

Features

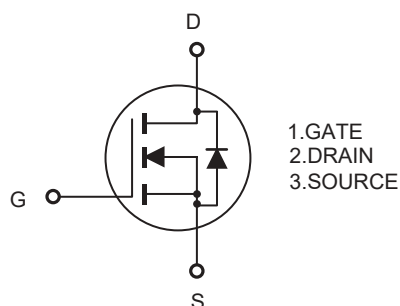
- High Current Rating
- Lower $R_{DS(ON)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter V_{SD} Specifications
- Avalanche Energy Specified
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"

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

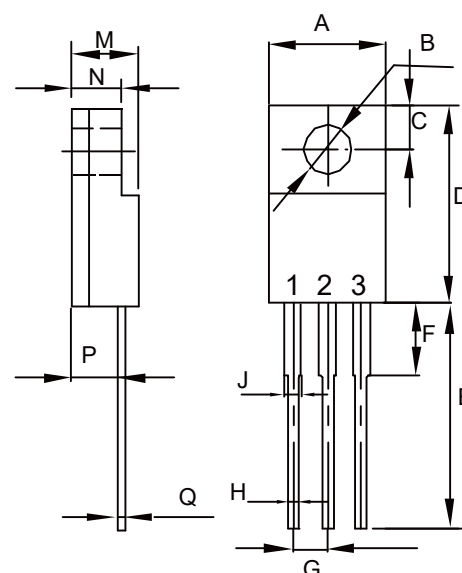
Parameter	Symbol	Rating	Unit
Drain -Source Voltage	V_{DS}	650	V
Gate -Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous	I_D	12.0	A
Drain Current-Pulse ^(Note 4)	I_{DM}	48	A
Power Dissipation	P_D	2.0	W
Single Pulsed Avalanche Energy ^(note 1)	E_{AS}	540	mJ
Maximum Lead Temperature for Soldering Purposes, 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 =250μA	650			V
Drain-Source Diode Forward Voltage ^(note2)	V _{SD}	V _{GS} =0V, I _S =12.0A			1.4	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V			1.0	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 =250μA	2.0	3.5	4.0	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =6A		0.7	0.85	Ω
Dynamic Characteristics(note 3)						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V,f=1MHz		1800		pF
Output Capacitance	C _{oss}			200		
Reverse Transfer Capacitance	C _{rss}			25		
Switching characteristics(note2,3,4)						
Total Gate Charge	Q _g	V _{DS} =520V,V _{GS} =10V,I _D =12A		42	5	nC
Gate-Source Charge	Q _{gs}			8.6		
Gate-Drain Charge	Q _{gd}			21		
Turn-On Delay Time(note 3)	t _{d(on)}	V _{DD} =325V,V _{GS} =10V, R _G =25Ω,I _D =12.0A		30		ns
Turn-On Rise Time(note 3)	t _r			90		
Turn-Off Delay Time(note 3)	t _{d(off)}			160		
Turn-Off Fall Time(note 3)	t _f			90		
Drain-Source Diode Characteristics						
Maximum Continuous Drain-source Diode Forward Current	I _S				12	A
Maximum Pulsed Drain-source Diode Forward Current	I _{SM}				48	A

Notes:

1. $L=7.5mH, I_L=12A, V_{DD}=50V, R_G=25\Omega$, 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.
4. Pulse width limited by maximum junction temperature

Curve Characteristics

Fig. 1 - Output Characteristics

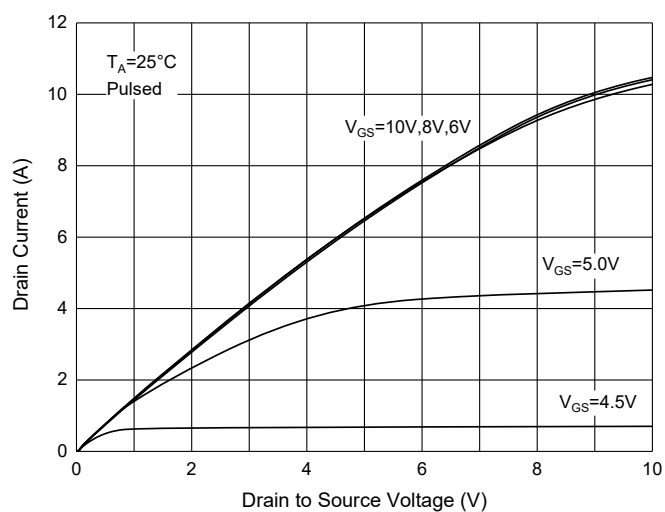


Fig. 2 - Transfer Characteristics

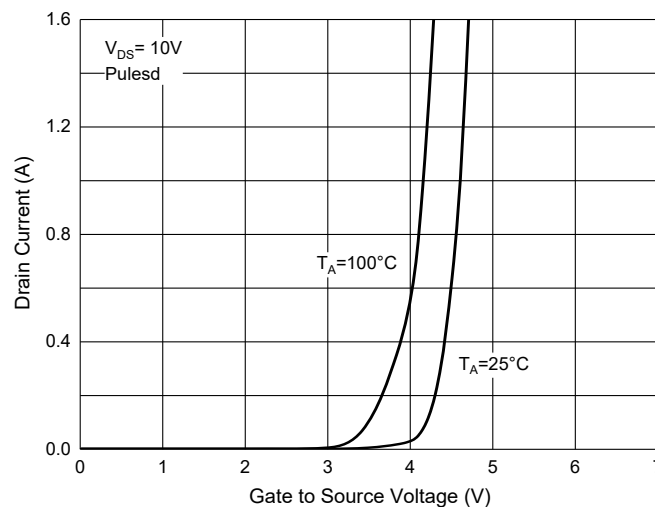


Fig. 3 - $R_{DS(ON)} - I_D$

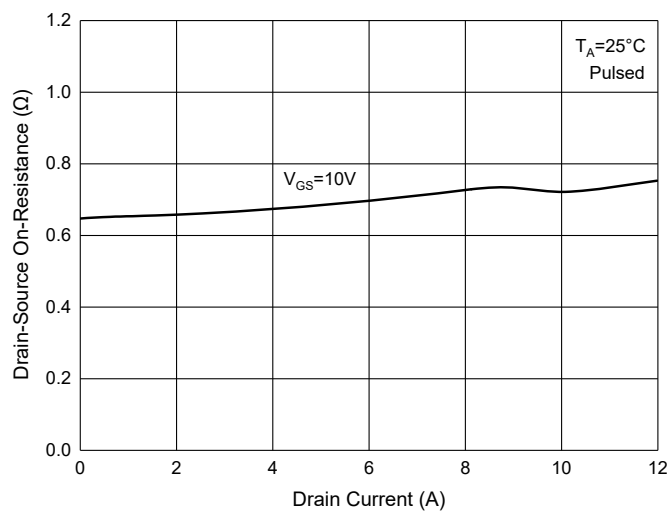


Fig. 4 - $R_{DS(ON)} - V_{GS}$

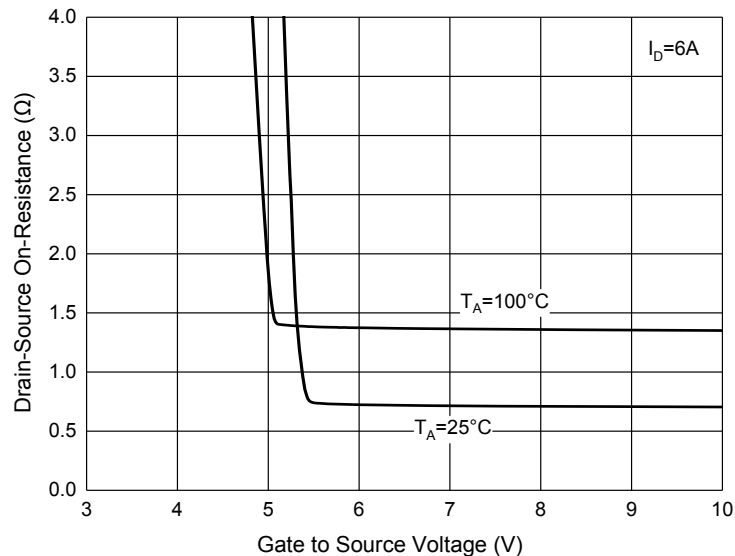


Fig. 5 - $I_S - V_{SD}$

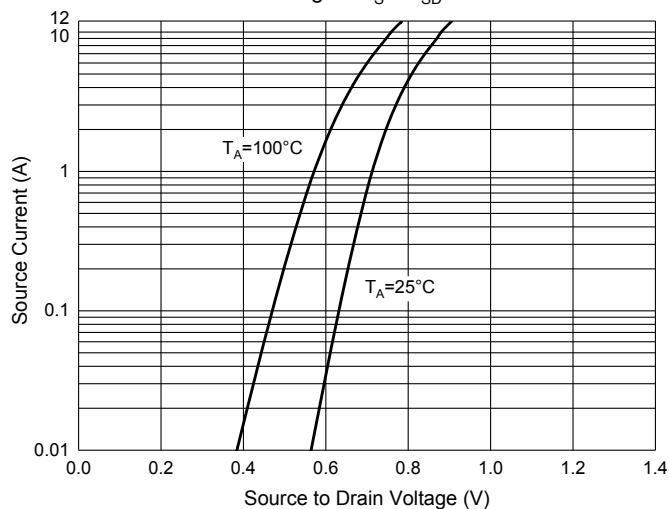
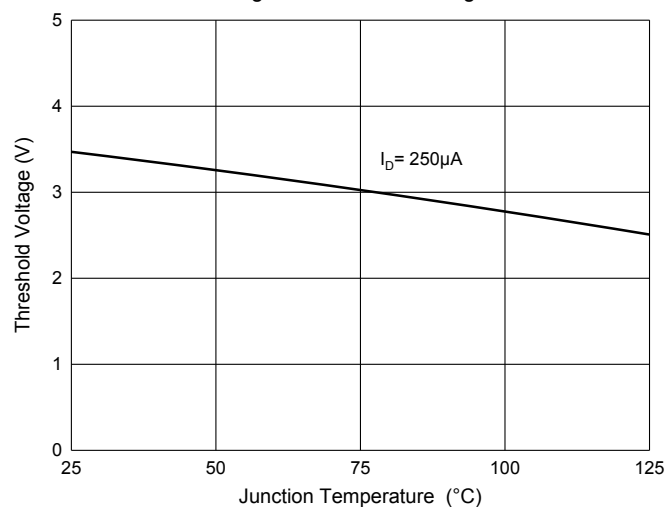


Fig. 6 - Threshold Voltage



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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