

## Features

- Split Gate Trench MOSFET Technology
- Low Thermal Resistance
- 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)

## Maximum Ratings

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Drain -Source Voltage	$V_{DS}$	100	V
Gate -Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	130	A
		82	
Drain Current-Pulse <sup>(Note2)</sup>	$I_{DM}$	520	A
Power Dissipation	$P_D$	310	W
Single Pulsed Avalanche Energy <sup>(Note3)</sup>	$E_{AS}$	340	mJ

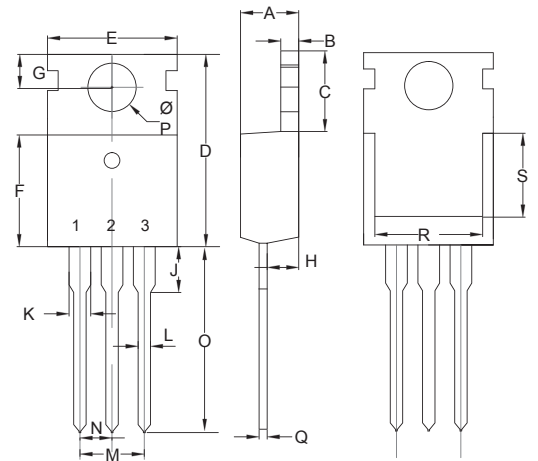
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

2. Pulse Width Limited by Maximum Junction Temperature.

3. L=0.5mH,  $I_{AS}=37A$ ,  $V_{DD}=50V$ ,  $V_{GS}=10V$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ C$

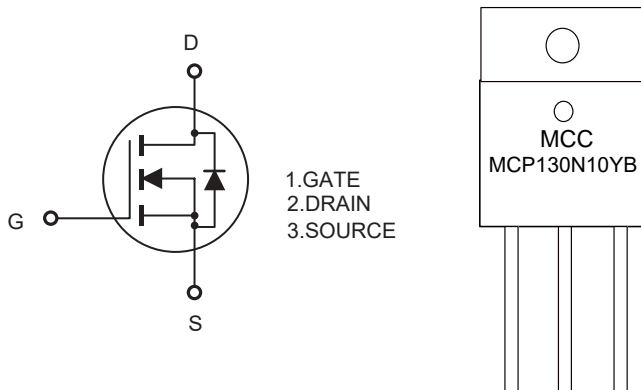
# N-Channel Enhancement Mode Field Effect Transistor

## TO-220AB(H)



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.172	0.188	4.37	4.77	
B	0.049	0.057	1.25	1.45	
C	0.246	0.270	6.25	6.85	
D	0.594	0.634	15.10	16.10	
E	0.382	0.406	9.70	10.30	
F	0.346	0.370	8.80	9.40	
G	0.102	0.118	2.60	3.00	
H	0.087	0.102	2.20	2.60	
J	-----	0.134	-----	3.40	
K	0.046	0.058	1.17	1.47	
L	0.028	0.037	0.70	0.95	
M	0.200		5.08		TYP.
N	0.100		2.54		TYP.
O	0.502	0.543	12.75	13.80	
P	0.134	0.150	3.40	3.80	Φ
Q	0.016	0.026	0.40	0.65	
R	0.276	-----	7.00	-----	
S	0.217	-----	5.50	-----	

## Internal Structure and Marking Code



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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ C$			1	$\mu A$
		$V_{DS}=100V, V_{GS}=0V, T_J=150^\circ C$			100	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.8	2.5	V
Drain-Source On-Resistance <sup>(Note4)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=65A$		4	5.5	m $\Omega$
		$V_{DS}=4.5V, I_D=20A$		5	6.5	
Gate resistance	$R_G$	f=1MHz, Open drain		0.8		$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		4450		$\mu F$
Output Capacitance	$C_{oss}$			1500		
Reverse Transfer Capacitance	$C_{rss}$			90		
Total Gate Charge	$Q_g$	$V_{DD}=50V, V_{GS}=10V, I_D=65A$		68		nC
Gate-Source Charge	$Q_{gs}$			11		
Gate-Drain Charge	$Q_{gd}$			16		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=50V, I_D=65A, R_G=2.2\Omega$		18		ns
Turn-On Rise Time	$t_r$			79		
Turn-Off Delay Time	$t_{d(off)}$			33		
Turn-Off Fall Time	$t_f$			7		
<b>Drain-Source Body Diode Characteristics</b>						
Body Diode Voltage	$V_{SD}$	$T_J=25^\circ C, I_{SD}=65A, V_{GS}=0V$		0.9	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=65A, di/dt=600A/\mu s$		35		ns
Reverse Recovery Charge	$Q_{rr}$			160		$\mu C$
Diode Forward Current	$I_s$	$V_{GS} < V_{th}$			130	A
Pulsed Source Current	$I_{sp}$				440	

**Notes:**

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

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

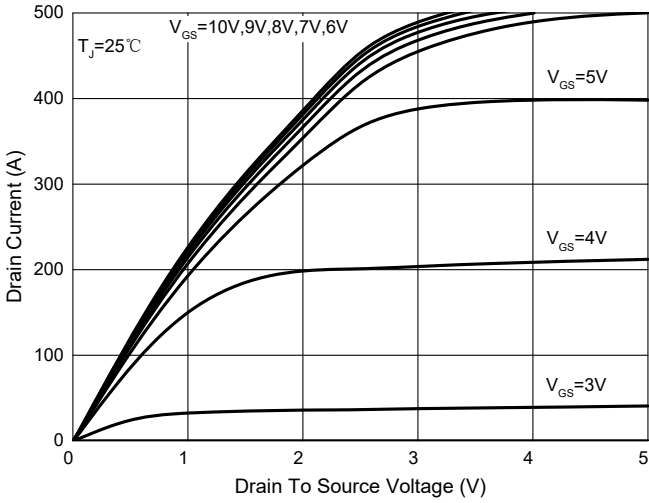


Fig. 2 - Transfer Characteristics

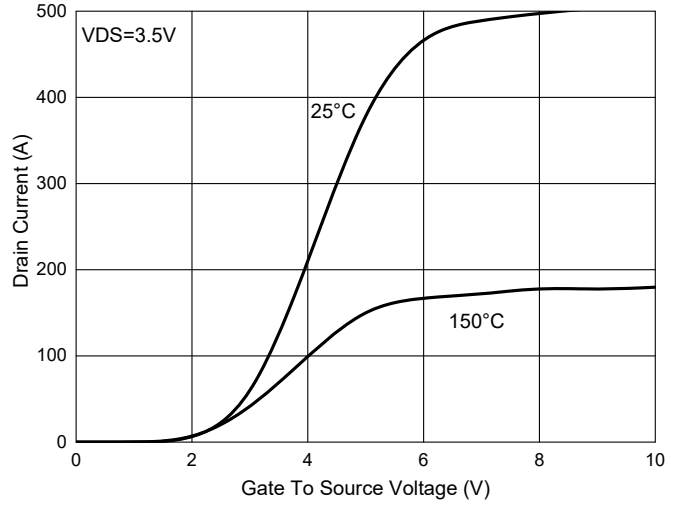


Fig. 3 -  $R_{DS(ON)} - I_D$

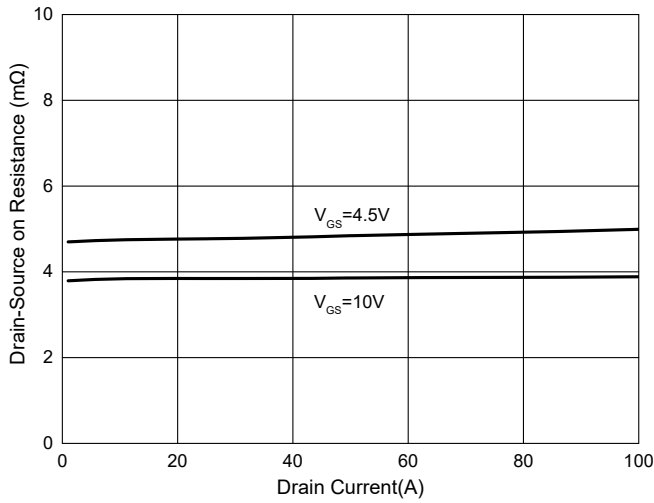


Fig. 4 -  $I_S - V_{SD}$

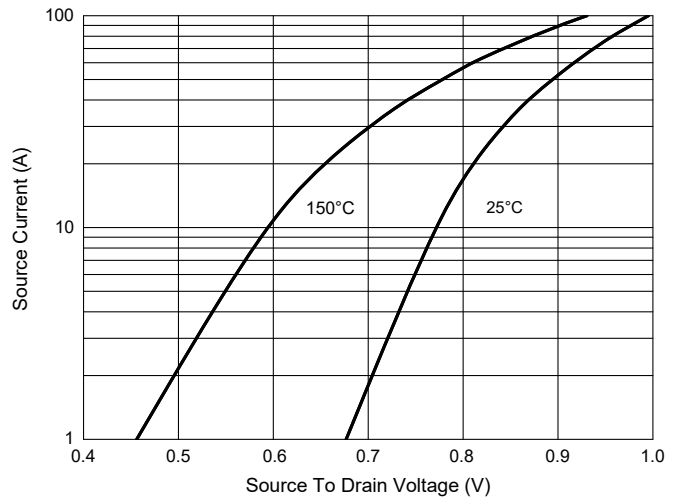


Fig. 5 - Normalized On Resistance Characteristics

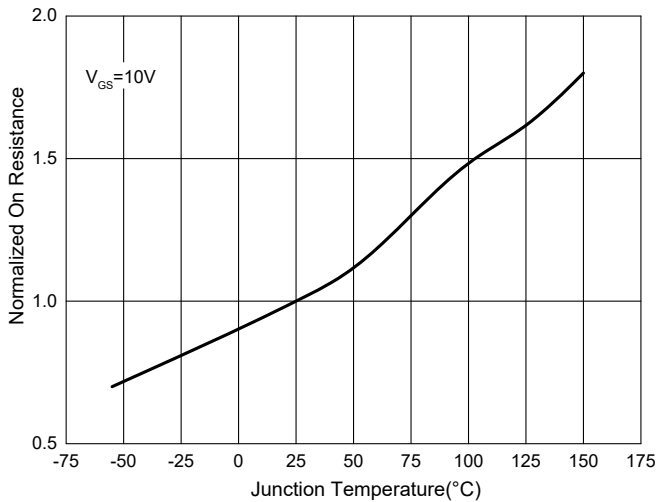
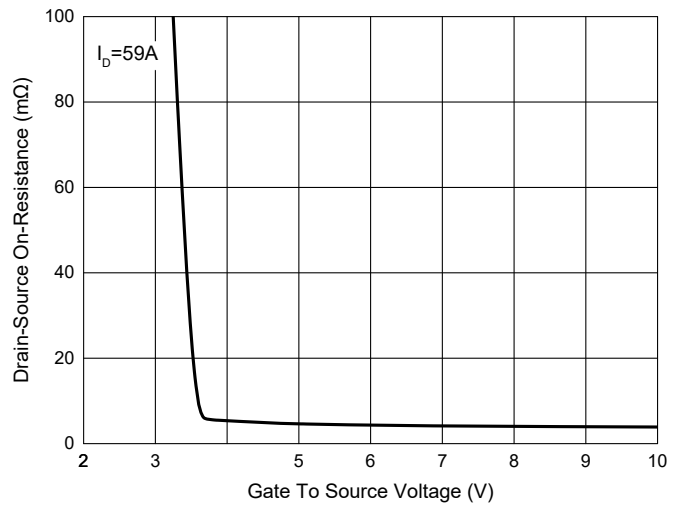


Fig. 6 -  $R_{DS(ON)} - V_{GS}$



**Curve Characteristics**

Fig. 7 - Gate Charge

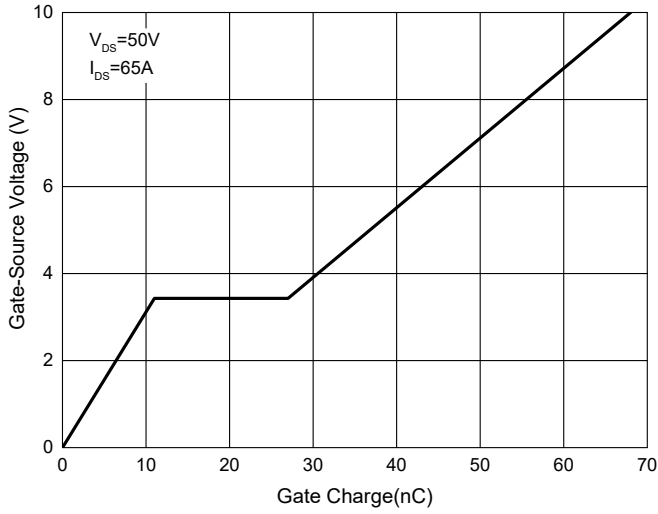


Fig. 8 - Capacitance Characteristics

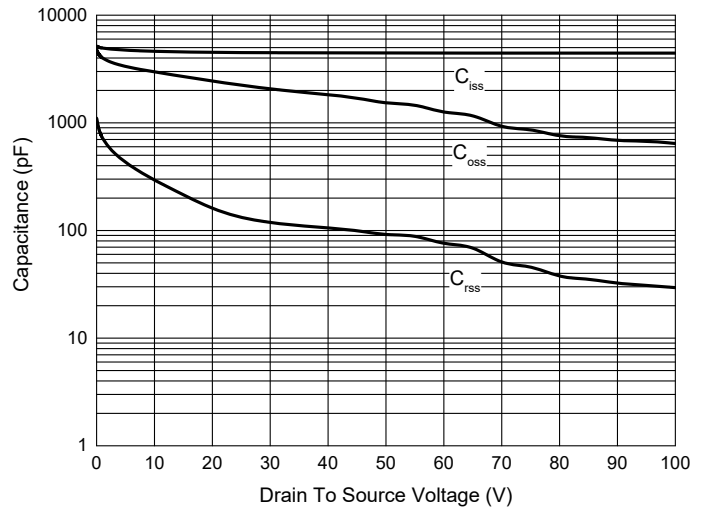


Fig. 9 - Safe Operation Area

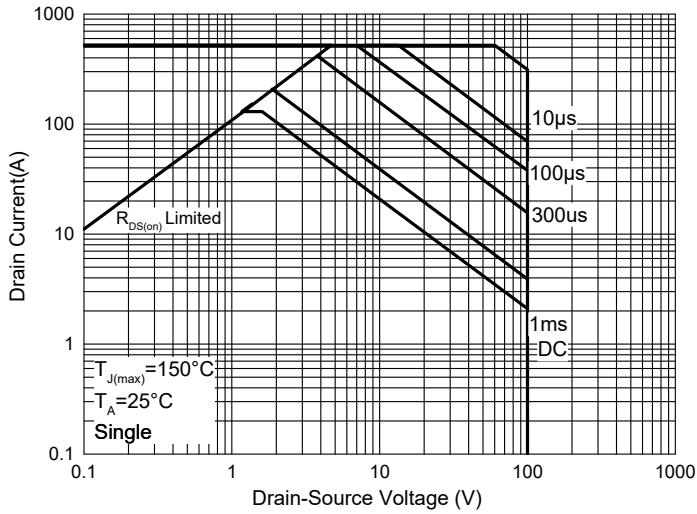
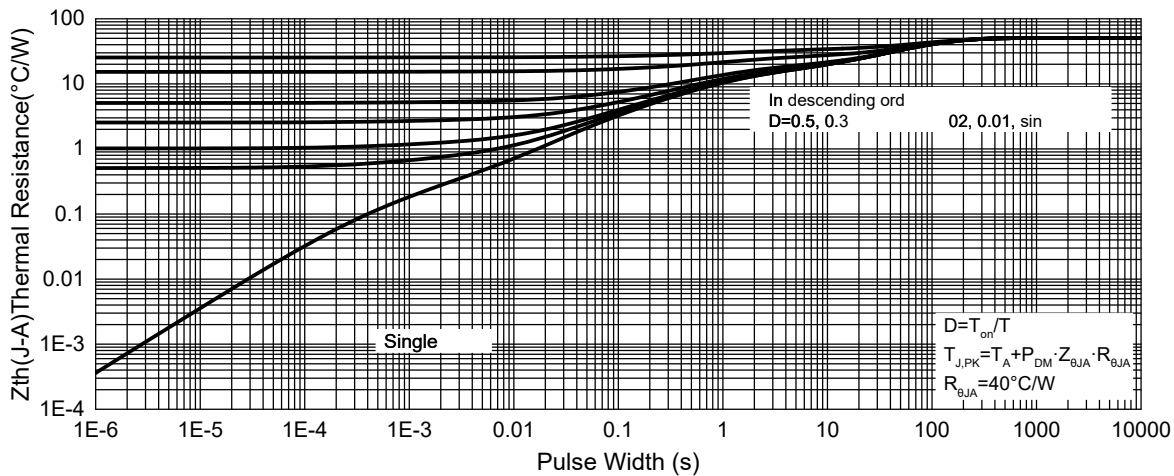


Fig. 10 - Maximum Transient Thermal Impedance



### Ordering Information

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

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