

## Features

- Split Gate Trench MOSFET Technology
- 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

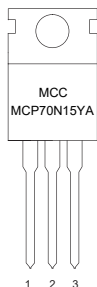
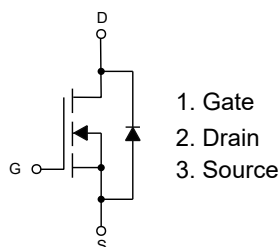
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance:30°C/W Junction to Ambient(Steady-State)<sup>(Note2)</sup>
- Thermal Resistance:1.1°C/W Junction to Case(Steady-State)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	150	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	70
		$T_C=100^\circ\text{C}$	49.5
Pulsed Drain Current <sup>(Note3)</sup>	$I_{DM}$	280	A
Total Power Dissipation <sup>(Note4)</sup>	$P_D$	136	W
Single Pulsed Avalanche Energy <sup>(Note5)</sup>	$E_{AS}$	192	mJ

Note:

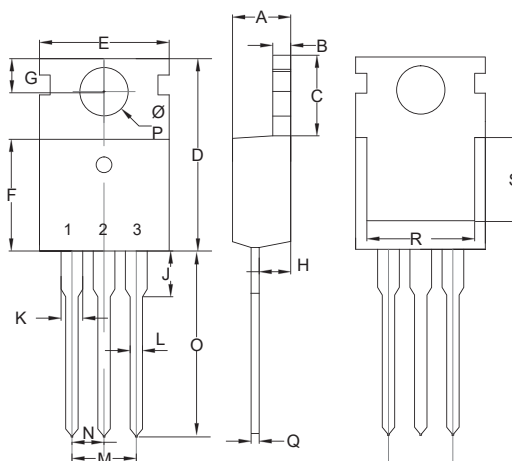
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
5.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=50\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.5\text{mH}$

## Internal Structure and Marking Code



# N-CHANNEL MOSFET

## 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	----	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	150			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=120V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3	4	5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=35A$		16.4	21	m $\Omega$
Gate Resistance	$R_G$	f=1MHz, Open drain		0.7		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				70	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$			1.3	V
Reverse Recovery Time	$t_{rr}$	$I_S=35A, di/dt=1300A/\mu s$		51		ns
Reverse Recovery Charge	$Q_{rr}$			947		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=75V, V_{GS}=0V, f=0.5MHz$		2511		pF
Output Capacitance	$C_{oss}$			200		
Reverse Transfer Capacitance	$C_{rss}$			7		
Total Gate Charge	$Q_g$	$V_{DS}=75V, V_{GS}=10V, I_D=35A$		38		nC
Gate-Source Charge	$Q_{gs}$			10.7		
Gate-Drain Charge	$Q_{gd}$			9.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=75V, V_{GS}=10V, R_G=2.2\Omega, I_D=35A$		12.7		ns
Turn-On Rise Time	$t_r$			59.8		
Turn-Off Delay Time	$t_{d(off)}$			23.3		
Turn-Off Fall Time	$t_f$			6.6		

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

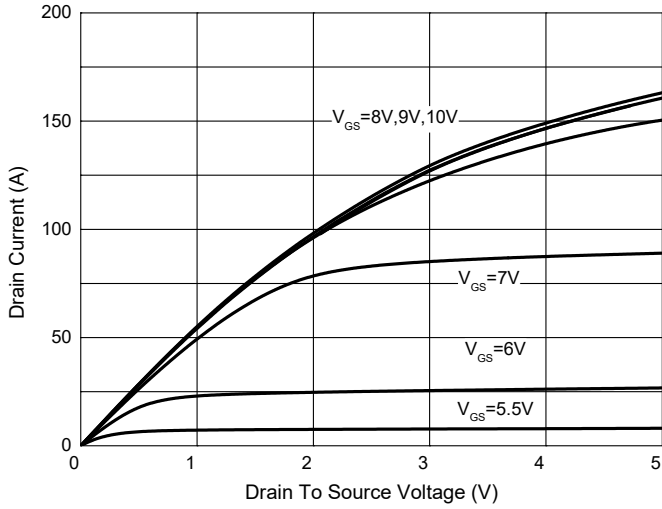


Fig. 2 - Transfer Characteristics

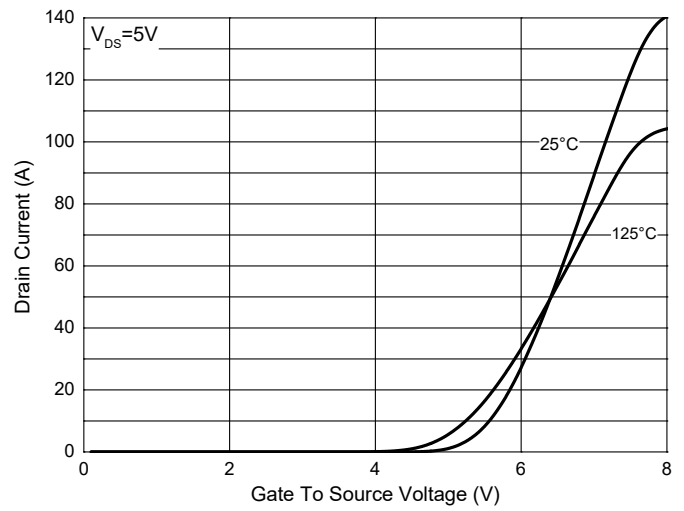


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

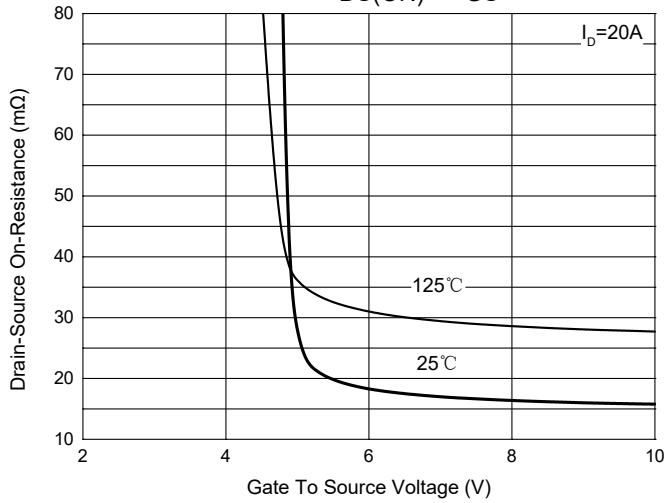


Fig. 4 -  $R_{DS(ON)} - I_D$

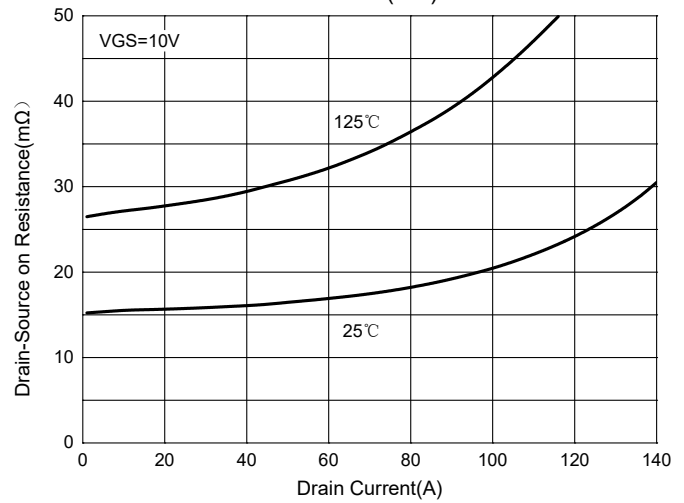


Fig. 5 - Capacitance Characteristics

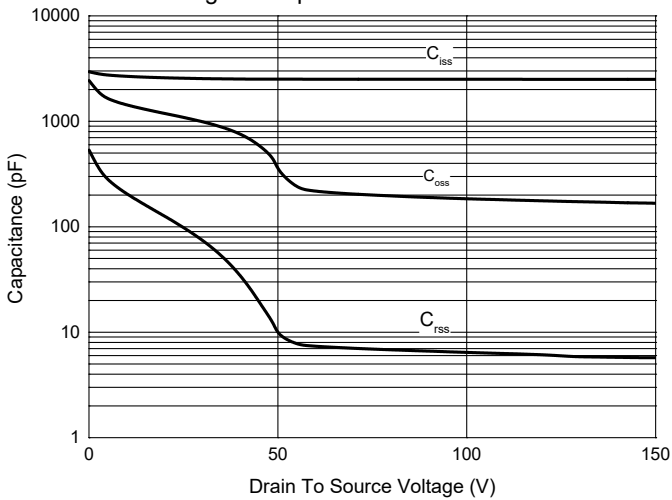
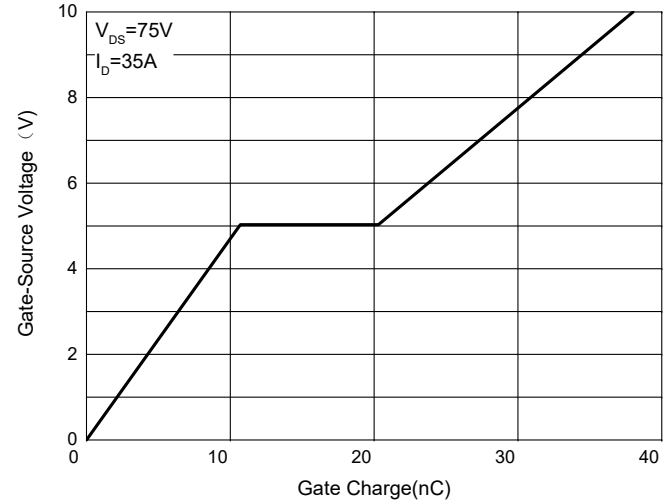
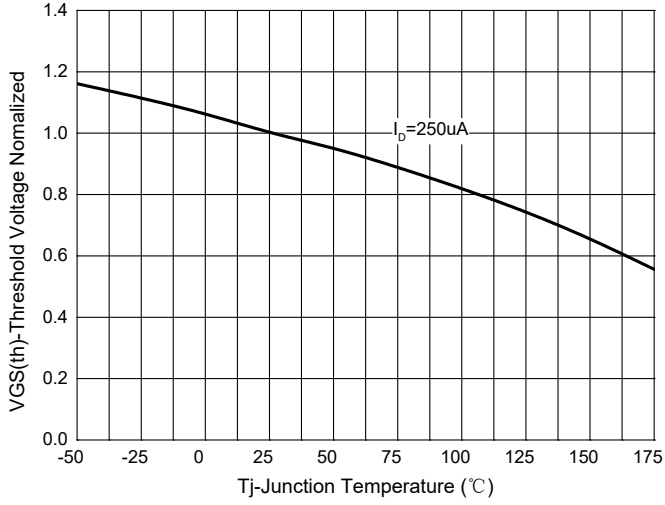


Fig. 6 - Gate Charge

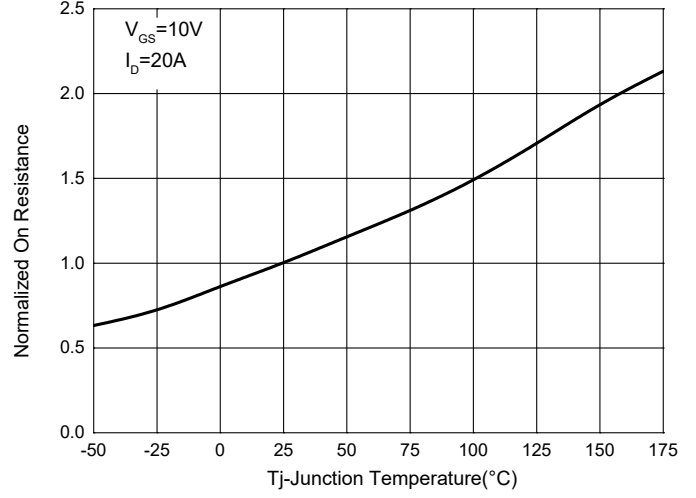


**Curve Characteristics**

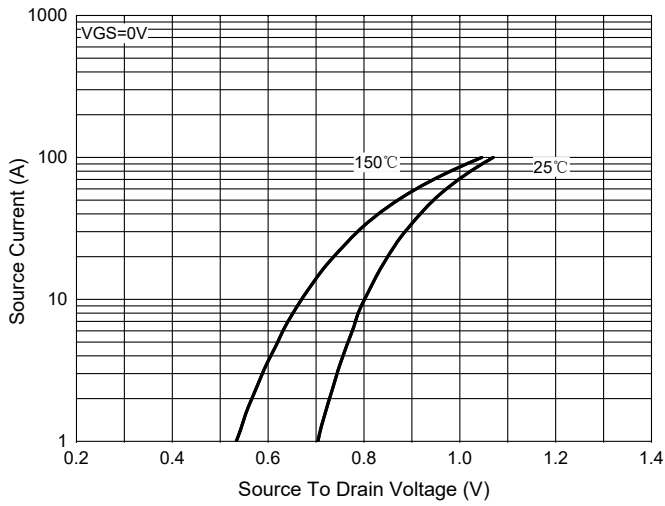
**Fig. 7 - Normalized Threshold Voltage**



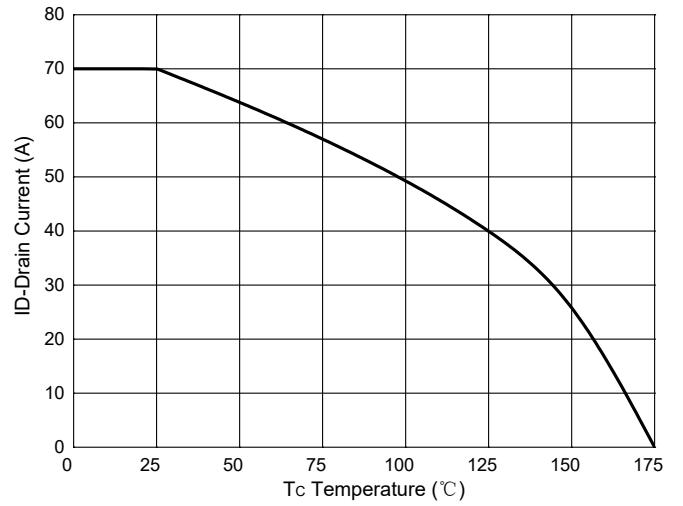
**Fig.8-Normalized On Resistance Characteristics**



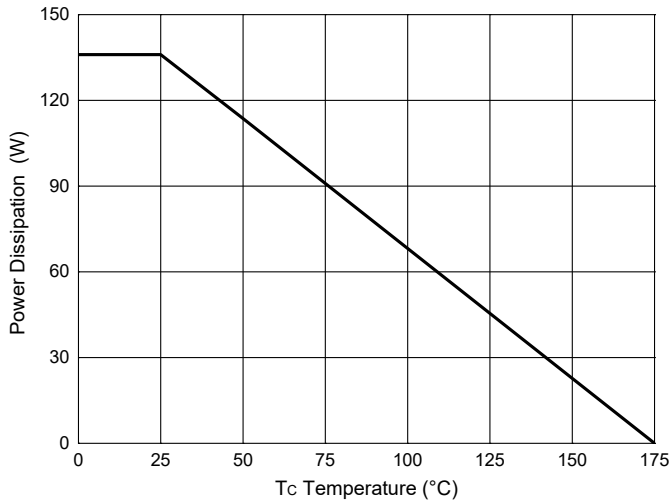
**Fig.9 - IS—VSD**



**Fig. 10 - Drain Current**



**Fig.11-PD Dissipation**



**Curve Characteristics**

Fig. 12 - Safe Operation Area

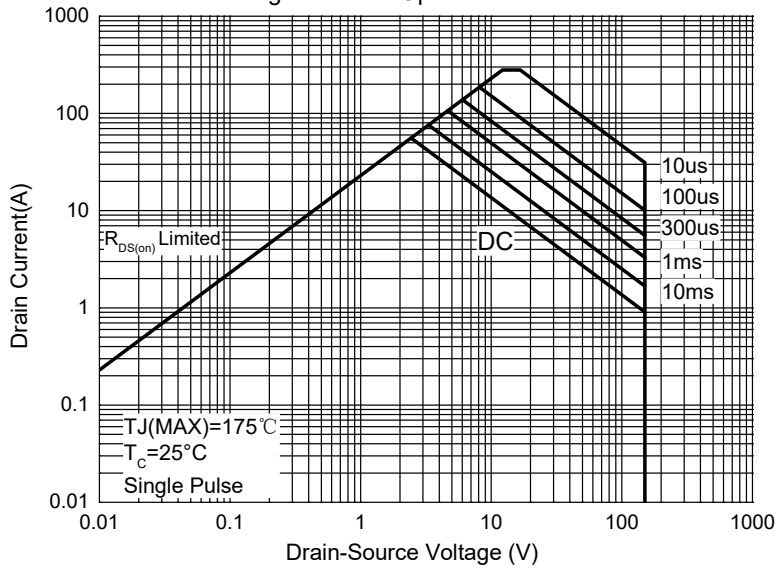
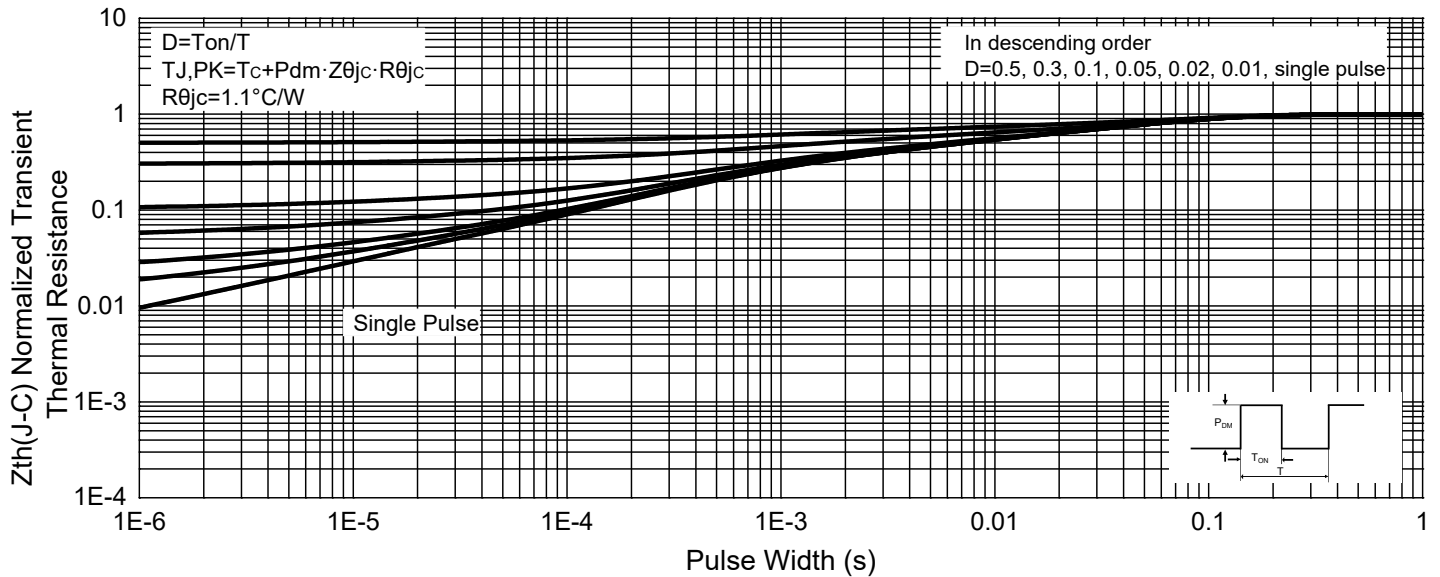


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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