

**Features**

- Excellent Stability and Uniformity
- Split Gate Trench Mosfet Technology
- Lower  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings**

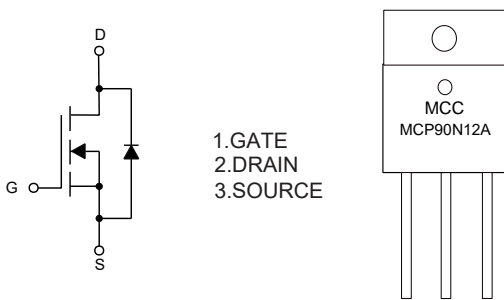
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 0.75°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain -Source Voltage	$V_{DS}$	120	V
Gate -Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	$T_C=25^\circ C$	90
		$T_C=100^\circ C$	56
Drain Current-Pulse <sup>(Note2)</sup>	$I_{DM}$	300	A
Power Dissipation	$P_D$	166	W
Single Pulsed Avalanche Energy <sup>(Note3)</sup>	$E_{AS}$	441	mJ

**Notes:**

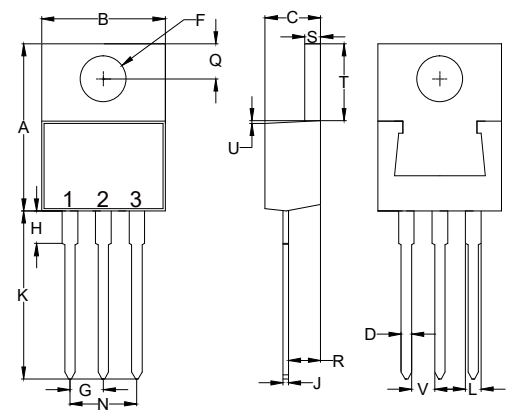
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Pulse Width Limited by Maximum Junction Temperature.
3. EAS Condition:  $T_J=25^\circ C$ ,  $V_{DD}=50V$ ,  $V_G=10V$ ,  $R_g=25\Omega$ ,  $L=2mH$ ,  $I_{AS}=21A$ .

**Internal Structure and Marking Code**



**N-CHANNEL MOSFET**

**TO-220**



**DIMENSIONS**

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.560	0.625	14.22	15.88	
B	0.380	0.420	9.65	10.67	
C	0.140	0.190	3.56	4.82	
D	0.020	0.045	0.51	1.14	
F	0.139	0.161	3.53	4.09	Φ
G	0.090	0.110	2.29	2.79	
H	-----	0.250	-----	6.35	
J	0.012	0.025	0.30	0.64	
K	0.500	0.580	12.70	14.73	
L	0.045	0.060	1.14	1.52	
N	0.190	0.210	4.83	5.33	
Q	0.100	0.135	2.54	3.43	
R	0.080	0.115	2.04	2.92	
S	0.045	0.055	1.14	1.39	
T	0.230	0.270	5.84	6.86	
U	-----	0.050	-----	1.27	
V	0.045	-----	1.15	-----	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	120			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=120V, V_{GS}=0V, T_J=25^\circ C$			1	uA
		$V_{DS}=120V, V_{GS}=0V, T_J=150^\circ C$			100	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	2.0	3.0	V
Drain-Source On-Resistance <sup>(Note3)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=45A$		7	9	mΩ
		$V_{GS}=4.5V, I_D=20A$		8.5	11	
Gate resistance	$R_G$	$V_{GS}=0V, f=1MHz$		0.7		Ω
Body Diode Voltage	$V_{SD}$	$I_{SD}=45A, V_{GS}=0V$		0.9	1.2	V
<b>Dynamic Characteristics <sup>(Note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=60V, V_{GS}=0V, f=1MHz$		4600		pF
Output Capacitance	$C_{oss}$			430		
Reverse Transfer Capacitance	$C_{riss}$			15		
Total Gate Charge	$Q_g$	$V_{DS}=60V, V_{GS}=10V, I_D=45A$		72		nC
Gate-Source Charge	$Q_{gs}$			20		
Gate-Drain Charge	$Q_{gd}$			8		
Reverse Recovery Charge	$Q_{rr}$	$I_F=45A, di/dt=100A/\mu s$		195		ns
Reverse Recovery Time	$t_{rr}$			86		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=60V, I_D=45A, V_{GS}=10V, R_G=2.2\Omega$		19		ns
Turn-On Rise Time	$t_r$			36		
Turn-Off Delay Time	$t_{d(off)}$			45		
Turn-Off Fall Time	$t_f$			45		

Note 3. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

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

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

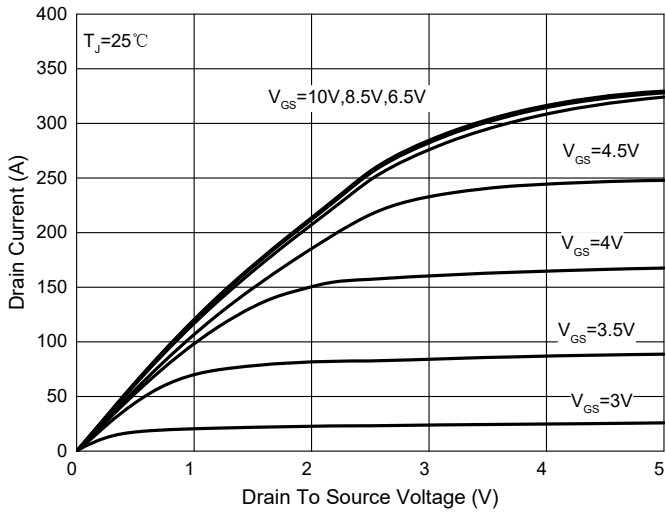


Fig. 2 - Transfer Characteristics

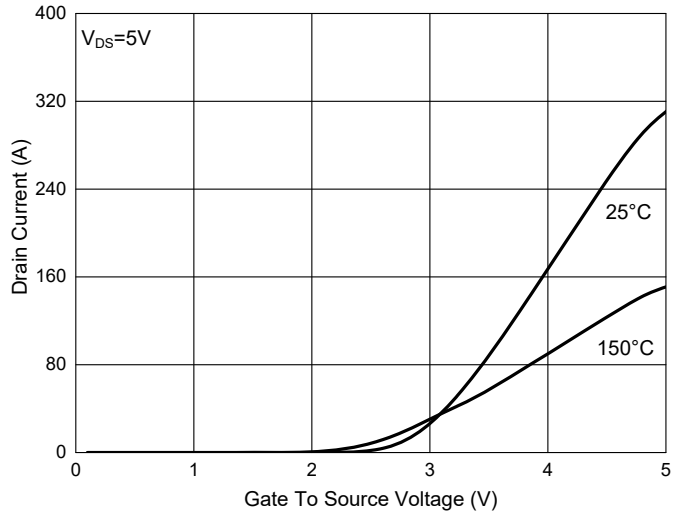


Fig. 3 -  $R_{DS(ON)} - I_D$

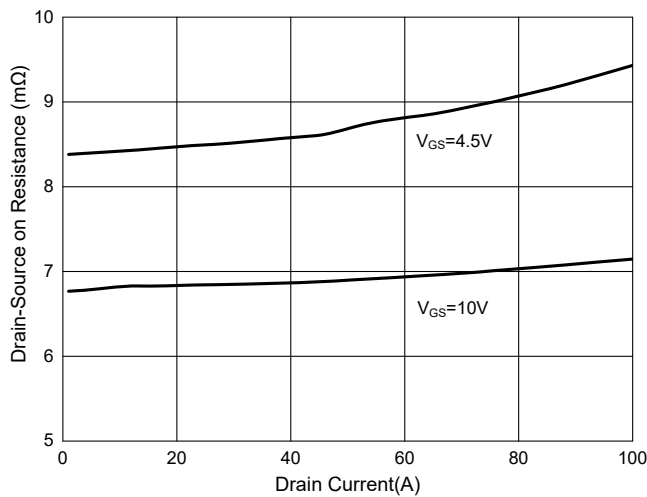


Fig. 4 - Normalized On Resistance Characteristics

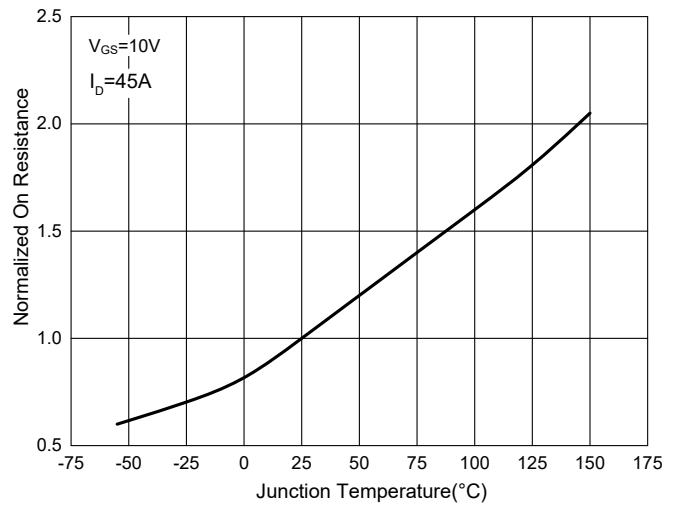


Fig. 5 - Gate Charge

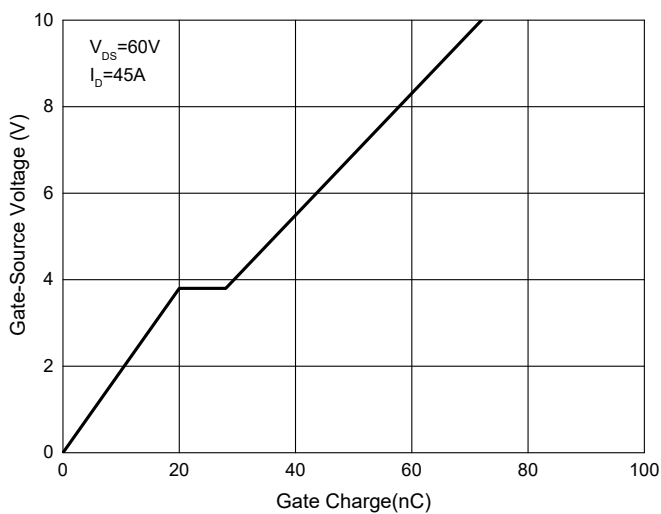
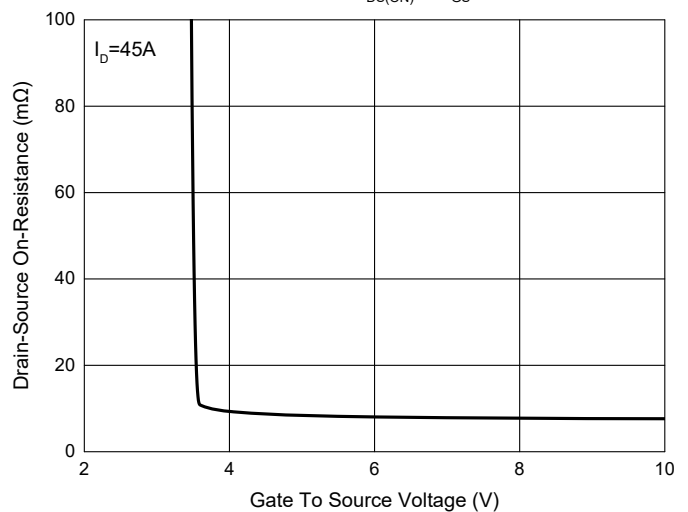


Fig. 6 -  $R_{DS(ON)} - V_{GS}$



**Curve Characteristics**

Fig. 7 - Capacitance Characteristics

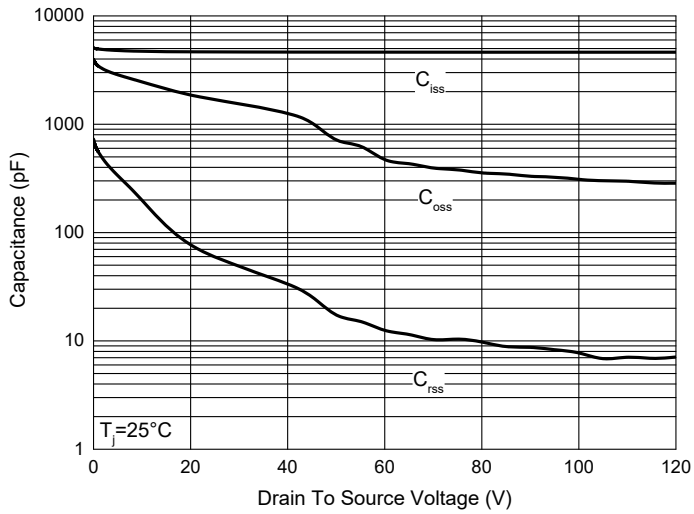


Fig. 8 - Power dissipation

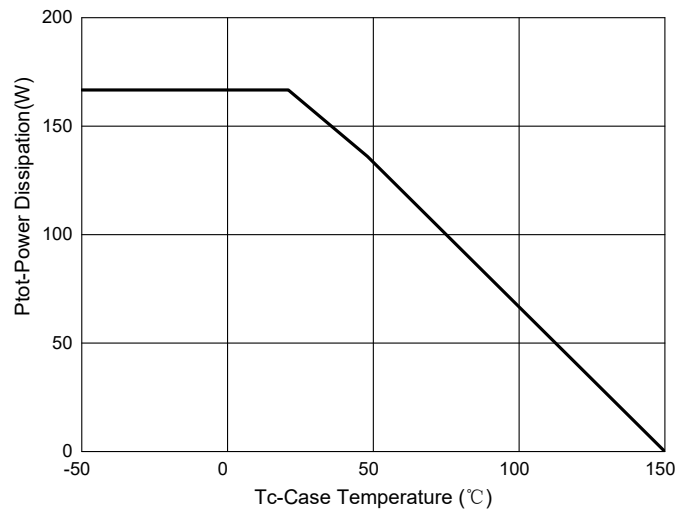


Fig. 9 - Safe Operation Area

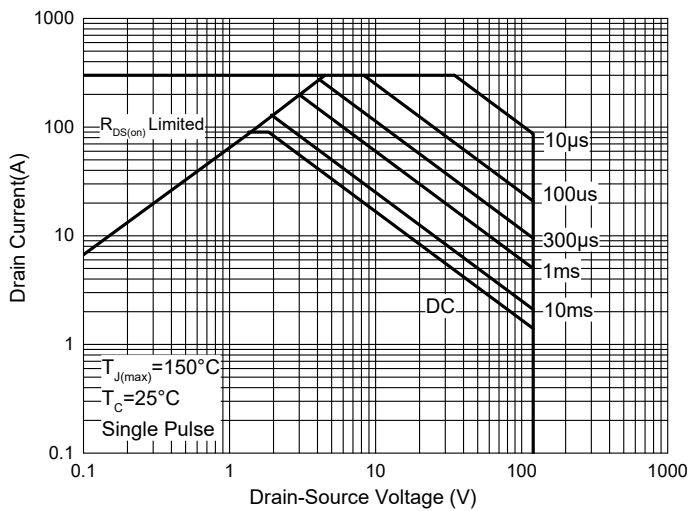
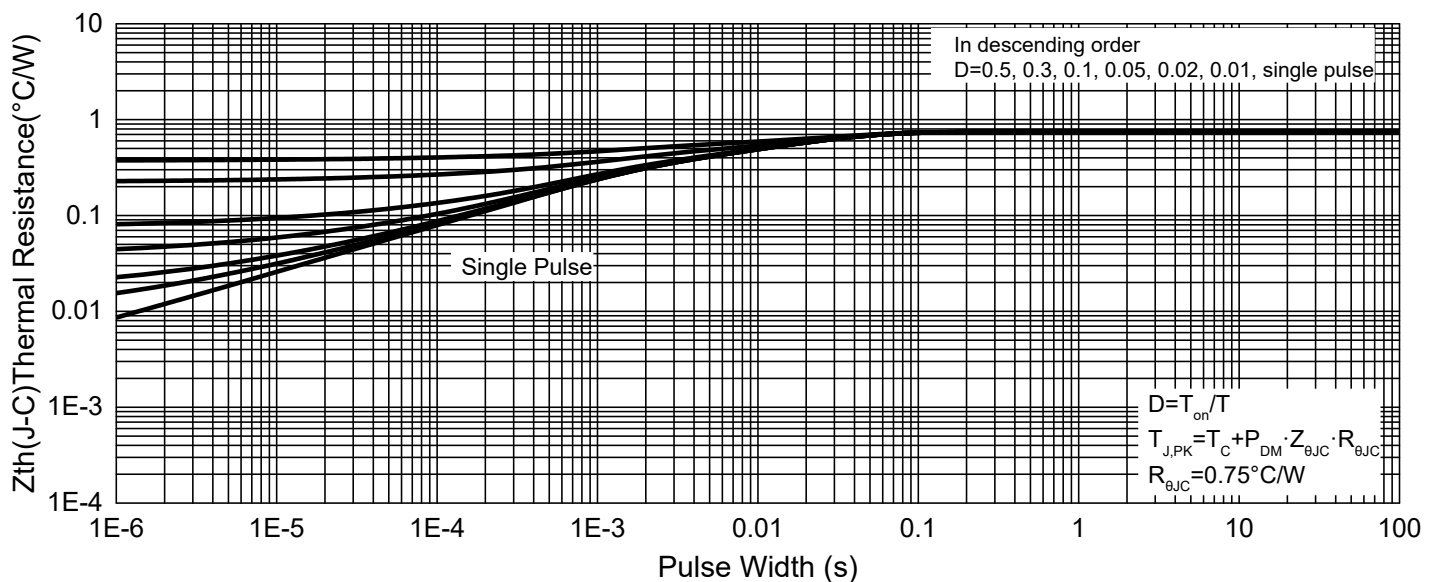


Fig. 10 - Maximum Transient Thermal Impedance



## Ordering Information

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

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