

Features

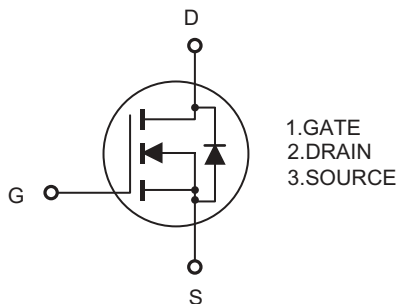
- High Current Rating
- Lower $R_{DS(ON)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter V_{SD} Specifications
- Avalanche Energy Specified
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free Available Upon Request By Adding Suffix "-HF"

Maximum Ratings

- Operating Junction Temperature Range: -55°C to $+150^{\circ}\text{C}$
- Storage Temperature Range: -55°C to $+150^{\circ}\text{C}$
- Thermal Resistance: 62.5°C/W Junction to Ambient

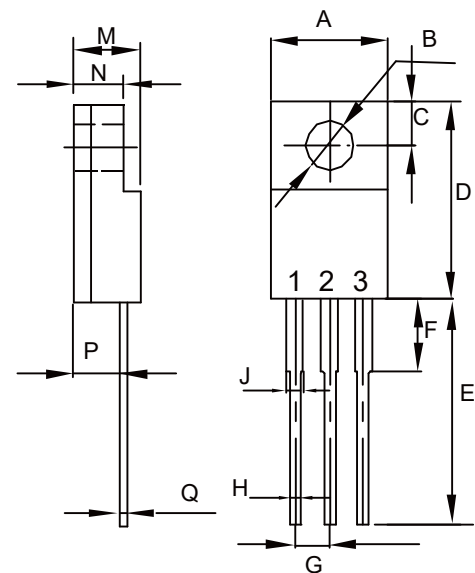
Parameter	Symbol	Rating	Unit
Drain -Source Voltage	V_{DS}	650	V
Gate -Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous	I_D	4.0	A
Drain Current-Pulse	I_{DM}	16	A
Power Dissipation	P_D	2.0	W
Single Pulsed Avalanche Energy ^(note 1)	E_{AS}	80	mJ
Maximum Lead Temperature for Soldering Purposes, 1/8" from Case for 5 Seconds	T_L	260	$^{\circ}\text{C}$

Internal Structure



**N-Channel
Enhancement Mode
Field Effect Transistor**

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	

Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Diode Forward Voltage ^(note2)	V_{SD}	$V_{GS}=0V, I_S=4.0A$			1.5	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$			25	μA
Gate-Body Leakage Current, Forward ^(note2)	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$			100	nA
Gate-Body Leakage Current, Reverse ^(note2)	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$			-100	
On Characteristics(note2)						
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A$			3	Ω
Dynamic Characteristics(note 3)						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$			760	pF
Output Capacitance	C_{oss}				180	
Reverse Transfer Capacitance	C_{riss}				20	
Switching characteristics						
Total Gate Charge	Q_g	$V_{DS}=480V, V_{GS}=10V, I_D=4A$		5.0	10	nC
Gate-Source Charge	Q_{gs}			2.7		
Gate-Drain Charge	Q_{gd}			2.0		
Turn-On Delay Time(note 3)	$t_{d(on)}$	$V_{DD}=300V, V_{GS}=10V, R_G=9.1\Omega, I_D=4.0A$			20	ns
Turn-On Rise Time(note 3)	t_r				10	
Turn-Off Delay Time(note 3)	$t_{d(off)}$				40	
Turn-Off Fall Time(note 3)	t_f				20	

Notes:

1. $L=10mH, I_L=4A, V_{DD}=50V, V_{GS}=10V, R_G=25\Omega, \text{Starting } T_J=25^\circ C.$
2. Pulse Test : Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. These parameters have no way to verify.

Curve Characteristics

Fig. 1 - Output Characteristics

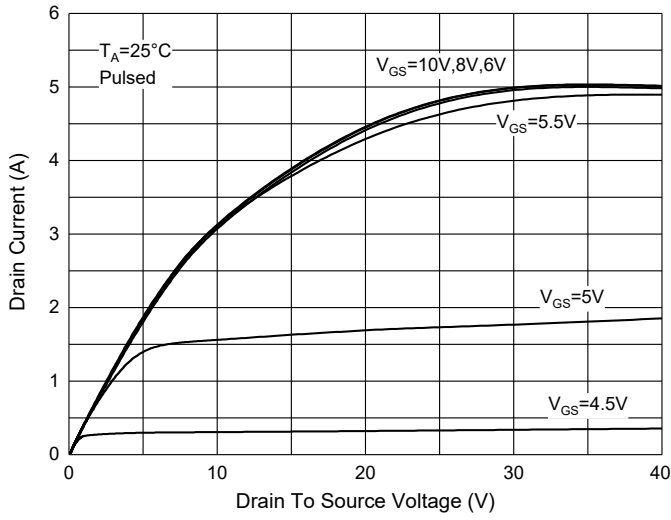


Fig. 2 - Transfer Characteristics

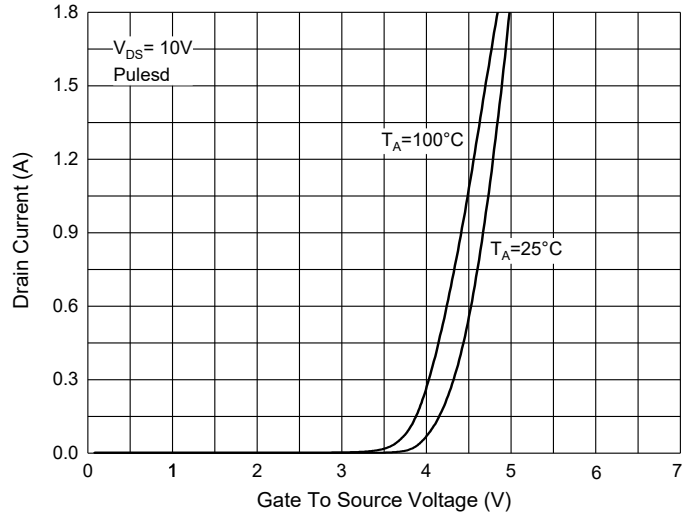


Fig. 3 - $R_{DS(ON)} - I_D$

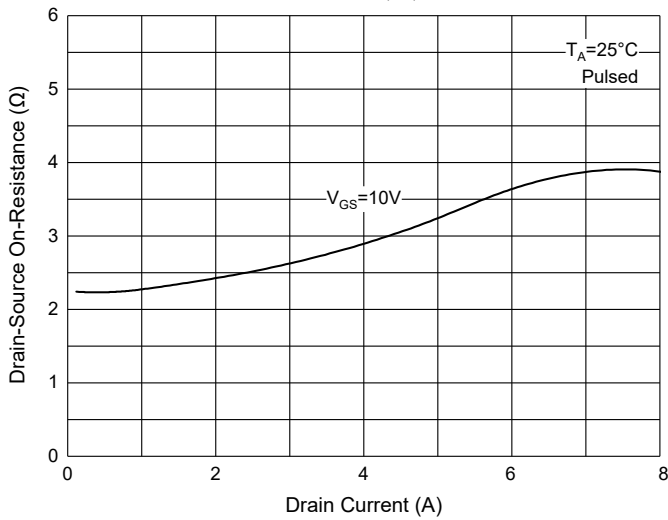


Fig. 4 - $R_{DS(ON)} - V_{GS}$

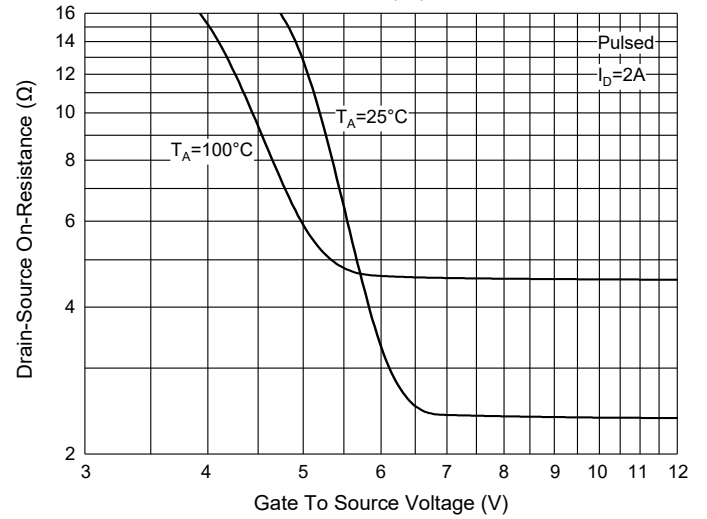


Fig. 5 - $I_S - V_{SD}$

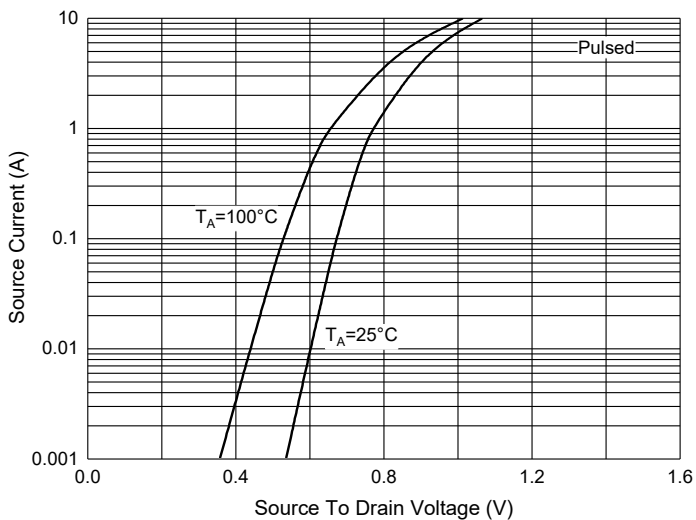
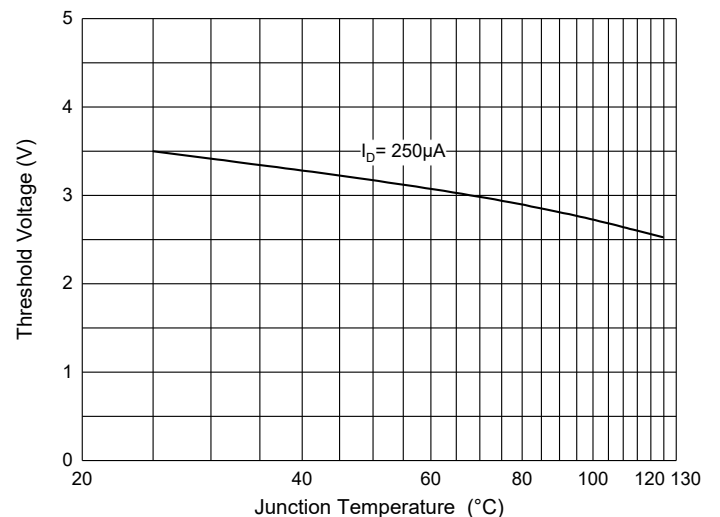


Fig. 6 - Threshold Voltage



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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