

Features

- Very Low FOM $R_{DS(on)} \times Q_g$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

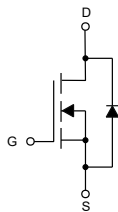
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 62°C/W Junction to Ambient
- Thermal Resistance: 1.6°C/W Junction to Case

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	V_{DS}	650	V	
Gate-Source Voltage	V_{GS}	±30	V	
Continuous Drain Current	I_D	11	A	
Pulsed Drain Current (Note 1)	I_{DM}	33	A	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	211	mJ	
Avalanche Current (Note 1)	I_{AR}	1.6	A	
Repetitive Avalanche Energy (Note 1)	E_{AR}	0.32	mJ	
Total Power Dissipation	$T_C=25^\circ C$	P_D	78	W

Note: 1. Repetitive Rating, Pulse Width Limited by Maximum Junction Temperature.

2. $I_{AS}=1.6A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$.

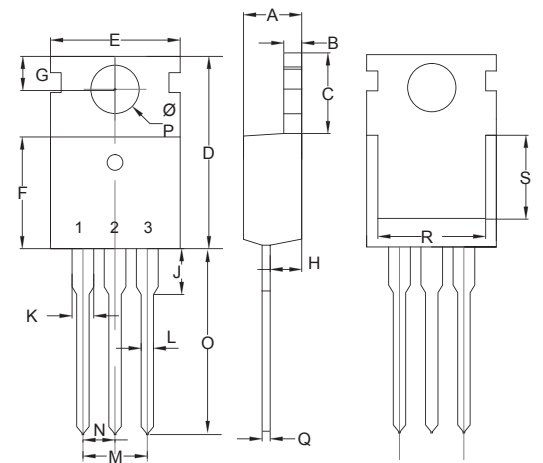
Internal Structure



1. Gate
2. Drain
3. Source

**N-CHANNEL
Super-Junction
Power 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	
Static Characteristics							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V	
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$			± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			1	μA	
		$V_{DS}=650V, V_{GS}=0V, T_J=150^\circ C$			100		
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5		4	V	
Drain-Source On-Resistance ^(Note 3)	$R_{DS(on)}$	$V_{GS}=10V, I_D=5.5A$		0.34	0.38	Ω	
Forward transconductance ^(Note 3)	g_{FS}	$V_{DS}=10V, I_D=5.5A$		7.8		S	
Dynamic Characteristics^(Note 4)							
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		901		μF	
Output Capacitance	C_{oss}			50			
Reverse Transfer Capacitance	C_{rss}			5.5			
Total Gate Charge	Q_g	$V_{DD}=520V, V_{GS}=10V, I_D=11A$		21		nC	
Gate-Source Charge	Q_{gs}			4.5			
Gate-Drain Charge	Q_{gd}			7			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=400V, I_D=11A, R_G=25\Omega$		41		ns	
Turn-On Rise Time	t_r			20			
Turn-Off Delay Time	$t_{d(off)}$			123			
Turn-Off Fall Time	t_f			6.4			
Drain-Source Body Diode Characteristics							
Continuous Body Diode Current	I_S	$T_C=25^\circ C$			9.2	A	
Pulsed Diode Forward Current	I_{SM}				29		
Body Diode Voltage	V_{SD}	$I_{SD}=11A, V_{GS}=0V$		0.9	1.2	V	
Reverse Recovery Time	t_{rr}	$V_R=520V, I_F=I_S, di_F/dt=100A/\mu s$		280		ns	
Reverse Recovery Charge	Q_{rr}				2.8		μC
Peak Reverse Recovery Current	I_{rrm}				17		A

Note 3. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1\%$.

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

Curve Characteristics

Fig. 1 - Typical Output Characteristics

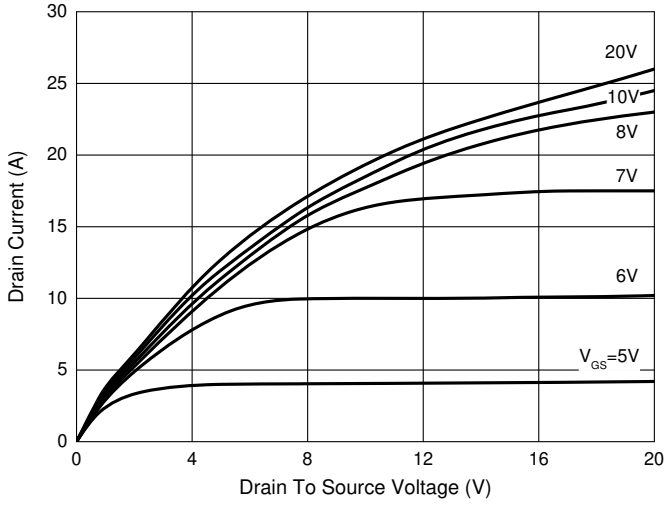


Fig. 2 - Transfer Characteristics

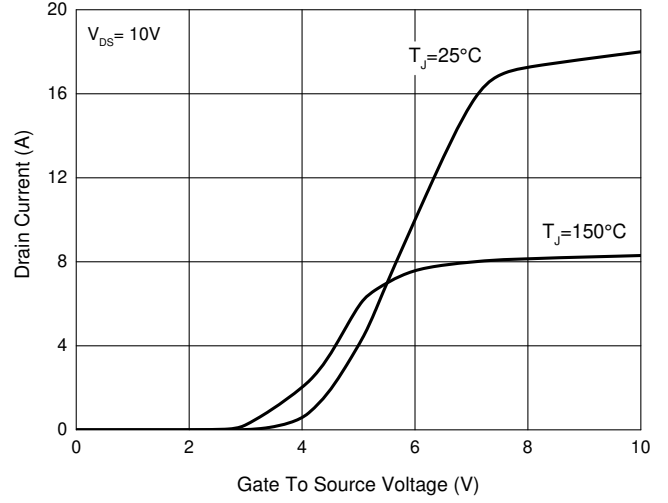


Fig. 3 - $R_{DS(ON)} - I_D$

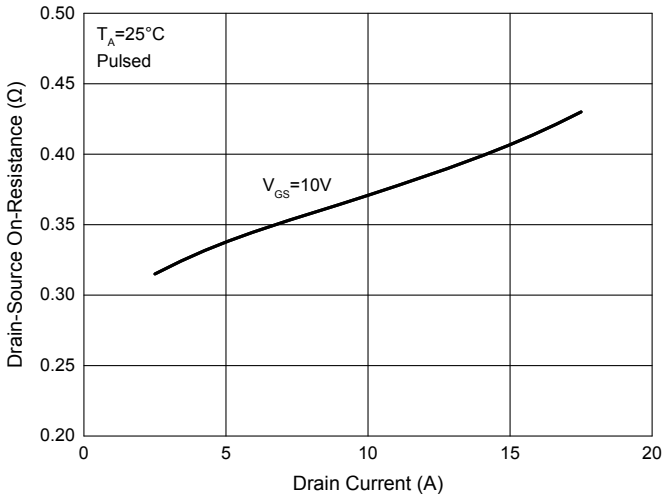


Fig. 4 - Capacitance Characteristics

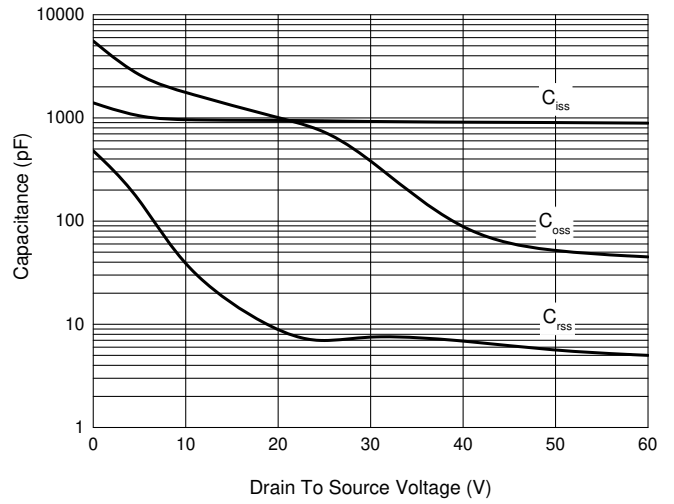


Fig. 5 - Total Gate Charge Characteristics

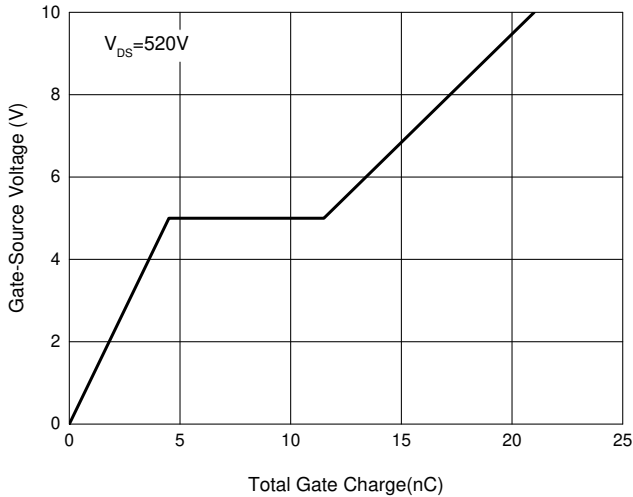
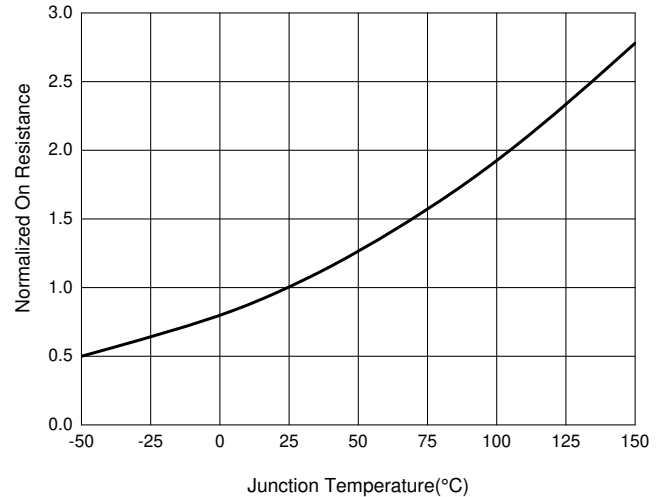


Fig. 6 - Normalized On Resistance Characteristics



Ordering Information

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

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-BP-HF

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