown Voltage vs. Junction Temperature



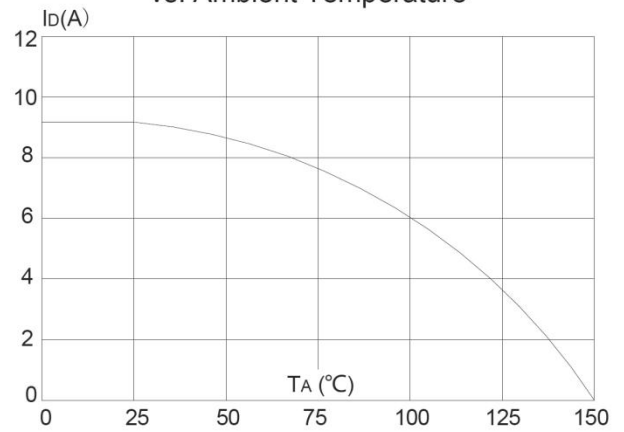
Normalized on Resistance vs. Junction Temperature



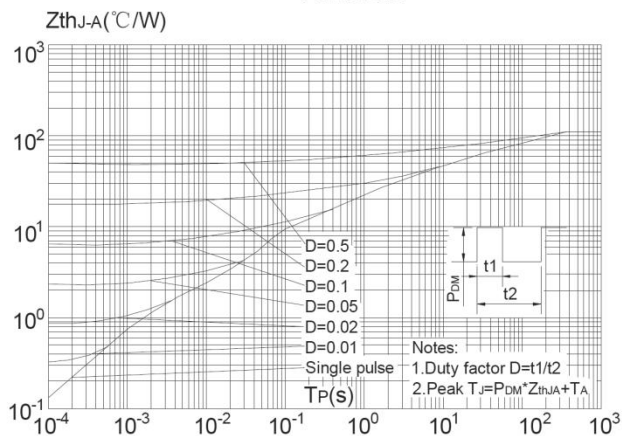
Maximum Safe Operating Area



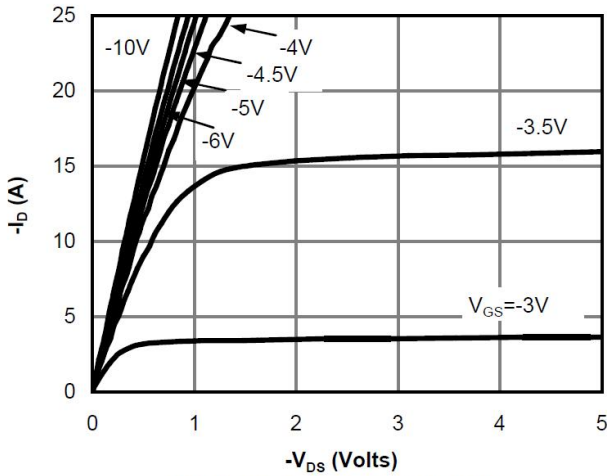
Maximum Continuous Drain Current vs. Ambient Temperature



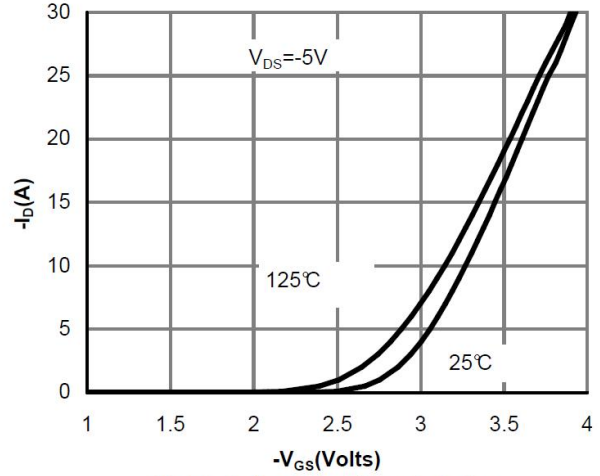
Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



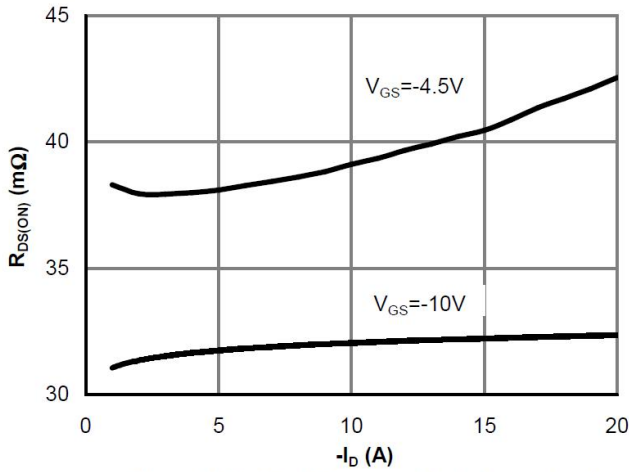
**P-Channel Typical Characteristics**



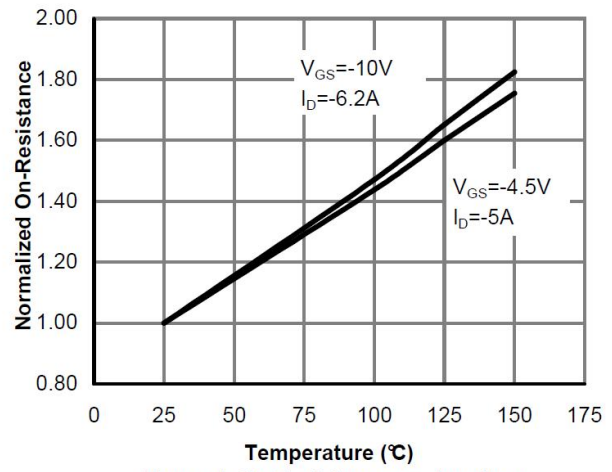
**Fig 1: On-Region Characteristics**



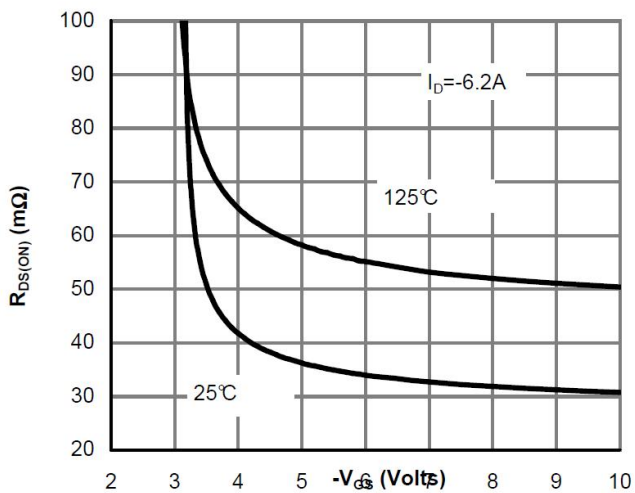
**Figure 2: Transfer Characteristics**



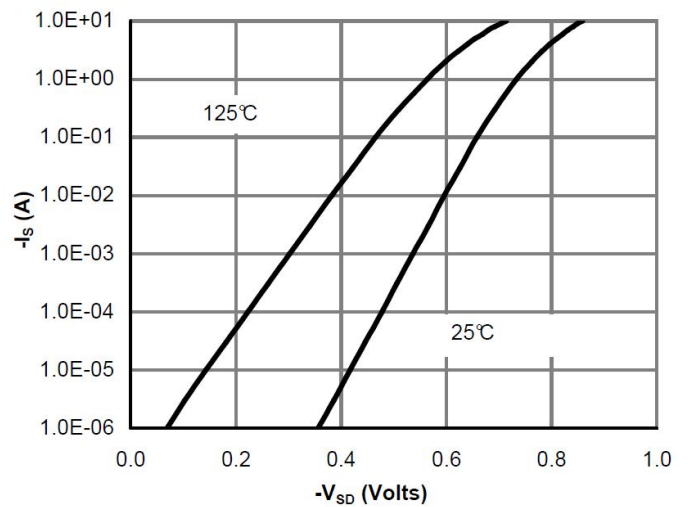
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



**Figure 5: On-Resistance vs. Gate-Source Voltage**



**Figure 6: Body-Diode Characteristics**



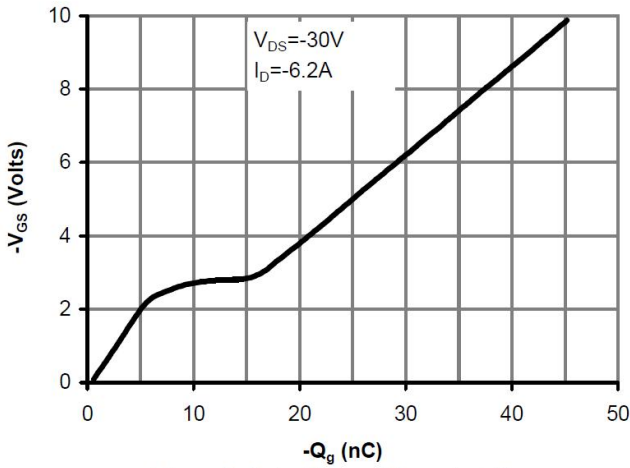


Figure 7: Gate-Charge Characteristics

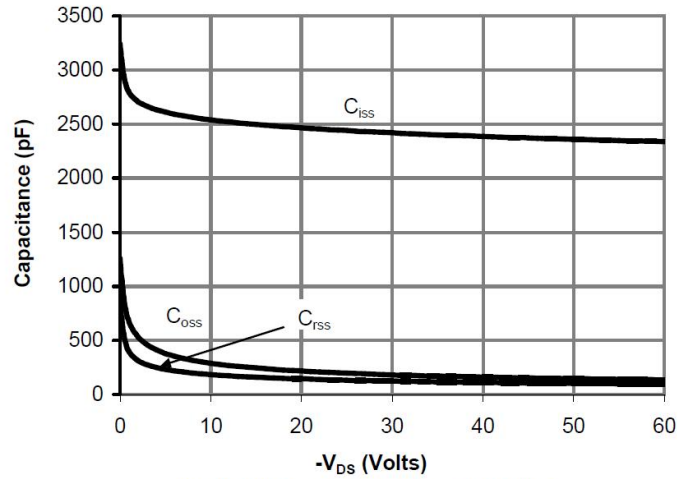


Figure 8: Capacitance Characteristics

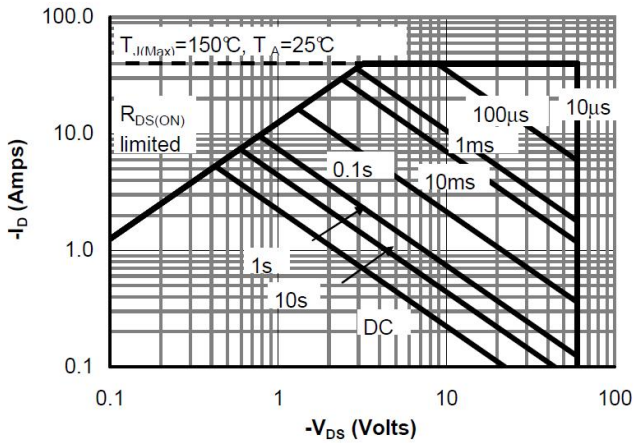


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

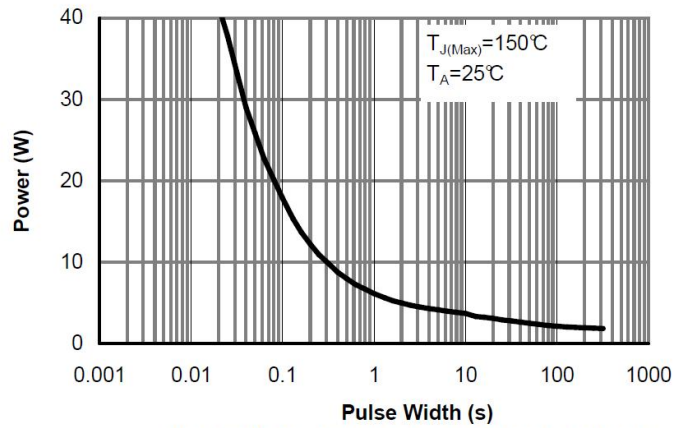


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

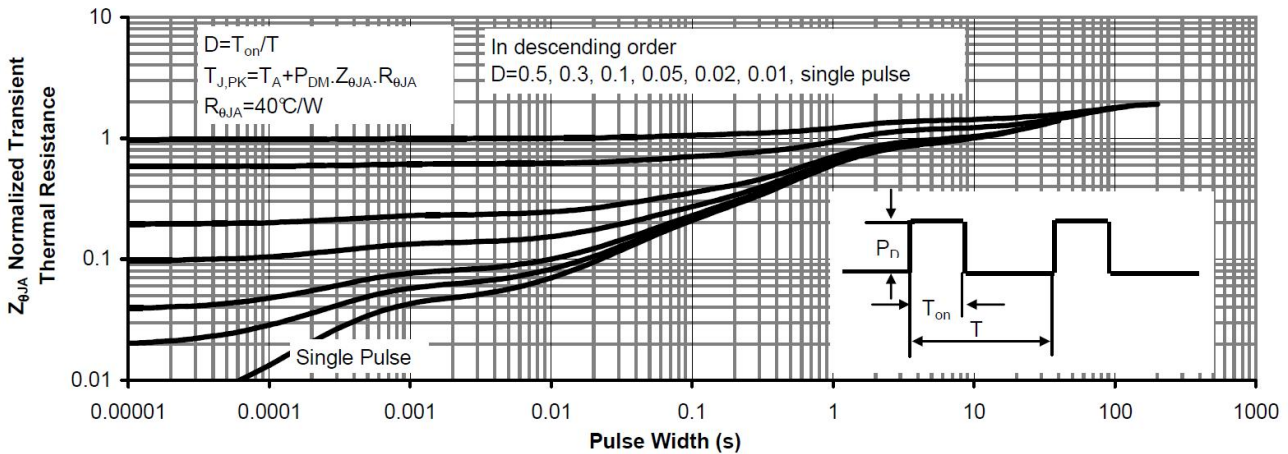
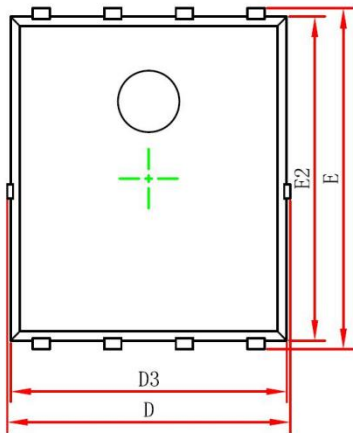
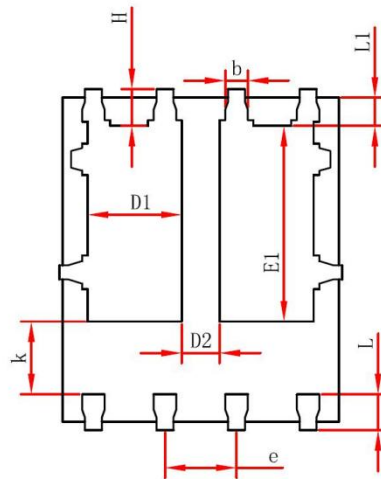


Figure 11: Normalized Maximum Transient Thermal Impedance

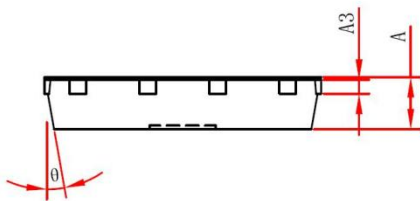
**PDFN5X6-8L Package Information**



Top View  
[顶视图]



Bottom View  
[背视图]



Side View  
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254 REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°





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文件版本	制修日期	修订页次	修订人	变更内容	
Ver-1.0	2023/3/1		覃源	新建规格书	
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