

MDF11N60

N-Channel MOSFET 600V, 11 A, 0.55Ω

General Description

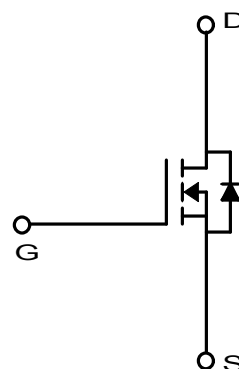
MDF11N60 is suitable device for SMPS, high Speed switching and general purpose applications.

Features

- $V_{DS} = 600V$
- $I_D = 11A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 0.55\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- High Current, High Speed Switching



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current (※)	$T_C=25^\circ C$	I_D	11	A
	$T_C=100^\circ C$		6.9	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	44	A
Power Dissipation	$T_C=25^\circ C$	P_D	49	W
	Derate above 25 °C		0.39	W/ °C
Peak Diode Recovery dv/dt ⁽³⁾		Dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	720	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

※ I_D limited by maximum junction temperature

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	2.55	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF11N60	-55~150°C	TO-220F	Tube	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	5.0	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5.5A$		0.45	0.55	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 30V, I_D = 5.5A$	-	13	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 480V, I_D = 11A, V_{GS} = 10V^{(3)}$	-	38.4	-	nC
Gate-Source Charge	Q_{gs}		-	11.2	-	
Gate-Drain Charge	Q_{gd}		-	14	-	
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	1700		pF
Reverse Transfer Capacitance	C_{rss}		-	6.2		
Output Capacitance	C_{oss}		-	184		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 300V, I_D = 11A, R_G = 25\Omega^{(3)}$	-	38		ns
Rise Time	t_r		-	50		
Turn-Off Delay Time	$t_{d(off)}$		-	76		
Fall Time	t_f		-	33		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S		-	11	-	A
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 11A, V_{GS} = 0V$	-		1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 11A, di/dt = 100A/\mu s^{(3)}$	-	430		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	4.0		μC

Note :

- Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
- Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ C$.
- $I_{SD} \leq 11.5A$, $di/dt \leq 200A/\mu s$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$
- $L = 6.3mH$, $I_{AS} = 11.5A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

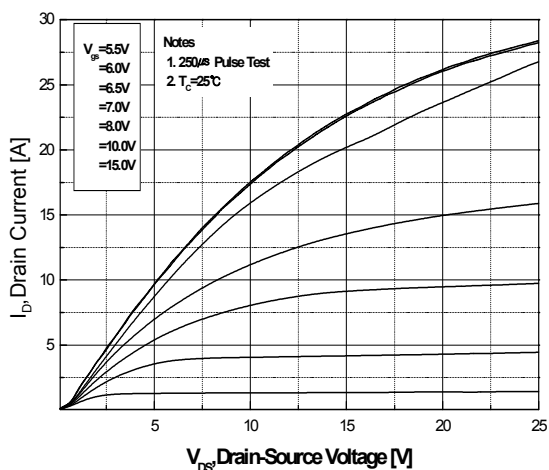


Fig.1 On-Region Characteristics

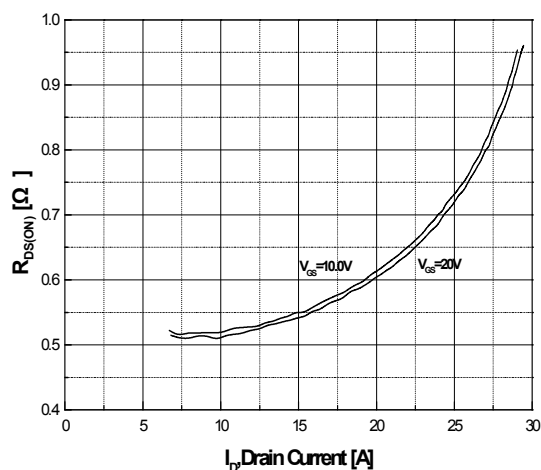


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

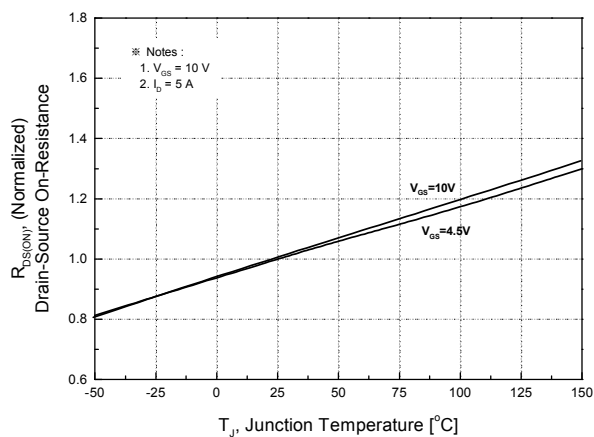


Fig.3 On-Resistance Variation with Temperature

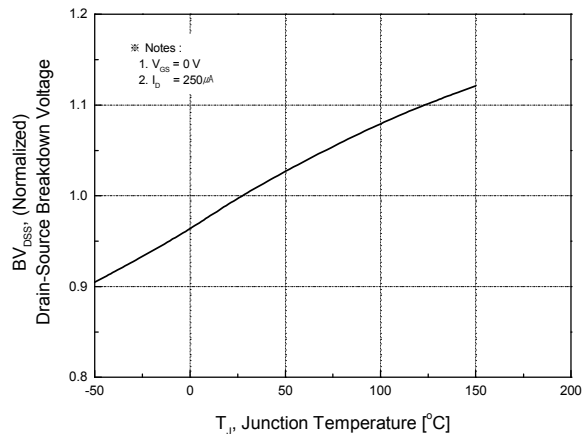


Fig.4 Breakdown Voltage Variation vs. Temperature

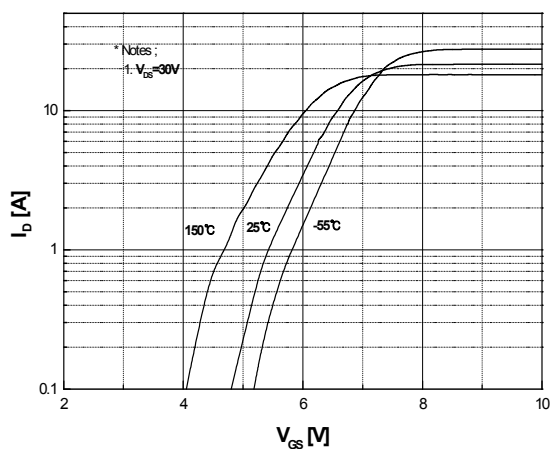


Fig.5 Transfer Characteristics

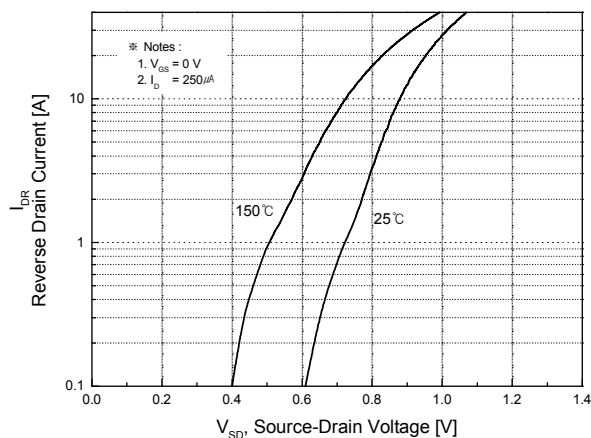
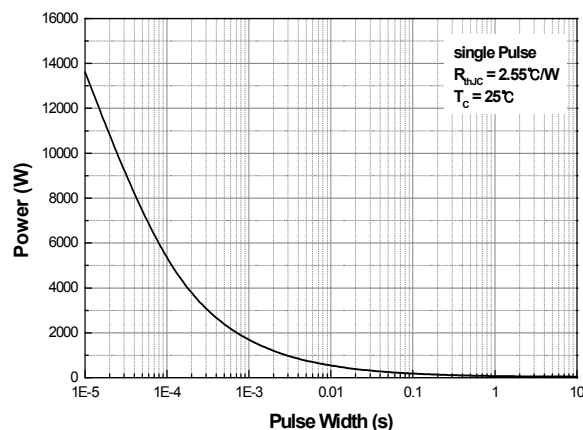
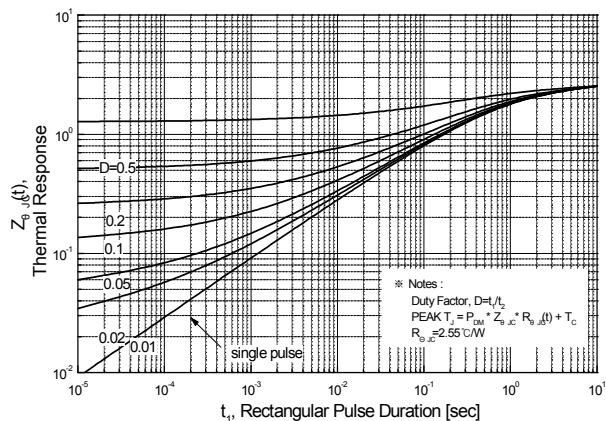
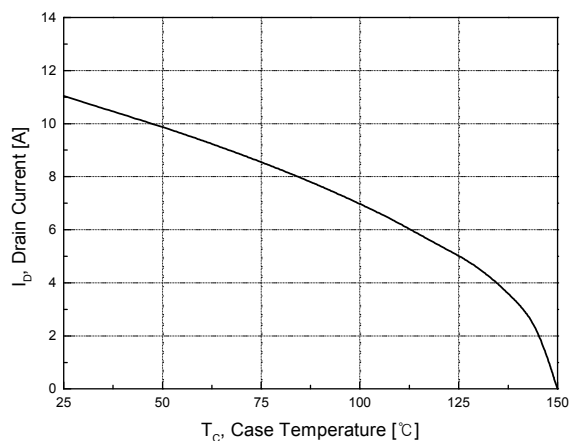
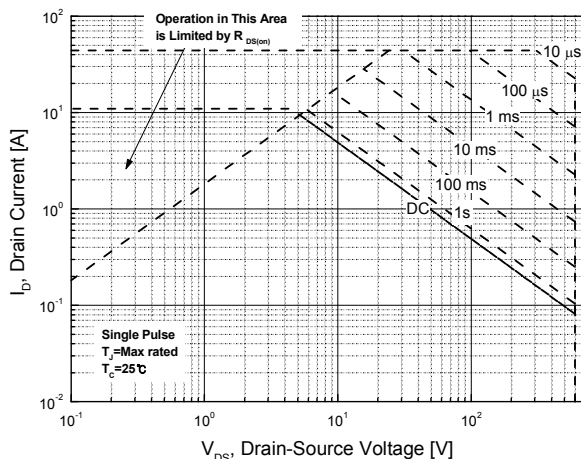
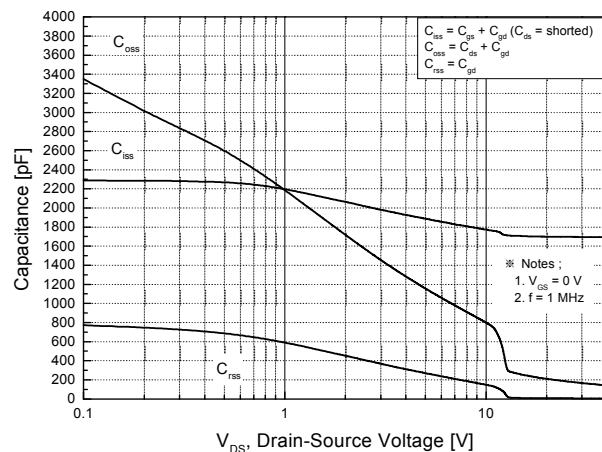
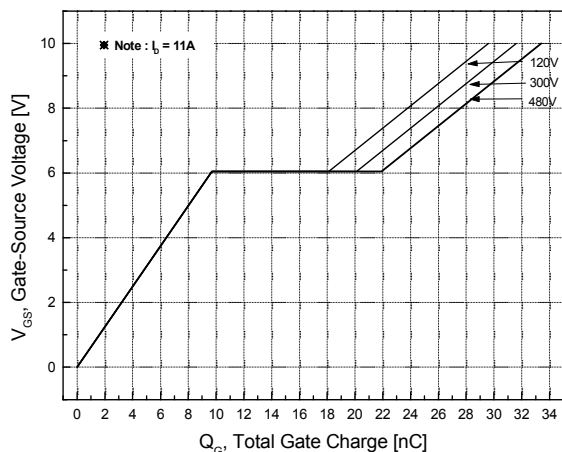


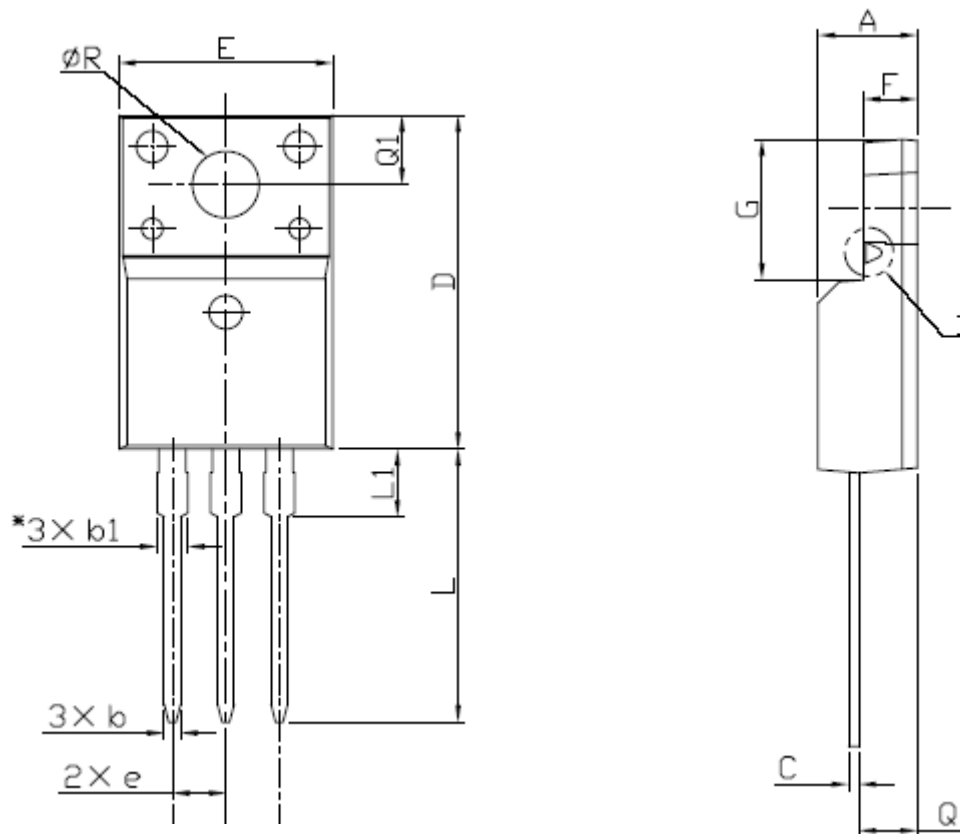
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimensions

3 Leads, TO-220F

Dimensions are in millimeters unless otherwise specified



Symbol	Min	Nom	Max
A	4.30		4.90
b	0.50		1.00
b1	0.95		1.60
C	0.40		0.80
D	14.50		16.07
E	9.60		10.36
e	2.54		
F	2.34		3.10
G	6.20		7.20
L	12.58		13.38
L1	3.03		4.70
Q	2.30		2.96
Q1	2.40		3.50
ØR	3.00		3.40