

### Features

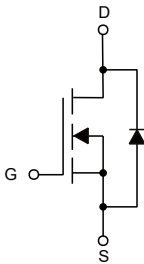
- High Current Rating
- Lower  $R_{DS(ON)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter  $V_{SD}$  Specifications
- Avalanche Energy Specified
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free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

### 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:  $100^{\circ}\text{C/W}$  Junction to Ambient

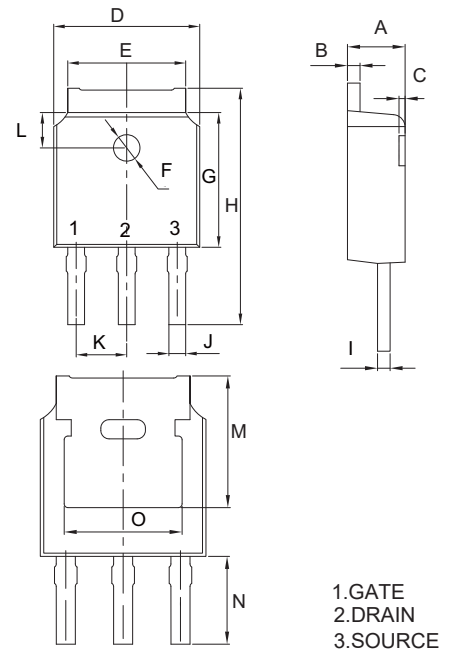
Parameter	Symbol	Rating	Unit
Drain -Source Voltage	$V_{DS}$	600	V
Gate -Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous	$I_D$	4.0	A
Continuous Drain-Source Diode Forward Current	$I_S$	4.0	A
Single Pulsed Avalanche Energy <sup>(Note1)</sup>	$E_{AS}$	260	mJ

### Internal Structure



## N-CHANNEL MOSFET

### TO-251S



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.087	0.094	2.20	2.40	
B	0.018	0.023	0.46	0.58	
C	0.000	0.012	0.00	0.30	
D	0.256	0.264	6.50	6.70	
E	0.201	0.215	5.10	5.46	
F	0.043	0.051	1.10	1.30	$\phi$
G	0.236	0.244	6.00	6.20	
H	0.409	0.433	10.40	11.00	
I	0.018	0.023	0.46	0.58	
J	0.026	0.034	0.66	0.86	
K	0.086	0.094	2.19	2.39	
L	0.063		1.60		REF.
M	0.211		5.35		REF.
N	0.138		3.50		REF.
O	0.190		4.83		REF.

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	600			V
Gate-Threshold Voltage <sup>(Note2)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Gate-Body Leakage Current <sup>(Note2)</sup>	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 600V, V_{GS} = 0V$			25	$\mu A$
Drain-Source On-Resistance <sup>(Note2)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A$		2	3	$\Omega$
Drain- Source Diode Forward Voltage <sup>(Note2)</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 4A$			1.5	V
Forward Transconductance <sup>(Note2)</sup>	$g_{fs}$	$V_{DS}=50V, I_D=2A$	2.0	2.6		S
<b>Dynamic Characteristics</b>						
Input Capacitance <sup>(Note3)</sup>	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		540	760	pF
Output Capacitance <sup>(Note3)</sup>	$C_{oss}$		125	180		
Reverse Transfer Capacitance <sup>(Note3)</sup>	$C_{rss}$		8	20		
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=480V, V_{GS}=10V, I_D=4A$		5	10	nC
Gate-Source Charge	$Q_{gs}$		2.7			
Gate-Drain Charge	$Q_{gd}$		2			
Turn-on Delay Time <sup>(Note3)</sup>	$t_{d(on)}$	$V_{DD}=300V, V_{GS}=10V, R_G=9.1\Omega, I_D=4A$		12	20	ns
Turn-on Rise Time <sup>(Note3)</sup>	$t_r$		7	10		
Turn-off Delay Time <sup>(Note3)</sup>	$t_{d(off)}$		19	40		
Turn-off Fall Time <sup>(Note3)</sup>	$t_f$		10	20		

 Note: 1.  $L=30mH, I_L=4A, V_{DD}=100V, V_{GS}=10V, R_G=25\Omega, \text{Starting } T_J=25^\circ C$ 

 2. Pulse Test : Pulse Width  $\leq 300\mu s, \text{ Duty Cycle } \leq 2\%$ 

3. These Parameters Have No Way to Verify

**Curve Characteristics**

Fig. 1 - Output Characteristics

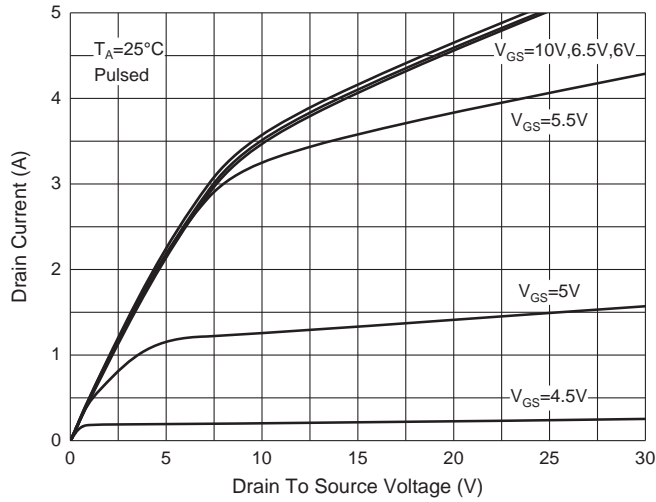


Fig. 2 - Transfer Characteristics

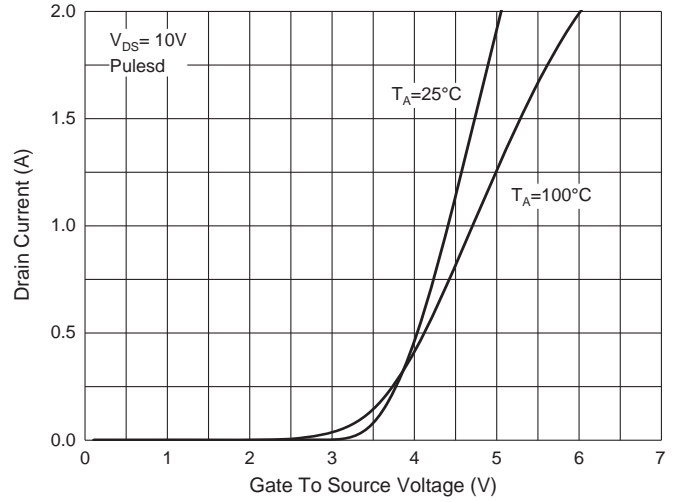


Fig. 3 -  $R_{DS(ON)} - I_D$

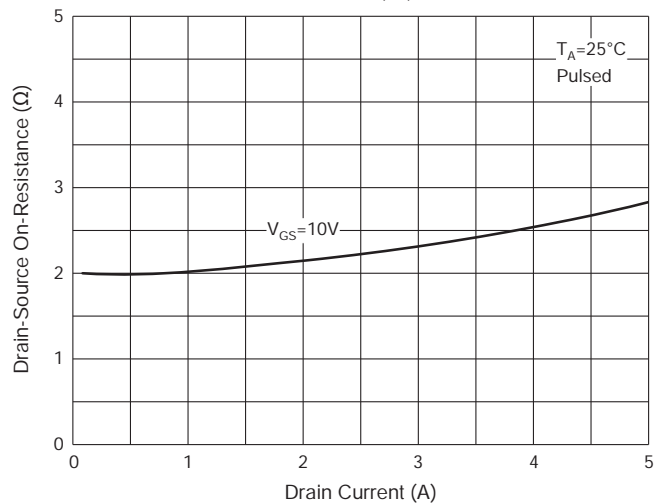


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

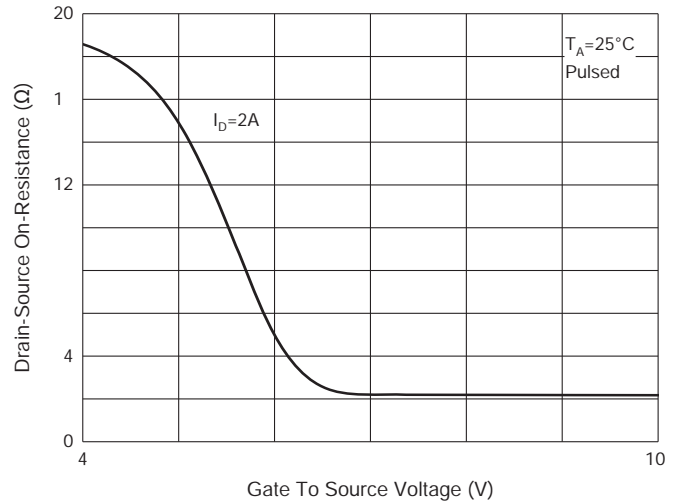


Fig. 5 -  $I_S - V_{SD}$

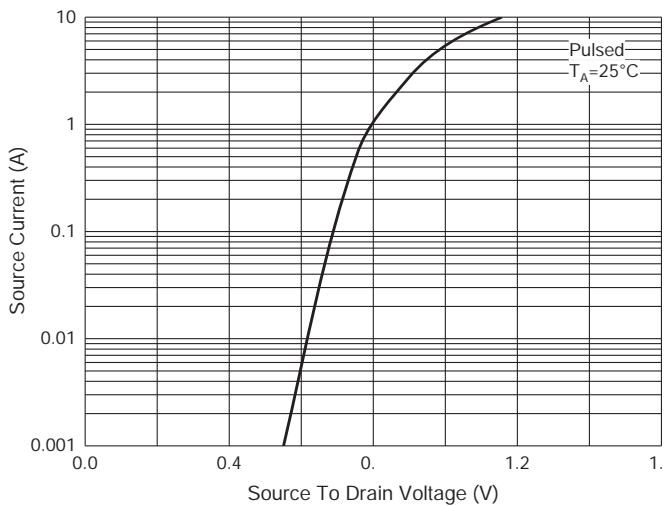
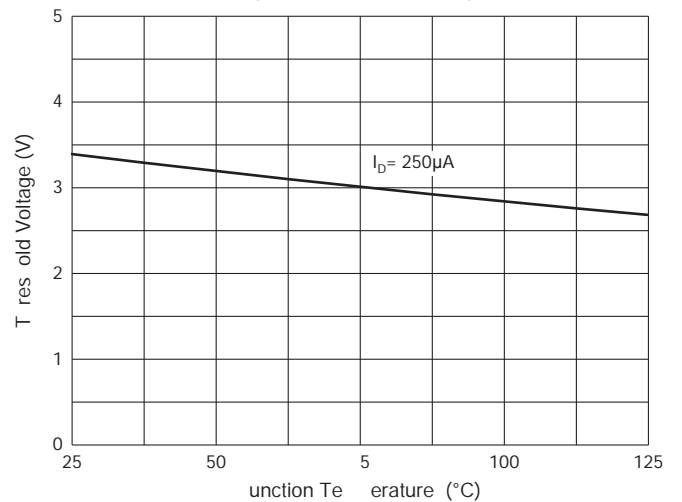


Fig. 6 -  $T_{res} - V_{GS}$



## Ordering Information

Device	Packing
Part Number-BP	Bulk:4Kpcs/Box

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

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