

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: 1.6°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
		$T_C=100^\circ C$	47
Drain Current-Pulse ^(Note2)	I_{DM}	300	A
Power Dissipation	P_D	78	W
Single Pulsed Avalanche Energy ^(Note3)	E_{AS}	441	mJ

Notes:

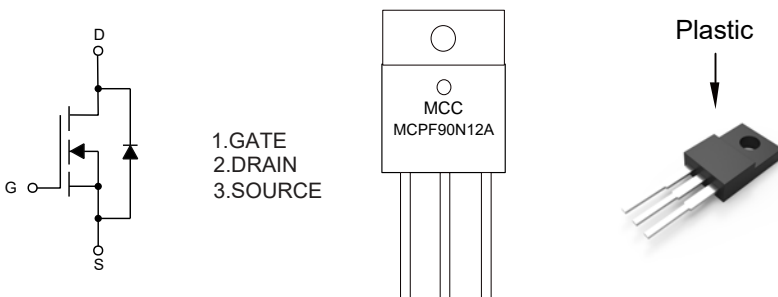
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Pulse Width Limited by Maximum Junction Temperature.
3. EAS Condition: $T_J=25^\circ C$, $V_{DD}=50V, V_G=10V, R_g=25\Omega, L=2mH, I_{AS}=21A$.



TO-220F

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	

Internal Structure and Marking Code



Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	120			V
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V$			± 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 ^(Note4)	$R_{DS(on)}$	$V_{GS}=10V, I_D=45A$		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
Dynamic Characteristics ^(Note 5)						
Input Capacitance	C_{iss}	$V_{DS}=60V, V_{GS}=0V, f=1MHz$		4600		pF
Output Capacitance	C_{oss}			430		
Reverse Transfer Capacitance	C_{rss}			23		
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 4. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

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

Curve Characteristics

Fig. 1 - Typical Output Characteristics

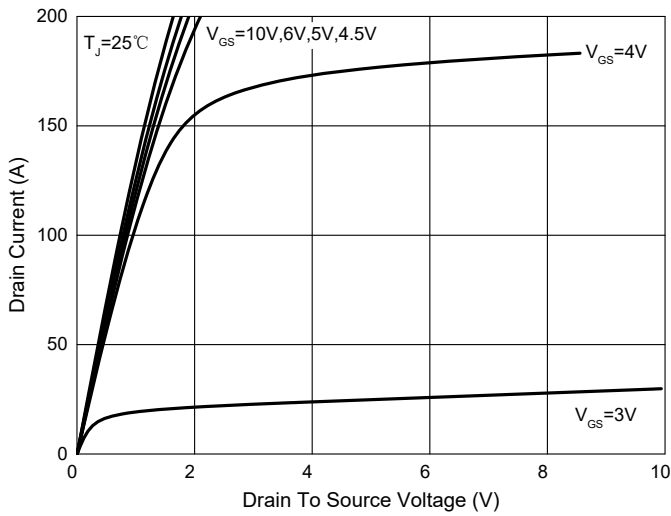


Fig. 2 - Transfer Characteristics

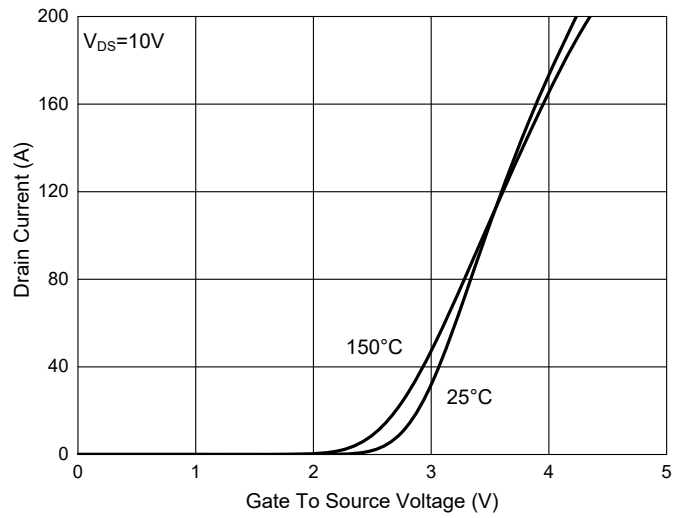


Fig. 3 - $R_{DS(ON)} - I_D$

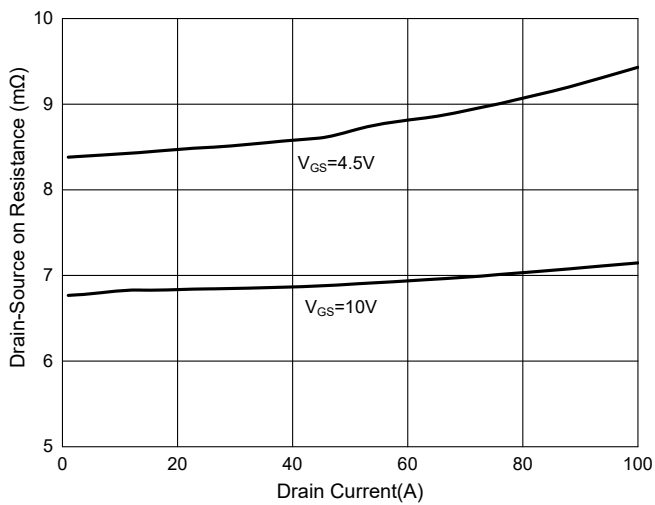


Fig. 4 - Normalized On Resistance Characteristics

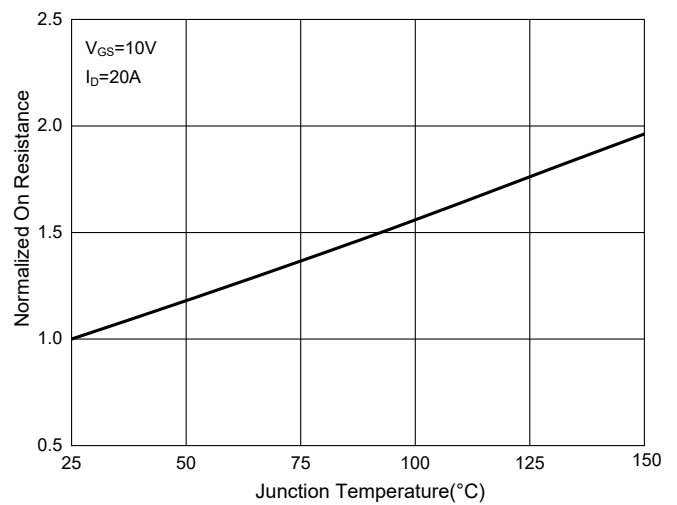


Fig. 5 - Gate Charge

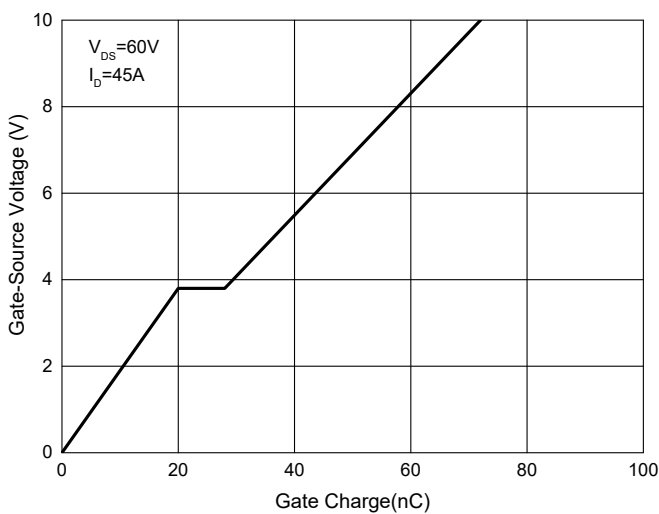
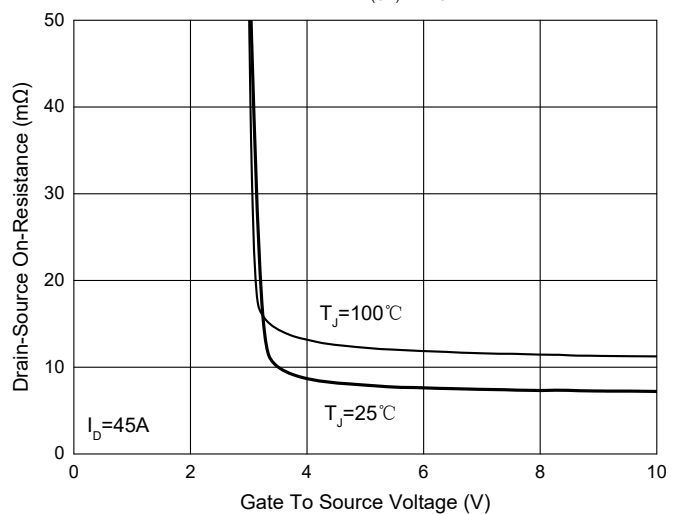


Fig. 6 - $R_{DS(ON)} - V_{GS}$



Curve Characteristics

Fig. 7 - Capacitance Characteristics

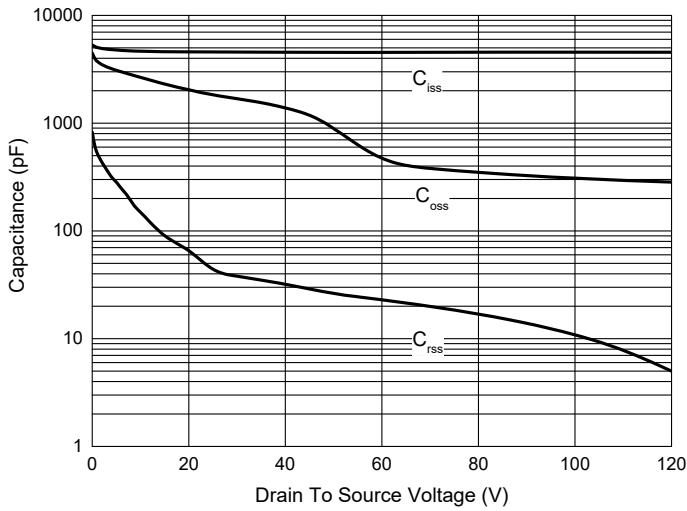


Fig. 8 - Safe Operation Area

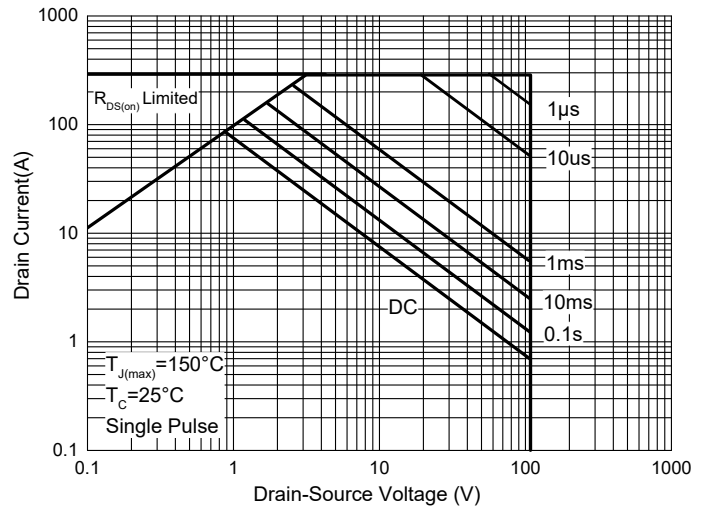
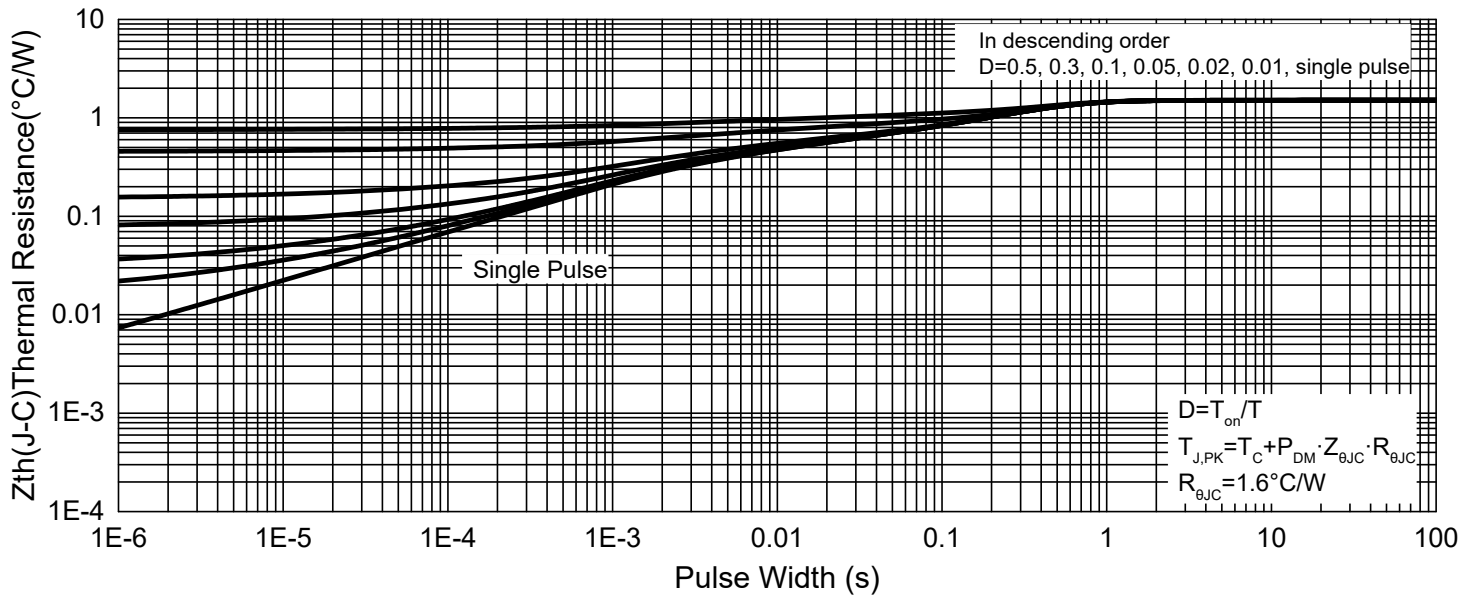


Fig. 9 - Maximum Transient Thermal Impedance



Ordering Information

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

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