

## Features

- Very Low FOM  $R_{DS(on)} \times Q_g$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

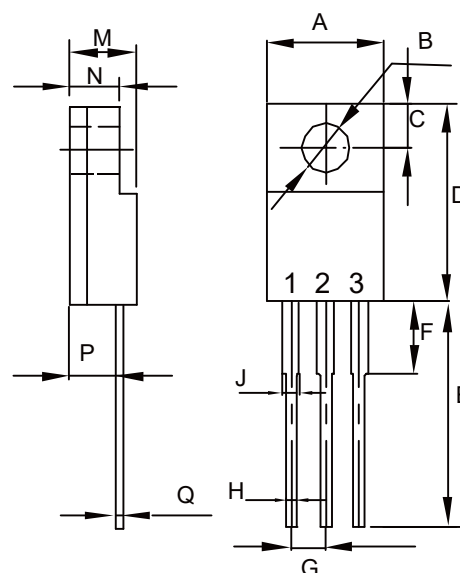
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 34°C/W Junction to Ambient
- Thermal Resistance: 1.4°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	900	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	8.0
		$T_C=100^\circ\text{C}$	5.0
Pulsed Drain Current (Note 1)	$I_{DM}$	32	A
Single Pulse Avalanche Energy	$E_{AS}$	68	mJ
Total Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	113
			W

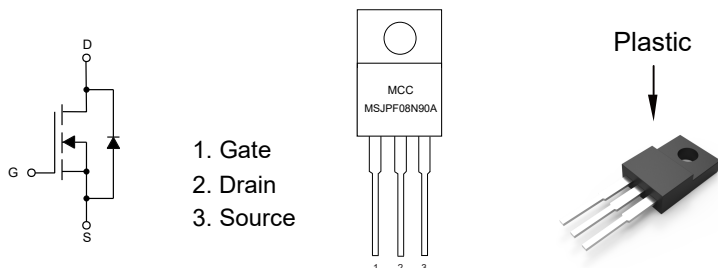
Note1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

# N-CHANNEL Super-Junction Power MOSFET

## TO-220F



## Internal Structure and Marking Code



1. Gate
2. Drain
3. Source

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.392	0.421	9.96	10.70	
B		0.138		3.50	Φ
C		0.106		2.70	TYP.
D	0.567	0.642	14.40	16.30	
E		0.520		13.20	TYP.
F	---	0.177	---	4.50	
G		0.100		2.54	TYP.
H	0.020	0.035	0.50	0.90	
J	0.043	0.053	1.10	1.35	
M	0.169	0.201	4.30	5.10	
N	---	0.140	---	3.56	
P	0.083	0.126	2.10	3.20	
Q	0.020	0.032	0.50	0.80	

**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
<b>Static Characteristics</b>							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	900			V	
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$			$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=900V, V_{GS}=0V$			1	$\mu A$	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V	
Drain-Source On-Resistance <sup>(Note 2)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=2.5A$		1.05	1.3	$\Omega$	
Gate resistance	$R_G$	$V_{GS}=0V, f=1MHz$		2.3		$\Omega$	
<b>Dynamic Characteristics<sup>(Note 3)</sup></b>							
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		474		pF	
Output Capacitance	$C_{oss}$			438			
Reverse Transfer Capacitance	$C_{rss}$			14			
Total Gate Charge	$Q_g$	$V_{DD}=720V, V_{GS}=10V, I_D=5A$		13.6		nC	
Gate-Source Charge	$Q_{gs}$			3.4			
Gate-Drain Charge	$Q_{gd}$			5.8			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=450V, I_D=5A, R_G=25\Omega, V_{GS}=10V$		14		ns	
Turn-On Rise Time	$t_r$			23			
Turn-Off Delay Time	$t_{d(off)}$			44			
Turn-Off Fall Time	$t_f$			21			
<b>Drain-Source Body Diode Characteristics</b>							
Continuous Body Diode Current	$I_S$	$T_C=25^\circ C$			8	A	
Body Diode Voltage	$V_{SD}$	$I_{SD}=8A, V_{GS}=0V$			1.4	V	
Reverse Recovery Time	$t_{rr}$	$V_{DD}=100V, I_S=5A, di_F/dt=100A/\mu s$		486		ns	
Reverse Recovery Charge	$Q_{rr}$				2.5		$\mu C$
Peak Reverse Recovery Current	$I_{rrm}$				10.2		A

Note 2. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$ .

3. Guaranteed by Design, Not Subject to Production Testing.

Fig. 1 - Typical Output Characteristics

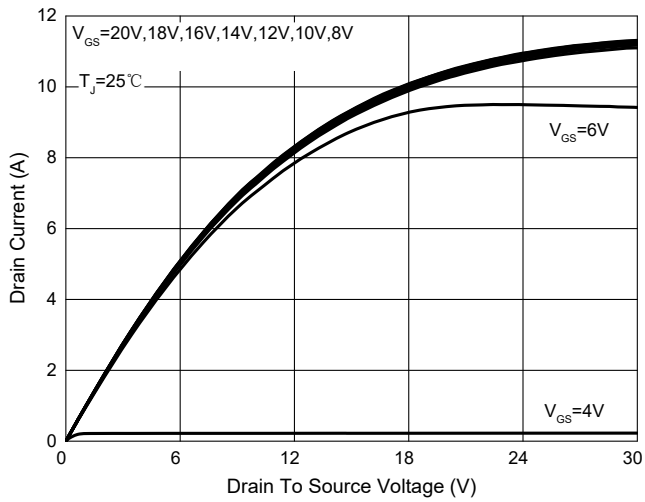


Fig. 2 - Transfer Characteristics

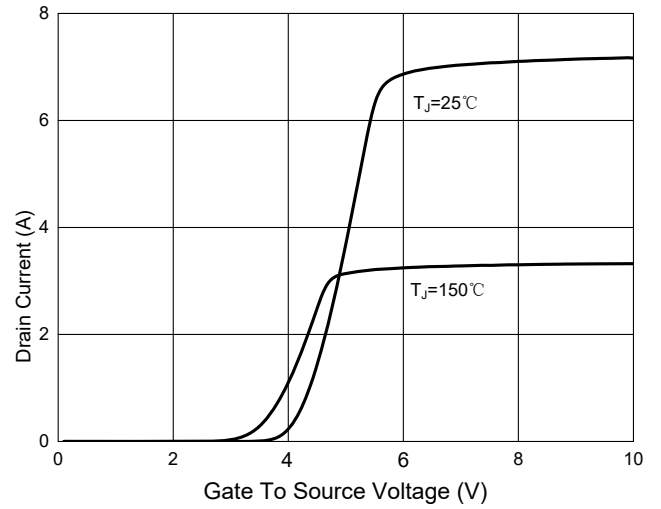


Fig. 3 -  $R_{DS(ON)} - I_D$

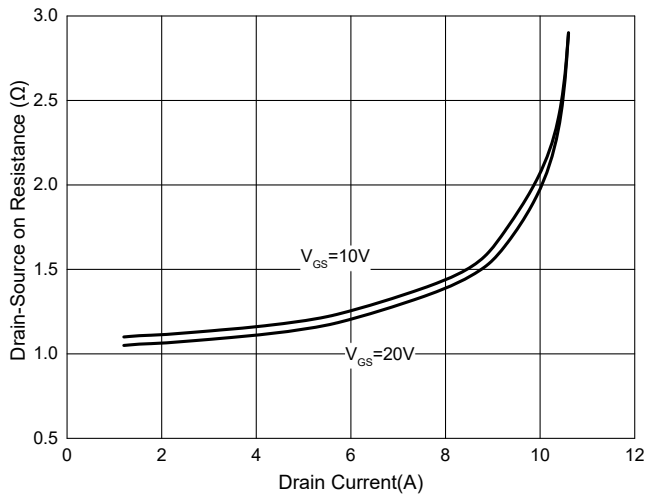


Fig. 4 - Normalized On Resistance Characteristics

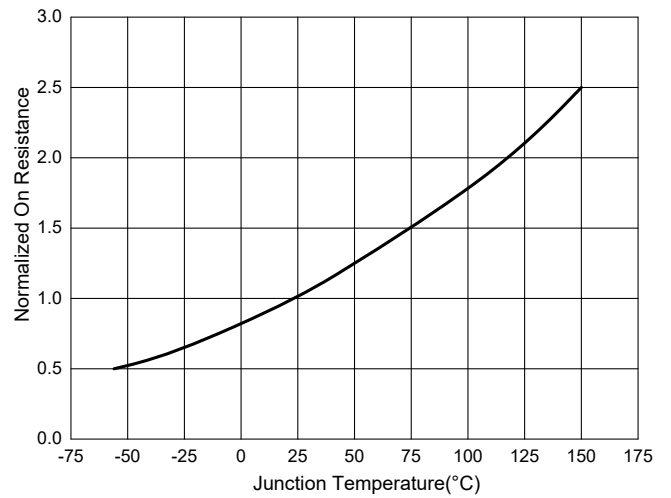


Fig. 5 - Gate Charge

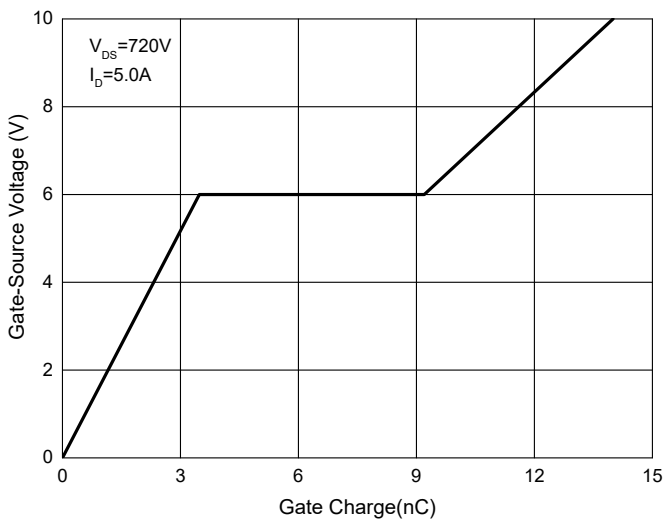


Fig. 6 -  $I_S - V_{SD}$

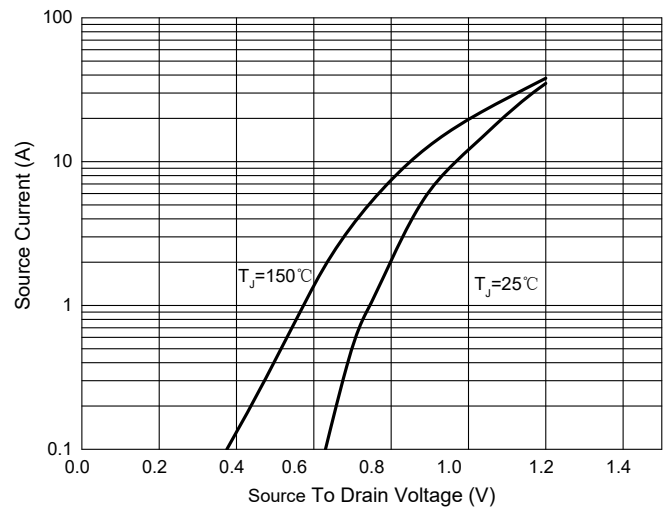


Fig. 7 - Capacitance Characteristics

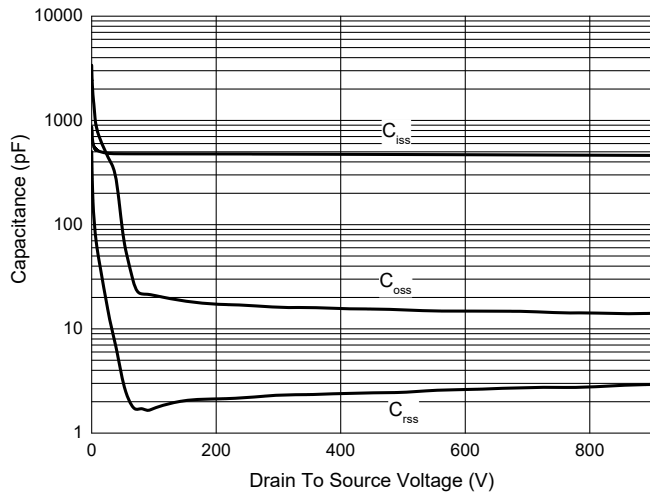


Fig. 8 - Safe Operation Area

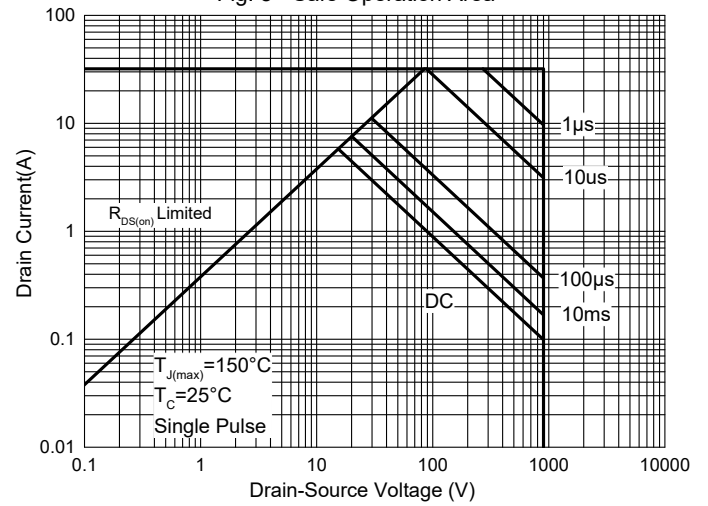
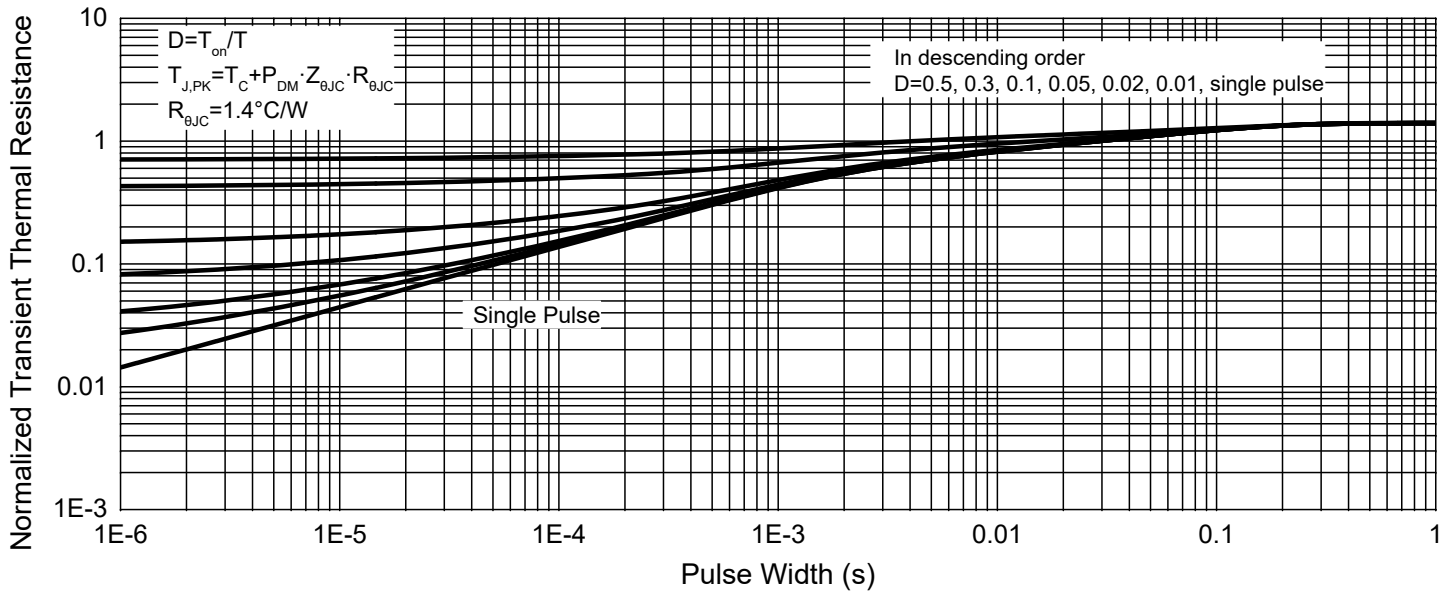


Fig. 9 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-BP	Bulk: 50pcs/Tube; 1Kpcs/Box; 5Kpcs/Ctn

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-BP-HF

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