Features

- Very Low FOM $R_{DS(on)}$ x Q_g
- Halogen Free. “Green” Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

N-CHANNEL MOSFET

Maximum Ratings

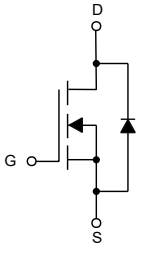
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 5.7°C/W Junction to Case(Note2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Volltage	V_{GS}	±30	V
Continuous Drain Current	I_D	20	A
Pulsed Drain Current(3)	I_{DM}	60	A
Total Power Dissipation	P_D	34	W
Single Pulsed Avalanche Energy(4)	E_{AS}	485	mJ

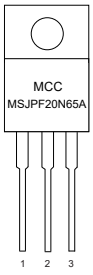
Note:

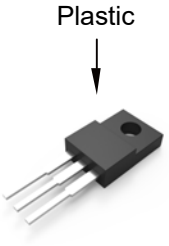
1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Surface Mounted on 1 in^2 pad area, t ≤10 sec
3. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

Internal Structure and Marking Code

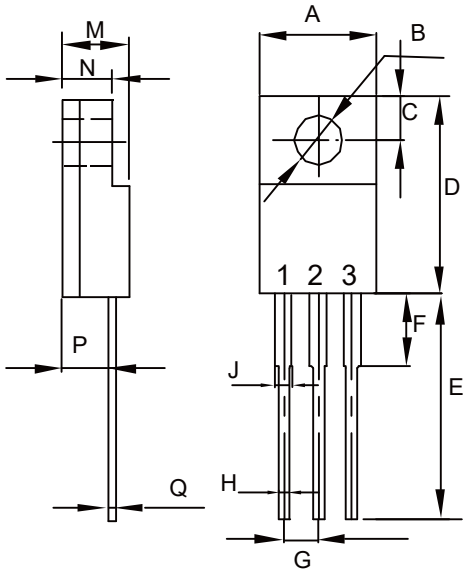


1. Gate
2. Drain
3. Source





TO-220F



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.390	0.421	9.90	10.70	
B	0.122	0.130	3.10	3.30	Φ
C	0.106		2.70		TYP.
D	0.567	0.642	14.40	16.30	
E	0.630	0.661	16.00	16.80	
F	0.134	0.150	3.40	3.80	
G	0.092	0.108	2.34	2.74	
H	0.020	0.035	0.50	0.90	
J	0.043	0.056	1.10	1.42	
M	0.169	0.201	4.30	5.10	
N	0.096	0.104	2.45	2.65	
P	0.083	0.126	2.10	3.20	
Q	0.016	0.032	0.40	0.80	

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	650			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =±30V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V, T_C=25°C			1	μA
Gate-Threshold Voltage (Note 4)	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	3	4	V
Drain-Source On-Resistance (Note 4)	$R_{DS(on)}$	V_{GS}=10V, I_D=10A		167	180	mΩ
Gate Resistance (Note 4)	R_G	f = 1.0MHz Open Drain		2.2		Ω
Dynamic Characteristics (Note 5)						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V,f=1MHz		1807		pF
Output Capacitance	C_{oss}			1214		
Reverse Transfer Capacitance	C_{rss}			103		
Total Gate Charge	Q_g	V_{DS}=560V,V_{GS}=10V,I_D=20A		56		nC
Gate-Source Charge	Q_{gs}			12		
Gate-Drain Charge	Q_{gd}			25		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=350V,I_D=20A V_{GS}=10V,R_{GEN}=25Ω		30		ns
Turn-On Rise Time	t_r			55		
Turn-Off Delay Time	$t_{d(off)}$			167		
Turn-Off Fall Time	t_f			103		
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=20A			1.4	V
Continuous Body Diode Current	I_S				20	A
Reverse Recovery Time	t_{rr}	V_{DD}=100V, I_S=11A, di_F/dt = 100A/μs		332		ns
Reverse Recovery Charge	Q_{rr}			4901		nC
Peak Reverse Recovery Current	I_{rrm}			31		A

Note:
4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1% .
5. Guaranteed by Design, not Subject to Production.

Fig. 1 - Typical Output Characteristics

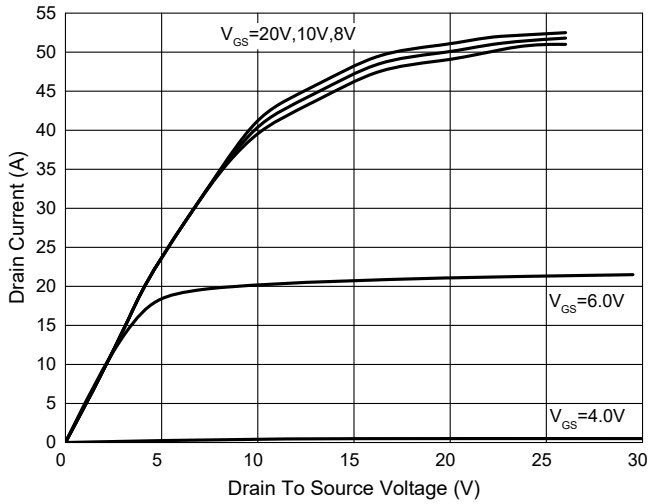


Fig. 2 - Normalized On Resistance Characteristics

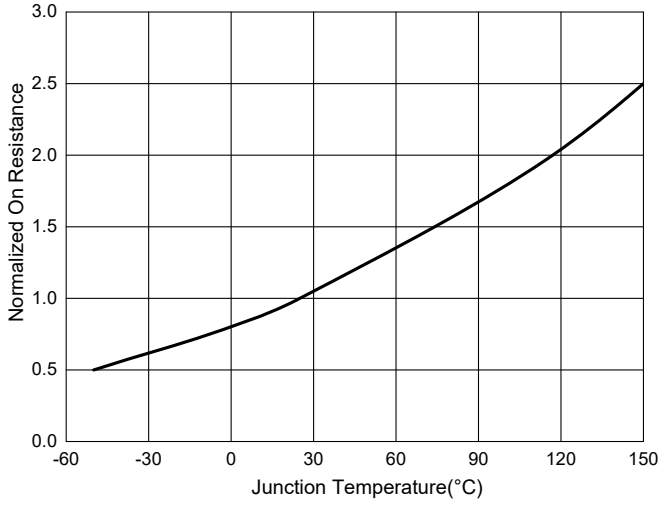


Fig. 3 - $R_{DS(ON)}$—I_D

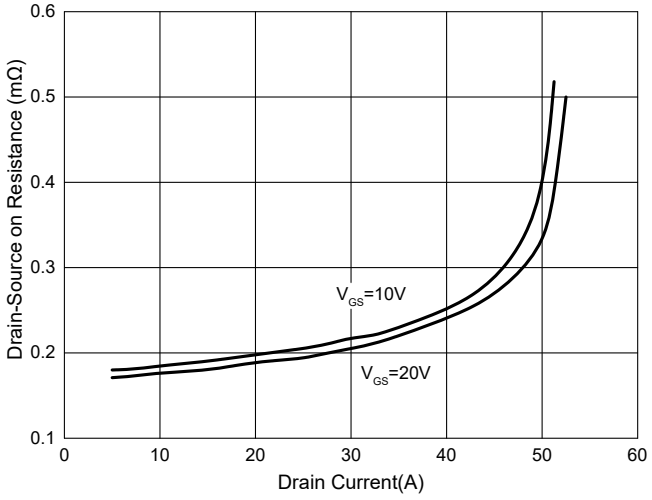


Fig. 4 - Capacitance Characteristics

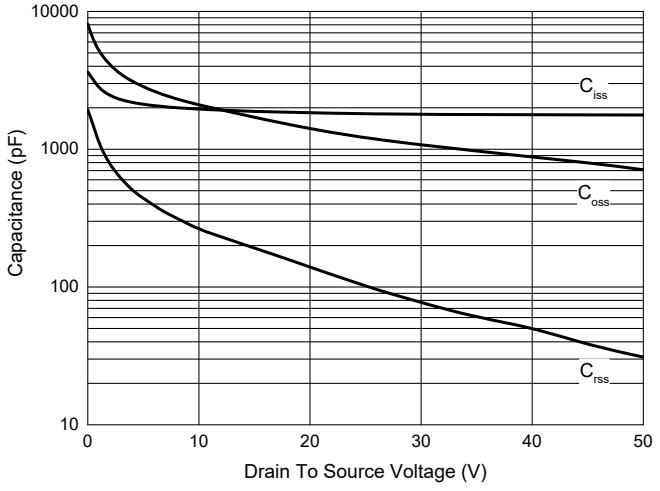


Fig. 5- Gate Charge

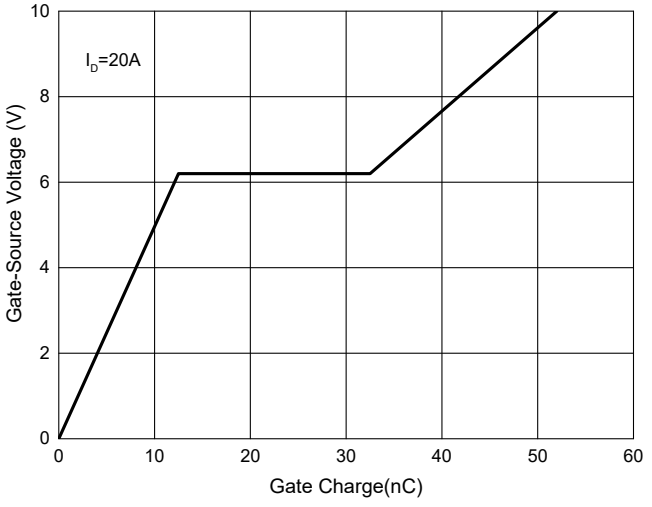


Fig. 6 - Normalized On Resistance Characteristics

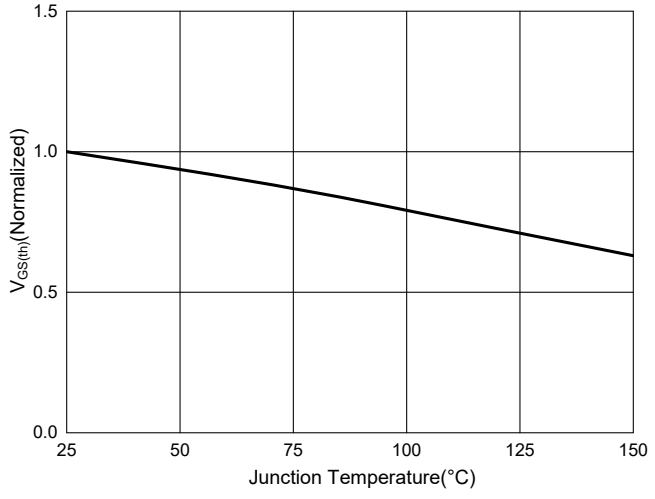
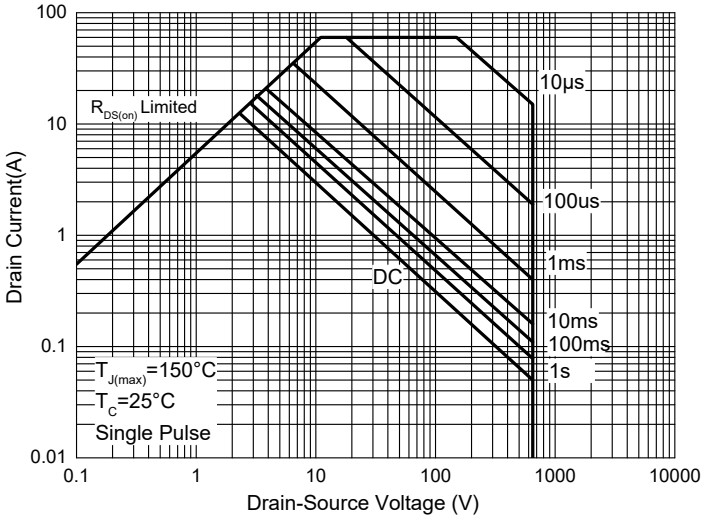


Fig. 7 - Safe Operation Area



Ordering Information

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