P-Channel Enhancement Mode Power MOSFET

Description

The G75P04D5A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

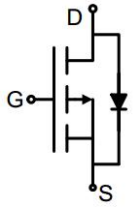
AEC-Q101 Qualified

General Features

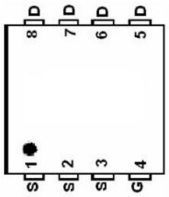
- V_{DS} -40V
- I_D (at V_{GS} = -10V) -88A
- $R_{DS(ON)}$ (at V_{GS} = -10V) < 6mΩ
- $R_{DS(ON)}$ (at V_{GS} = -4.5V) < 8mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

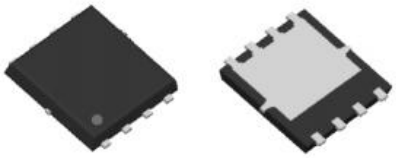
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6-8L

Ordering Information

Device	Package	Marking	Packaging
G75P04D5A	DFN5X6-8L	G75P04	5000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Continuous Drain Current	T_C = 25ºC	I_D	-88	A
	T_C = 100ºC		-63	
Pulsed Drain Current (note1)		I_{DM}	-352	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	139	W
Single pulse avalanche energy （note2）		E_{AS}	306	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 175	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	55	ºC/W
Maximum Junction-to-Case	R_{thJC}	1.08	ºC/W

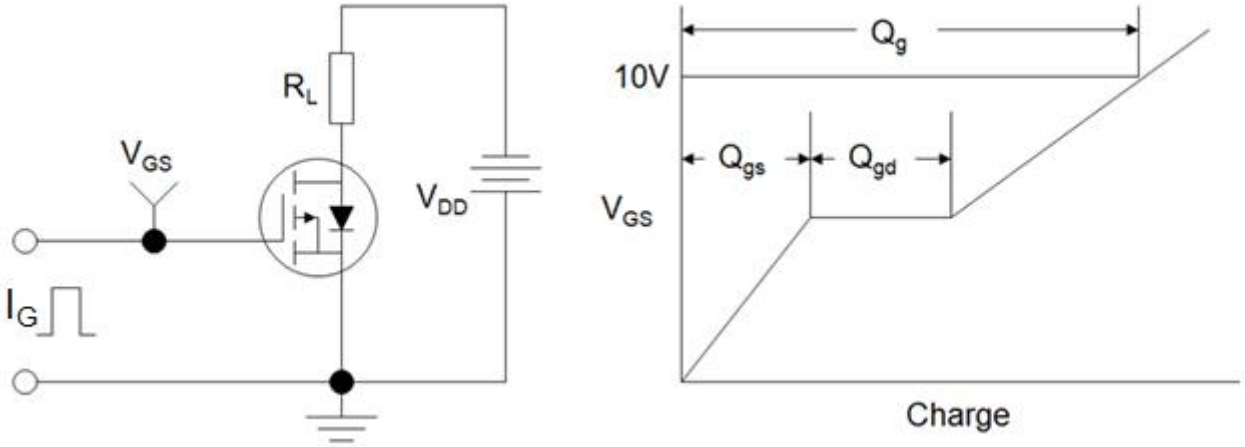
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.4	-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -20A	--	4.9	6.0	mΩ
		V_{GS} = -4.5V, I_D = -20A	--	6.5	8.0	
Forward Transconductance	g_{FS}	V_{DS} = -5V,I_D = -20A	--	44	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -20V, f = 1.0MHz	--	6640	--	pF
Output Capacitance	C_{oss}		--	665	--	
Reverse Transfer Capacitance	C_{rss}		--	650	--	
Total Gate Charge	Q_g	V_{DD} = -20V, I_D = -20A, V_{GS} = -10V	--	125	--	nC
Gate-Source Charge	Q_{gs}		--	16	--	
Gate-Drain Charge	Q_{gd}		--	25	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = -20V, I_D = -20A, R_G = 1Ω	--	15	--	ns
Turn-on Rise Time	t_r		--	12	--	
Turn-off Delay Time	$t_{d(off)}$		--	70	--	
Turn-off Fall Time	t_f		--	18	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	-88	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = -20A, V_{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q_{rr}	I_F = -20A, V_{GS} = 0V di/dt=-100A/us	--	50	--	nC
Reverse Recovery Time	T_{rr}		--	53	--	ns

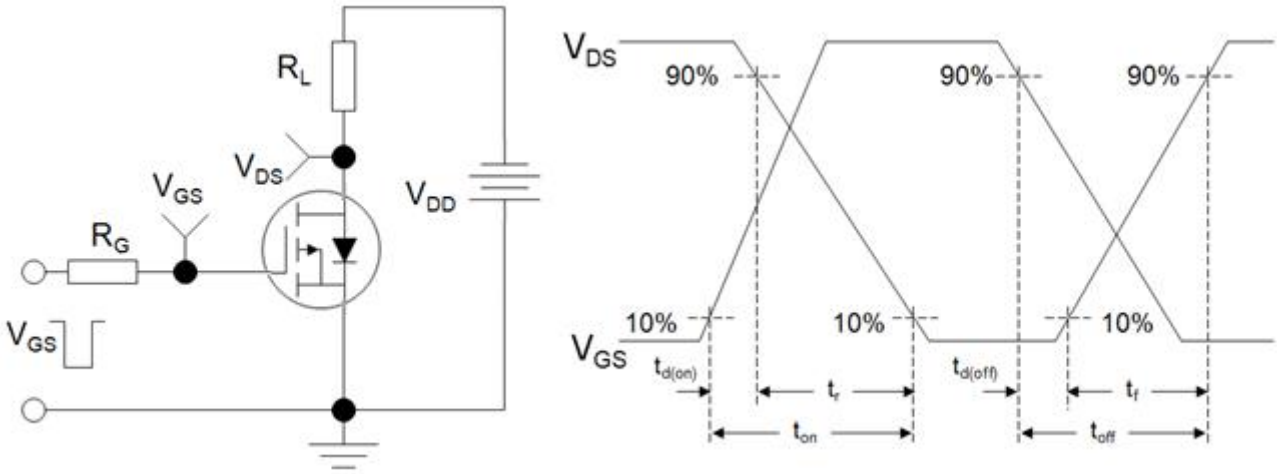
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=40V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 840mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

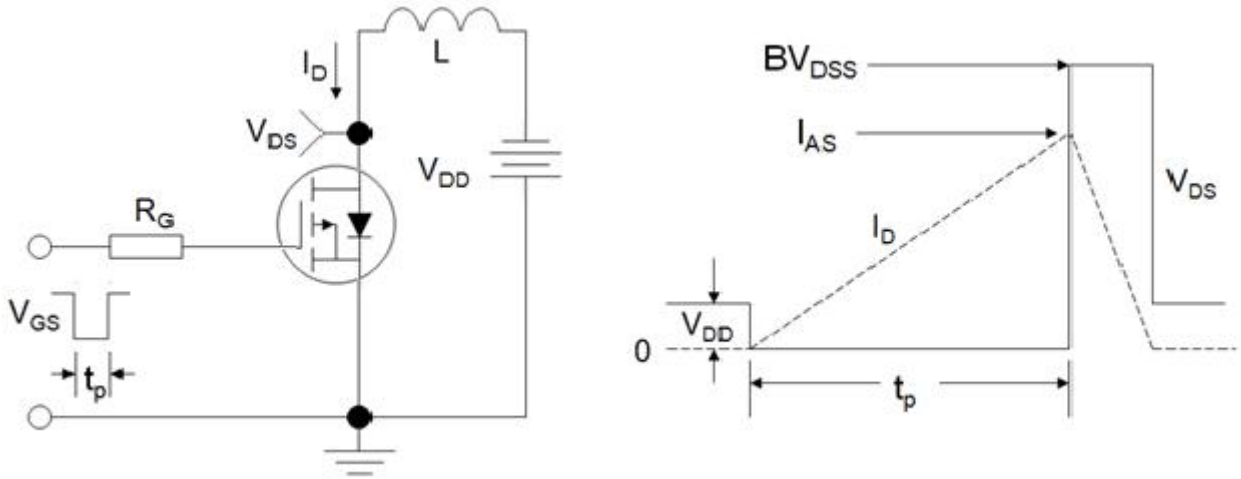
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

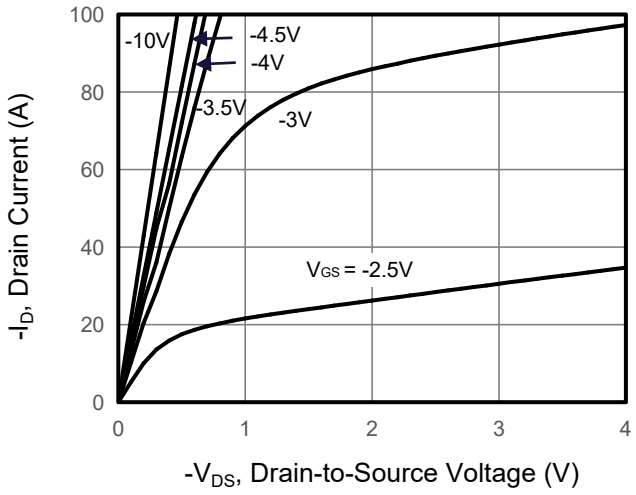


Figure 2. Transfer Characteristics

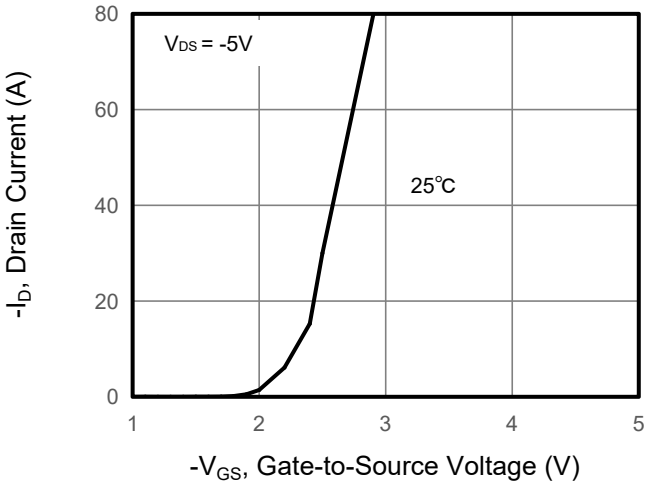


Figure 3.Drain Source On Resistance

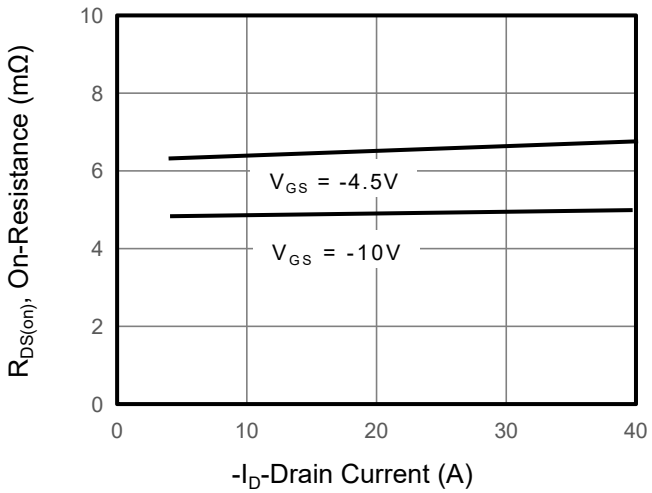


Figure 4. Gate Charge

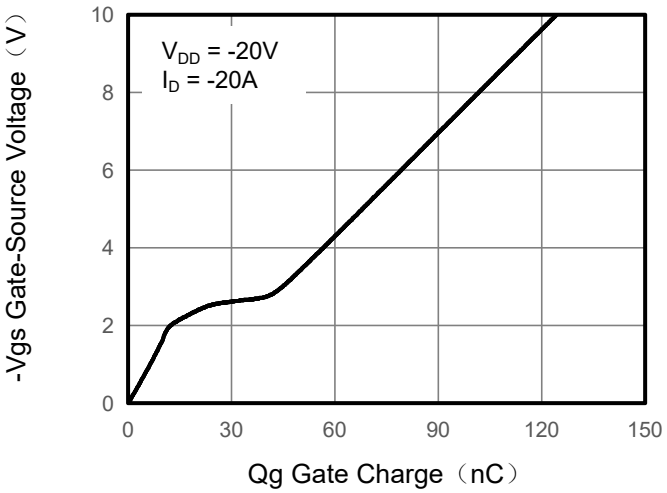


Figure 5. Capacitance

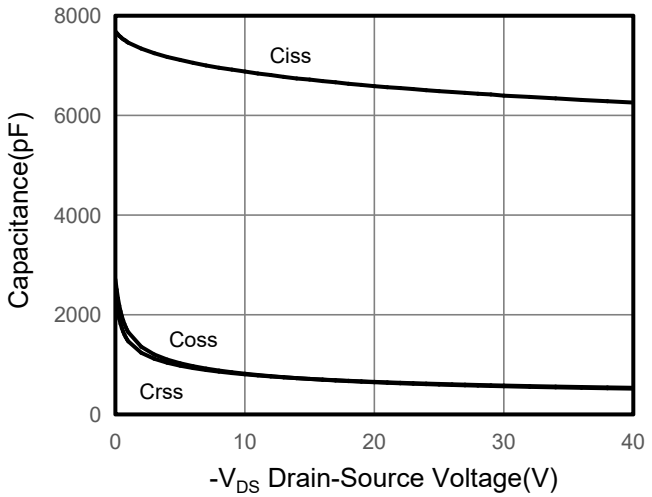
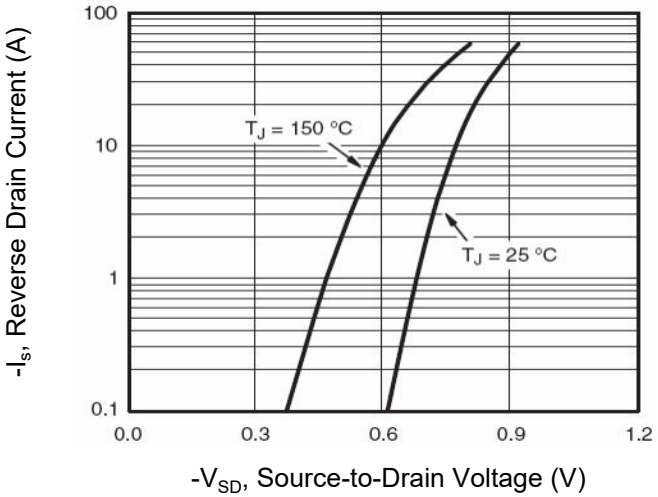


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

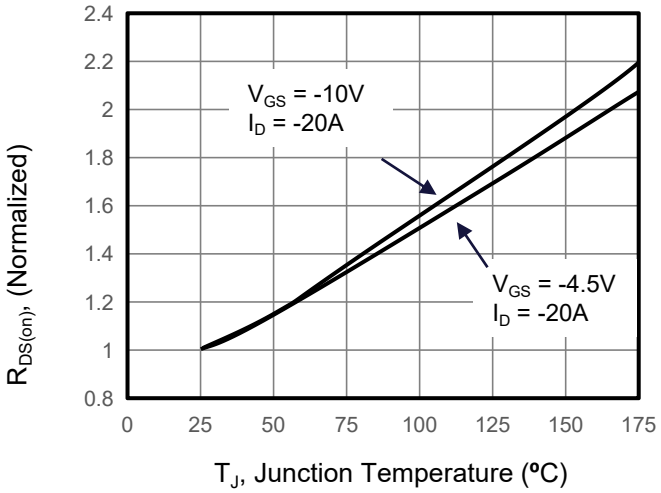


Figure 8. Safe Operation Area

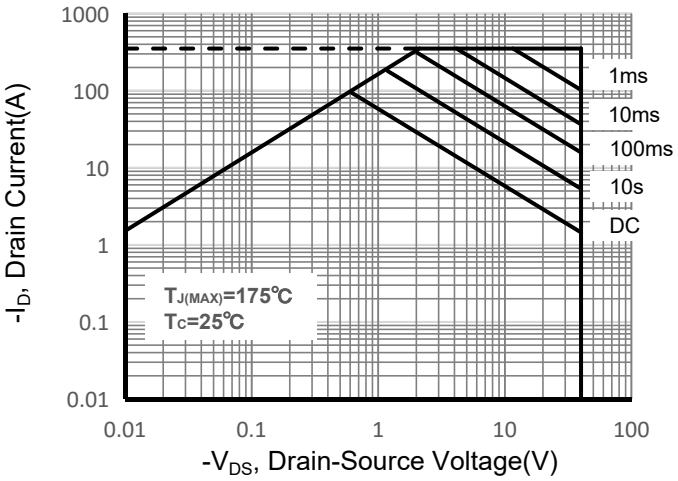


Figure 9. Maximum Continuous Drain Current vs Case Temperature

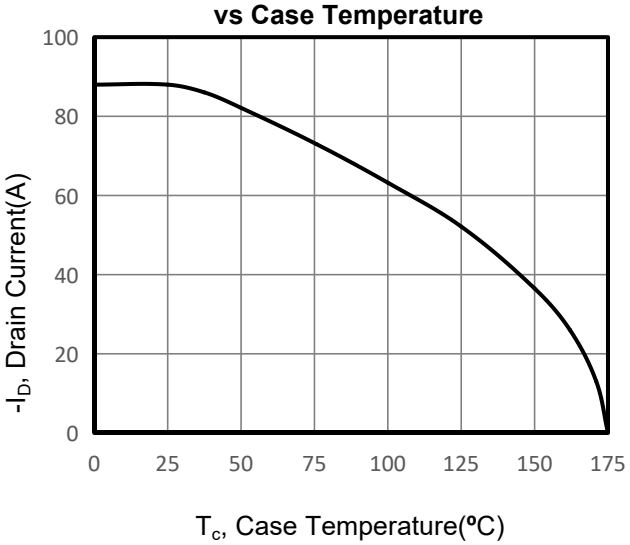
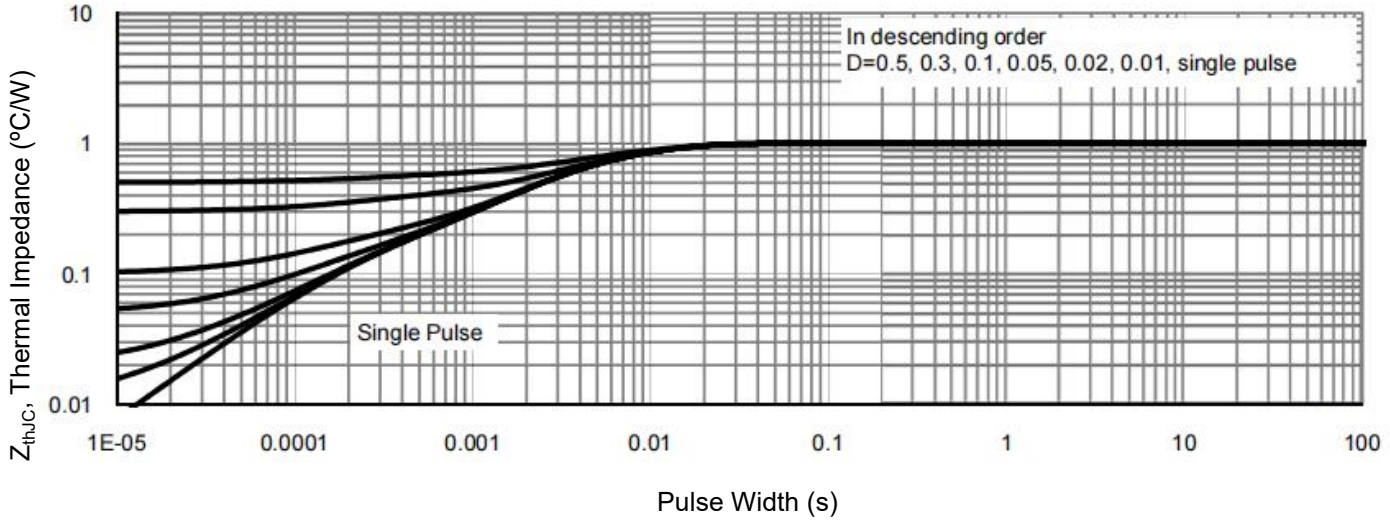
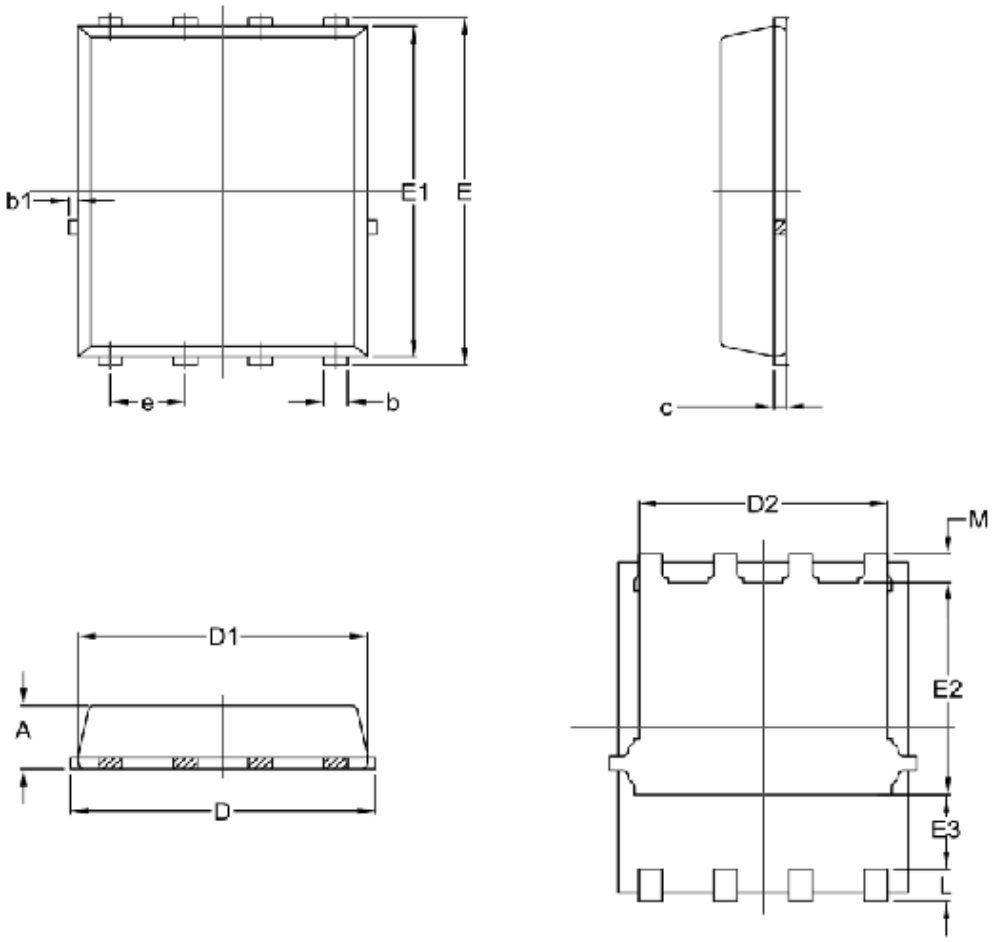


Figure 10. Normalized Maximum Transient Thermal Impedance



DFN5X6-8L Package Information



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.20
b	0.30	0.40	0.50
b1	0.02	0.15	0.22
c	0.15	0.20	0.35
D	4.95	5.15	5.35
D1	4.80	4.90	5.00
D2	4.00	4.20	4.40
E	5.95	6.05	6.25
E1	5.65	5.75	5.85
E2	3.50	3.70	3.90
E3	1.10	/	/
e		1.27	
L	0.40	0.55	0.70
M	0.35	0.50	0.65