

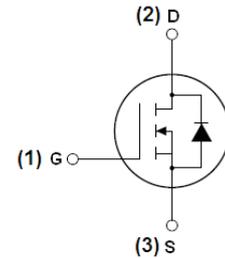
## N-Channel Enhancement Mosfet

### Features

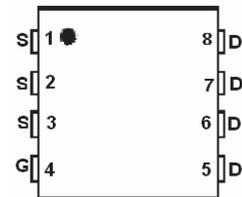
- 100V,73A  
 $R_{DS(on)} < 7.0m\Omega @ V_{GS} 10V$  TYP:5.6m $\Omega$   
 $R_{DS(on)} < 9.4m\Omega @ V_{GS} 4.5V$  TYP:7.4m $\Omega$
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(on)}$  and Low Gate Charge

### Applications

- Motor controls
- DC/DC converters
- Halogen-free



Schematic diagram



Pin assignment

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
75N100	RM75N100DF	DFN5X6	-	-	5000

### ABSOLUTE MAXIMUM RATINGS ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_c=25^\circ\text{C}$ ) <sup>(1)</sup>	$I_D$	73	A
Continuous Drain Current ( $T_c=100^\circ\text{C}$ )	$I_D$	46	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	292	A
Drain Power Dissipation	$P_D$	74	W
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	250	mJ
Thermal Resistance from Junction to Ambient <sup>(3)</sup>	$R_{\theta JA}$	38	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.7	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	-55~ +150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

#### Notes:

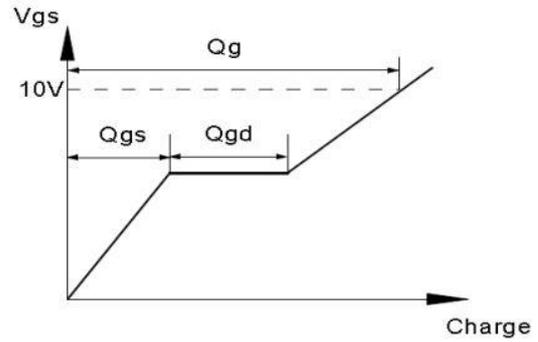
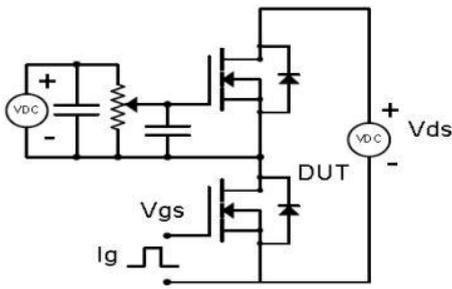
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition :  $T_J=25^\circ\text{C}$ ,  $V_{DD}=50\text{V}$ ,  $V_G=10\text{V}$ ,  $L=1.0\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AS}=22.4\text{A}$
- 3) The value of  $R_{\theta JA}$  Mounted on FR4 Board (25.4mm\*25.4mm\*t1.6mm) With 2oz Copper  $T_A=25^\circ\text{C}$

## MOSFET ELECTRICAL CHARACTERISTICS( $T_J=25^{\circ}\text{C}$ unless otherwise noted)

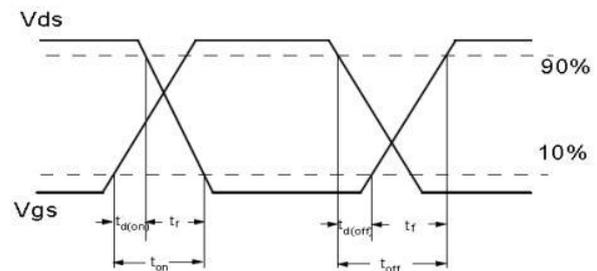
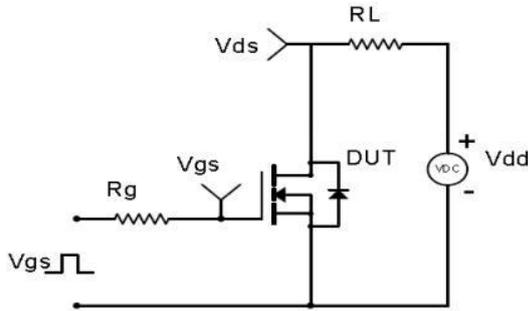
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.7	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	5.6	7.0	m $\Omega$
		$V_{GS} = 4.5V, I_D = 15A$	-	7.4	9.4	m $\Omega$
Forward transconductance	$R_g$	$V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz$	-	1.3	-	$\Omega$
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$	-	1585	-	pF
Output Capacitance	$C_{oss}$		-	693	-	
Reverse Transfer Capacitance	$C_{rss}$		-	13	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 20A, R_G = 3\Omega, V_{GS} = 10V$	-	4.6	-	nS
Turn-on rise time	$t_r$		-	10	-	
Turn-off delay time	$t_{d(off)}$		-	23	-	
Turn-off fall time	$t_f$		-	21	-	
Total Gate Charge	$Q_g$	$V_{DS} = 50V, I_D = 20A, V_{GS} = 10V$	-	27	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.9	-	
Gate-Drain Charge	$Q_{gd}$		-	5.3	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage	$V_{SD}$	$T_J = 25^{\circ}\text{C}, V_{GS} = 0V, I_S = 20A$	-	0.8	1.2	V
Diode Forward current	$I_S$	$T_C = 25^{\circ}\text{C}$	-	-	73	A
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25^{\circ}\text{C}, I_F = 20A, di/dt = 100A/\mu s$	-	49	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	82	-	nC

# Test Circuit & Waveform

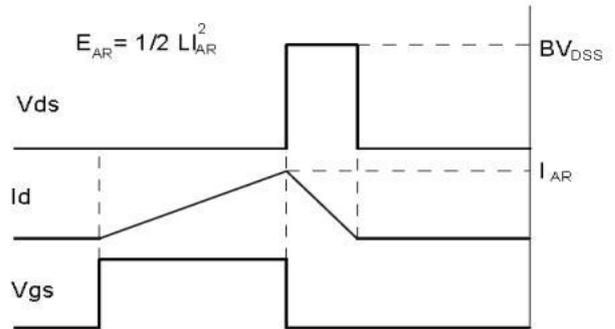
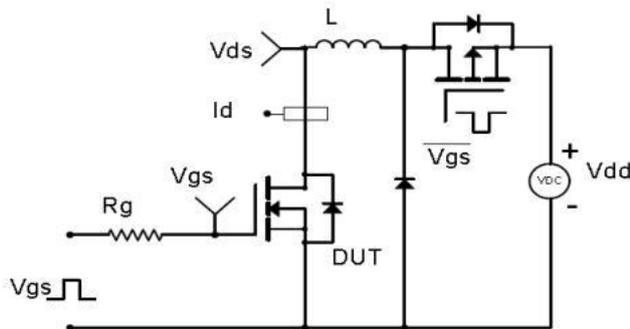
## Gate Charge Test Circuit & Waveform



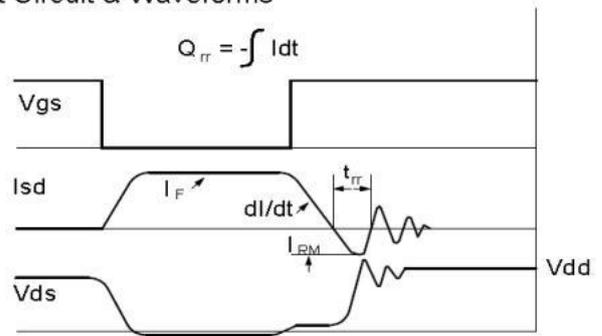
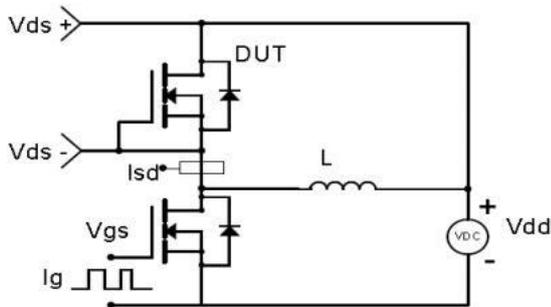
## Resistive Switching Test Circuit & Waveforms



## Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



## Diode Recovery Test Circuit & Waveforms



# RATING AND CHARACTERISTICS CURVES (RM75N100DF)

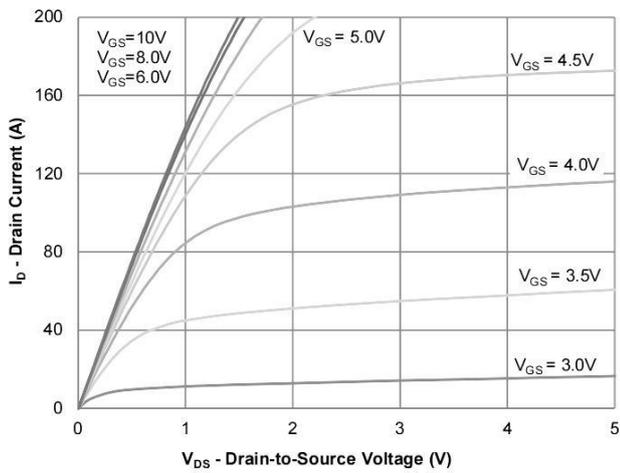


Figure 1: Output Characteristics

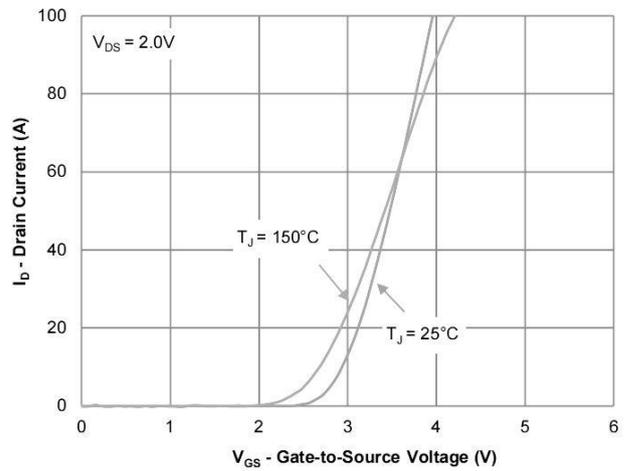


Figure 2: Transfer Characteristics

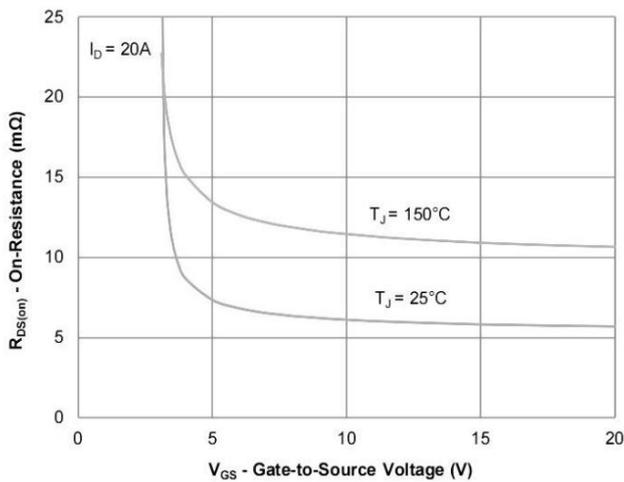


Figure 3: On-Resistance vs. Gate-Source Voltage

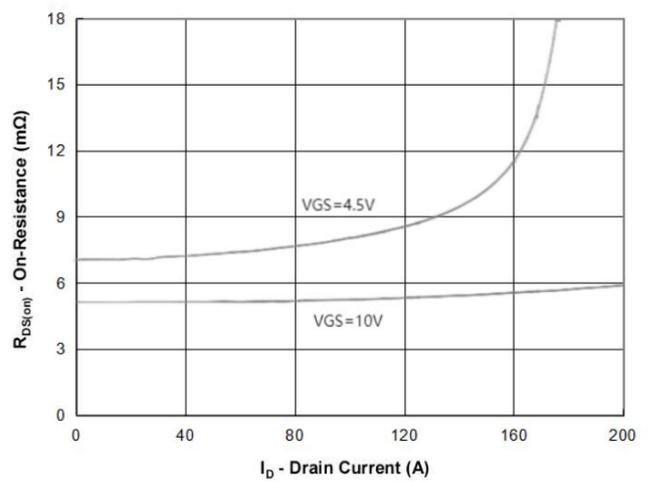


Figure 4: On-Resistance vs. Gate-Source Voltage

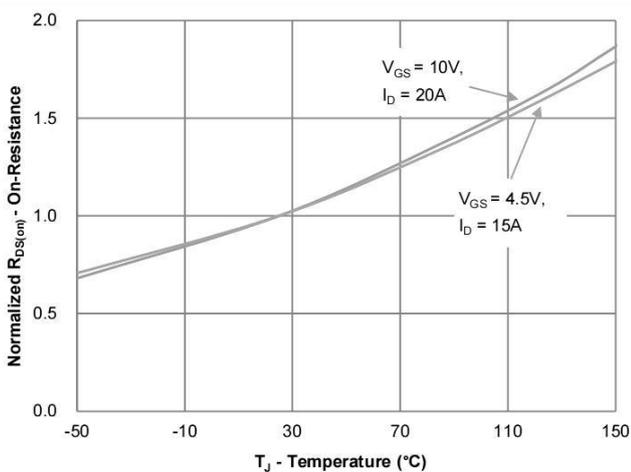


Figure 5: On-Resistance vs. Junction Temperature

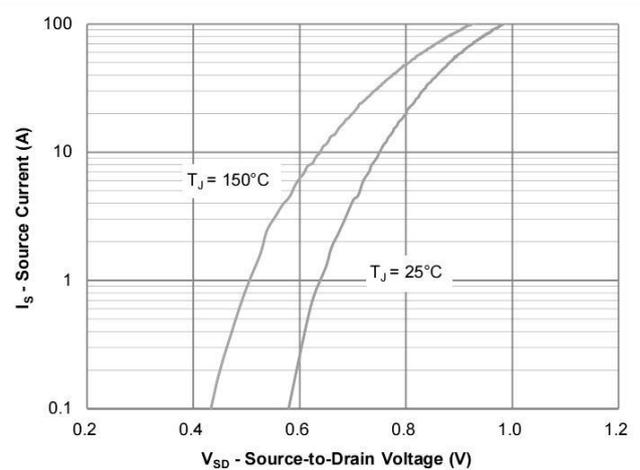


Figure 6: Source-Drain Diode Forward Voltage

# RATING AND CHARACTERISTICS CURVES (RM75N100DF)

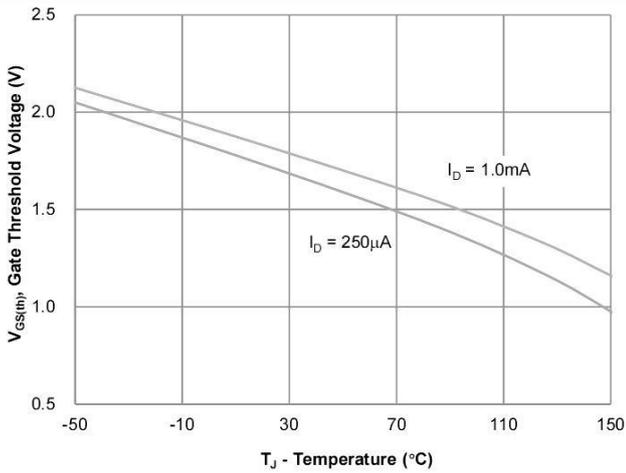


Figure 7: Gate Threshold Variation vs. Junction Temperature

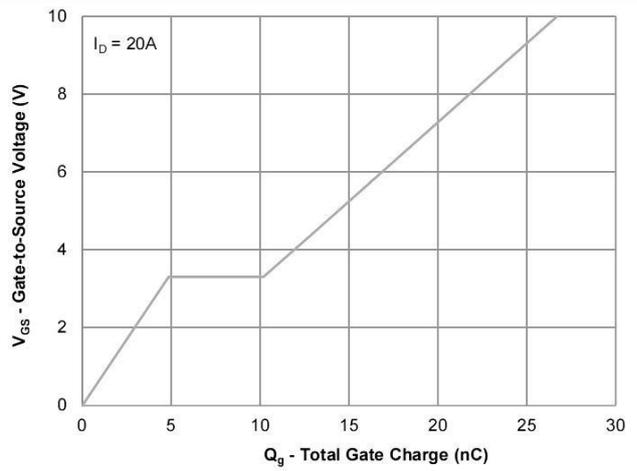


Figure 8: Gate Charge Characteristics

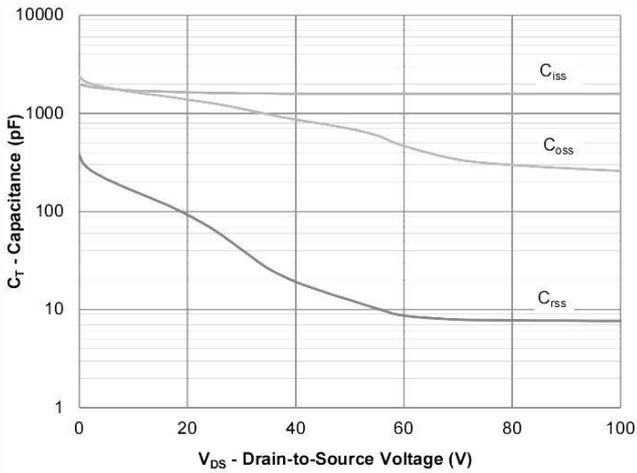


Figure 9: Capacitance Characteristics

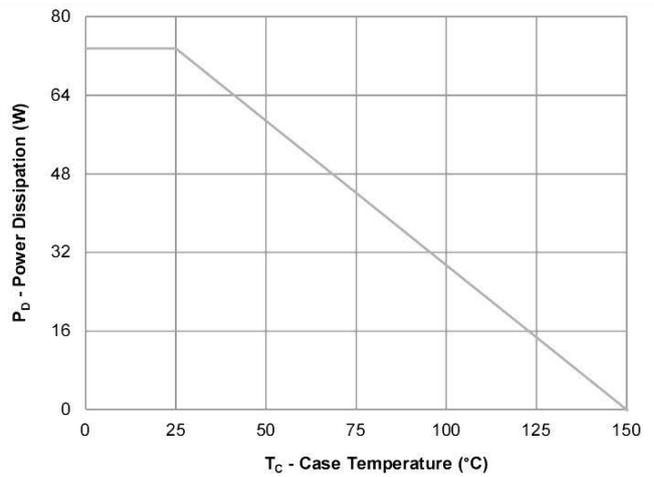


Figure 10: Power Derating

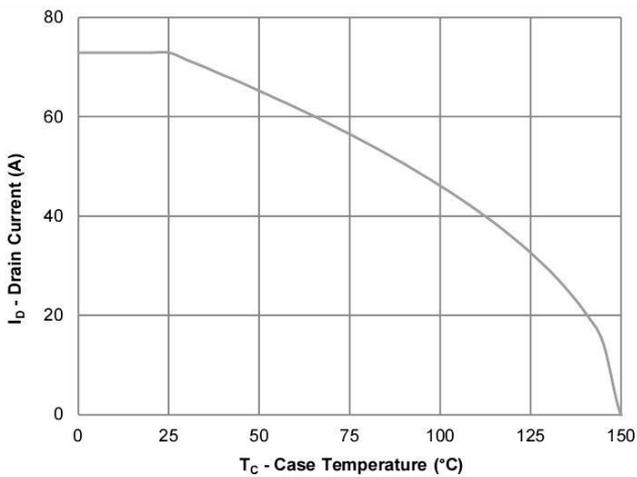


Figure 11: Current Derating

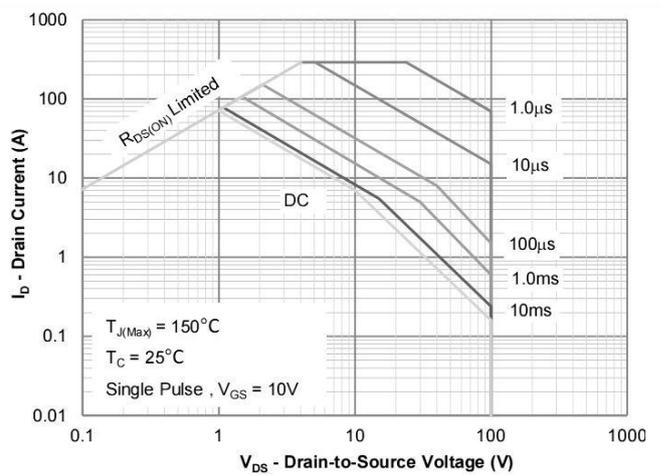


Figure 12: Safe Operating Area

## RATING AND CHARACTERISTICS CURVES (RM75N100DF)

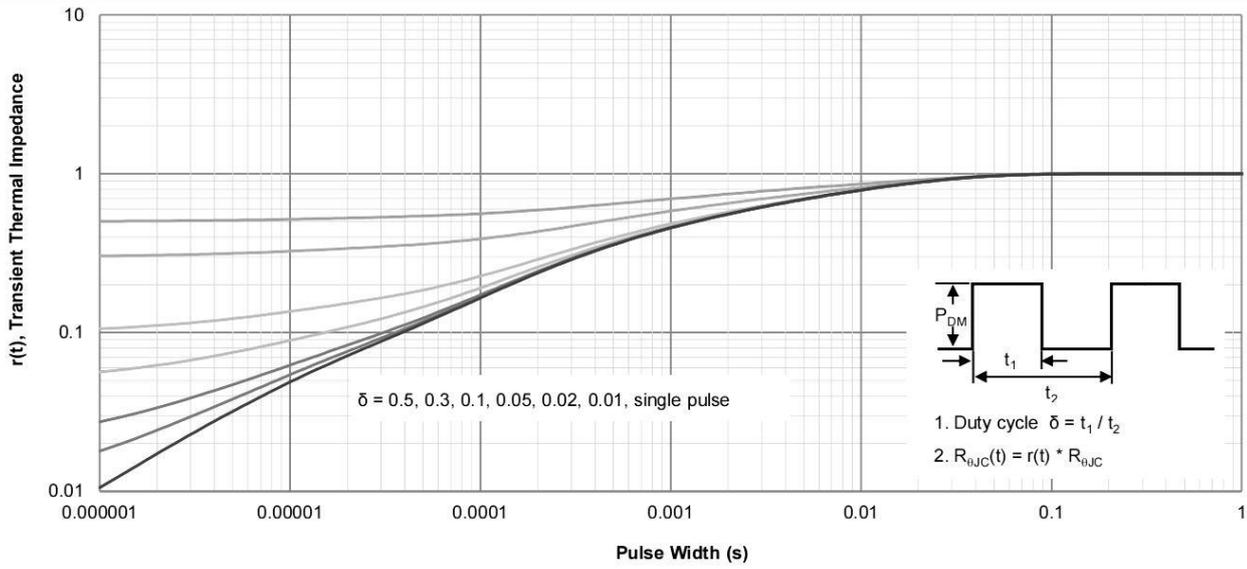
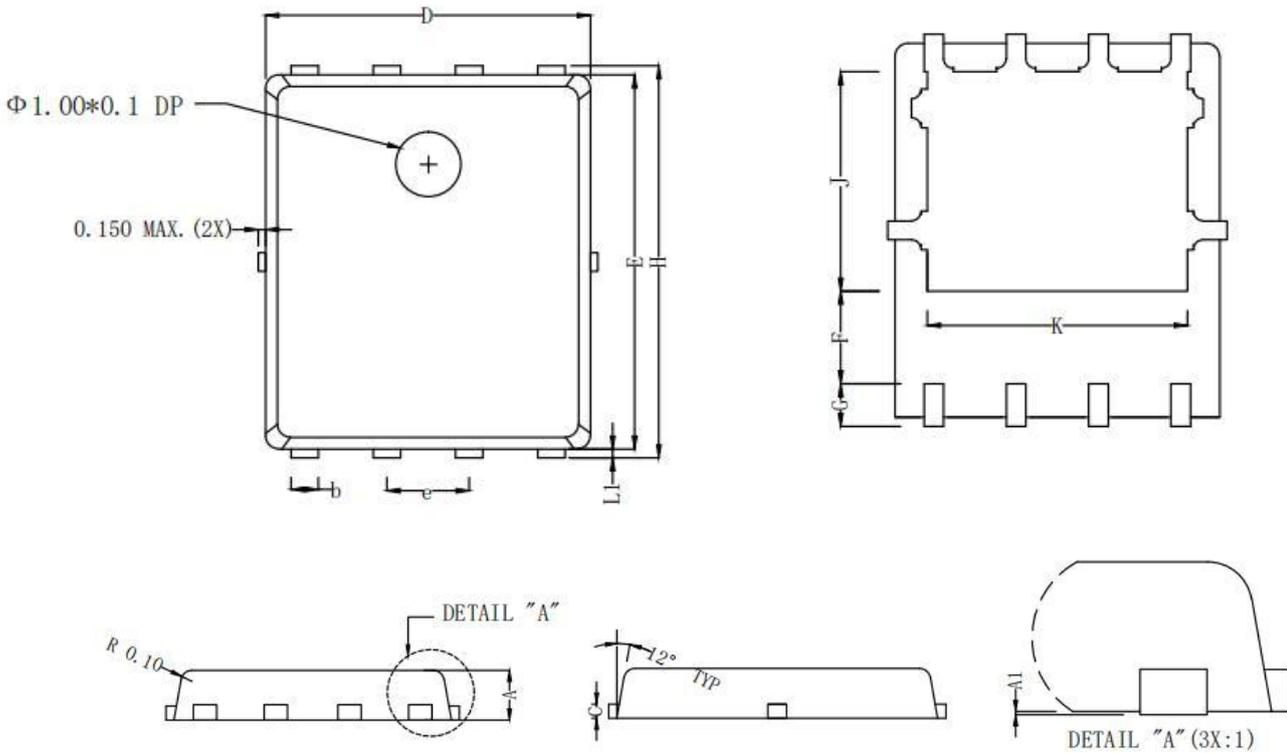


Figure 13: Normalized Maximum Transient Thermal Impedance

# DFN5X6 Package Information



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	0.90	1.00	1.10
A1	0.00	0.03	0.05
b	0.25	0.30	0.35
c	0.254 REF		
D	4.80	4.90	5.00
F	1.35 REF		
E	5.65	5.75	5.85
e	1.27 BSC		
H	5.90	6.00	6.10
L1	0.10	0.13	0.16
G	0.55 REF		
K	4.00 REF		
J	3.45 REF		

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