

FKBA4903

N&P Channel Enhancement-Mode MOSFET

Revision: A

General Description

Advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and low operation voltage. This device is suitable for using as a load switch or in PWM applications.

- Low $R_{DS(on)}$
- Small Package Outline
- ESD protected

Features

For N-Channel MOSFET

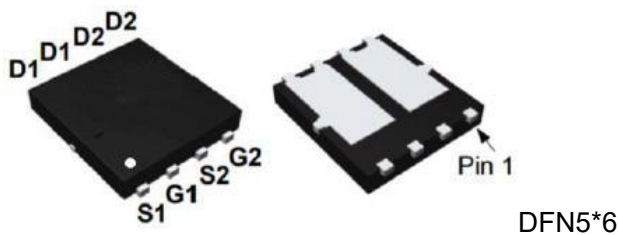
- $V_{DS} = 40V$
- $R_{DS(ON)} = 25m\Omega @ V_{GS}=10V$

For P-Channel MOSFET

- $V_{DS} = -40V$
- $R_{DS(ON)} = 30m\Omega @ V_{GS}=-10V$

Pin configurations

See Diagram below



Absolute Maximum Ratings

Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	40	-40	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Drain Current	Continuous	I_D	26	-25	A
	Pulsed		47	-46	
Total Power Dissipation	@TA=25°C	P_D	35.7	35.7	W
Operating Junction Temperature Range		T_J	-55 to 150		°C

Thermal Resistance

Parameter	Symbol	N-Channel		P-Channel		Units
		Typ	Max	Typ	Max	
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$		62		62	°C/W

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N-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA,	40			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =32V, V _{GS} =0V			1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20 V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =12A		25	30	mΩ
		V _{GS} =4.5V, I _D =10A		30	50	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =12A		8		S
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		593		pF
C _{oss}	Output Capacitance			76		pF
C _{rss}	Reverse Transfer Capacitance			56		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =4.5V, V _{DD} =20V, I _D =12A		5.5		nC
Q _{gs}	Gate Source Charge			1.25		nC
Q _{gd}	Gate Drain Charge			2.5		nC
t _{d(on)}	Turn-On Delay Time	V _{DD} =20V, R _{GEN} =3.3Ω I _D =1A		8.9		ns
t _{d(off)}	Turn-Off Delay Time			41		ns
t _{d(r)}	Turn-On Rise Time			2.2		ns
t _{d(f)}	Turn-Off Fall Time			2.7		ns
Source-Drain Diode Characteristics						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =1A			1.2	V
I _S	Continuous Source Current	V _G =V _D =0V			23	A
I _{SM}	Pulsed Source Current				46	A

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P-Channel Electrical Characteristics (T _J =25°C unless otherwise noted)							
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units	
OFF CHARACTERISTICS							
B _V DSS	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-40			V	
I _{DSS}	Drain to Source Leakage Current	V _{DS} =-32V, V _{GS} =0V			1	μA	
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20V			100	nA	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	-1		-2.5	V	
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-8A	-	30	45	mΩ	
		V _{GS} =-4.5V, I _D =-4A		55	70	mΩ	
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-8A		12.6		S	
DYNAMIC PARAMETERS							
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		1004		pF	
C _{oss}	Output Capacitance				108		pF
C _{rss}	Reverse Transfer Capacitance				80		pF
SWITCHING PARAMETERS							
Q _g	Total Gate Charge ²	V _{GS} =-4.5V, V _{DS} =-20V, I _D =-12A		9		nC	
Q _{gs}	Gate Source Charge				2.54		nC
Q _{gd}	Gate Drain Charge				3.1		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =-10V, V _{DS} =-15V, R _{GEN} =3.3Ω I _D =-1A		19.2		ns	
t _{d(off)}	Turn-Off Delay Time				48.6		ns
t _{d(r)}	Turn-On Rise Time				12.8		ns
t _{d(f)}	Turn-Off Fall Time				4.6		ns
Source-Drain Diode Characteristics							
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =-1A			-1	V	
I _S	Continuous Source Current	V _G =V _D =0V			-20	A	
I _{SM}	Pulsed Source Current				-40	A	

Typical Characteristics(N-Channel)

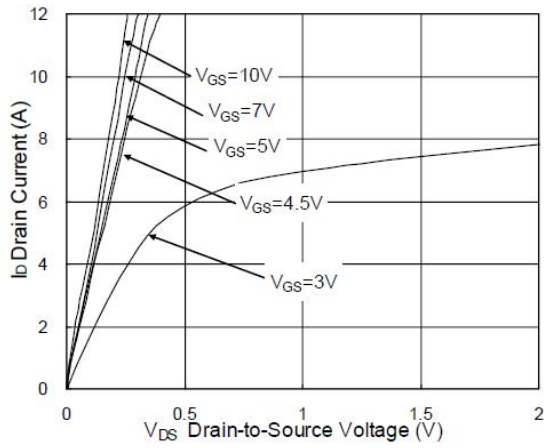


Fig.1 Typical Output Characteristics

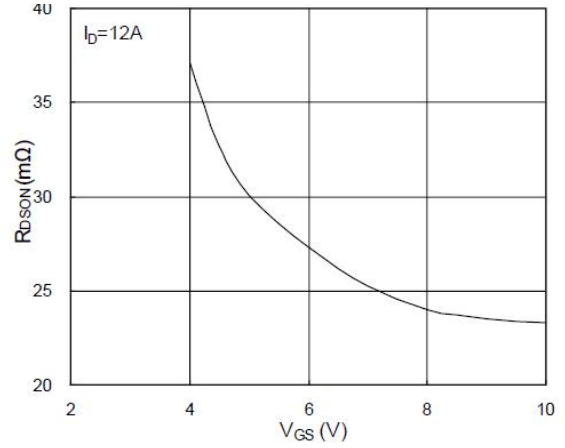


Fig.2 On-Resistance vs. G-S Voltage

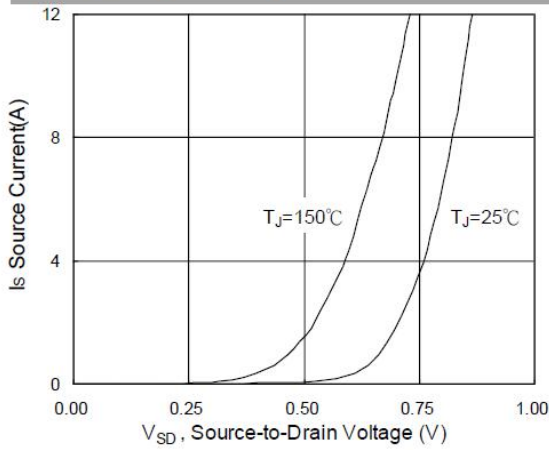


Fig.3 Forward Characteristics of Reverse

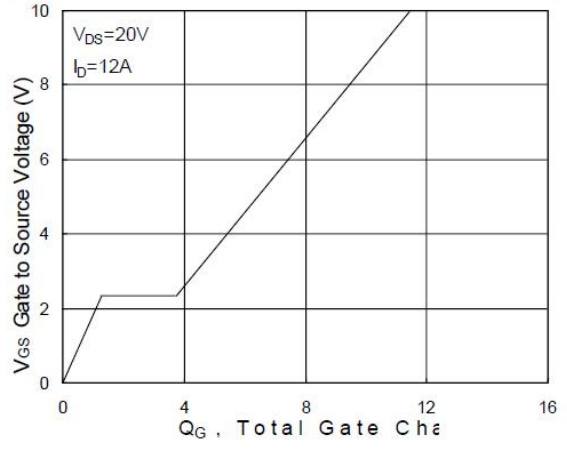


Fig.4 Gate-Charge Characteristics

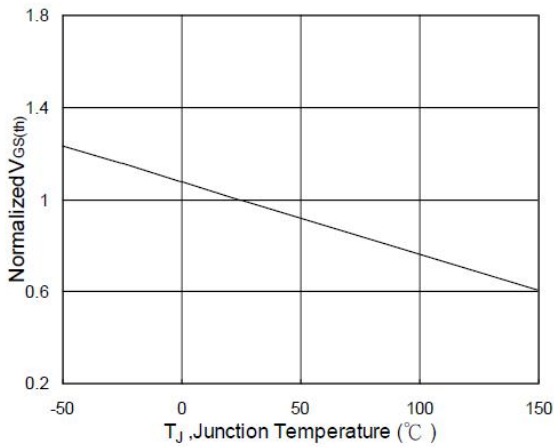


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

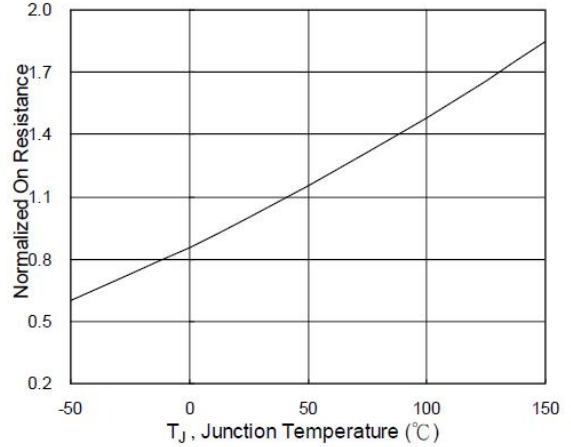


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics(N-Channel)

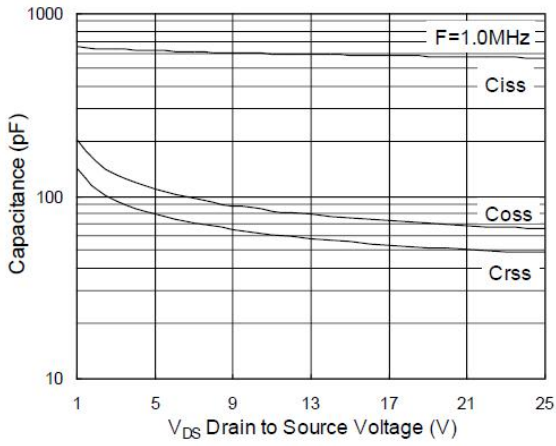


Fig.7 Capacitance

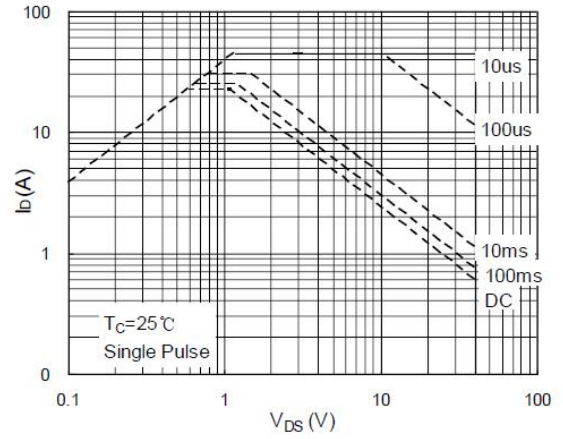


Fig.8 Safe Operating Area

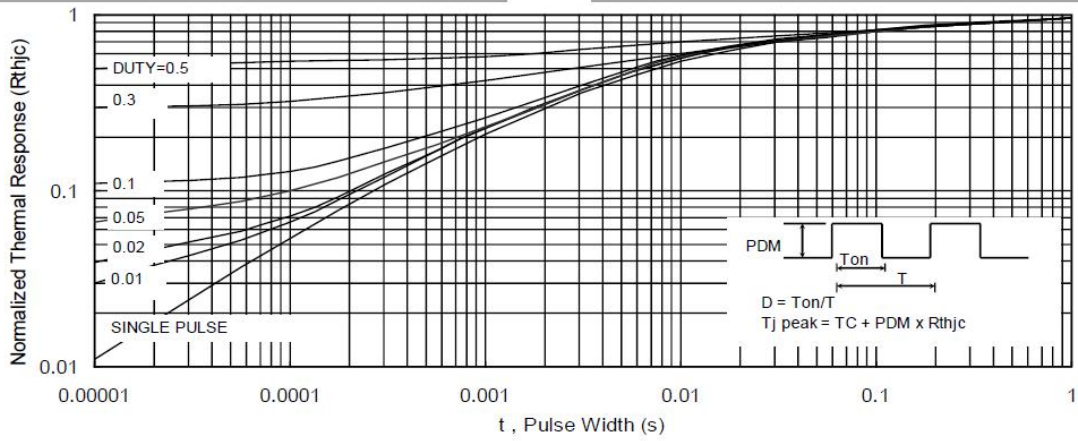


Fig.9 Normalized Maximum Transient Thermal Impedance

Typical Characteristics(P-Channel)

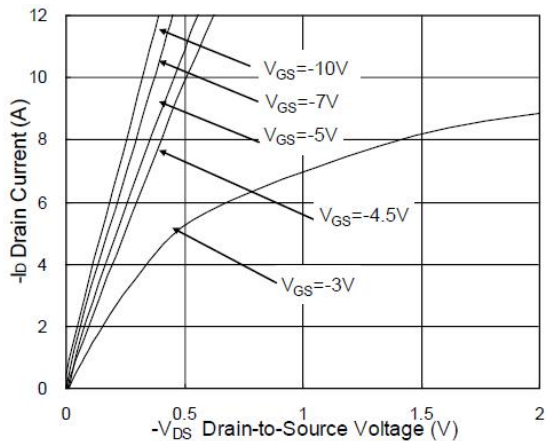


Fig.1 Typical Output Characteristics

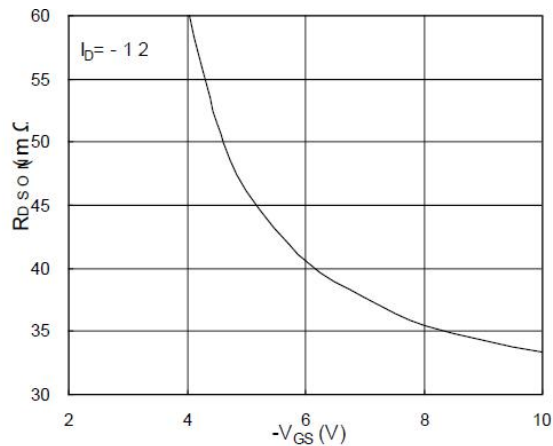


Fig.2 On-Resistance v.s Gate-Source

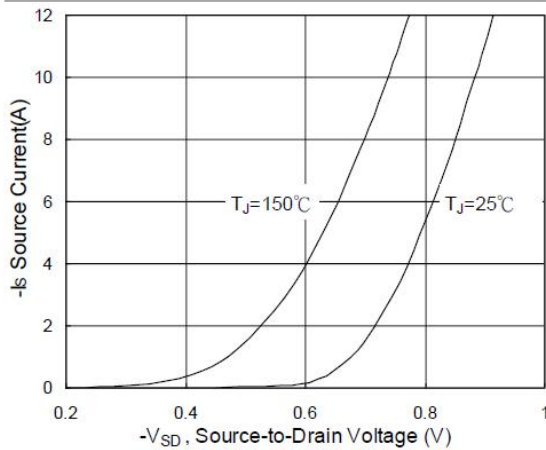


Fig.3 Forward Characteristics of Reverse

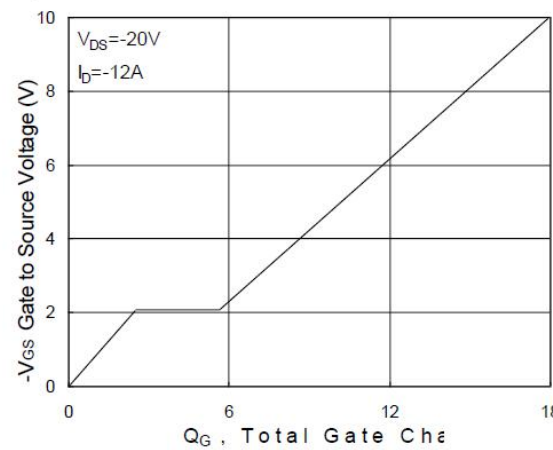


Fig.4 Gate-Charge Characteristics

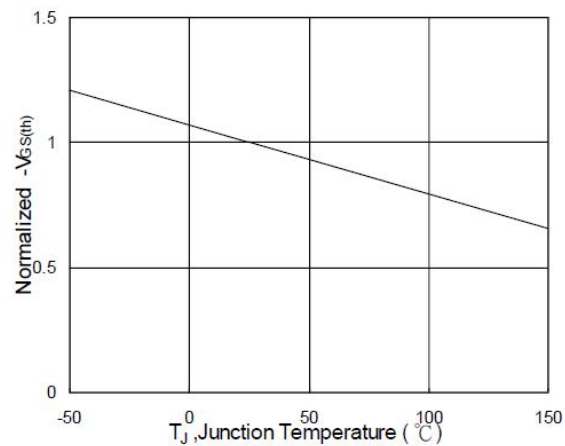


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

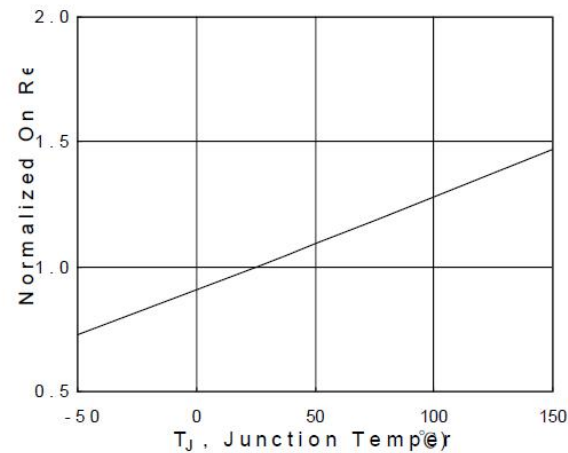


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Typical Characteristics(P-Channel)

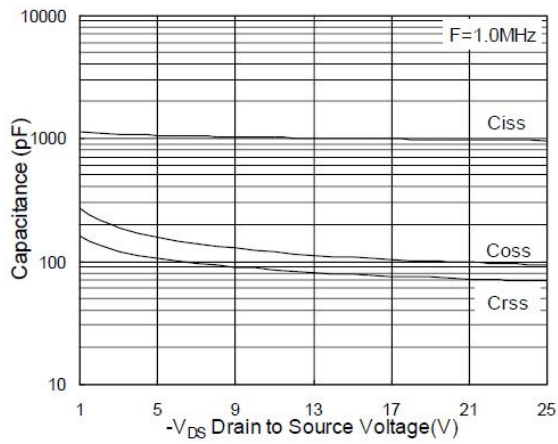


Fig.7 Capacitance

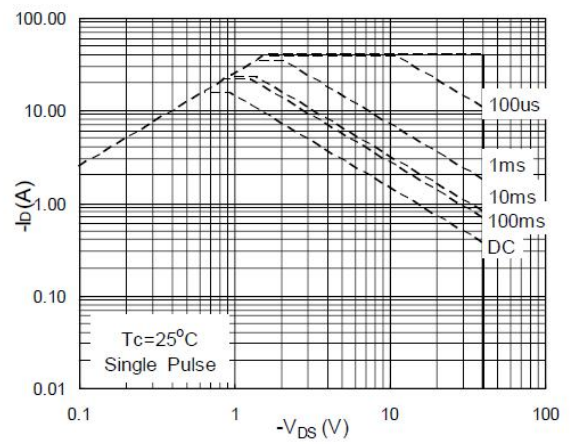


Fig.8 Safe Operating Area

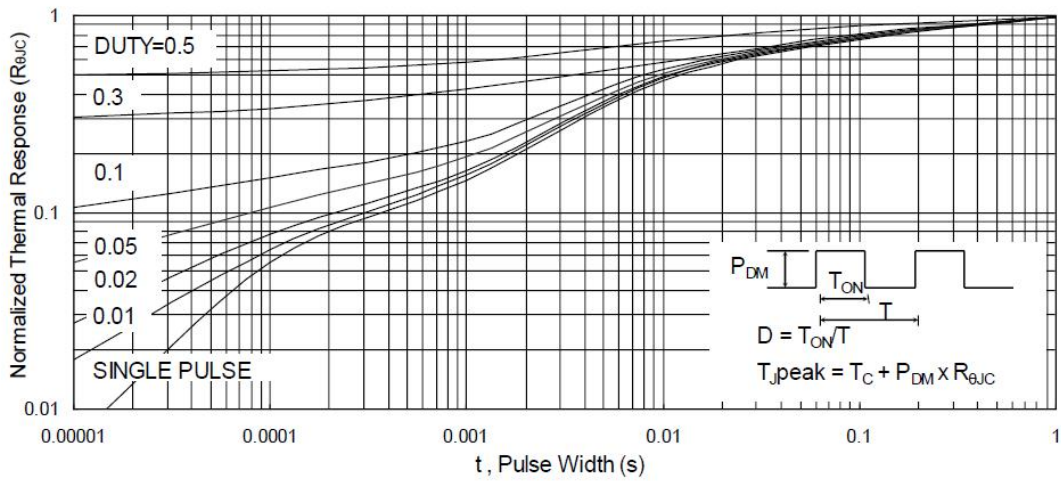
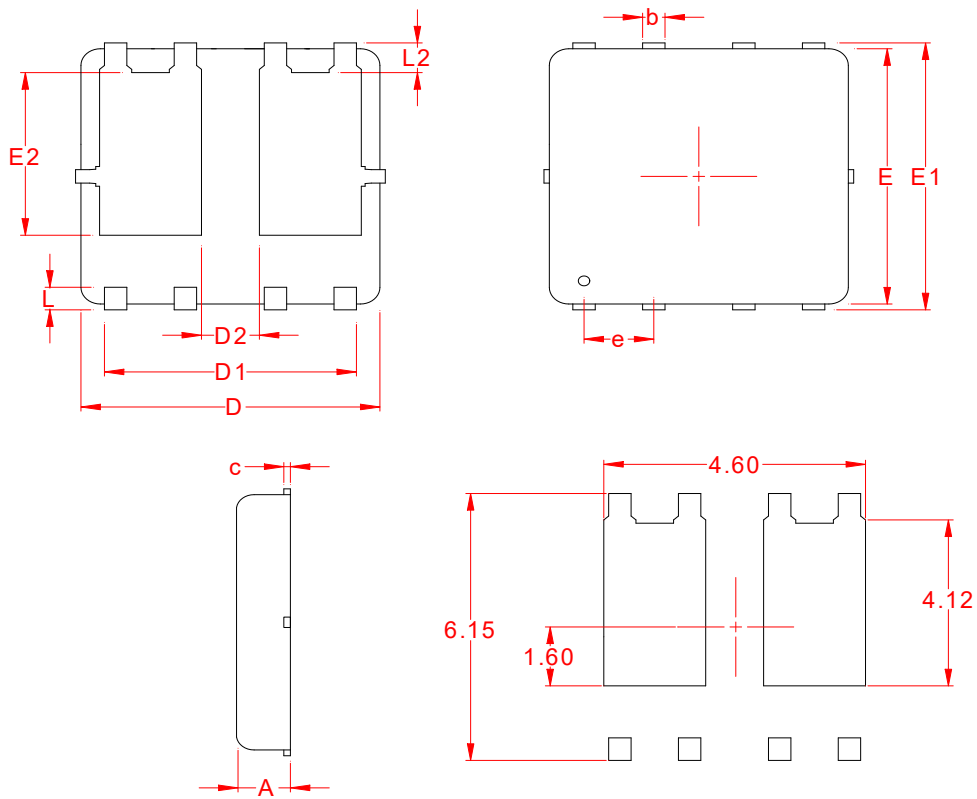


Fig.9 Normalized Maximum Transient Thermal Impedance

Package Outline Dimension

DFN5×6 EP2



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	—	0.05	0.000	—	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D1	4.35 BSC			0.171 BSC		
D2	0.50	0.60	0.75	0.020	0.024	0.030
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	3.82 BSC			0.150 BSC		
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	—	0.15	0	—	0.006
L2	0.68 REF			0.027 REF		
θ	0°	—	10°	0°	—	10°

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