

**Features**

- Halogen Free. "Green" Device (Note 1)
- Very Low FOM  $R_{DS(on)} \times Q_g$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1

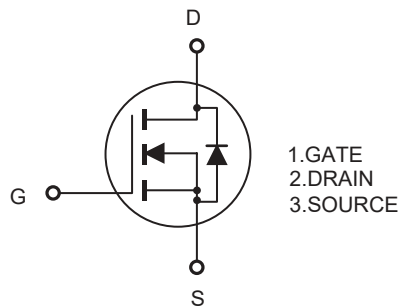
**Maximum Ratings**

- Operating Junction Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Storage Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Thermal Resistance:  $62^{\circ}\text{C/W}$  Junction to Ambient
- Thermal Resistance:  $0.83^{\circ}\text{C/W}$  Junction to Case

Parameter	Symbol	Rating	Unit
Drain -Source Voltage( $V_{GS} = 0\text{V}$ )	$V_{DS}$	700	V
Gate -Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous	$I_D$	20	A
Drain Current-Pulse <sup>(Note 2)</sup>	$I_{DM}$	60	A
Power Dissipation( $T_C = 25^{\circ}\text{C}$ )	$P_D$	151	W
Single Pulsed Avalanche Energy <sup>(Note 3)</sup>	$E_{AS}$	480	mJ
Avalanche Current <sup>(Note 2)</sup>	$I_{AR}$	4	A
Repetitive Avalanche Energy <sup>(Note 2)</sup>	$E_{AR}$	0.75	mJ

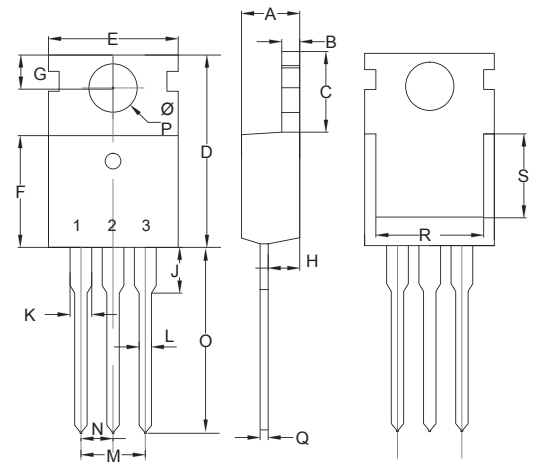
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

**Internal Structure**



**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	$\Phi$
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 Noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	700			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=700V, V_{GS}=0V, T_J=25^\circ C$			1	$\mu A$
		$V_{DS}=700V, V_{GS}=0V, T_J=150^\circ C$			100	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5		4.0	V
Drain-Source On-Resistance <sup>(Note 4)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		0.19	0.21	$\Omega$
Forward Transconductance <sup>(Note 4)</sup>	$g_{FS}$	$V_{DS}=10V, I_D=10A$		18.8		S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		2328		$\mu F$
Output Capacitance	$C_{oss}$			116		
Reverse Transfer Capacitance	$C_{rss}$			7		
Total Gate Charge	$Q_g$	$V_{DD}=480V, V_{GS}=10V, I_D=20A$		46		nC
Gate-Source Charge	$Q_{gs}$			11		
Gate-Drain Charge	$Q_{gd}$			13		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=300V, I_D=20A, R_G=25\Omega$		43		ns
Turn-On Rise Time	$t_r$			14		
Turn-Off Delay Time	$t_{d(off)}$			150		
Turn-Off Fall Time	$t_f$			7		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C=25^\circ C$			20.6	A
Pulsed Diode Forward Current	$I_{SM}$				70	
Body Diode Voltage	$V_{SD}$	$T_J=25^\circ C, I_{SD}=20A, V_{GS}=0V$		0.95	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_R=560V, I_F=I_S, di_F/dt=100A/\mu s$		410		ns
Reverse Recovery Charge	$Q_{rr}$				3.8	$\mu C$
Peak Reverse Recovery Current	$I_{rrm}$				35	A

**Notes**

- Pulse Width limited by maximum junction temperature
- $I_{AS} = 4A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ C$
- Pulse Test: Pulse Width  $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$

**Curve Characteristics**

Fig. 1 - Output Characteristics

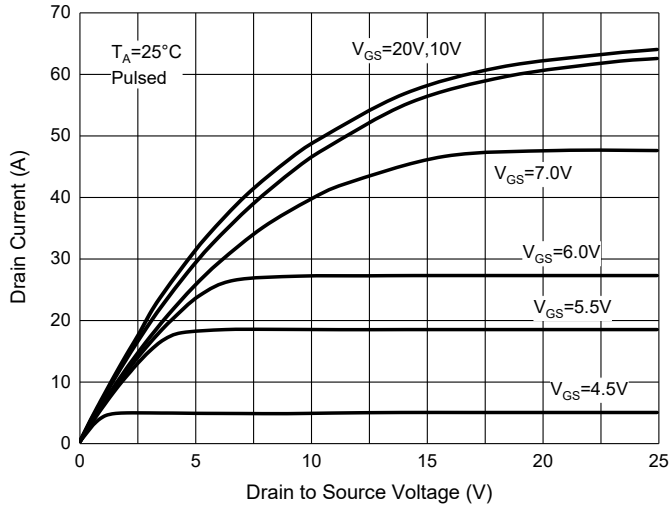


Fig. 2 - Transfer Characteristics

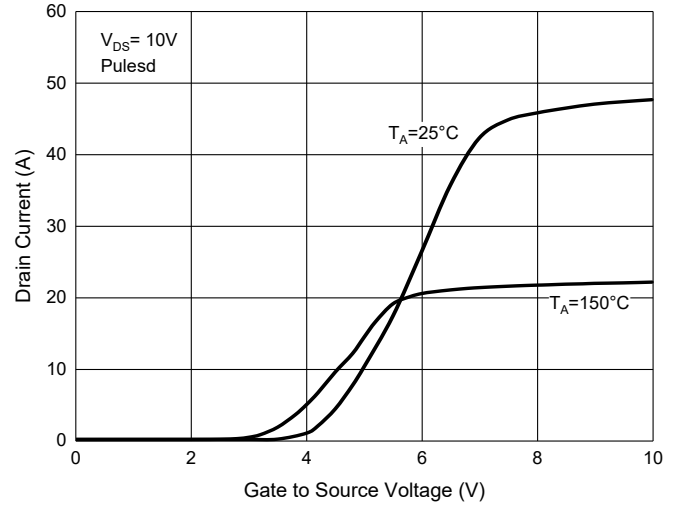


Fig. 3 -  $R_{DS(ON)} - I_D$

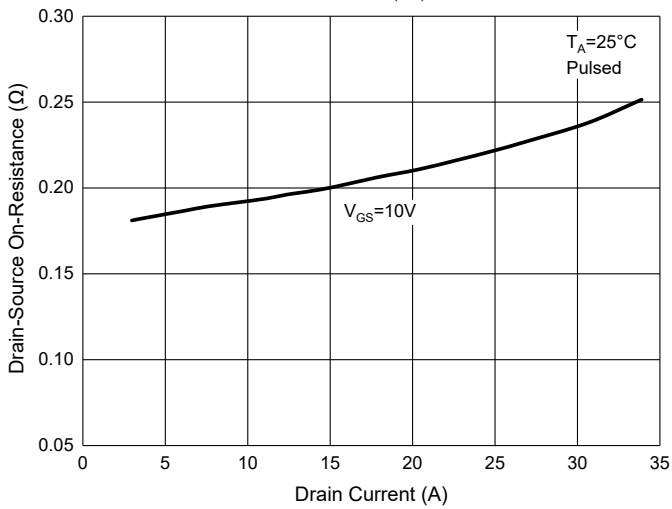


Fig. 4 - Capacitance Characteristics

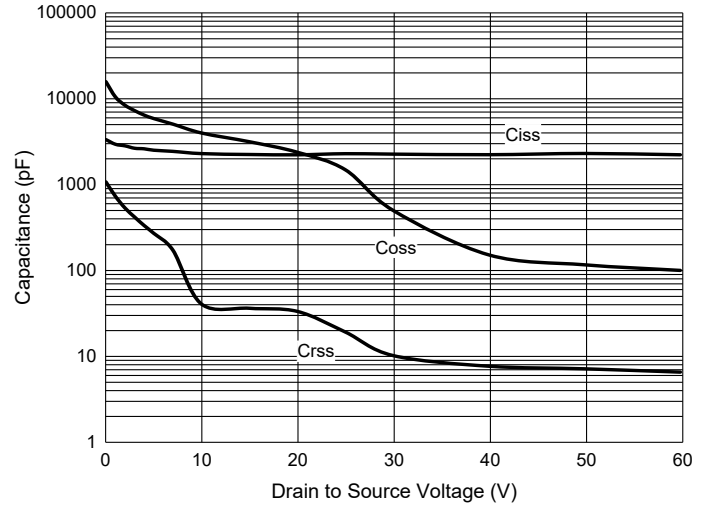


Fig. 5 - Gate Charge

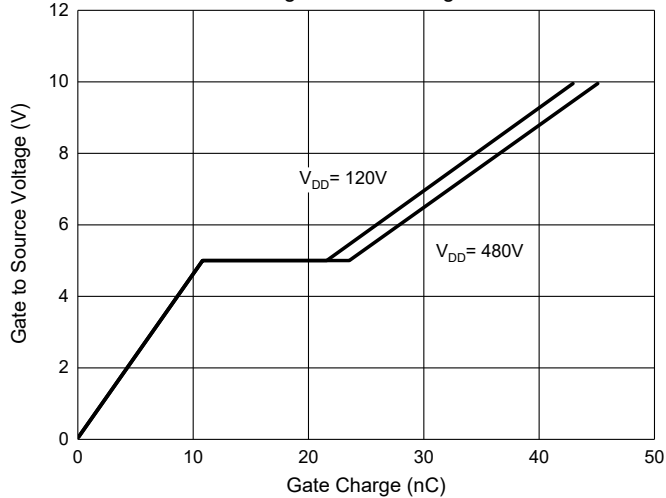
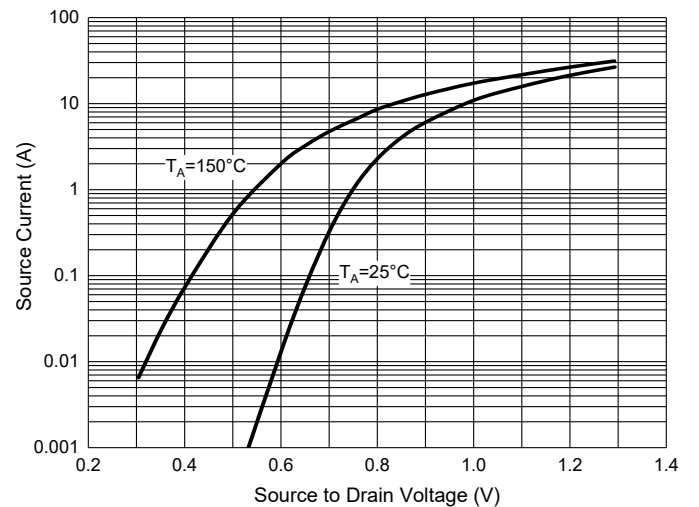


Fig. 6 -  $I_S - V_{SD}$



## Ordering Information

Device	Packing
Part Number-BP	Bulk:1Kpcs/Box

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