

Features

- Very Low FOM $R_{DS(on)} \times Q_g$
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

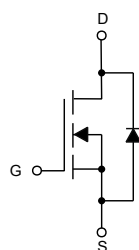
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 62.5°C/W Junction to Ambient (Note 2)
- Thermal Resistance: 3.2°C/W Junction to Case

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V _{DS}	650	V
Gate-Source Voltage		V _{GS}	±30	V
Continuous Drain Current	T _C =25°C	I _D	20	A
	T _C =100°C		13	
Pulsed Drain Current ^(Note 3)		I _{DM}	80	A
Total Power Dissipation ^(Note 4)		P _D	39	W
Single Pulsed Avalanche Energy ^(Note 5)		E _{AS}	303	mJ

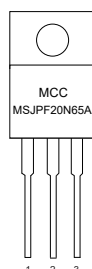
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
3. Repetitive rating; pulse width limited by max. junction temperature.
4. P_D is based on max. junction temperature, using junction-case thermal resistance.
5. $T_J=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, $L=30\text{mH}$.

Internal Structure and Marking Code

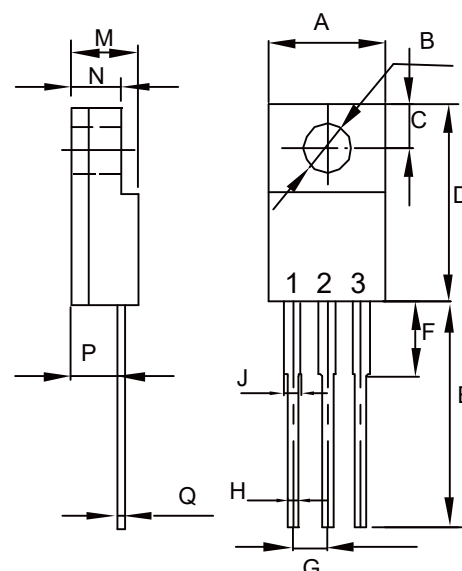


1. Gate
2. Drain
3. Source



N-CHANNEL Super-Junction Power MOSFET

TO-220F



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.381	0.406	9.70	10.30	
B	0.118	0.138	3.00	3.50	Φ
C	0.124	0.139	3.15	3.55	
D	0.610	0.634	15.50	16.10	
E	0.496	0.535	12.60	13.60	
F	0.134	0.150	3.40	3.80	
G	0.092	0.108	2.34	2.74	
H	0.027	0.035	0.70	0.90	
J	0.044	0.056	1.12	1.42	
M	0.173	0.193	4.40	4.90	
N	0.098	0.114	2.50	2.90	
P	0.085	0.100	2.15	2.55	
Q	0.016	0.024	0.40	0.60	

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, T _C =25°C			1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3.5	4	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A		167	190	mΩ
Gate Resistance	R _g	f = 1.0MHz,Open Drain		2.2		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				20	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse Recovery Time	t _{rr}	I _F =20A, dI _F /dt=100A/μs		365		ns
Reverse Recovery Charge	Q _{rr}			6067		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =50V,V _{GS} =0V,f=1MHz		1750		pF
Output Capacitance	C _{oss}			583		
Reverse Transfer Capacitance	C _{rss}			16		
Total Gate Charge	Q _g	V _{DS} =560V,V _{GS} =10V,I _D =20A		55		nC
Gate-Source Charge	Q _{gs}			9.6		
Gate-Drain Charge	Q _{gd}			25		
Turn-On Delay Time	t _{d(on)}	V _{DD} =350V, V _{GEN} =10V, R _G =25Ω, I _{DS} =20A		32		ns
Turn-On Rise Time	t _r			61		
Turn-Off Delay Time	t _{d(off)}			174		
Turn-Off Fall Time	t _f			55		

Curve Characteristics

Fig. 1 Typical Output Characteristics

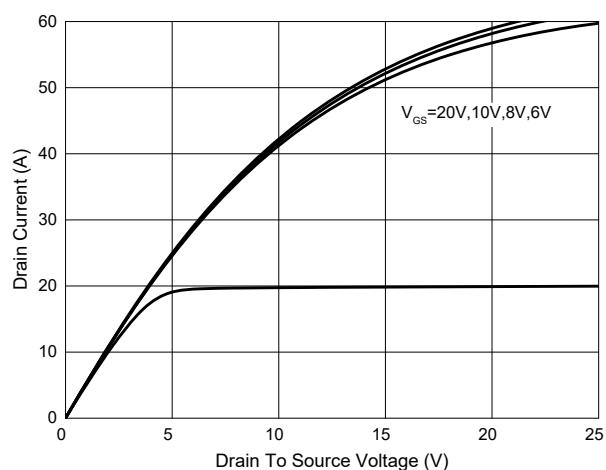


Fig. 2 - Transfer Characteristics

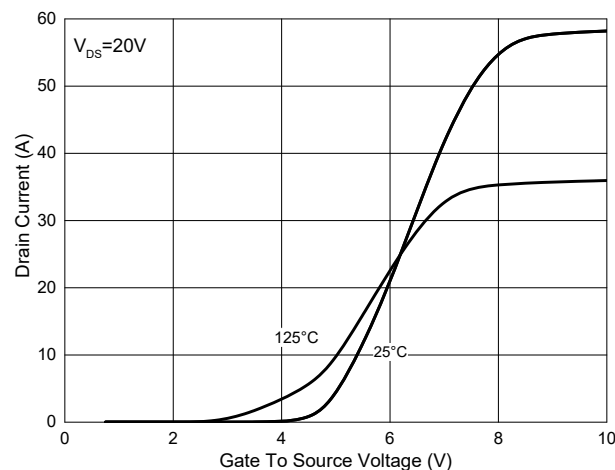


Fig.3 Rdson-Vgs

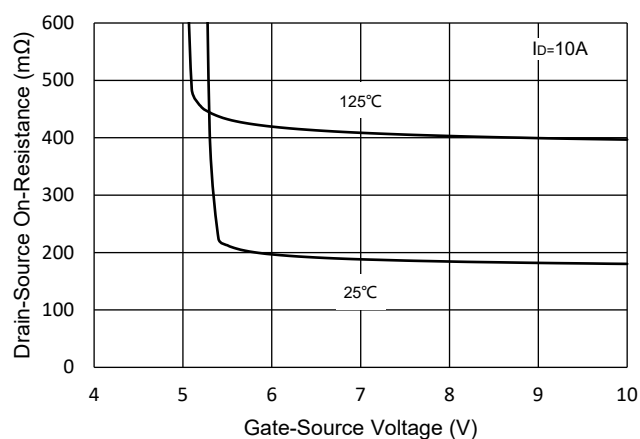


Fig.4 RDS(ON)-ID

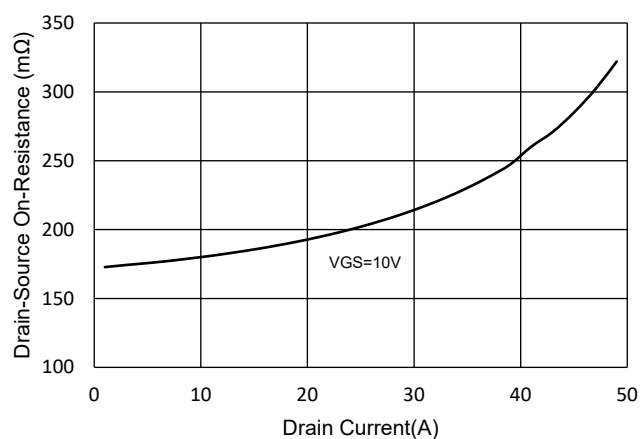


Fig.5 Capacitance Characteristics

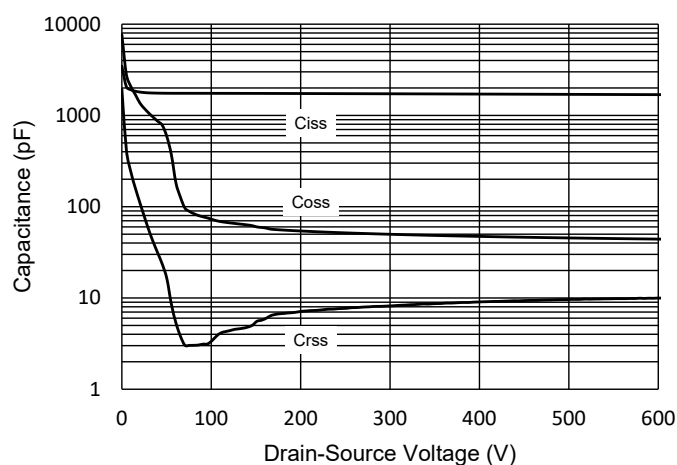
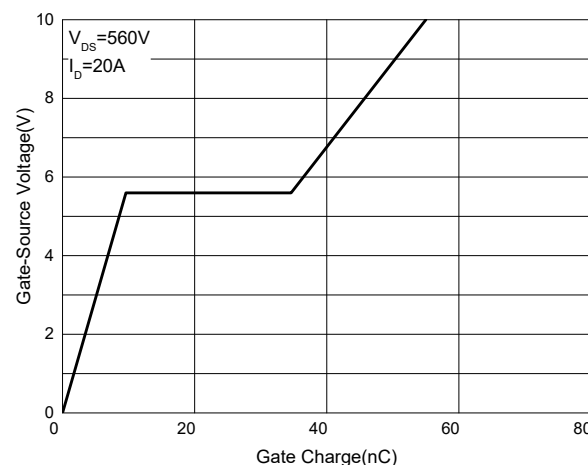


Fig. 6 - Gate Charge



Curve Characteristics

Fig.7 Normalized Threshold Voltage

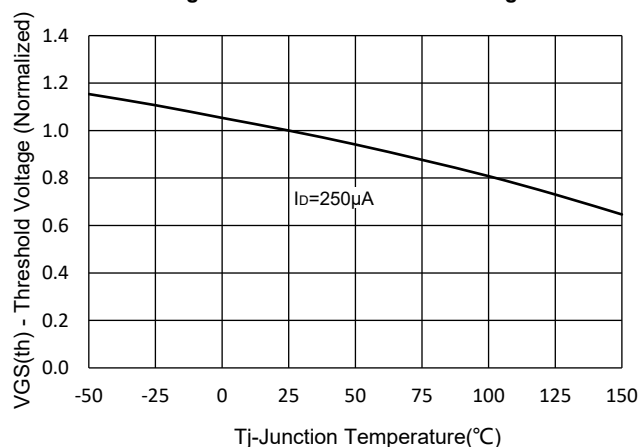


Fig.8 Normalized On Resistance Characteristics

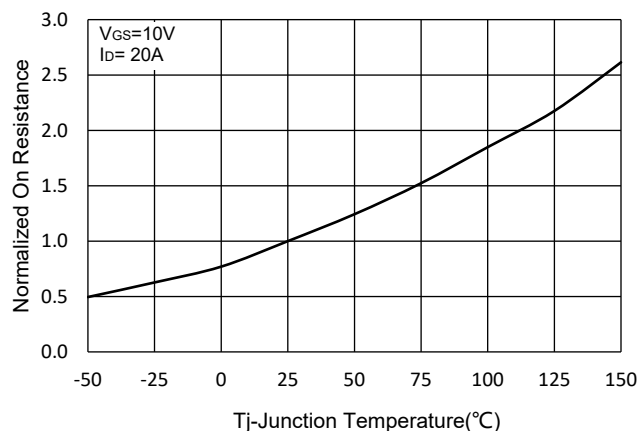


Fig.9 IS-VSD

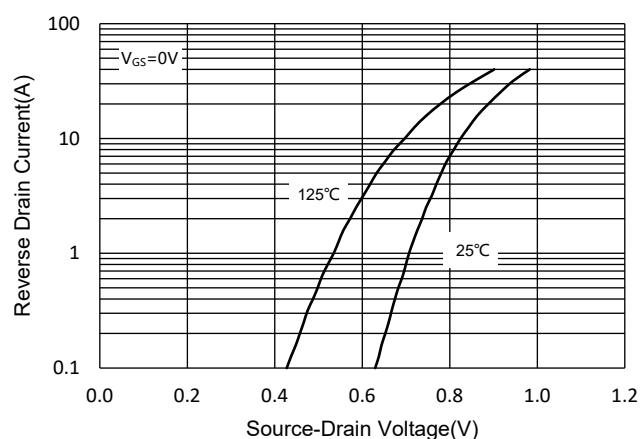


Fig. 10 - Drain Current

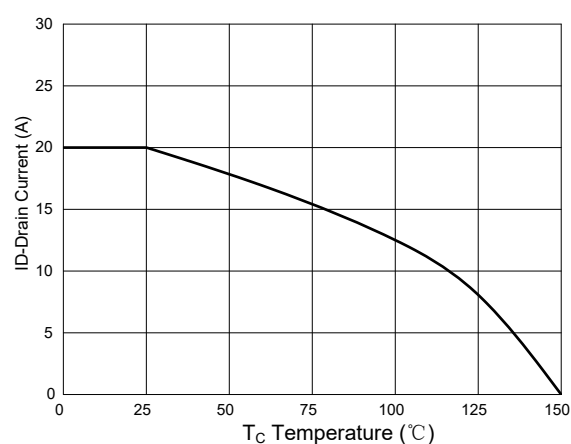
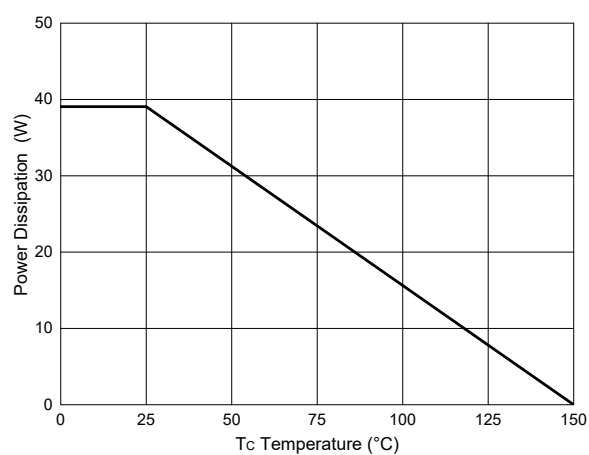


Fig.11 Power Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

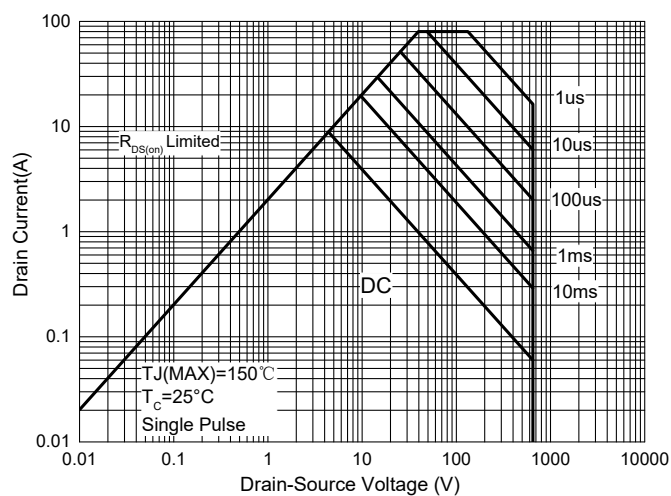
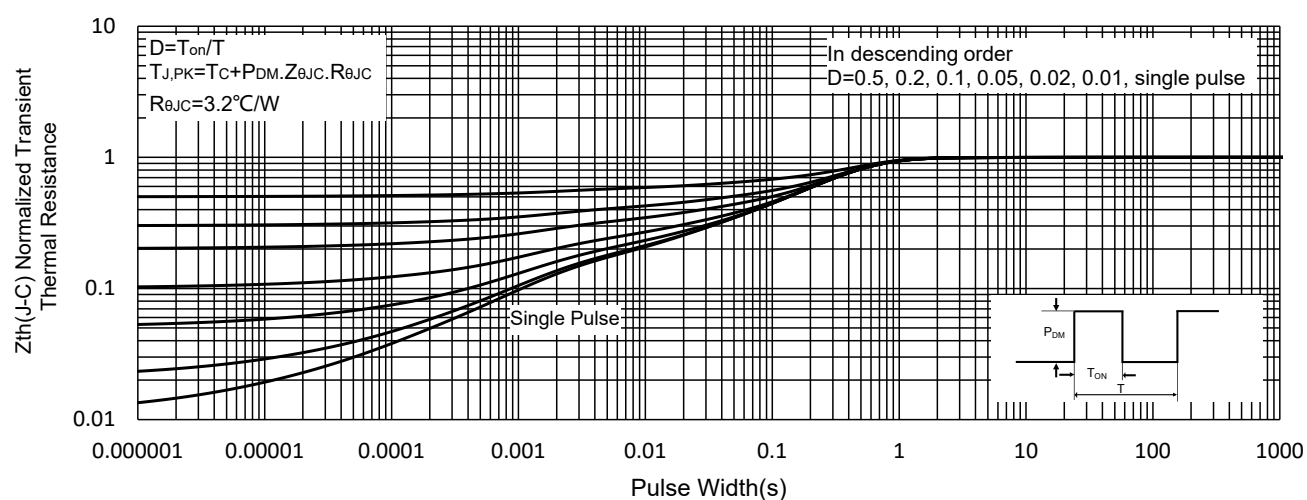


Fig.13 Normalized Transient Thermal Impedance



Ordering Information

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

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