

100V N-Ch Power MOSFET

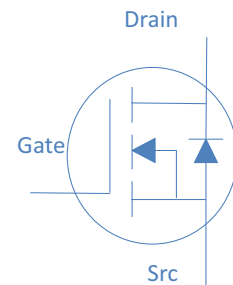
Feature

- ◇ 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

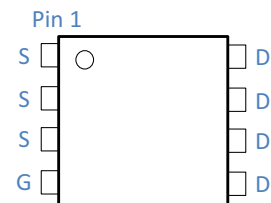
V_{DS}		100	V
$R_{DS(on),typ}$	$V_{GS}=10V$	5.5	$m\Omega$
$R_{DS(on),typ}$	$V_{GS}=4.5V$	7.8	$m\Omega$
I_D (Continuous)		70	A

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)

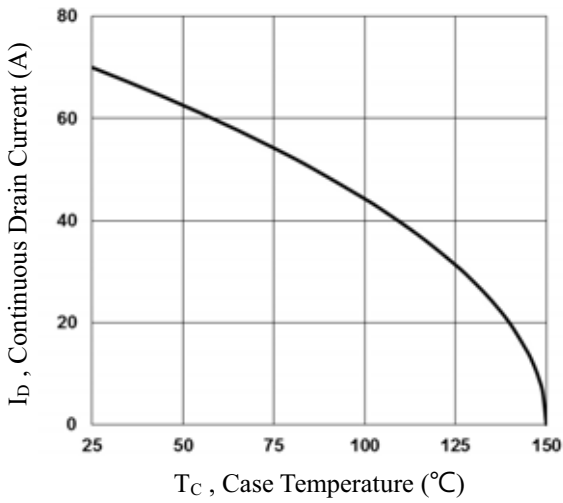


Fig.1 Continuous Drain Current vs. T_C

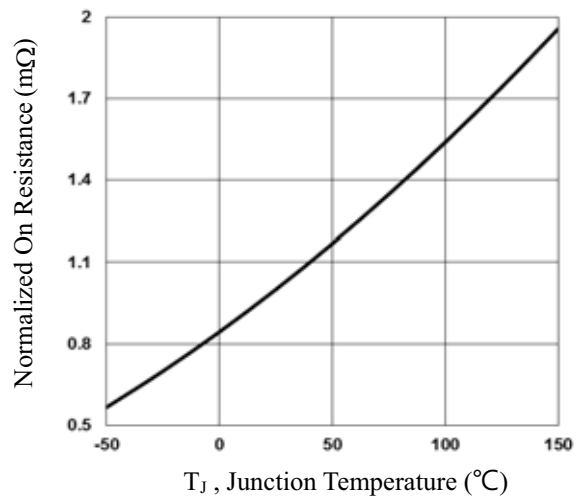


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

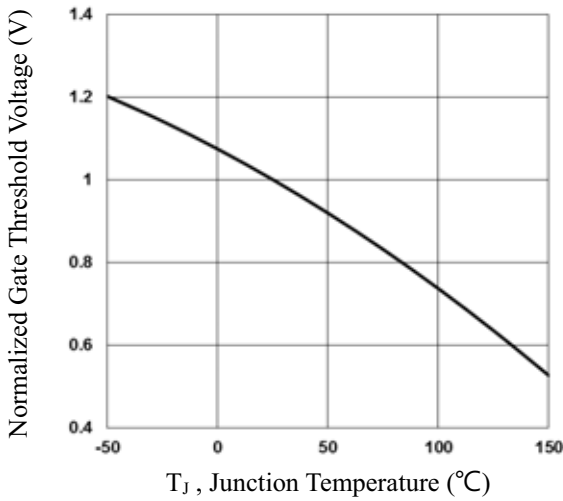


Fig.3 Normalized V_{th} vs. T_J

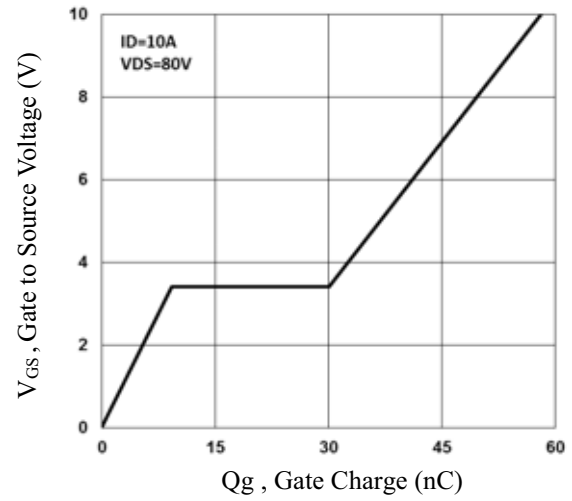


Fig.4 Gate Charge Characteristics

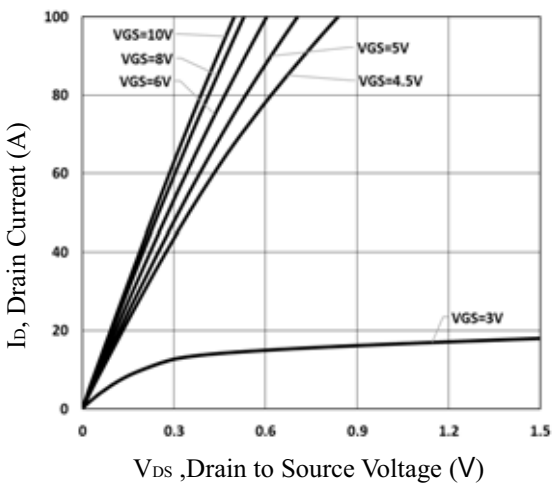


Fig.5 Typical Output Characteristics

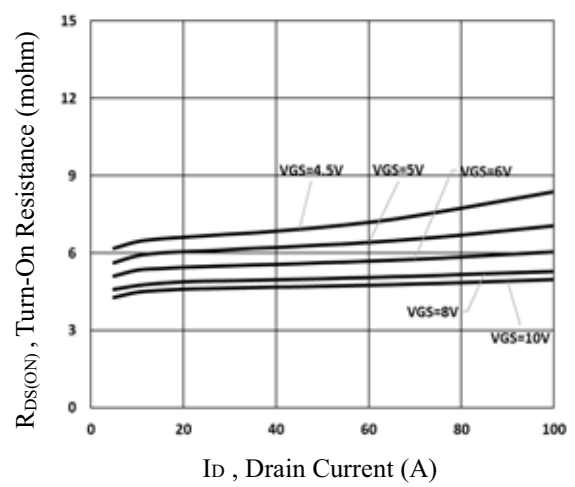


Fig.6 Turn-On Resistance vs. I_D

RATING AND CHARACTERISTICS CURVES (RM052N100DF)

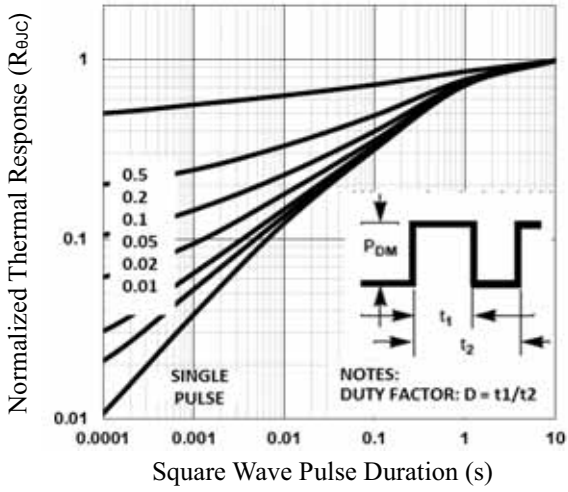


Fig.7 Normalized Transient Impedance

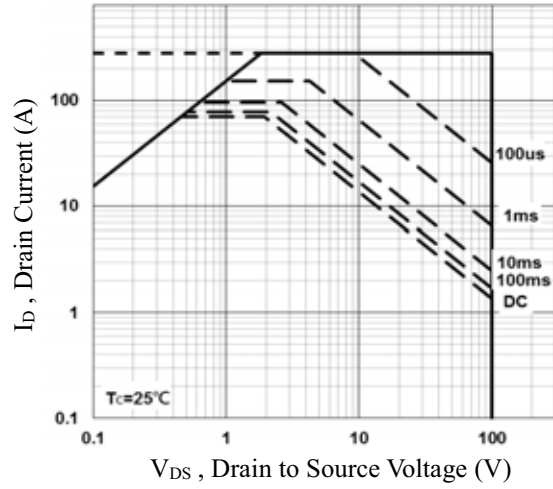


Fig.8 Maximum Safe Operation Area

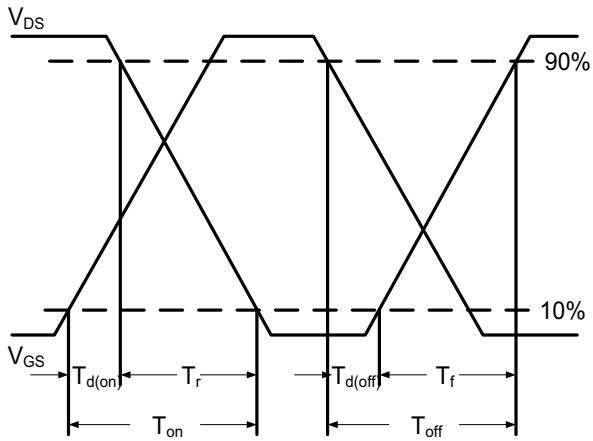


Fig.9 Switching Time Waveform

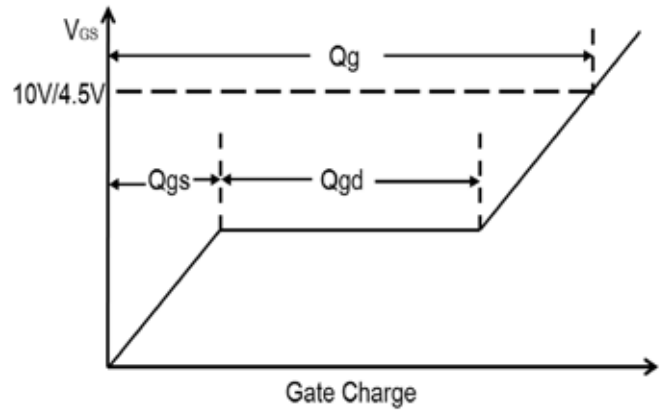
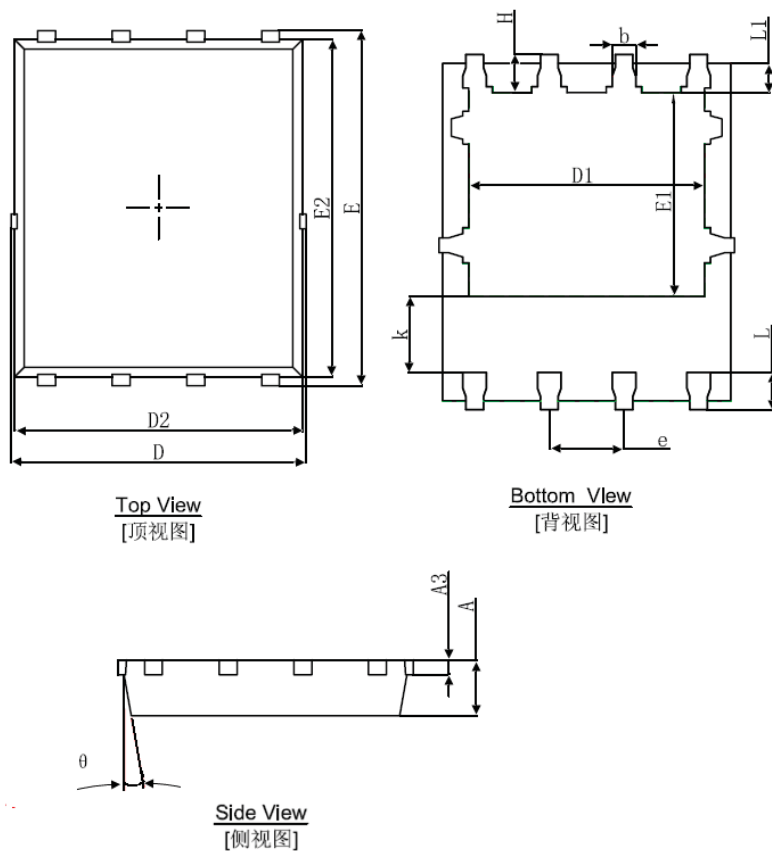


Fig.10 Gate Charge Waveform

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°

DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.