

100V N-Ch Power MOSFET

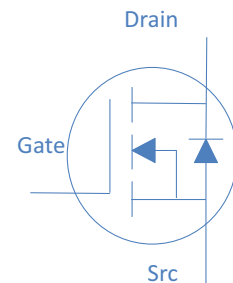
Feature

- ◇ Optimized for high speed smooth switching, Logic level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ V_{DS} spike 120V@10us

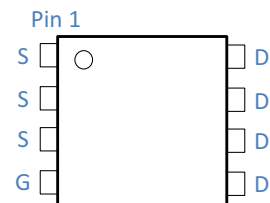
V_{DS}		100	V
$R_{DS(on),typ}$	$V_{GS}=10V$	5.5	$m\Omega$
$R_{DS(on),typ}$	$V_{GS}=4.5V$	7.8	$m\Omega$
I_D (Continuous)		70	A

Application

- ◇ DC-DC Conversion
- ◇ Hard Switching and High Speed Circuit
- ◇ Power Tools
- ◇ UPS
- ◇ SSR



Part Number	Package	Marking
RM052N100DF	DFN5x6	052N100



Absolute Maximum Ratings at $T_j=25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Continuous)	I_D	$T_C=25^\circ\text{C}$	70	A
		$T_C=100^\circ\text{C}$	44	
Drain to Source Voltage	V_{DS}	-	100	V
Gate to Source Voltage	V_{GS}	-	$\pm 20/-12$	V
Pulsed Drain Current	I_{DM}	-	280	A
Avalanche Energy, Single Pulse	E_{AS}	$L=0.3\text{mH}, T_C=25^\circ\text{C}$	320	mJ
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	142	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to 150	$^\circ\text{C}$

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.88	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$

Electrical Characteristics at $T_j=25^\circ\text{C}$ (unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	2.5	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=100V, T_j=25^\circ\text{C}$	-	-	1	μA
		$V_{GS}=0V, V_{DS}=100V, T_j=100^\circ\text{C}$	-	-	100	
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	4.6	5.5	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	-	6.2	7.8	$m\Omega$
Transconductance	g_{fs}	$V_{DS} = 10V, I_D = 5A$	-	18	-	S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	2.0	4.0	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$	-	4570	9100	μF
Output Capacitance	C_{oss}		-	1180	2300	
Reverse Transfer Capacitance	C_{rss}		-	49	98	
Total Gate Charge	Q_g	$V_{DD}=80V, I_D=10A, V_{GS}=10V$	-	58.2	100	nC
Gate to Source Charge	Q_{gs}		-	9.2	18	
Gate to Drain (Miller) Charge	Q_{gd}		-	20.8	30	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=1A, V_{GS}=10V,$ $R_G=6\Omega,$	-	24	48	ns
Rise time	t_r		-	19.8	39	
Turn off Delay Time	$t_{d(off)}$		-	46	92	
Fall Time	t_f		-	26	52	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=1A$	-	-	1.0	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_F=10A, dI_F/dt=100A/\mu s$	-	61.6	-	ns
Reverse Recovery Charge	Q_{rr}		-	120	-	nC

RATING AND CHARACTERISTICS CURVES (RM052N100DF)

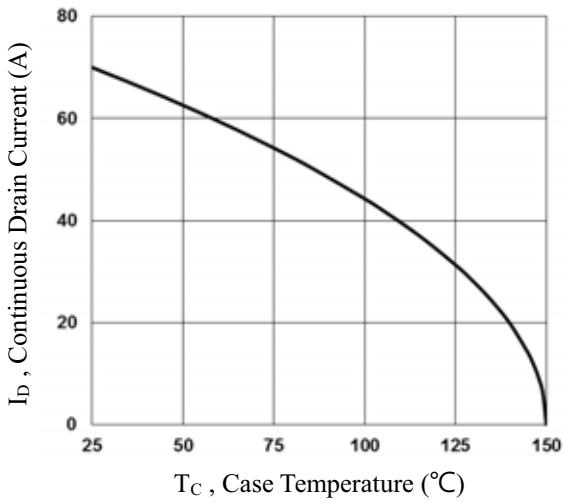


Fig.1 Continuous Drain Current vs. T_C

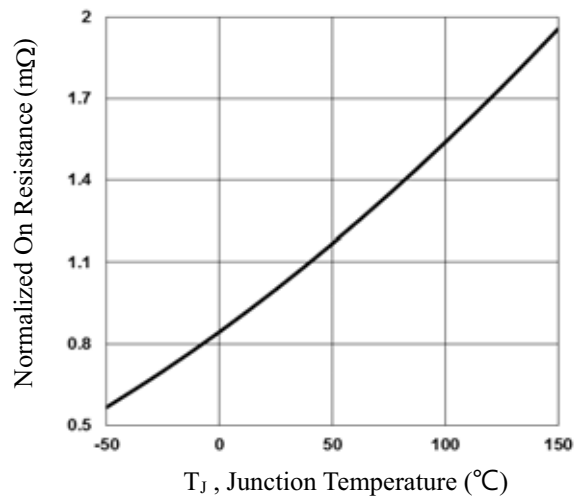


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

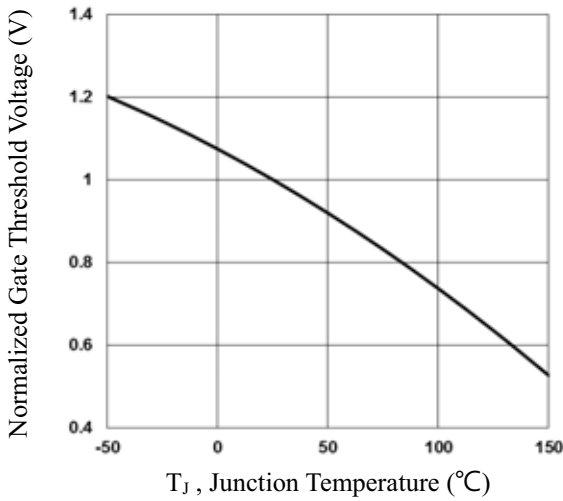


Fig.3 Normalized V_{th} vs. T_J

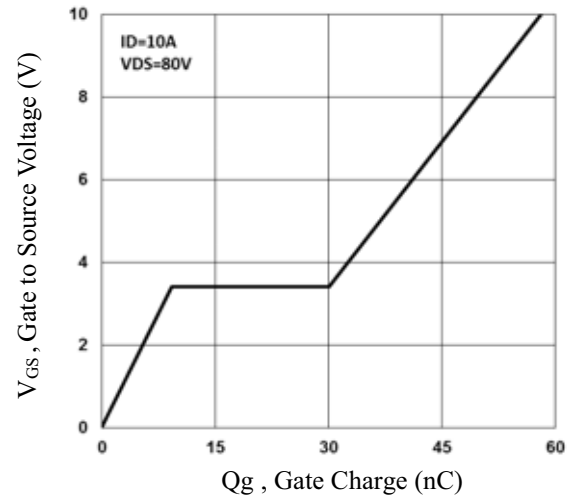


Fig.4 Gate Charge Characteristics

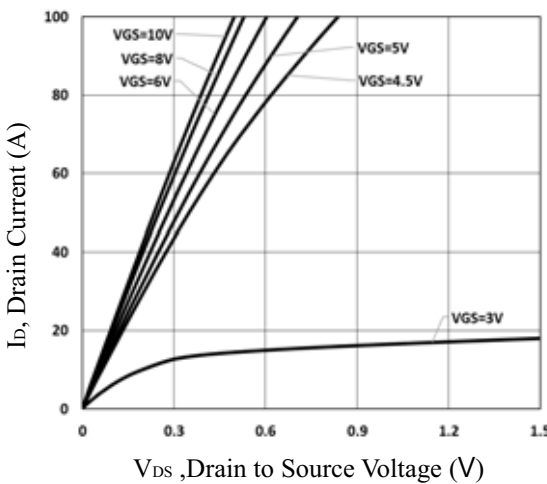


Fig.5 Typical Output Characteristics

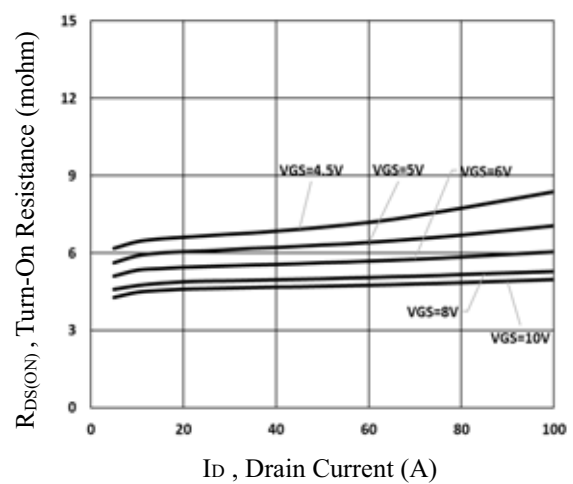


Fig.6 Turn-On Resistance vs. I_D

RATING AND CHARACTERISTICS CURVES (RM052N100DF)

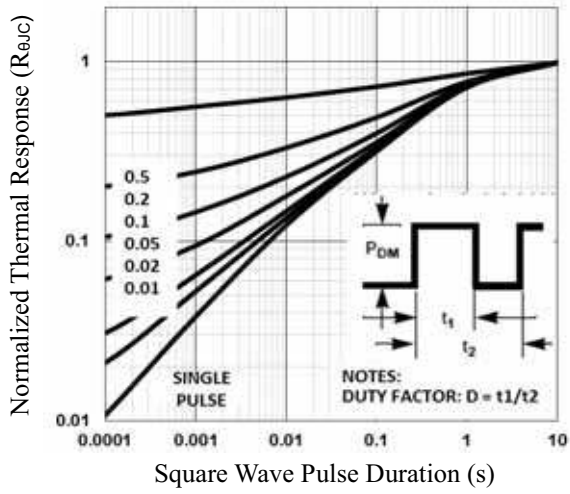


Fig.7 Normalized Transient Impedance

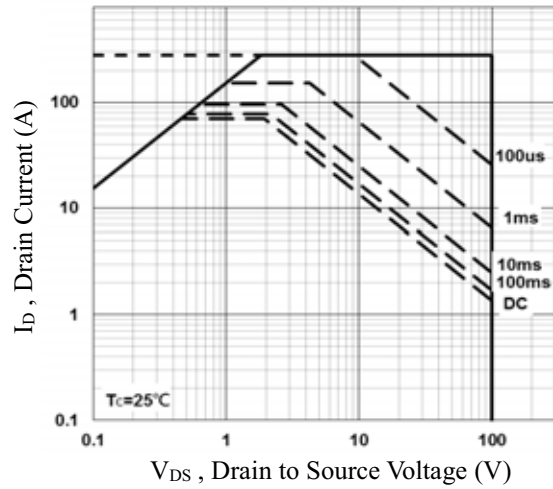


Fig.8 Maximum Safe Operation Area

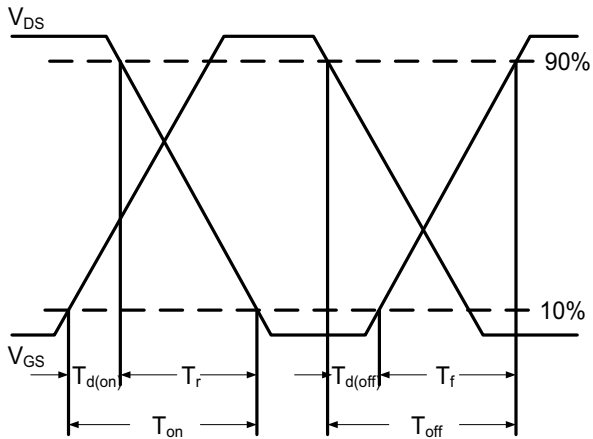


Fig.9 Switching Time Waveform

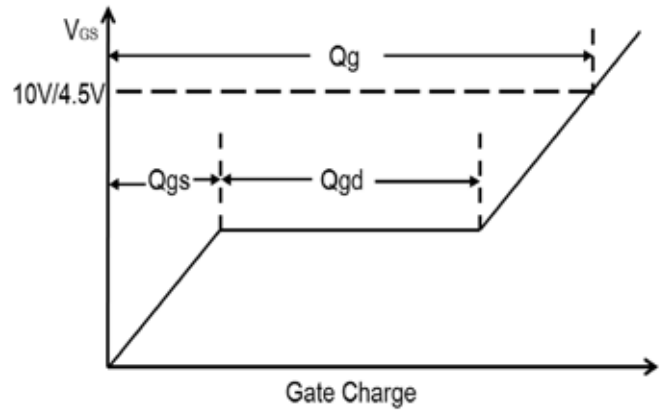
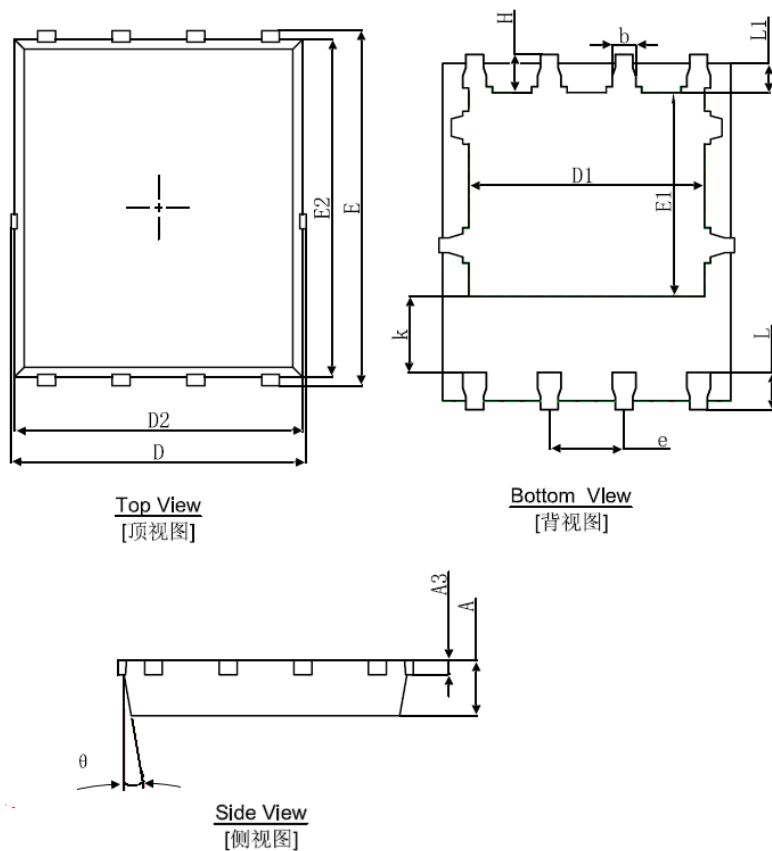


Fig.10 Gate Charge Waveform

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	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	1.270TYP.		0.050TYP.	
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	8°	12°	8°	12°

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