

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

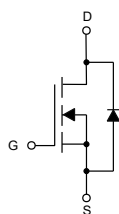
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 80°C/W Junction to Ambient
- Thermal Resistance: 4°C/W Junction to Case

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	$T_C=25^\circ\text{C}$ P_D	31.3	W

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

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

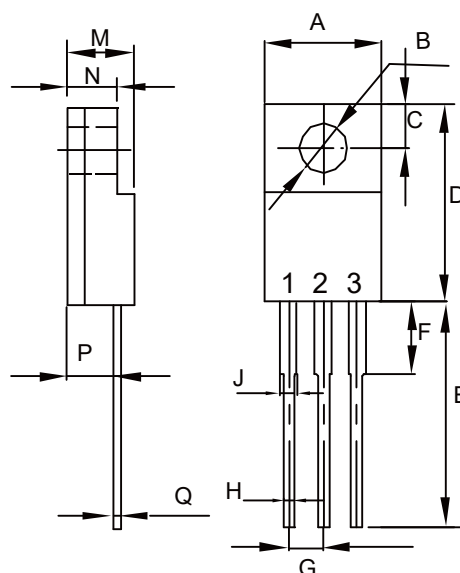
Internal Structure



1. Gate
2. Drain
3. Source

N-CHANNEL Super-Junction Power MOSFET

TO-220F



DIMENSIONS					
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 Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	650			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±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°C			100	
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	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 tranconductance ^(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		pF
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 =25Ω		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°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/μs		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

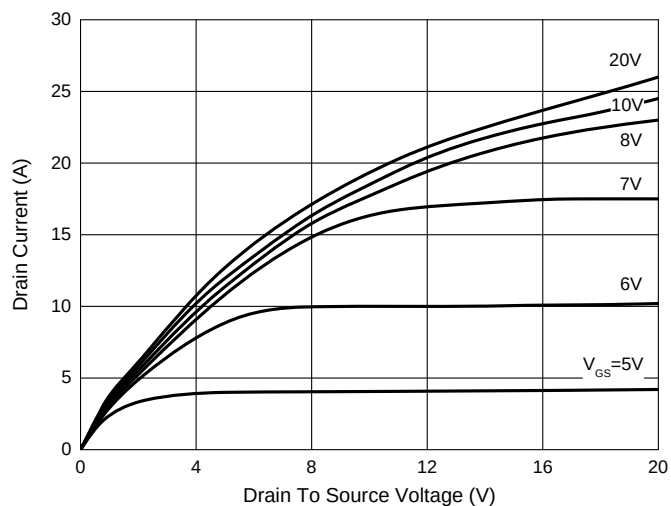


Fig. 2 - Transfer Characteristics

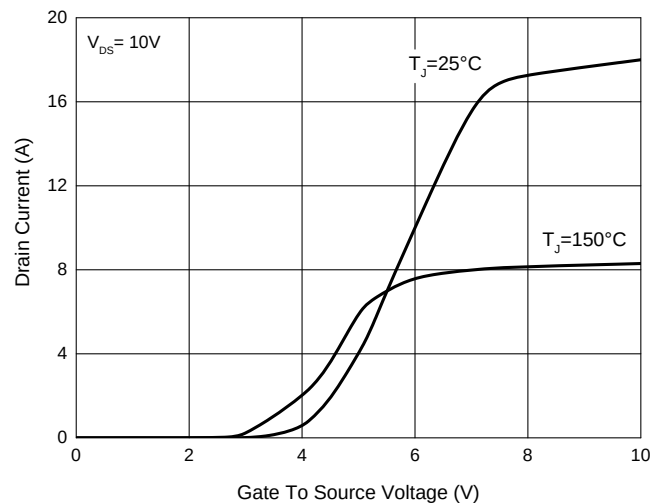


Fig. 3 - $R_{DS(ON)} - I_D$

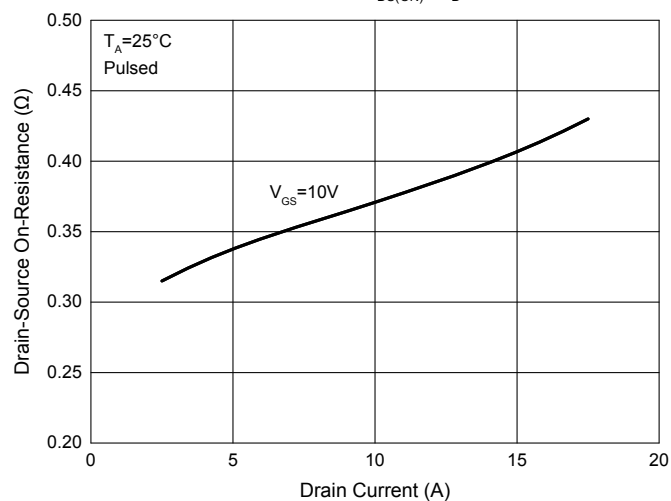


Fig. 4 - Capacitance Characteristics

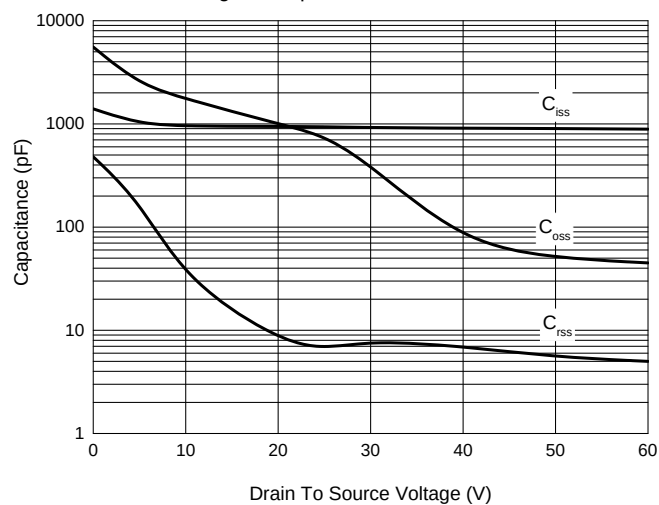


Fig. 5 - Total Gate Charge Characteristics

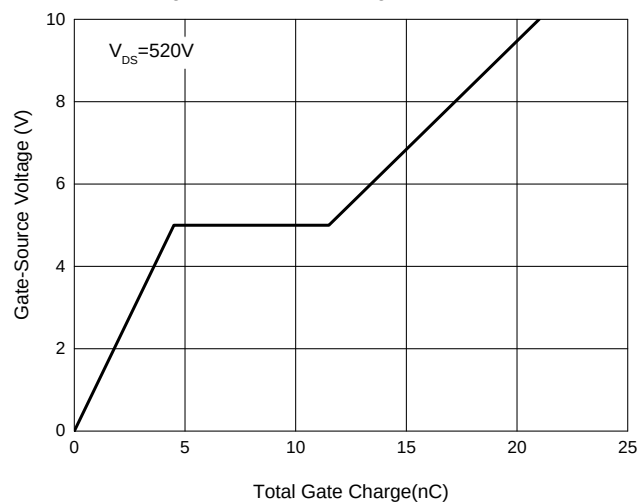


Fig. 6 - Normalized On Resistance Characteristics

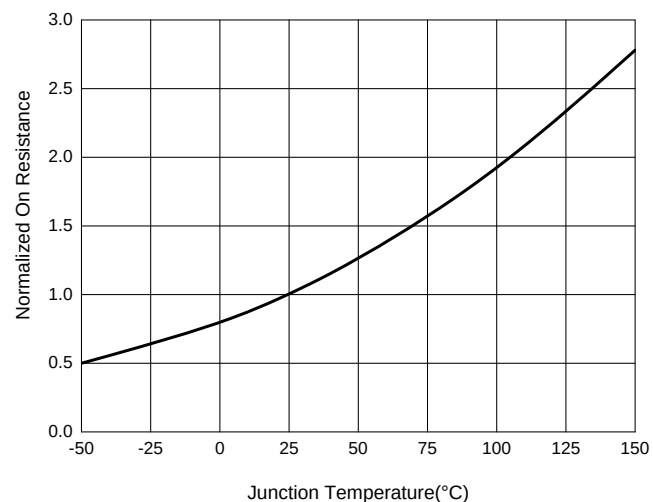


Fig.7- Drain-Source Breakdown Voltage Characteristics

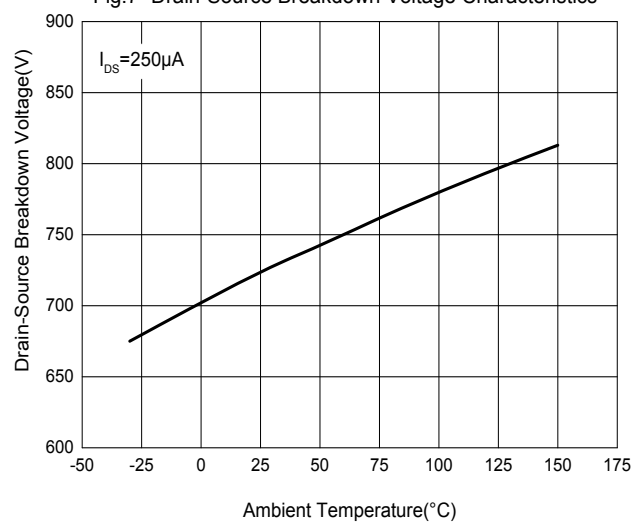
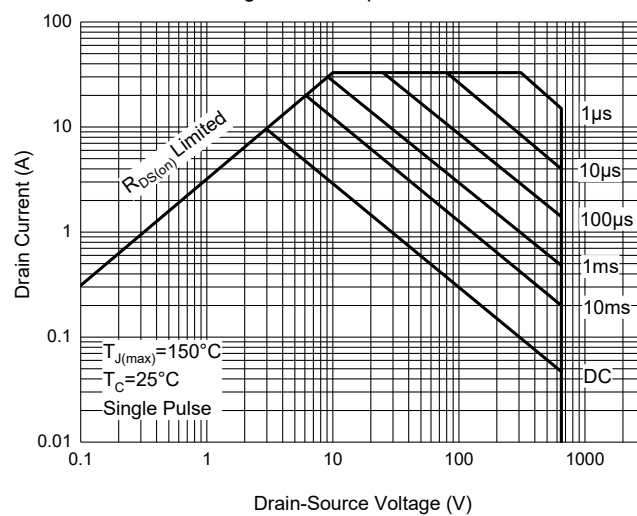


Fig. 8 - Safe Operation Area



Ordering Information

Device	Packing
Part Number-BP	Bulk:50pcs/Tube, 1Kpcs/Box, 5Kpcs/Carton

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

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