

## 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: 5.7°C/W Junction to Case

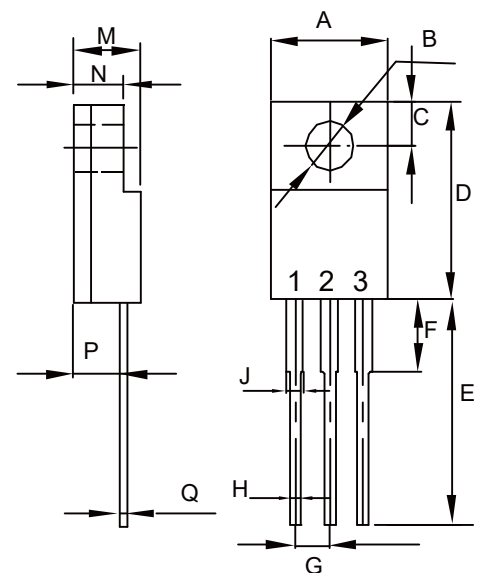
Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	800	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	6	A
Pulsed Drain Current <sup>(Note 1)</sup>	$I_{DM}$	18	A
Single Pulse Avalanche Energy <sup>(Note 2)</sup>	$E_{AS}$	170	mJ
Total Power Dissipation	$T_C=25^\circ\text{C}$ $P_D$	22	W

Note: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

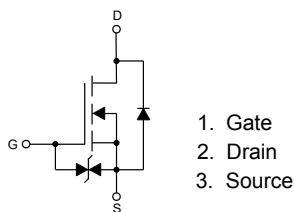
2.  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .

# N-CHANNEL Super-Junction Power MOSFET

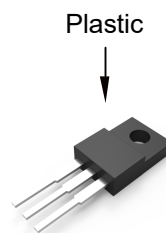
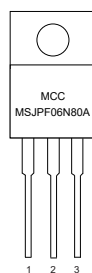
## TO-220F



## 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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	800			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			10	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=800V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	3.5	4.5	V
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=2.5A$		0.95	1.2	$\Omega$
Gate Resistance	$R_G$	$V_{GS}=0V, f=1.0MHz$		21		$\Omega$
<b>Dynamic Characteristics<sup>(Note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=100V, V_{GS}=0V, f=400kHz$		349		pF
Output Capacitance	$C_{oss}$			16		
Reverse Transfer Capacitance	$C_{rss}$			0.9		
Total Gate Charge	$Q_g$	$V_{DD}=640V, V_{GS}=10V, I_D=4.5A$		11		nC
Gate-Source Charge	$Q_{gs}$			3.3		
Gate-Drain Charge	$Q_{gd}$			4.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=400V, I_D=4.5A, R_G=25\Omega$		16		ns
Turn-On Rise Time	$t_r$			24		
Turn-Off Delay Time	$t_{d(off)}$			59		
Turn-Off Fall Time	$t_f$			19		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C=25^\circ C$			6	A
Pulsed Diode Forward Current	$I_{SM}$				18	
Body Diode Voltage	$V_{SD}$	$I_{SD}=4.5A, V_{GS}=0V$			1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{DD}=100V, I_F=I_S, di_F/dt=100A/\mu s$		380		ns
Reverse Recovery Charge	$Q_{rr}$				2	$\mu C$
Reverse Recovery Current	$I_{rrm}$				11	A

Note 3. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$ .

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

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

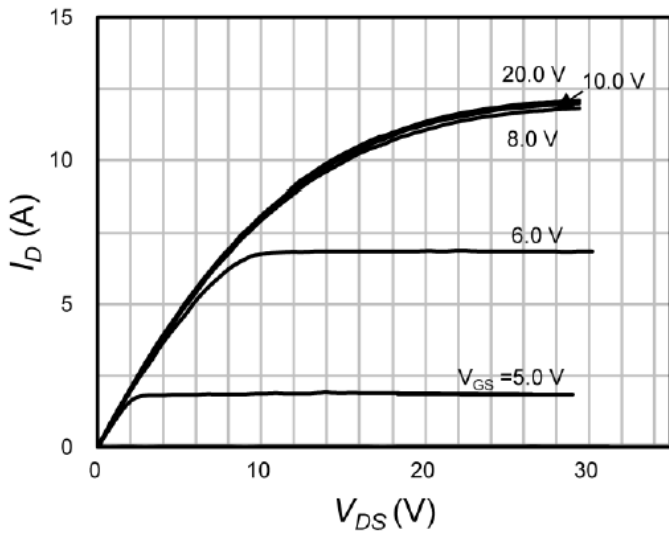


Fig. 2 - Transfer Characteristics

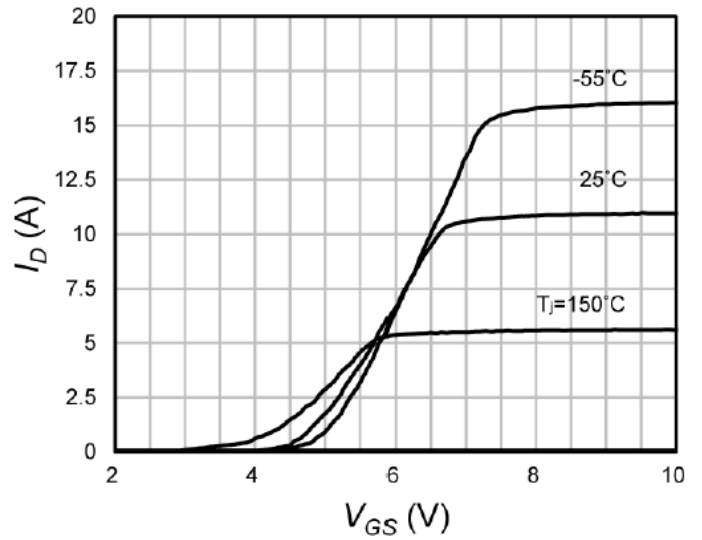


Fig. 3 -  $R_{DS(ON)} - I_D$

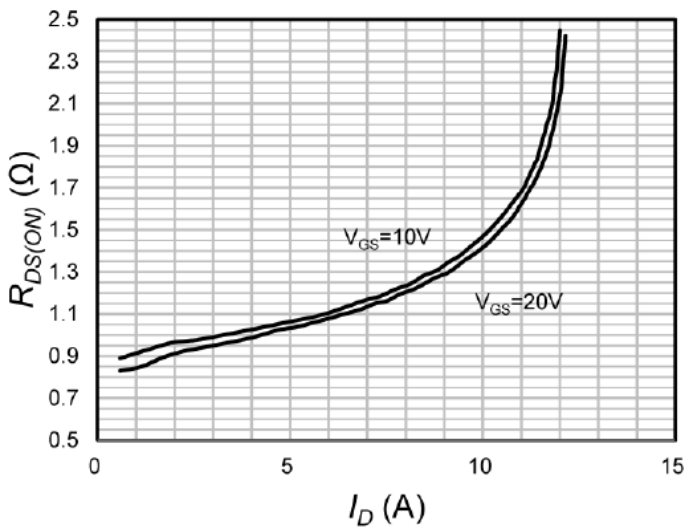


Fig. 4 -  $R_{DS(ON)} - T_J$

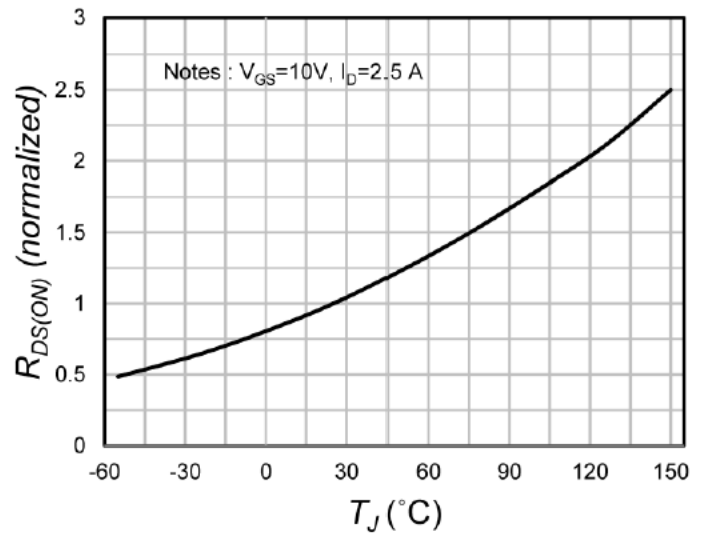


Fig. 5 - Gate Charge

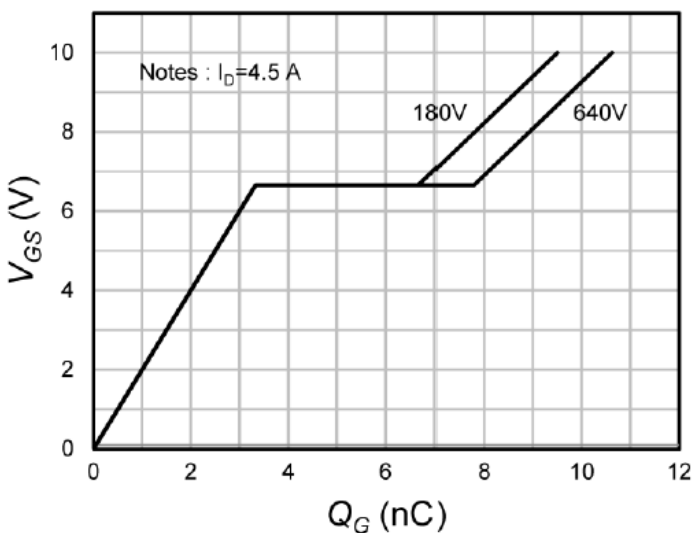
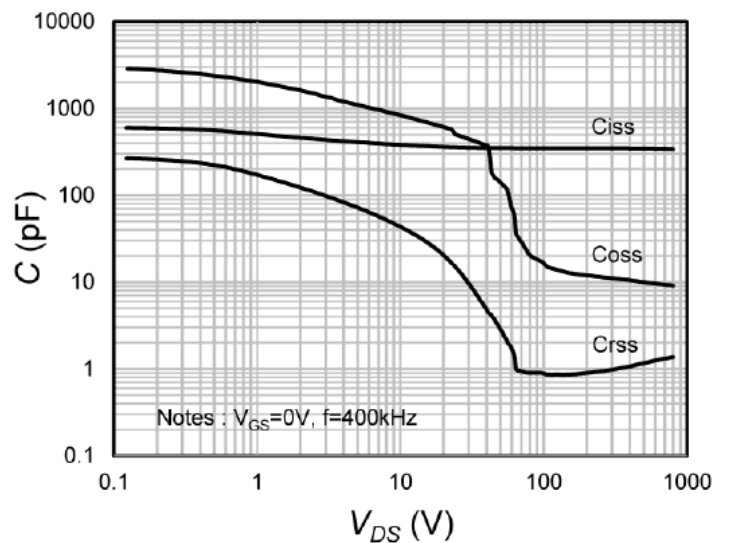


Fig. 6 - Capacitance Characteristics



## Curve Characteristics

Fig. 7 - Safe Operation Area

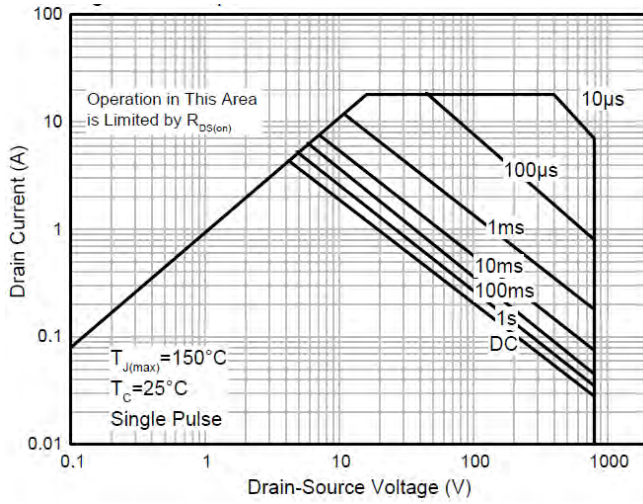
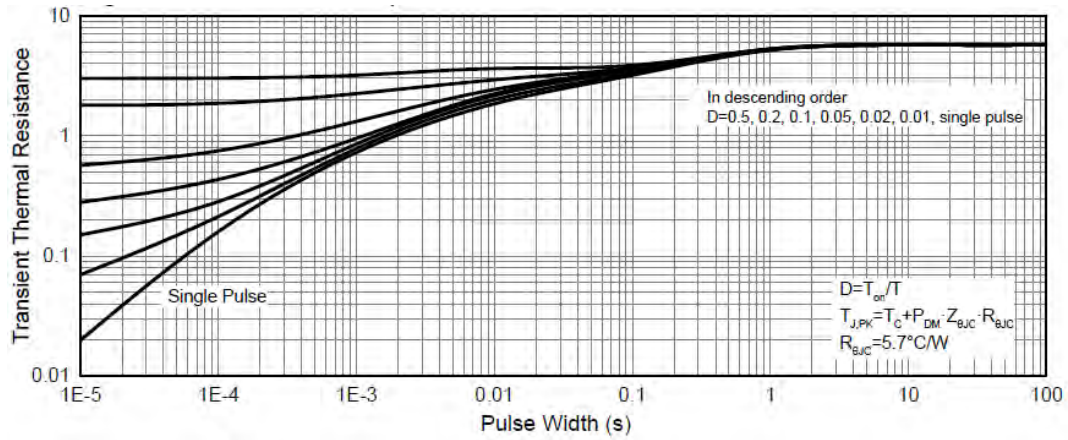


Fig.8 - Maximum Transient Thermal Impedance



## Ordering Information

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

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

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