Features

- Very Low FOM $R_{DS(on)}$×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)

N-CHANNEL Super-Junction Power MOSFET

Maximum Ratings

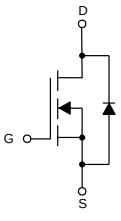
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 75°C/W Junction to Ambient(Note2)
- Thermal Resistance: 4.0°C/W Junction to Case

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Volltage		V_{GS}	±30	V
Continuous Drain Current	T_C=25°C	I_D	11	A
	T_C=100°C		7	
Pulsed Drain Current(Note3)		I_{DM}	44	A
Total Power Dissipation(Note4)		P_D	31.3	W
Single Pulse Avalanche Energy(Note5)		E_{AS}	142	mJ

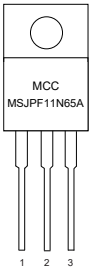
Note:

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 RθJA is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°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℃, V_{DD}=50V, V_{GS}=10V, R_G=25Ω, L=79mH.

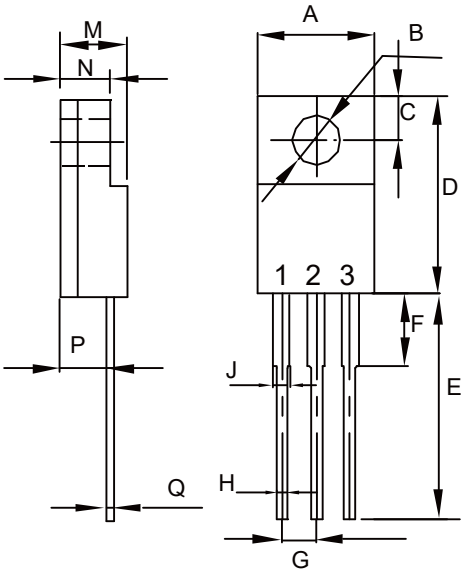
Internal Structure and Marking Code



1. Gate
2. Drain
3. Source



TO-220F



DIMENSIONS					
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			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	3.4	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=3.2A		0.33	0.38	Ω
Gate Resistance	R_g	f=1MHz, Open drain		22		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				11	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=11A			1.4	V
Reverse Recovery Time	t_{rr}	I_S=11A, dI_F/dt=550A/μs		175		ns
Reverse Recovery Charge	Q_{rr}			4.4		μC
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V,f=1MHz		774		pF
Output Capacitance	C_{oss}			890		
Reverse Transfer Capacitance	C_{rss}			26		
Total Gate Charge	Q_g	V_{DS}=520V,V_{GS}=10V,I_D=11A		20		nC
Gate-Source Charge	Q_{gs}			3		
Gate-Drain Charge	Q_{gd}			10		
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DD}=325V, I_D=11A, R_G=2.2Ω		45		ns
Turn-On Rise Time	t_r			14		
Turn-Off Delay Time	$t_{d(off)}$			71		
Turn-Off Fall Time	t_f			20		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

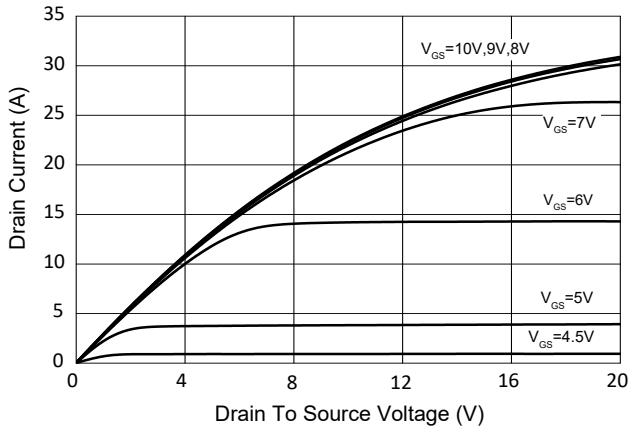


Fig.2 - Transfer Characteristic

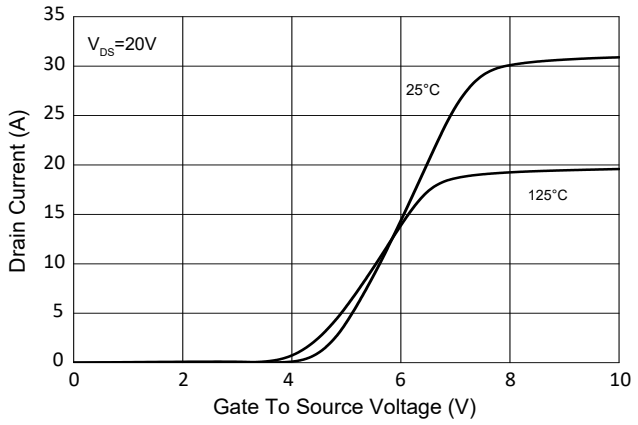


Fig.3 - $R_{DS(ON)}$ - V_{GS}

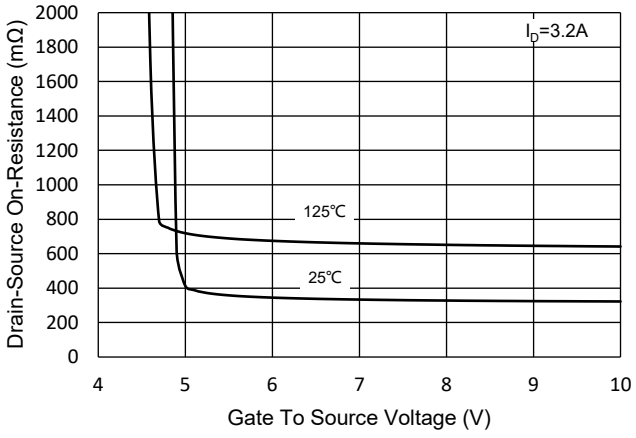


Fig.4 - $R_{DS(ON)}$ - I_D

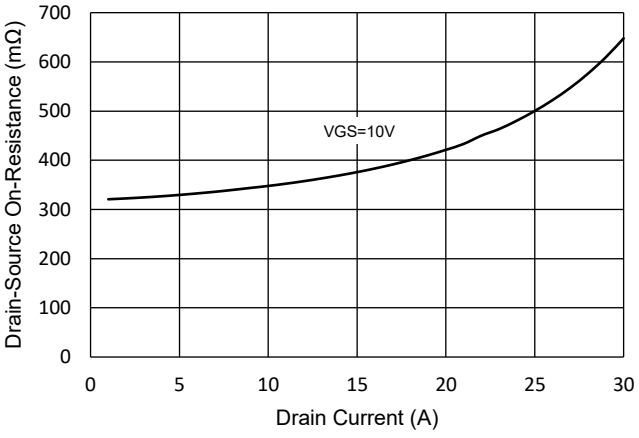


Fig.5 - Capacitance Characteristics

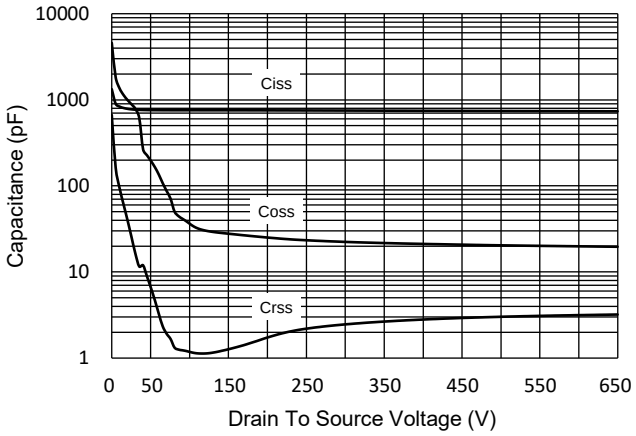
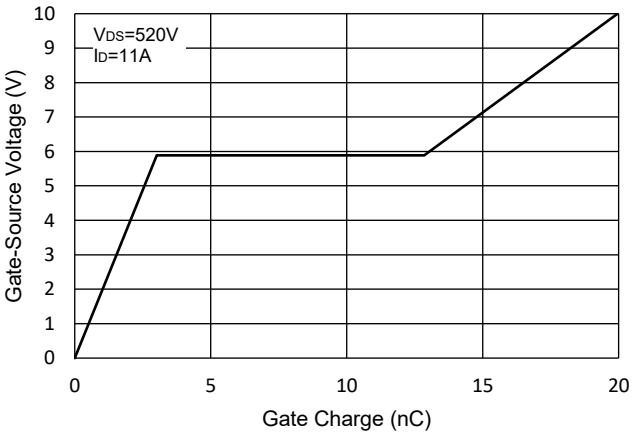


Fig.6 - Gate Charge



Curve Characteristics

Fig.7 - Normalized Threshold Voltage

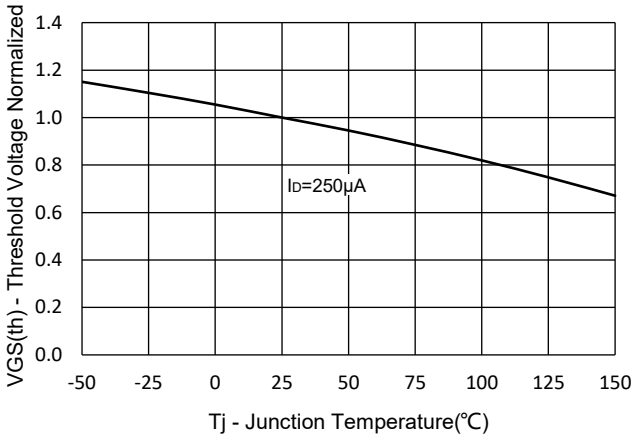


Fig.8 - Normalized On Resistance Characteristics

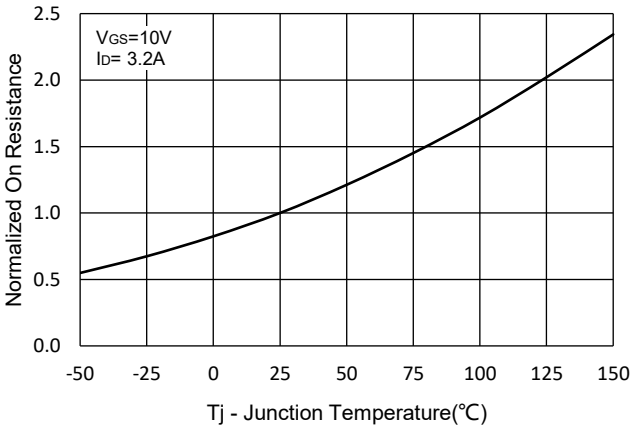


Fig.9 - I_S - V_{SD}

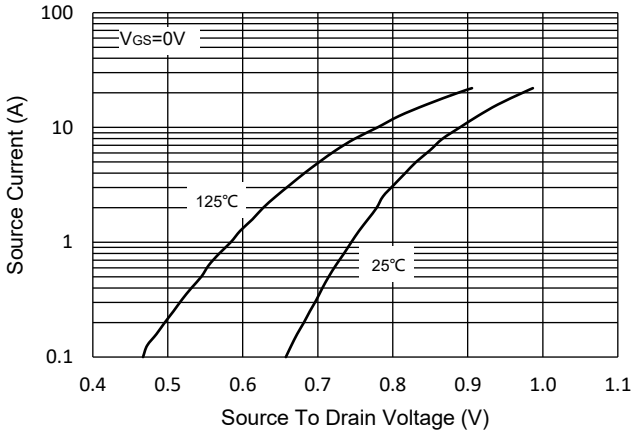


Fig.10 - Drain Current

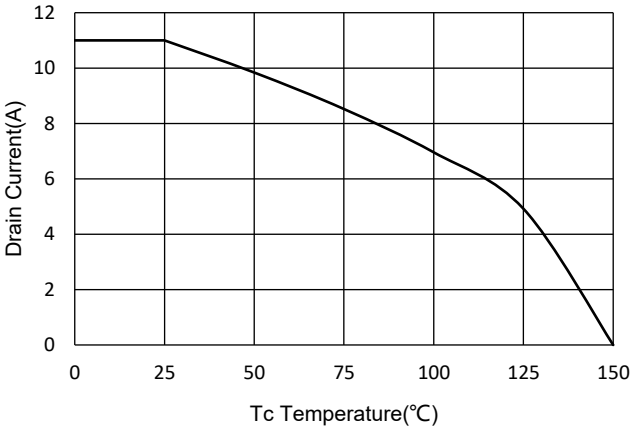
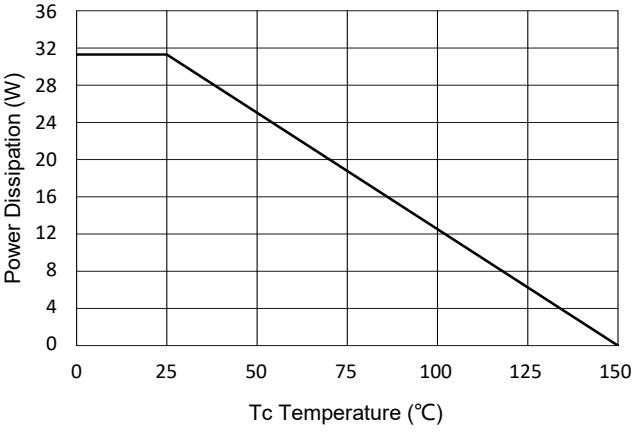


Fig.11 - PD Dissipation



Curve Characteristics

Fig.12 - Safe Operation Area

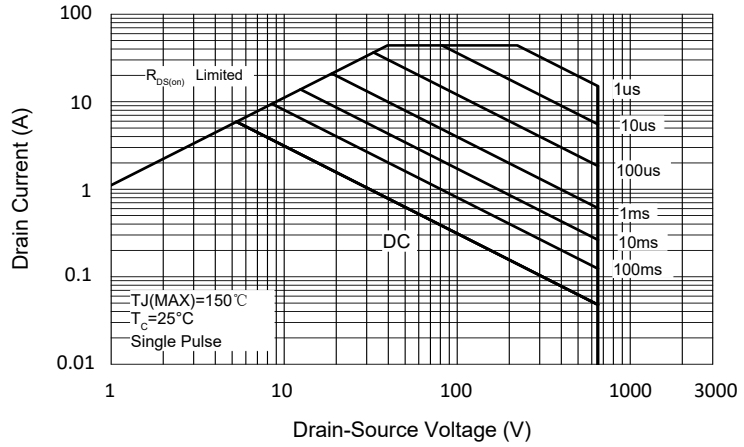
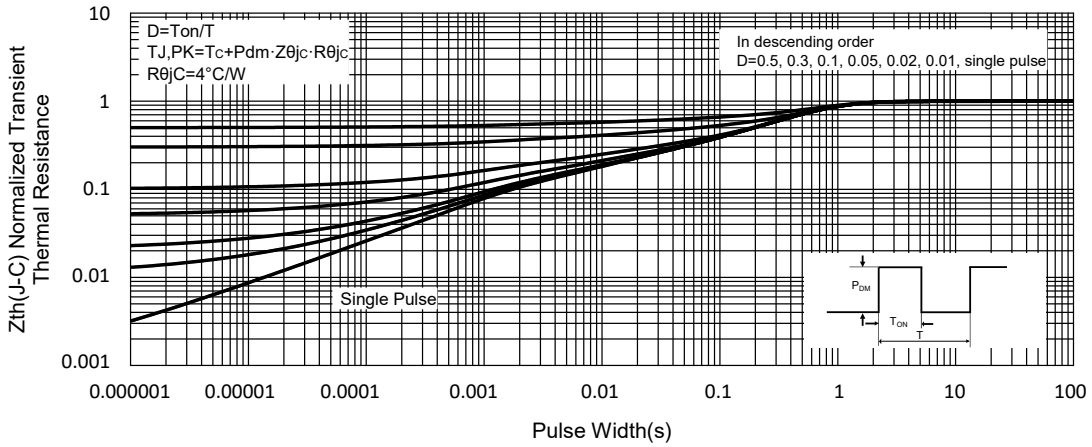


Fig.13 - Normalized Transient Thermal Impedance



Ordering Information

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