

N-Channel Enhancement Mode Power MOSFET

Description

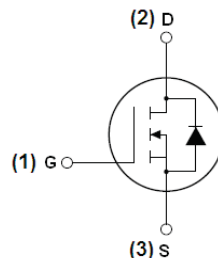
The RM100N30DF uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

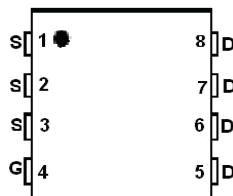
- $V_{DS} = 30V, I_D = 100A$
 $R_{DS(ON)} < 2.6 m\Omega @ V_{GS} = 10V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

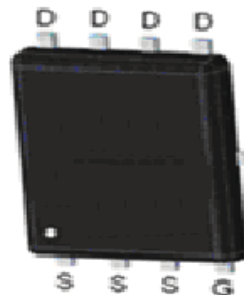
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply
- Halogen-free



Schematic diagram



Marking and pin assignment



DFN5X6-8L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
100N30	RM100N30DF	DFN5X6-8L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	100	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D (100^\circ C)$	70	A
Pulsed Drain Current	I_{DM}	300	A
Maximum Power Dissipation	P_D	55	W
Derating factor		0.43	W/ $^\circ C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.421	°C/W
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

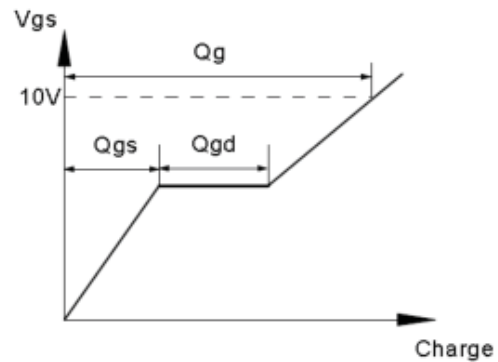
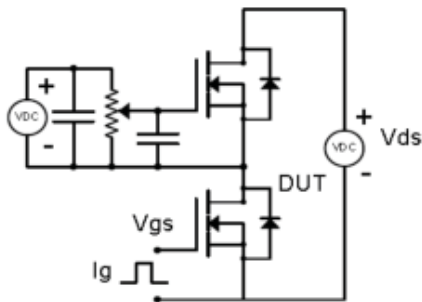
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250A	30	33	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250A	1.0	1.5	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	-	2.6	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =20A	32	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =15V,V _{GS} =0V, F=1.0MHz	-	3300	-	PF
Output Capacitance	C _{OSS}		-	480	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	433	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, R _L =15Ω V _{GS} =10V,R _G =2.5Ω	-	4.0	-	nS
Turn-on Rise Time	t _r		-	26	-	nS
Turn-Off Delay Time	t _{d(off)}		-	58	-	nS
Turn-Off Fall Time	t _f		-	29	-	nS
Total Gate Charge	Q _g	V _{DS} =15V,I _D =20A, V _{GS} =10V	-	68	-	nC
Gate-Source Charge	Q _{gs}		-	9.6	-	nC
Gate-Drain Charge	Q _{gd}		-	13		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =10A	-		1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	100	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A di/dt = 100A/μs ^(Note3)	-	20	-	nS
Reverse Recovery Charge	Q _{rr}		-	12	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

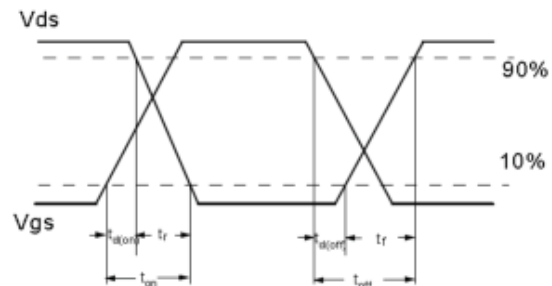
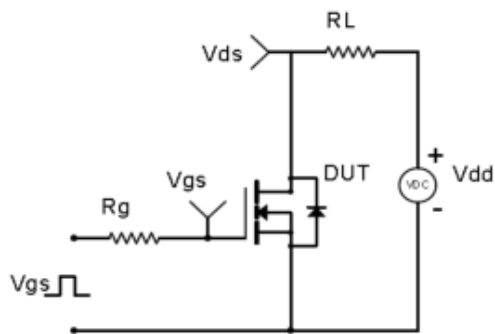
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit & Waveform

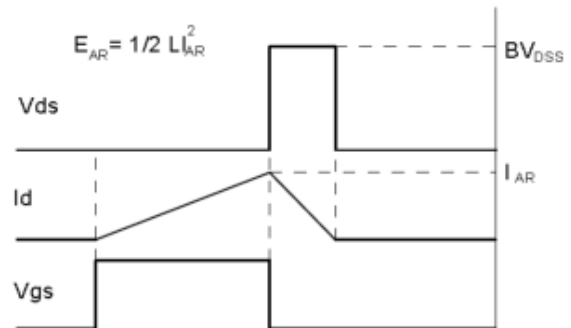
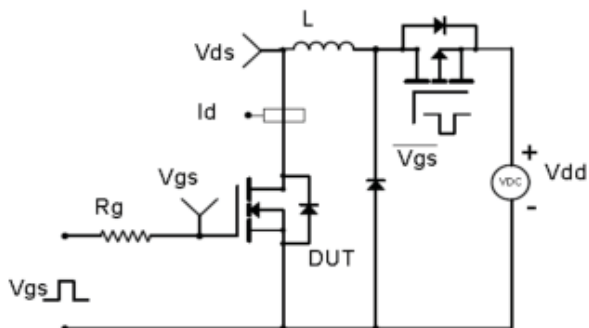
Gate Charge Test Circuit & Waveform



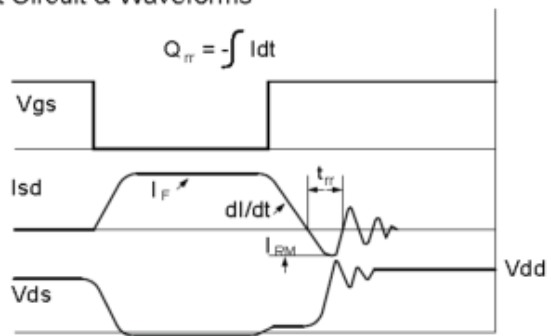
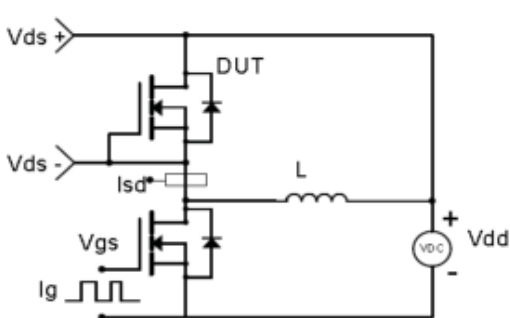
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



RATING AND CHARACTERISTICS CURVES (RM100N30DF)

Fig.1 Power Dissipation Derating Curve

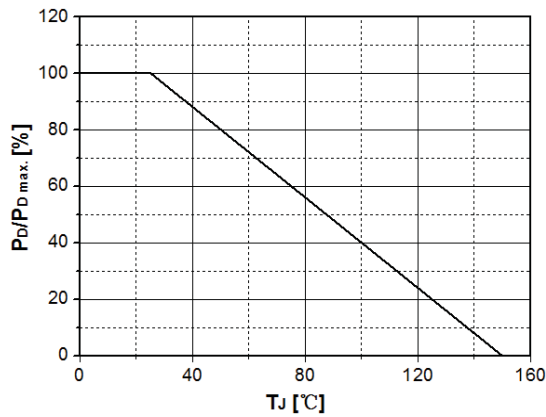


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

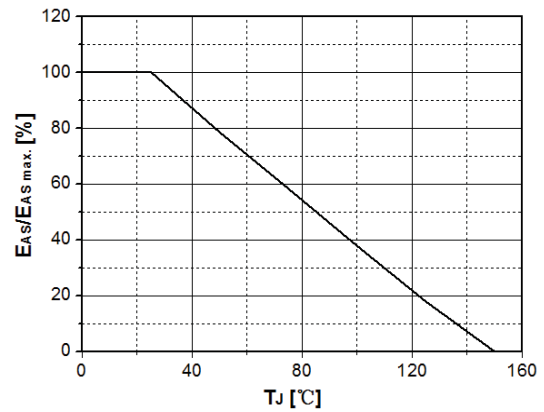


Fig.3 Typical Output Characteristics

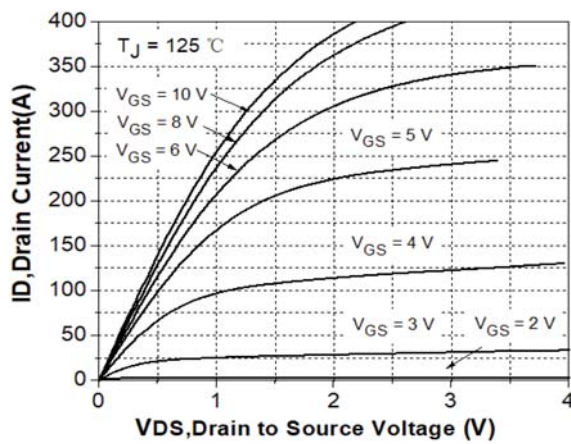


Fig. 4 Transconductance vs. Drain Current

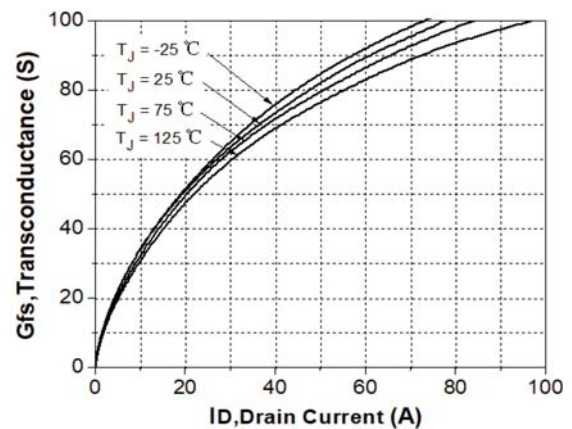


Fig.5 Typical Transfer Characteristics

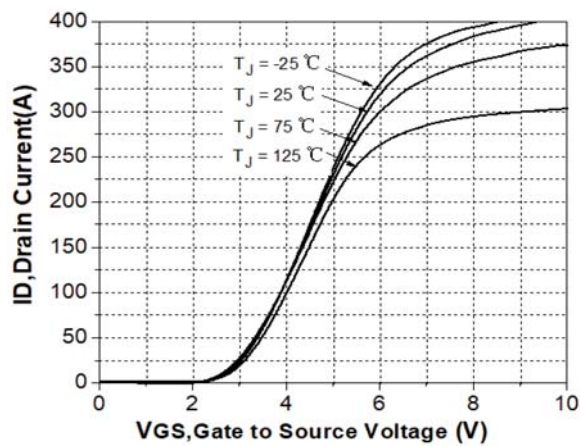
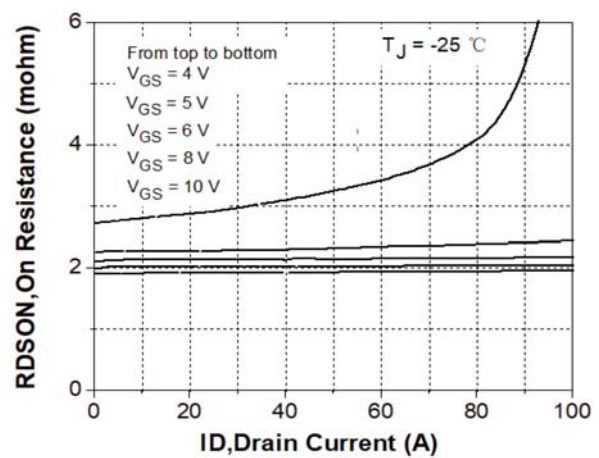


Fig. 6 State Resistance vs. Drain Current @-25°C



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Fig.7 State Resistance vs. Drain Current
@25°C

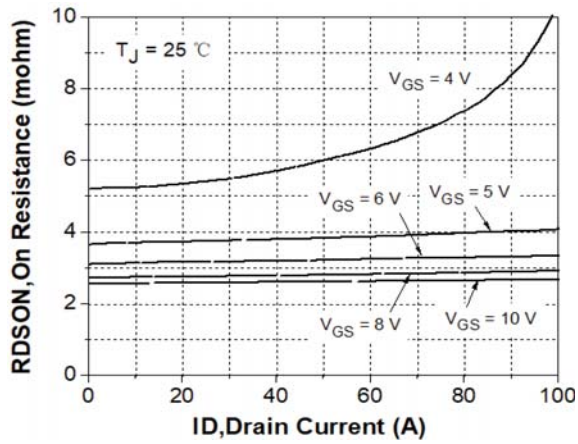


Fig. 8 State Resistance vs. Drain Current
@125°C

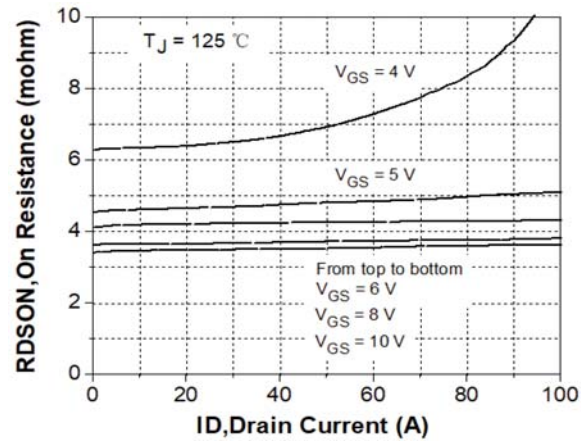


Fig.9 Typical Capacitance vs. Drain Source Voltage

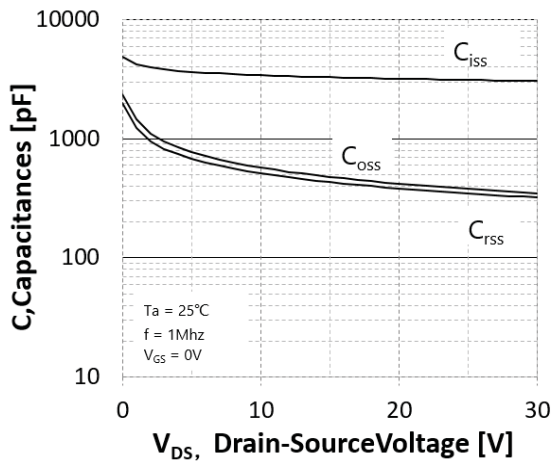


Fig.10 Dynamic Input Characteristics

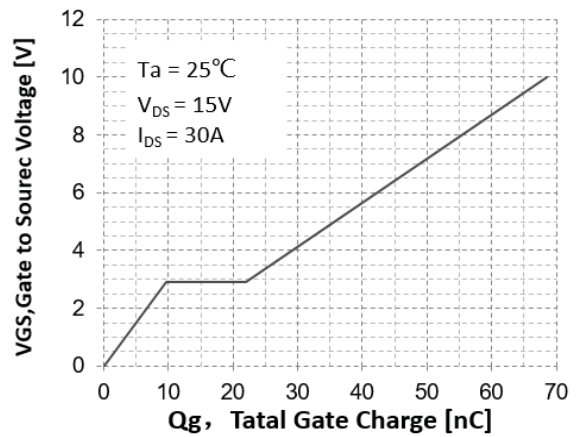


Fig.11 Breakdown Voltage vs. Junction Temperature

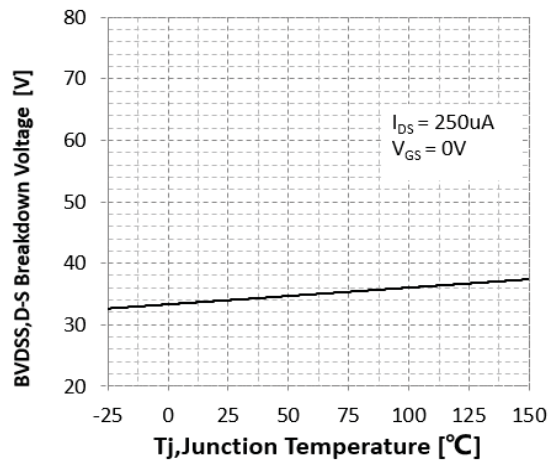
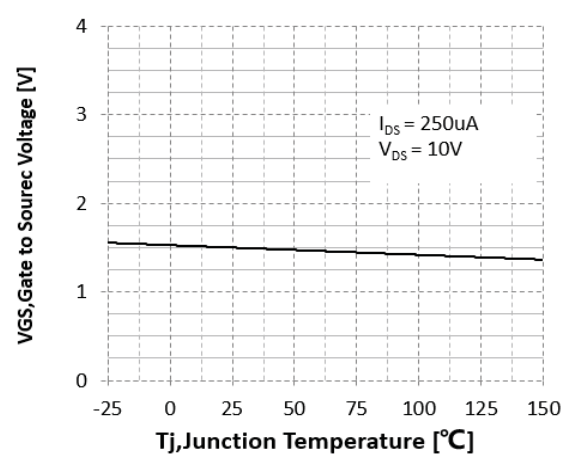


Fig. 12 Gate Threshold Voltage vs. Junction Temperature



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Fig.13 On-Resistance Variation vs. Junction Temperature

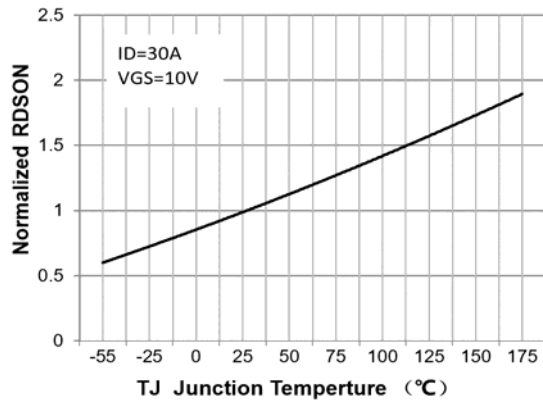


Fig.14 Maximum Drain Current vs. Case Temperature

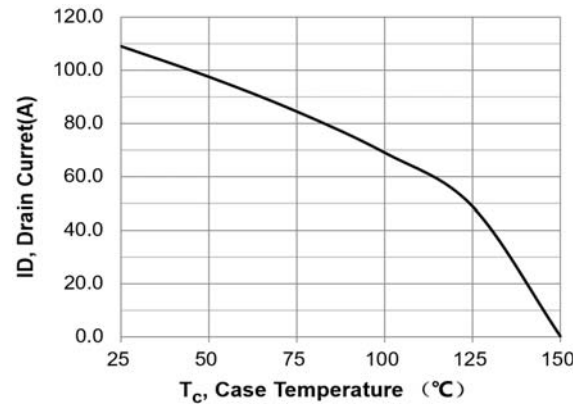
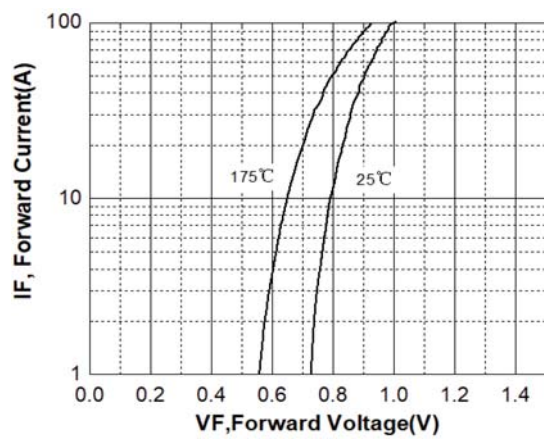


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current



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Fig.16 Safe Operating Area

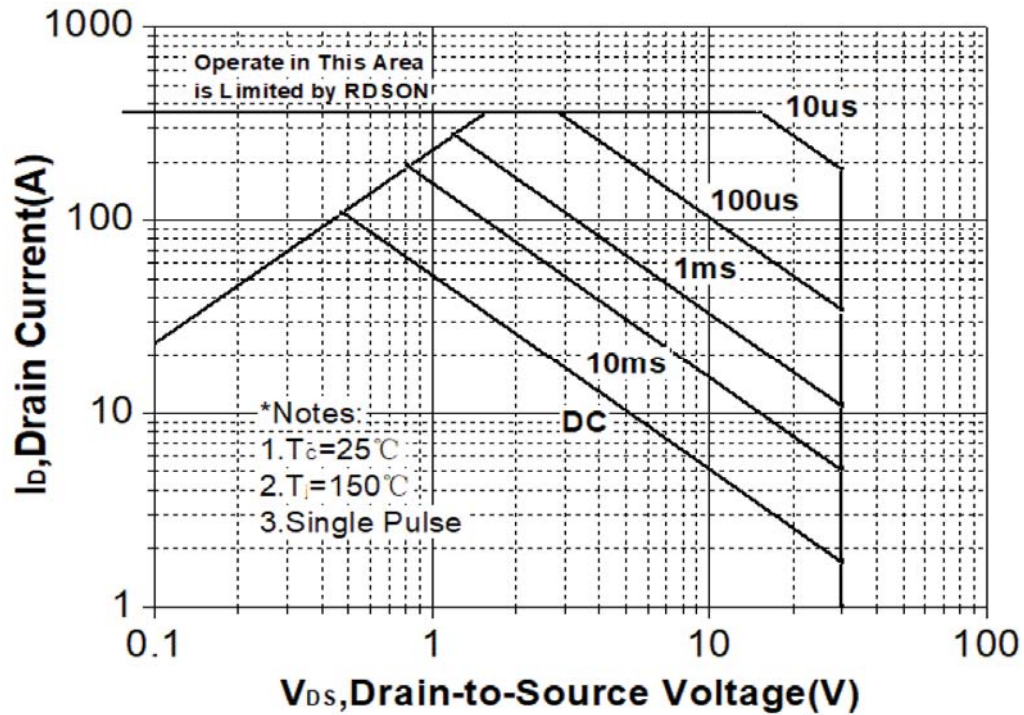
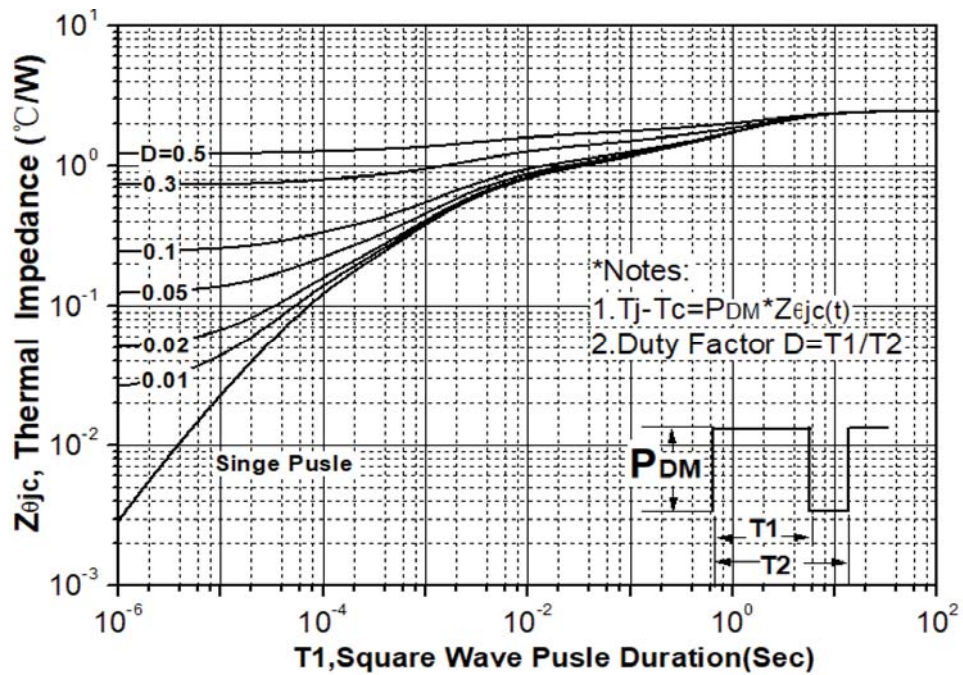
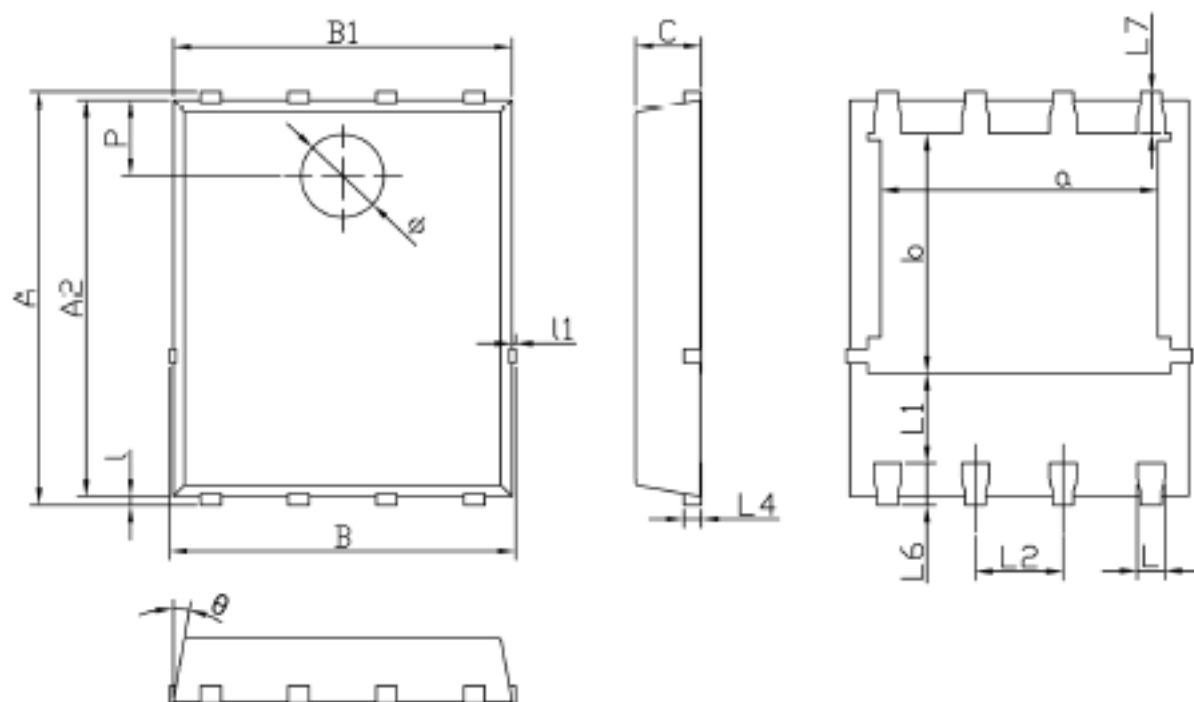


Fig. 17 Transient Thermal Response Curve



DFN5X6-8L Package Information



Dimensions In Millimeter			
Symbol	MIN	TYP	MAX
A	5.90	6.00	6.10
a	3.91	4.01	4.11
A2	5.70	5.75	5.80
B	4.90	5.00	5.10
b	3.37	3.47	3.57
B1	4.00	4.20	5.00
C	0.90	0.95	1.00
L	0.35	0.40	0.45
l	0.06	0.13	0.20
L1	1.10	-	-
l1	-	-	0.10
L2	1.17	1.27	1.37
L4	0.21	0.26	0.34
L6	0.51	0.61	0.71
L7	0.51	0.61	0.71
P	1.00	1.10	1.20
θ	8°	10°	12°
ϕ	1.10	1.20	1.30

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