

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	15mΩ@10V	25A
	18mΩ@4.5V	
-40V	23mΩ@-10V	-23A
	32mΩ@-4.5V	

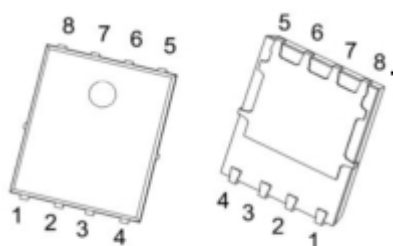
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Fast Switching Speed

Application

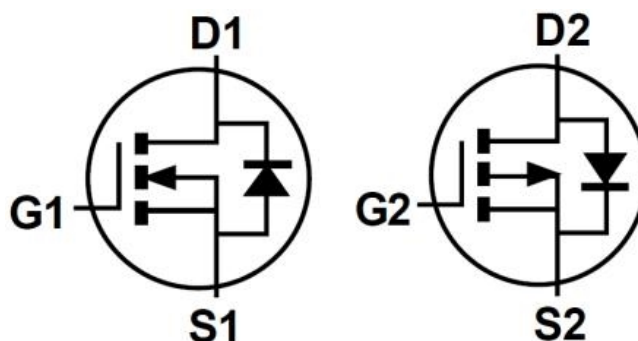
- Load switching
- Inverters
- Power Management

Package

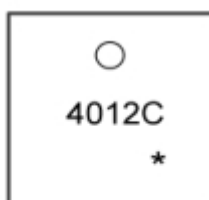


PDFNWB5×6-8L

Circuit diagram



Marking



4012C : Product code
* : Month code.

Absolute maximum ratings

($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	40	-40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current($T_C=25^{\circ}\text{C}$)	I_D	25	-23	A
Pulsed Drain Current	I_{DM}	100	-92	
Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)	P_D	32		W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.9		$^{\circ}\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_{STG}	-55~ +150		$^{\circ}\text{C}$

N-Electrical characteristics

($T_A=25^{\circ}\text{C}$, unless otherwise noted)

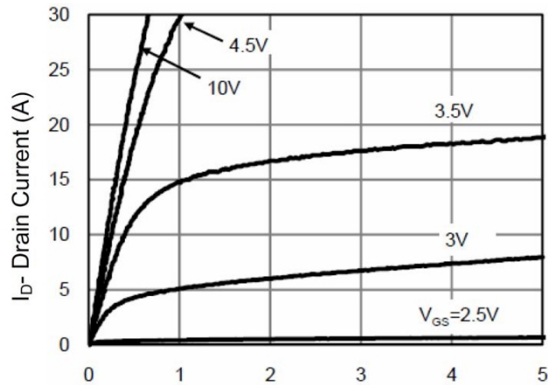
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV (BR)DSS	V _{GS} = 0V, I _D =250μA	40			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =32V, V _{GS} = 0V, T _J =25°C			1	uA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} = 0V			±100	uA
Gate threshold voltage ⁽¹⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.5	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A		15	19	mΩ
		V _{GS} =4.5V, I _D =8A		18	25	
Dynamic Characteristics						
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz		1061		pF
Output capacitance	C _{oss}			110		
Reverse transfer capacitance	C _{rss}			95		
Total gate charge	Q _g	V _{DS} =15V, V _{GS} =10V, I _D =10A		23		nC
Gate-source charge	Q _{gs}			3.3		
Gate-drain charge	Q _{gd}			5.3		
Switching Characteristics						
Turn-on Delay Time	T _{d(on)}	V _{DS} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =6A		5.5		nS
Turn-on Rise Time	T _r			14		
Turn-Off Delay Time	T _{d(off)}			25		
Turn-Off Fall Time	t _f			12		
Source-Drain Diode Characteristics						
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V, T _J =25°C			1.2	V

P-Electrical characteristics

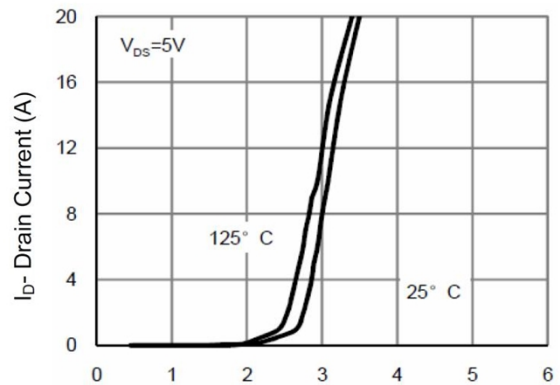
(T_A=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	$BV_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -32V, V_{GS} = 0V, T_J = 25^{\circ}C$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.5	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -5A$		23	29	m Ω
		$V_{GS} = -4.5V, I_D = -3A$		32	43	
Switching Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$		1415		pF
Output Capacitance	C_{oss}			134		
Reverse Transfer Capacitance	C_{rss}			102		
Total Gate Charge	Q_g	$V_{DS} = -15V, V_{GS} = -10V, I_D = -10A$		11.5		nC
Gate-Source Charge	Q_{gs}			3.5		
Gate-Drain Charge	Q_{gd}			3.3		
Switching Characteristics						
Turn-on Delay Time	$T_{d(on)}$	$V_{DS} = -15V, V_{GS} = -10V, R_{GEN} = 3.3\Omega, I_D = -6A$		22		nS
Turn-on Rise Time	T_r			15.7		
Turn-Off Delay Time	$T_{d(off)}$			59		
Turn-Off Fall Time	t_f			5.5		
Source-Drain Diode Characteristics						
Body Diode Voltage	V_{SD}	$I_S = -1A, V_{GS} = 0V, T_J = 25^{\circ}C$			-1.2	V

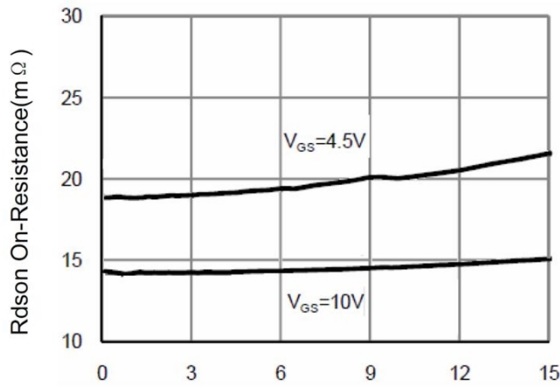
N-Channel Typical Characteristics



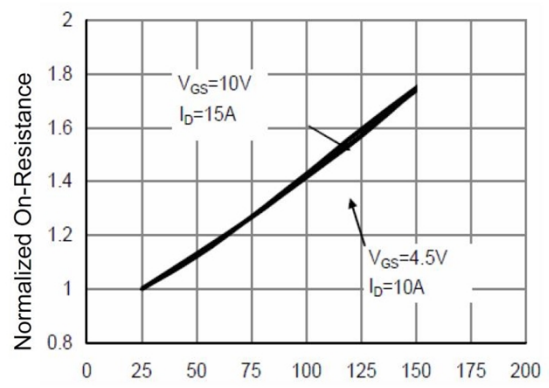
V_{DS} Drain-Source Voltage (V)
Output Characteristics



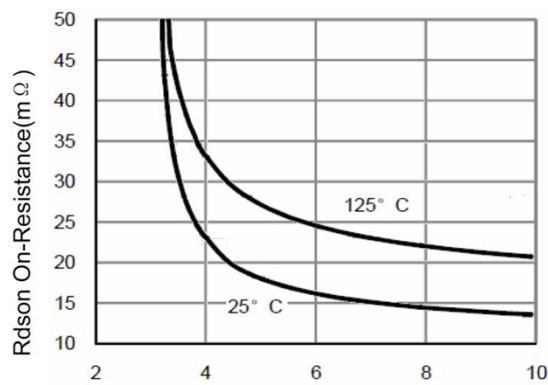
V_{GS} Gate-Source Voltage (V)
Transfer Characteristics



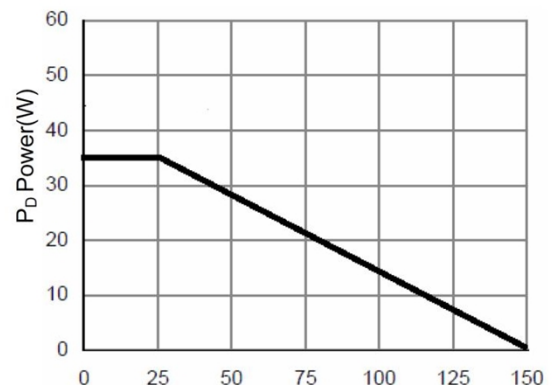
I_D Drain Current (A)
Drain-Source On-Resistance



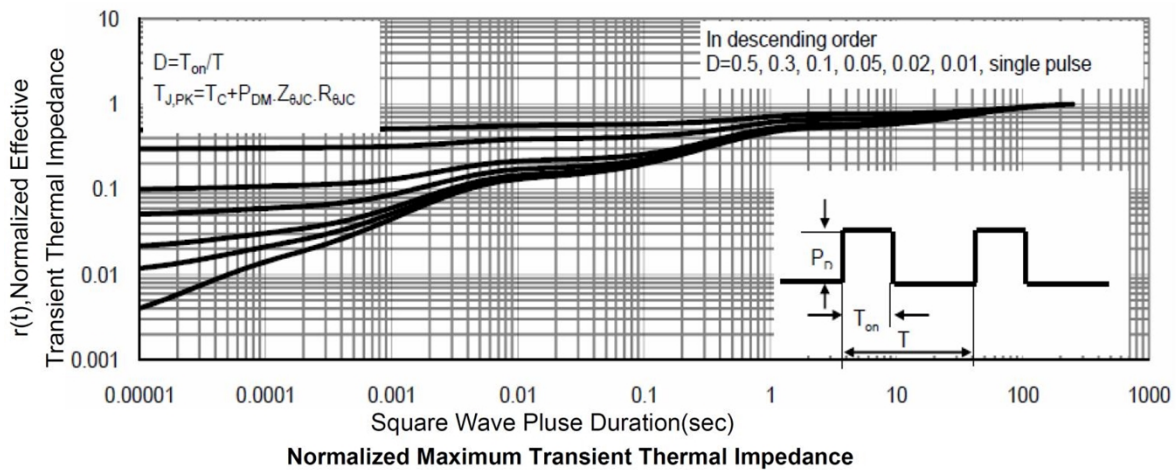
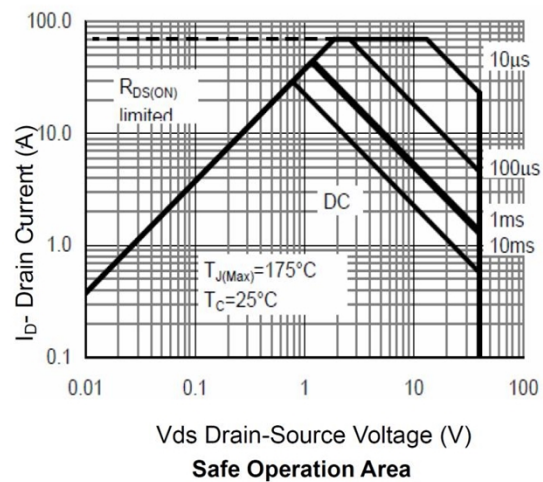
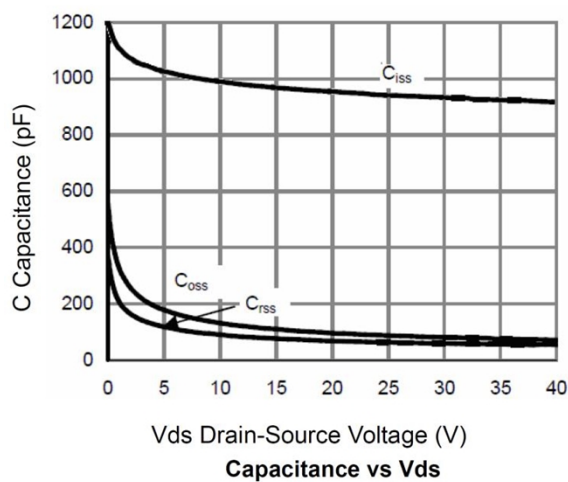
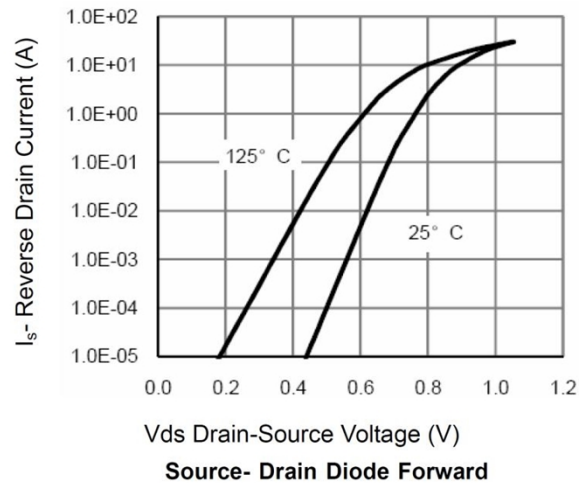
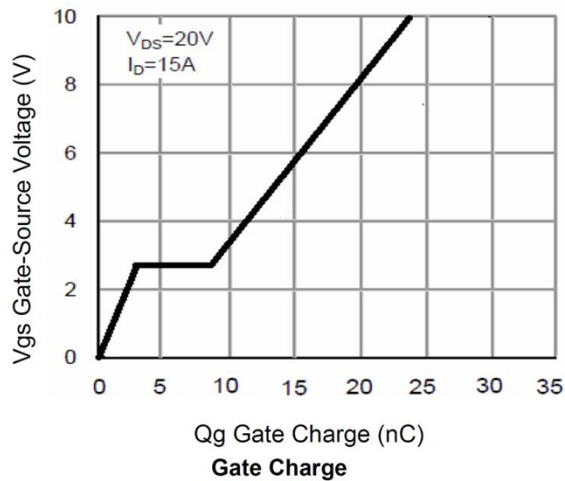
T_J -Junction Temperature (°C)
Drain-Source On-Resistance



V_{GS} Gate-Source Voltage (V)
Rdson vs Vgs



T_J -Junction Temperature (°C)
Power Dissipation



P-Channel Typical Characteristics

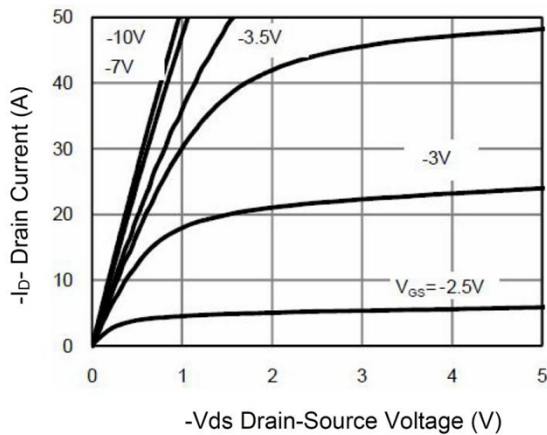


Figure 1 Output Characteristics

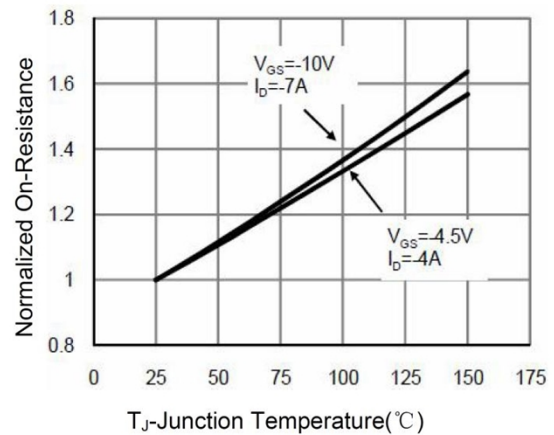


Figure 4 Rdson-Junction Temperature

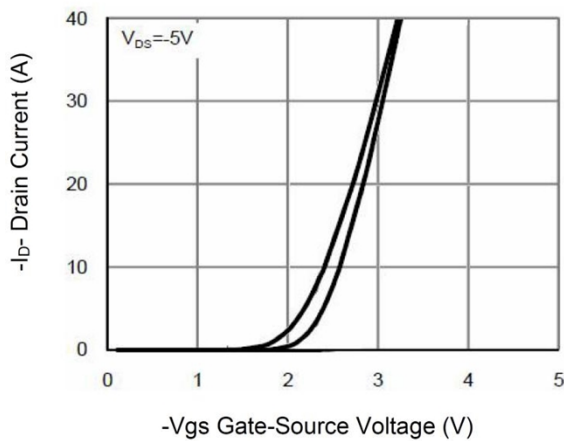


Figure 2 Transfer Characteristics

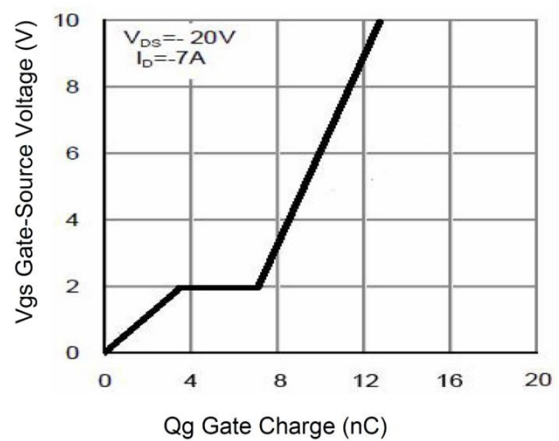


Figure 5 Gate Charge

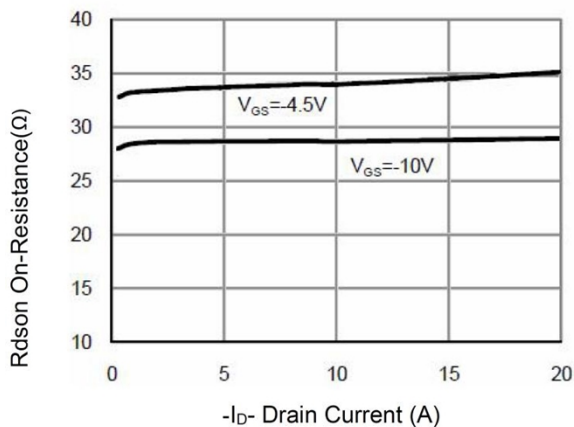


Figure 3 Rdson- Drain Current

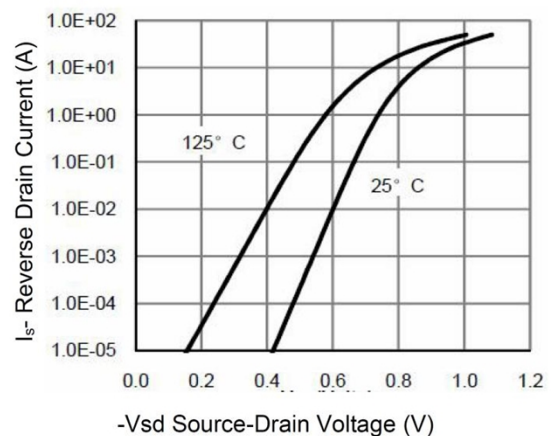


Figure 6 Source- Drain Diode Forward

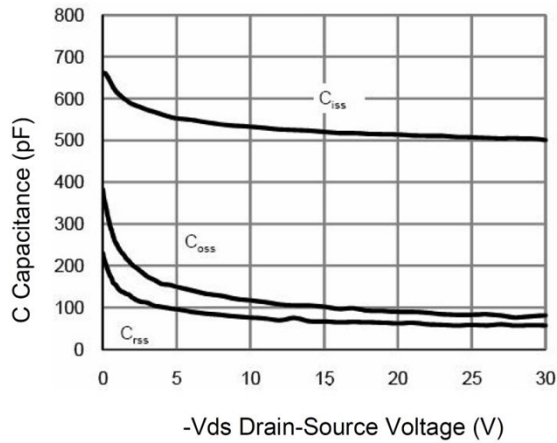


Figure 7 Capacitance vs Vds

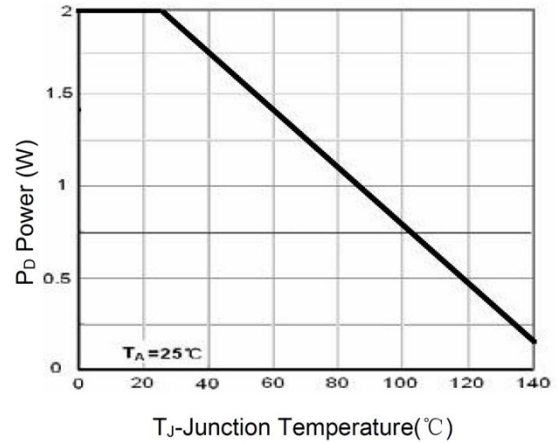


Figure 9 Power Dissipation

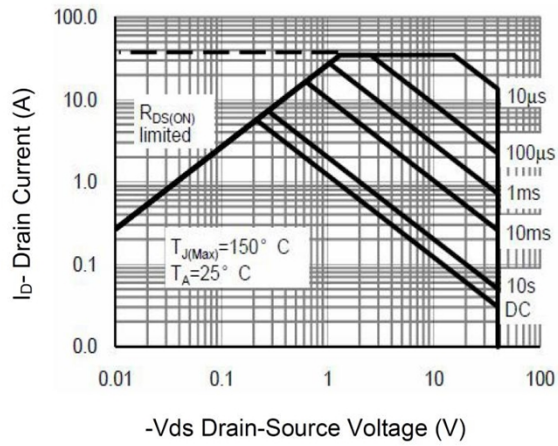


Figure 8 Safe Operation Area

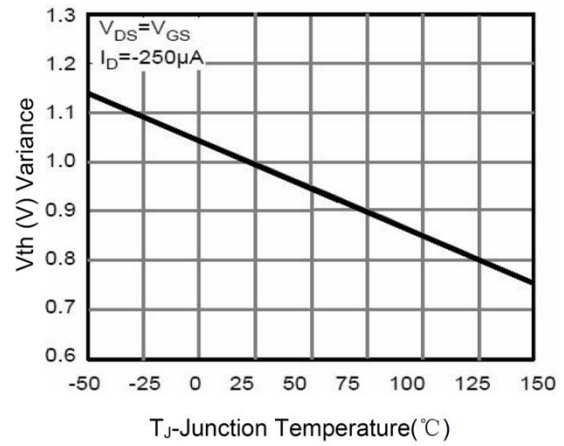


Figure 10 $V_{GS(th)}$ vs Junction Temperature

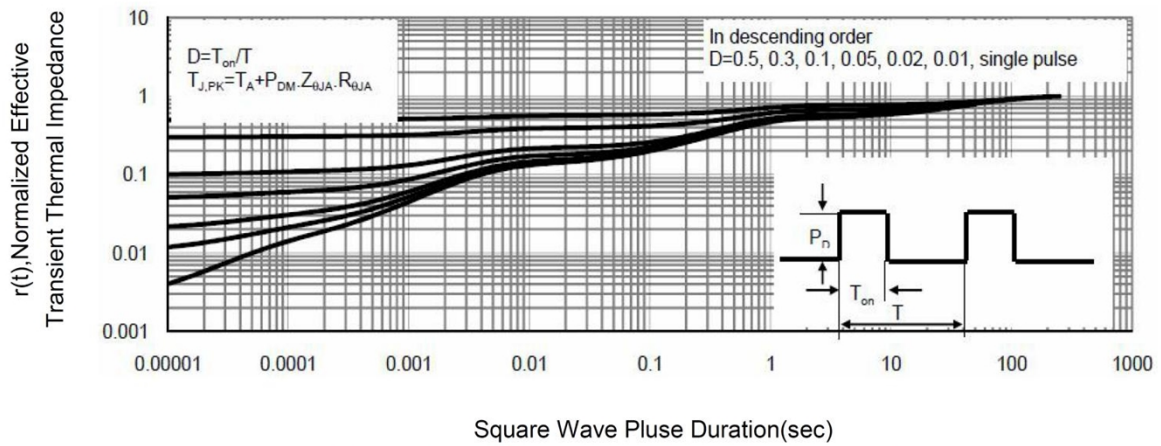
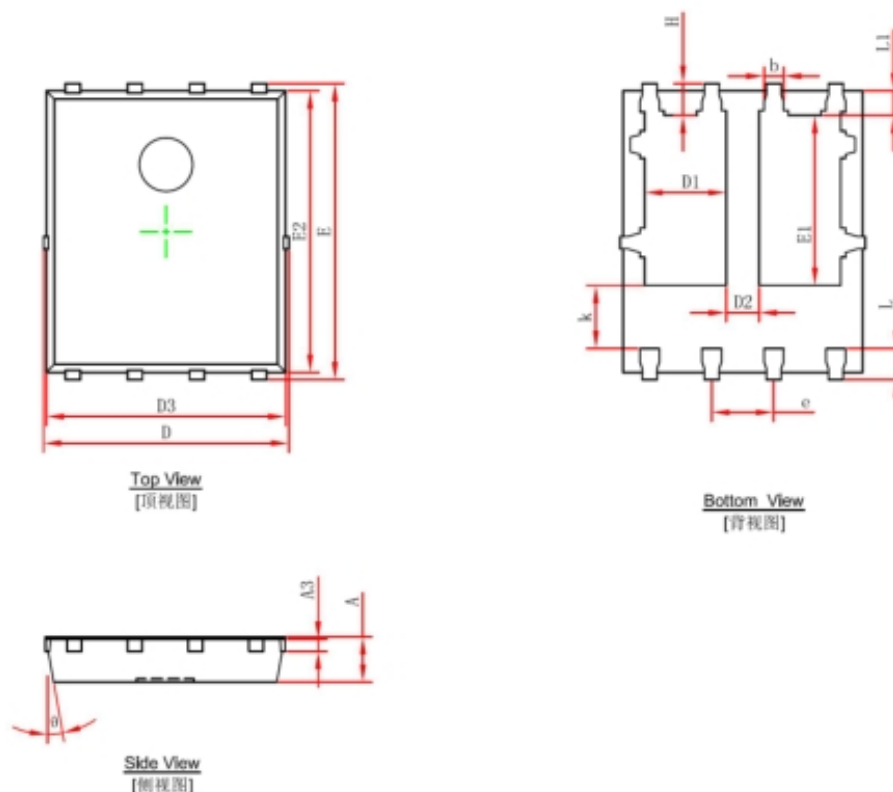


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFNWB5x6-8L-A Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254 REF.		0.010 REF.	
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	1.270 TYP.		0.050 TYP.	
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°