MPF09N90

N-Channel Power MOSFET

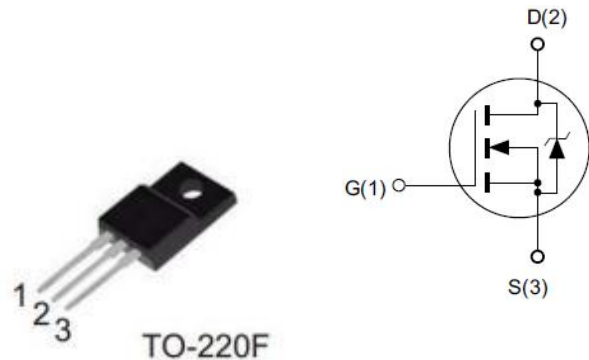### Features

◆ 900V, 9A, $R_{DS(ON)}$(Typ.) = 0.9Ω@VGS = 10V.
◆ Low ON Resistance
◆ Low Gate Charge
◆ Low Reverse transfer capacitance
◆ Fast Switching
◆ 100% Avalanche Tested

Application

◆ Power switch circuit of adaptor and charger

Absolute Maximum Ratings Tc = 25°C unless otherwise noted

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage [a]	900	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, T_C =25°C	9	A
	Drain Current-Continuous, T_C =100°C	5.4	A
I_{DM}	Drain Current-Pulsed [b]	36	A
P_D	Maximum Power Dissipation @ T_J =25°C	41	W
EAS	Single Pulsed Avalanche Energy [d]	1035	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-Case Max.	3.02	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max.	62.5	°C/W

Electrical Characteristics T_J = 25°C unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	900	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 900V, V_{GS} = 0V	-	-	25	μA
I_{GSS}	Forward Gate Body Leakage Current	V_{DS} = 0V, V_{GS} = ±30V	-	-	±10	μA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{GS}(th)	Gate Threshold Voltage	$V_{DS} = V_{GS}$, I_D =250µA	2	-	4	V
R_{DS}(on)	Static Drain-Source On-Resistance [c]	V_{GS} = 10V, I_D =4.5A	-	0.9	1.1	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	2716	-	pF
Coss	Output Capacitance		-	211	-	pF
Crss	Reverse Transfer Capacitance		-	11.3	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 450V, I_D =9A, R_G = 10Ω, V_{GS}=10V	-	30.4	-	ns
t_r	Turn-On Rise Time		-	41.6	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	82	-	ns
t_f	Turn-Off Fall Time		-	52	-	ns
Qg	Total Gate Charge	V_{DS} = 720V, I_D =9A, V_{GS} = 10V	-	57.9		nC
Qgs	Gate-Source Charge		-	10.6	-	nC
Qgd	Gate-Drain Charge		-	23.4	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	V_{GS} = 0V	-	-	9	A
I_{SM}	Maximum Pulsed Current	V_{GS} = 0V	-	-	36	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 9A	-	-	1.5	V
trr	Reverse Recovery Time	I_S=9A,T_j= 25℃ dIF/dt=100A/us, V_{GS}=0V	-	845	-	ns
Qrr	Reverse Recovery Charge		-	8.03	-	uC

Notes:

a. TJ=+25 ℃ to +150 ℃

b. Repetitive rating; pulse width limited by maximum junction temperature.

c. Pulse width ≦300us; duty cycle ≦2%

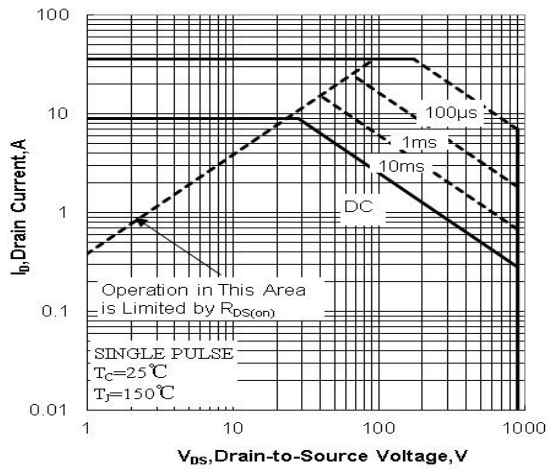d. L=10mH, VDD=50V,Ias=14A,RG=25Ω Starting TJ=25 ℃
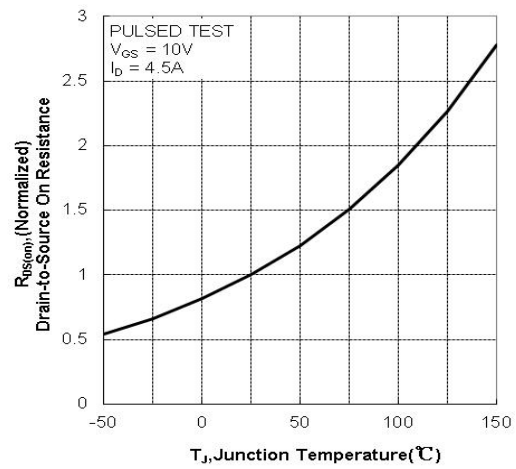
Figure 1. Maximum Safe Operating Area

Figure 2. Normalized On-Resistance Variation with Temperature
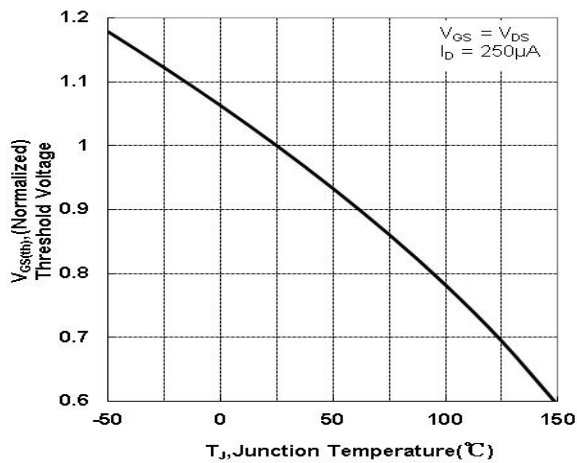

Figure 3. Gate Threshold Variation with Temperature
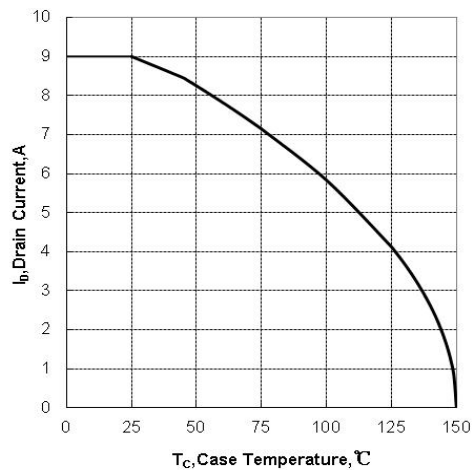

Figure 4. Maximum Drain Current with Case Temperature
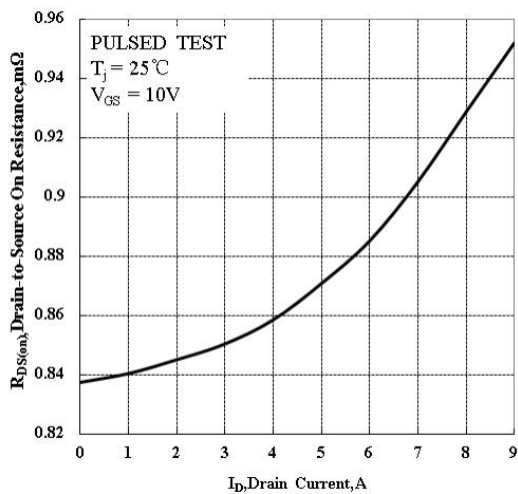

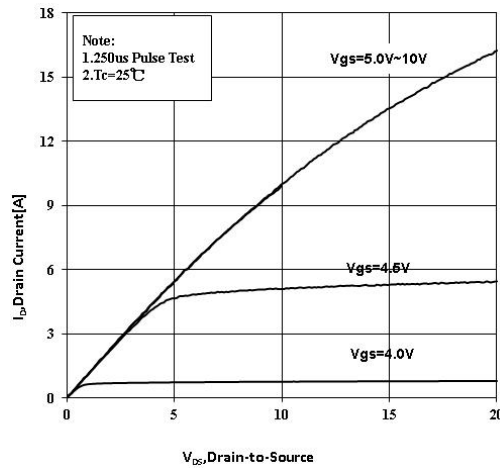**Figure 5. Typical Drain to Source ON Resistance vs Drain Current**
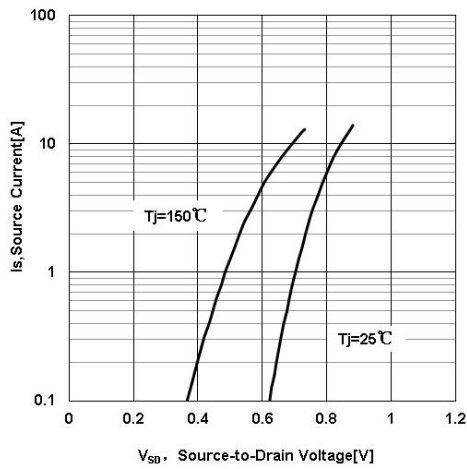

Figure 6. On-State Characteristics

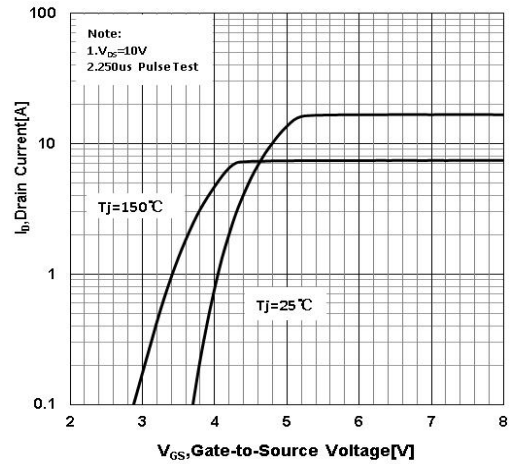**Figure 7. Body Diode Forward Voltage Variation with Source Current**

Figure 8. Transfer Characteristics Variation with Source Current
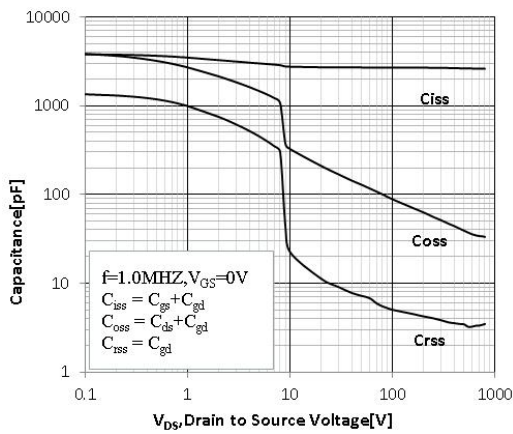

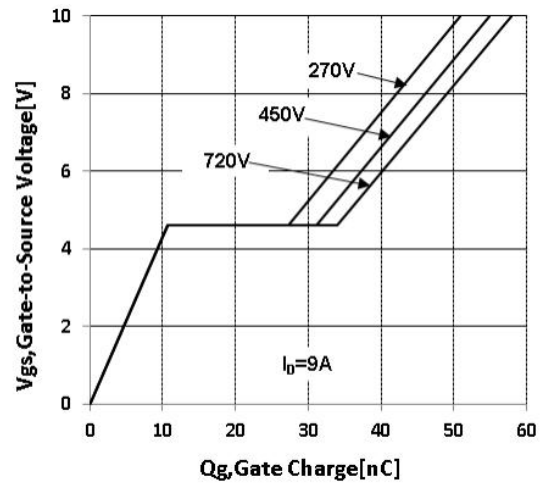**Figure 9. Capacitance Characteristics**

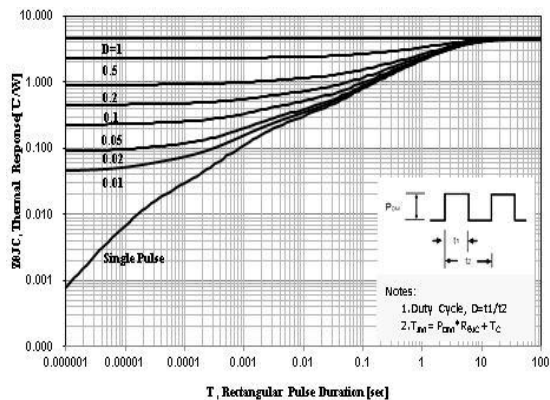**Figure 10. Gate Charge Characteristics**

Figure 11. Normalized Effective Transient Thermal Impedance With Pulse Duration
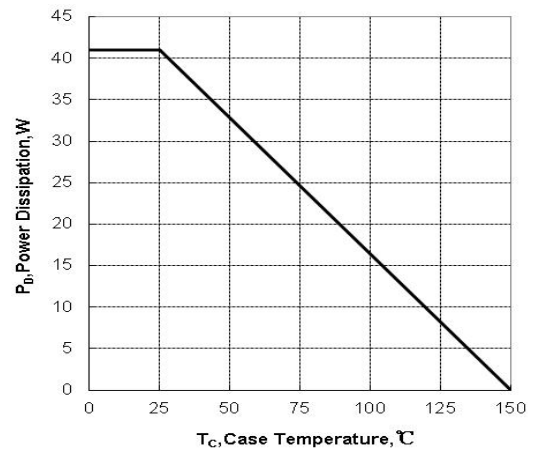

Figure 12.   Maximum Power dissipation vs   Case Temperature

■ **Package Information**