

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
30V	10mΩ@10V	40A
	14mΩ@4.5V	

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-30V	17mΩ@-10V	-40A
	27mΩ@-4.5V	

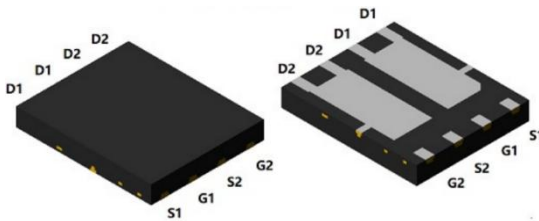
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Trench FET Power MOSFET technology
- Excellent package for good heat dissipation
- Suffix “-Q1” for AEC-Q101

Application

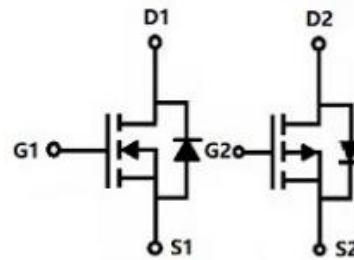
- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

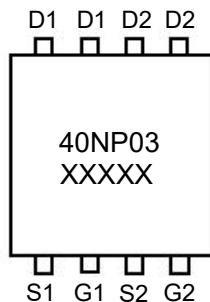


DFN5X6-8L

Circuit diagram



Marking



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

Parameter	Symbol	N-Channel	p-Channel	Unit
Drain-Source Voltage	V _{DS}	30	-30	V
Gate-Source Voltage	V _{GS}	±20	±25	V
Continuous Drain Current	I _D	40	-40	A
Pulsed Drain Current ¹⁾	I _{DM}	140	-160	A
Power Dissipation	P _D	21	35	W
Single Pulse Avalanche Energy ²⁾	E _{AS}	56	72	mJ
Thermal Resistance, Junction-to-Case ³⁾	R _{θjc}	6.0	3.57	°C/W
Junction Temperature	T _J	-55 ~ +150		°C
Storage Temperature	T _{STG}	-55 ~ +150		°C

N-CH Electrical characteristics (T_J=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.5	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 15A		8	10	mΩ
		V _{GS} = 4.5V, I _D = 10A		12	14	mΩ
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz		1015		pF
Output Capacitance	C _{oss}			201		
Reverse Transfer Capacitance	C _{rss}			164		
Total Gate Charge	Q _g	V _{DS} = 15V, V _{GS} = 10V, I _D = 15A		23.6		nC
Gate-Source Charge	Q _{gs}			3.9		
Gate-Drain Charge	Q _{gd}			7		
Turn-on delay time	t _{d(on)}	V _{DD} = 20V, V _{GS} = 10V, I _D = 2A R _L = 1Ω, R _{GEN} = 3Ω		7		nS
Turn-on rise time	t _r			19		
Turn-off delay time	t _{d(off)}			24		
Turn-off fall time	t _f			24		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				40	A
Diode Forward voltage	V _{DS}	V _{GS} = 0V, I _S = 15A			1.2	V
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 25A		5		nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs		0.2		nC

P-CH Electrical characteristics (T_J=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±25V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.2	-1.8	-2.8	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -15A		13	17	mΩ
		V _{GS} = -4.5V, I _D = -10A		17	27	mΩ
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz		2152		pF
Output Capacitance	C _{oss}			308		
Reverse Transfer Capacitance	C _{rss}			242		
Total Gate Charge	Q _g	V _{DS} = -15V, V _{GS} = -10V, I _D = -12A		40.1		nC
Gate-Source Charge	Q _{gs}			8.4		
Gate-Drain Charge	Q _{gd}			8.6		
Turn-on delay time	t _{d(on)}	V _{DD} = -15V, V _{GS} = -10V, I _D = -1A, R _{GEN} = 2.5Ω		8		nS
Turn-on rise time	t _r			19		
Turn-off delay time	t _{d(off)}			75		
Turn-off fall time	t _f			46		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				-40	A
Diode Forward voltage	V _{DS}	V _{GS} = 0V, I _S = -15A			-1.2	V
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = -12A di/dt = 100A/μs		18		nS
Reverse Recovery Charge	Q _{rr}			7.8		nC

Notes:

- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.
- 2) T_J=25°C, V_{DD}=20V, V_G=10V, L=0.5Mh.
- 3) R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design, while R_{θJA} is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

N- Channel Typical Characteristics

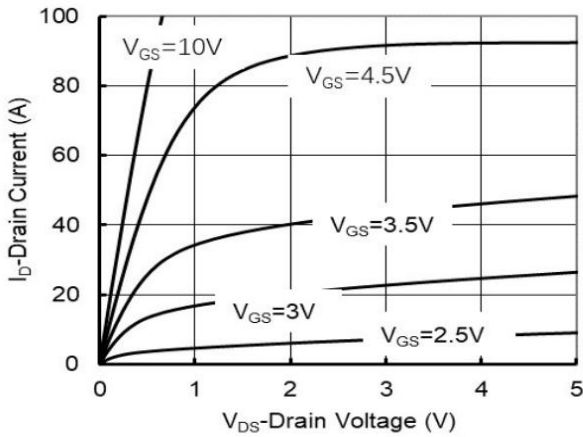


Figure1. Output Characteristics

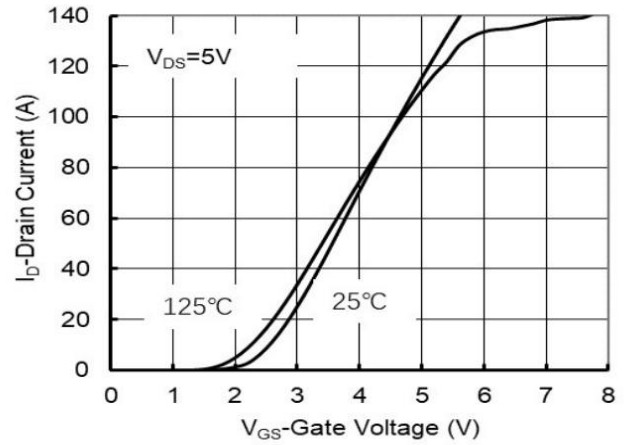


Figure2. Transfer Characteristics

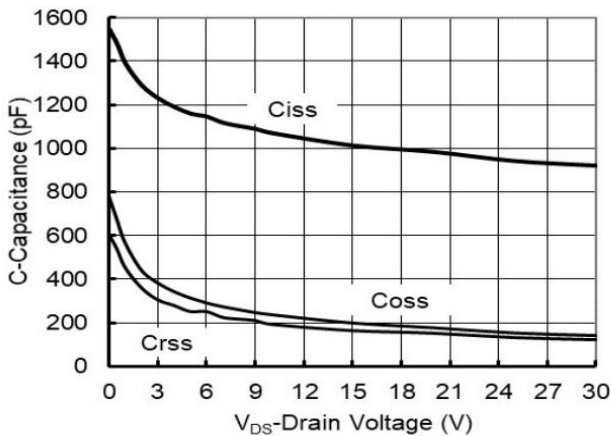


Figure3. Capacitance Characteristics

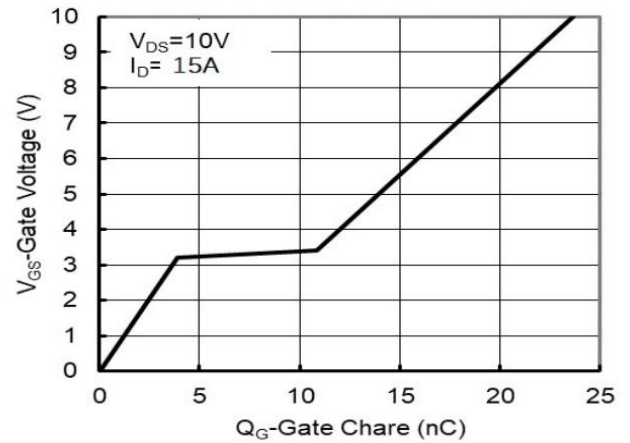


Figure4. Gate Charge

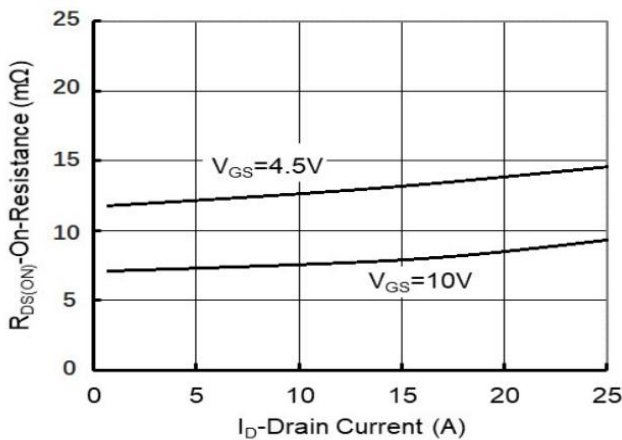


Figure5. Drain-Source on Resistance

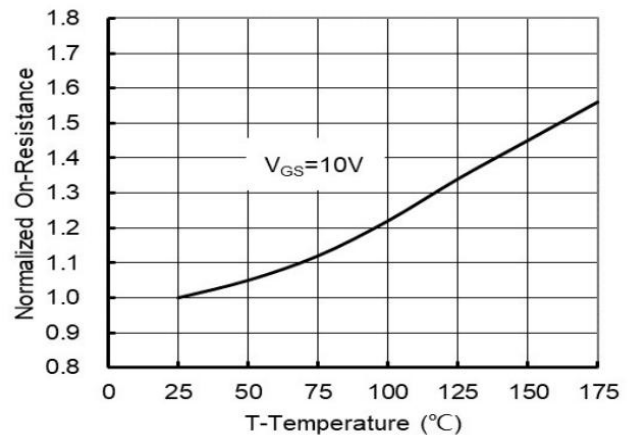


Figure6. Drain-Source on Resistance

N- Channel Typical Characteristics

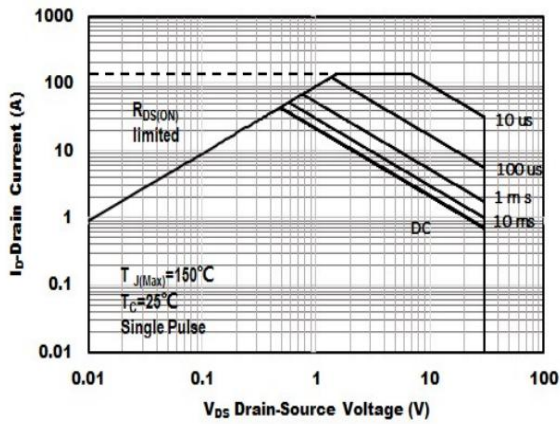


Figure7. Safe Operation Area

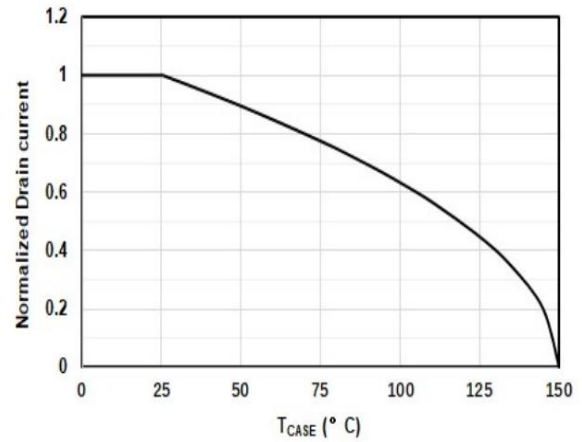


Figure8. Drain current vs. Case Temperature

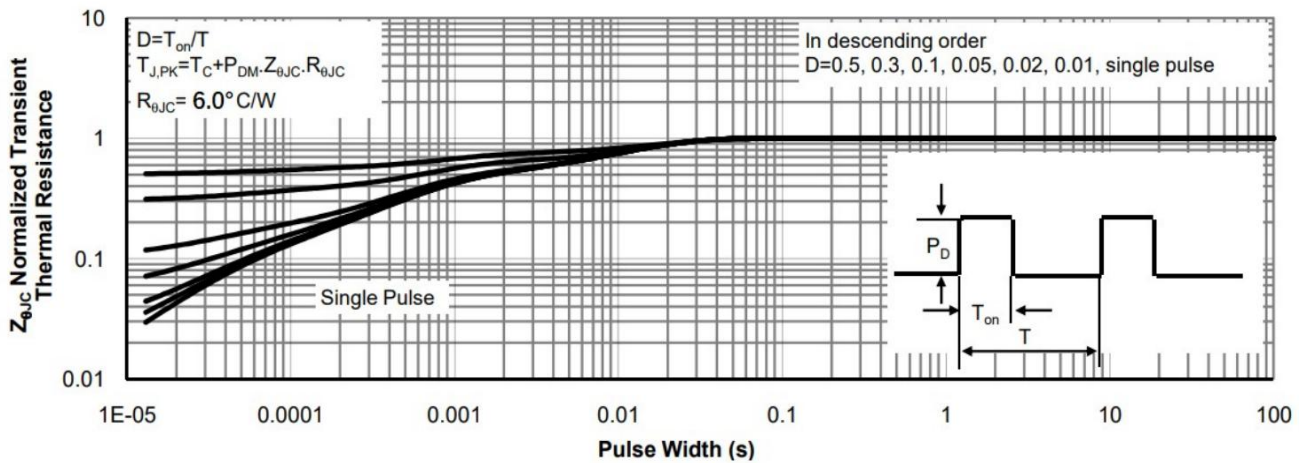


Figure 9. Normalized Maximum Transient Thermal Impedance

P- Channel Typical Characteristics

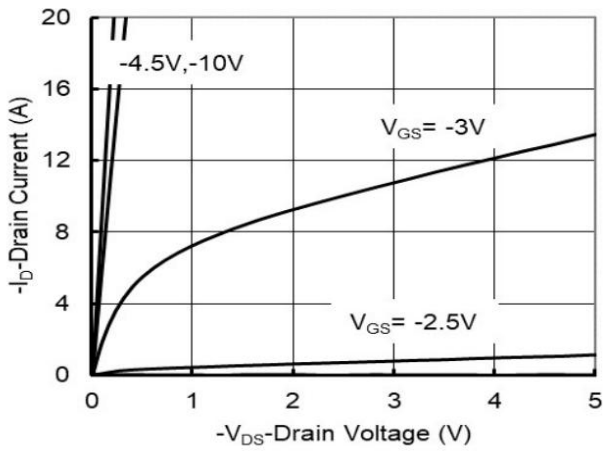


Figure1. Output Characteristics

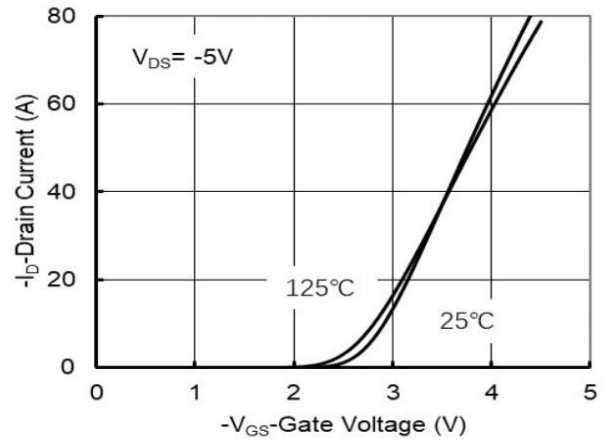


Figure2. Transfer Characteristics

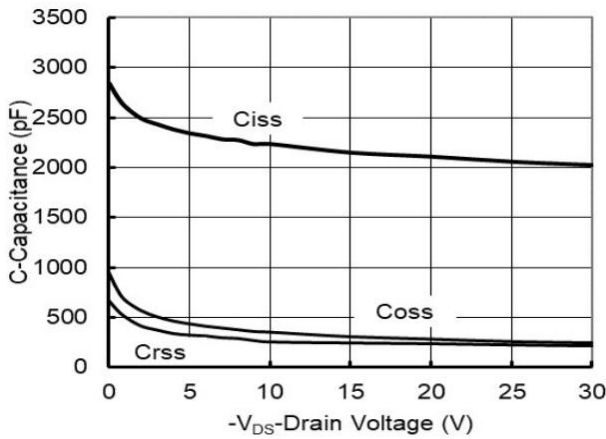


Figure3. Capacitance Characteristics

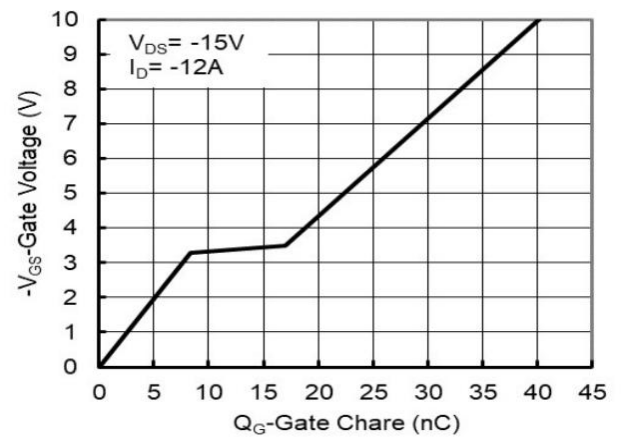


Figure4. Gate Charge

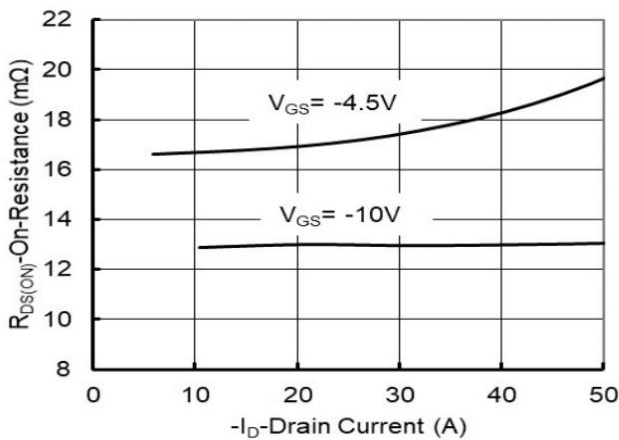


Figure5. Drain-Source on Resistance

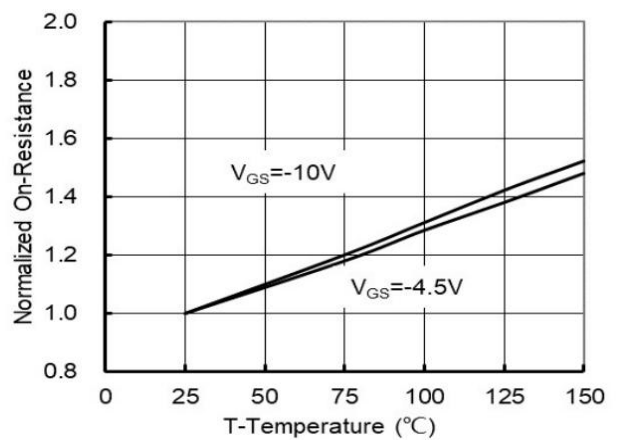


Figure6. Drain-Source on Resistance

P- Channel Typical Characteristics

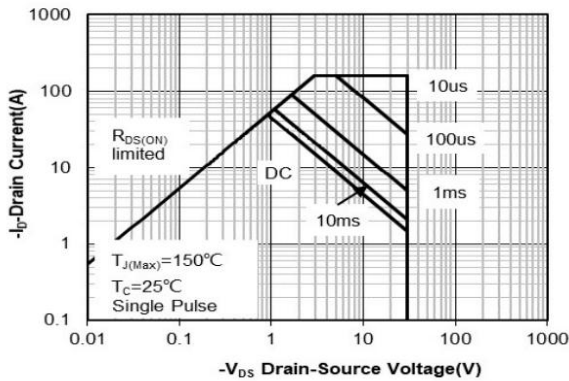


Figure7. Safe Operation Area

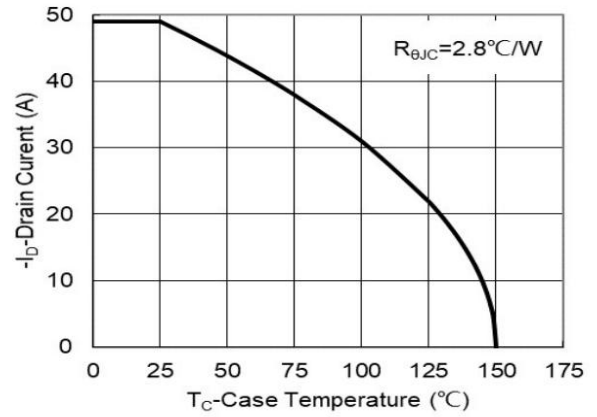


Figure8. Drain current vs. Case Temperature

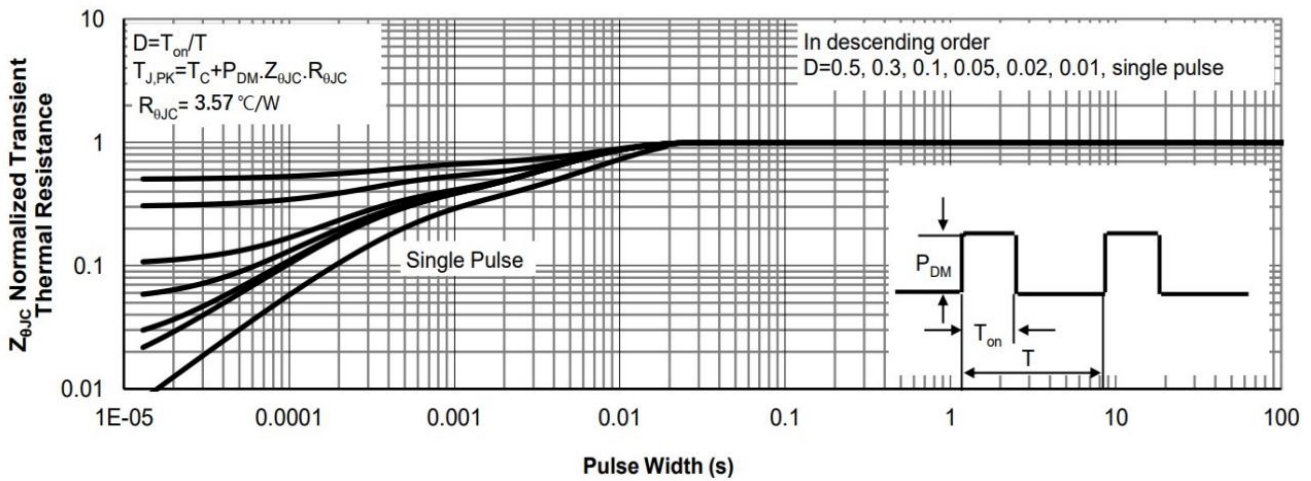
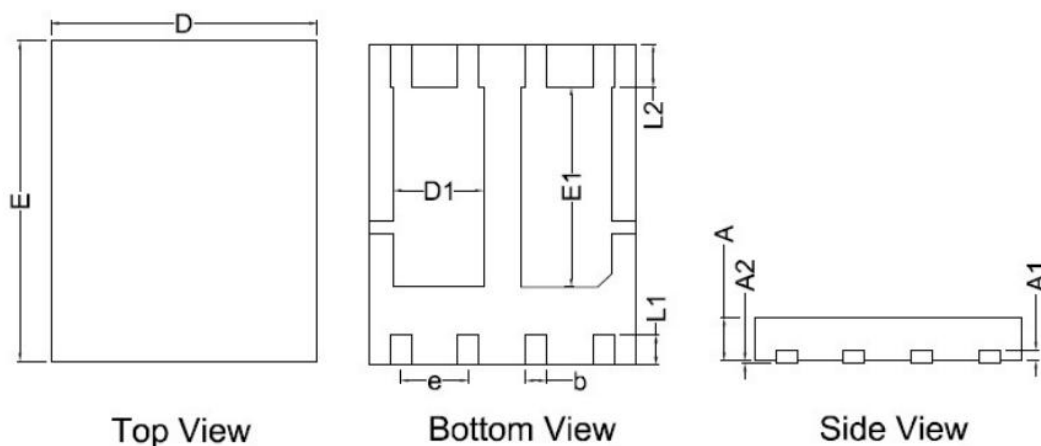


Figure 9. Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.027	0.035
A1	0.200 BSC		0.008BSC	
A2	0.000	0.100	0.000	0.004
b	0.300	0.500	0.011	0.020
D	4.900	5.100	0.193	0.201
D1	1.600	1.800	0.063	0.071
E	5.900	6.100	0.232	0.240
E1	3.650	3.850	0.143	0.152
e	1.270 BSC		0.050 BSC	
L1	0.450	0.650	0.018	0.026
L2	0.800 BSC		0.031 BSC	