

### Features

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

### Maximum Ratings

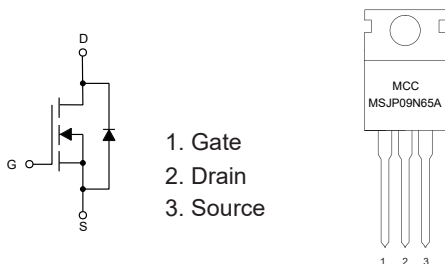
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 50°C/W Junction to Ambient (Note 2)
- Thermal Resistance: 1.1°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	9
		$T_C=100^\circ C$	5.7
Pulsed Drain Current <sup>(Note3)</sup>	$I_{DM}$	30	A
Total Power Dissipation <sup>(Note4)</sup>	$P_D$	113	W
Single Pulsed Avalanche Energy <sup>(Note5)</sup>	$E_{AS}$	70	mJ

Note:

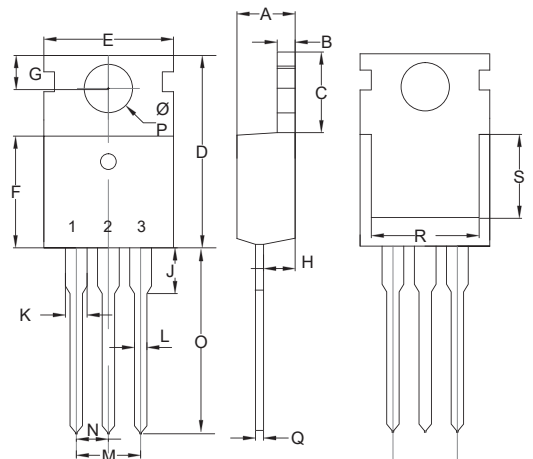
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ C$ .
3. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.
4.  $P_d$  is based on max. junction temperature, using junction-case thermal resistance.
5.  $V_{DD}=500V$ ,  $R_G=25\Omega$ ,  $L=79mH$ .

### Internal Structure and Marking Code



# N-CHANNEL Super-Junction Power MOSFET

## TO-220AB(H)



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.169	0.185	4.30	4.70	
B	0.049	0.055	1.25	1.40	
C	0.244	0.268	6.20	6.80	
D	0.598	0.638	15.20	16.20	
E	0.382	0.398	9.70	10.10	
F	0.354	0.370	9.00	9.40	
G	0.102	0.118	2.60	3.00	
H	0.087	0.102	2.20	2.60	
J	0.110	0.126	2.80	3.20	
K	0.048	0.055	1.22	1.40	
L	0.028	0.037	0.70	0.95	
M	0.188	0.212	4.78	5.38	
N	0.094	0.106	2.39	2.69	
O	0.496	0.535	12.60	13.60	
P	0.138	0.150	3.50	3.80	Φ
Q	0.016	0.024	0.40	0.60	
R	0.276	-----	7.00	-----	
S	0.217	-----	5.50	-----	

**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3.2	4	V
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=1.5A$		0.72	0.96	$\Omega$
Gate Resistance	$R_G$	$f = 1.0MHz, \text{Open Drain}$		20		$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		383		pF
Output Capacitance	$C_{oss}$			372		
Reverse Transfer Capacitance	$C_{rss}$			13		
Total Gate Charge	$Q_g$	$V_{DS}=300V, V_{GS}=10V, I_D=5A$		10.6		nC
Gate-Source Charge	$Q_{gs}$			2.4		
Gate-Drain Charge	$Q_{gd}$			4.3		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=300V, I_D=5A, R_G=6\Omega$		5.9		ns
Turn-On Rise Time	$t_r$			13.2		
Turn-Off Delay Time	$t_{d(off)}$			13.6		
Turn-Off Fall Time	$t_f$			32.8		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				9	A
Body Diode Voltage	$V_{SD}$	$I_{SD}=4.7A, V_{GS}=0V$			1.3	V
Reverse Recovery Time	$t_{rr}$	$I_S=5A, di_f/dt=100A/\mu s$		229		ns
Reverse Recovery Charge	$Q_{rr}$				1499	

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

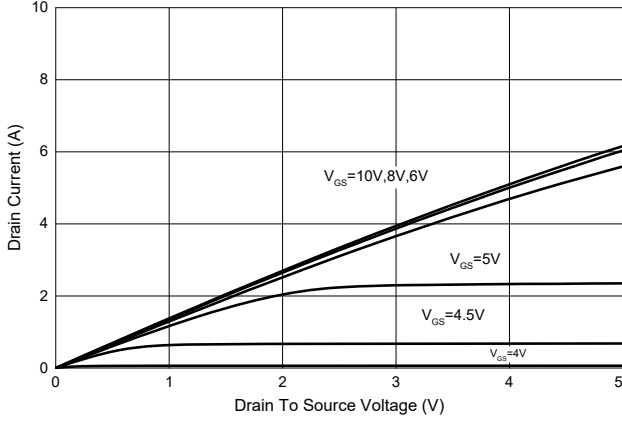


Fig. 2 - Transfer Characteristics

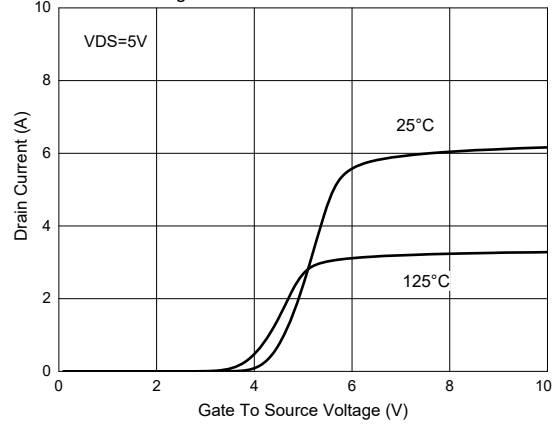


Fig. 3 -  $R_{DS(ON)} - I_D$

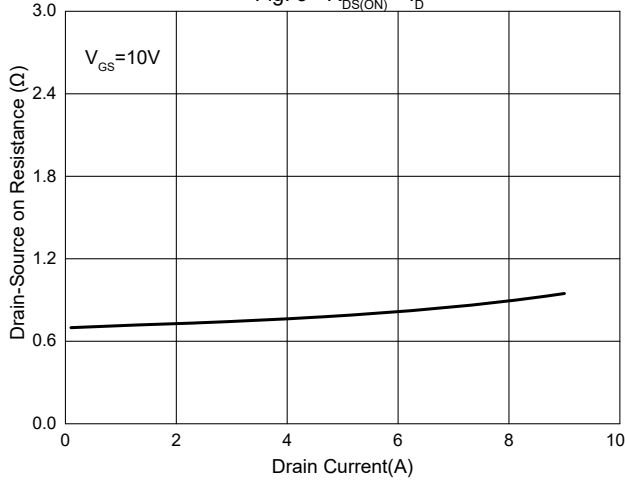


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

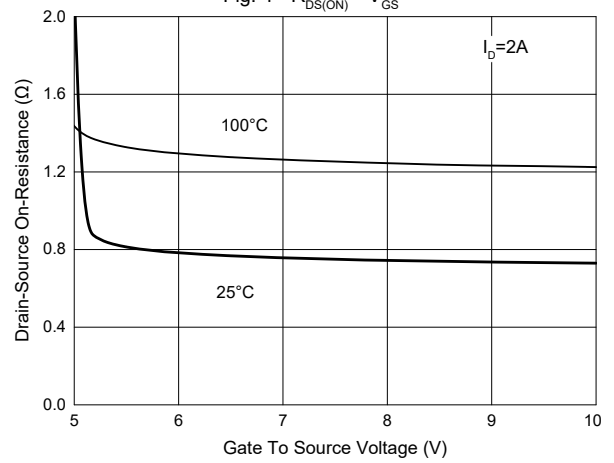


Fig. 5 - Normalized On Resistance Characteristics

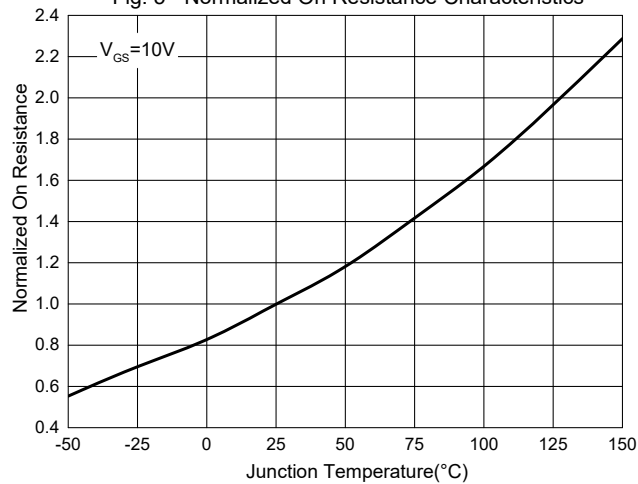
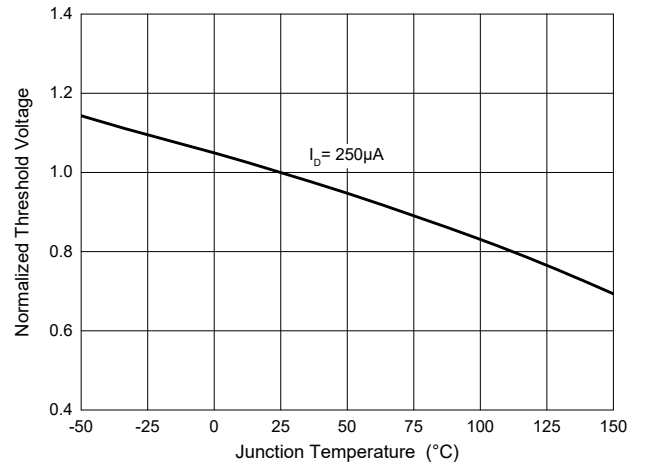
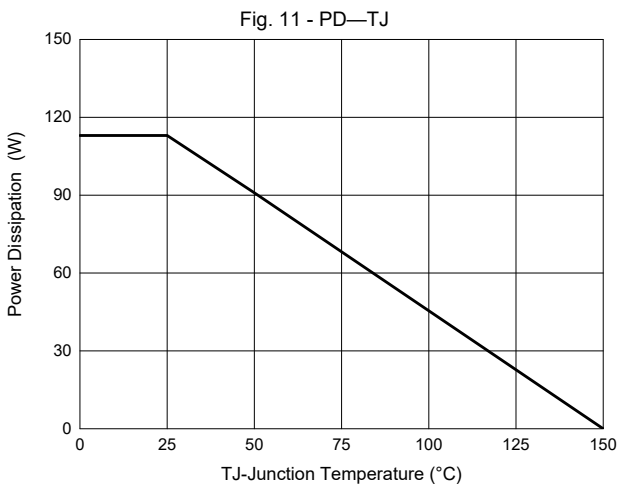
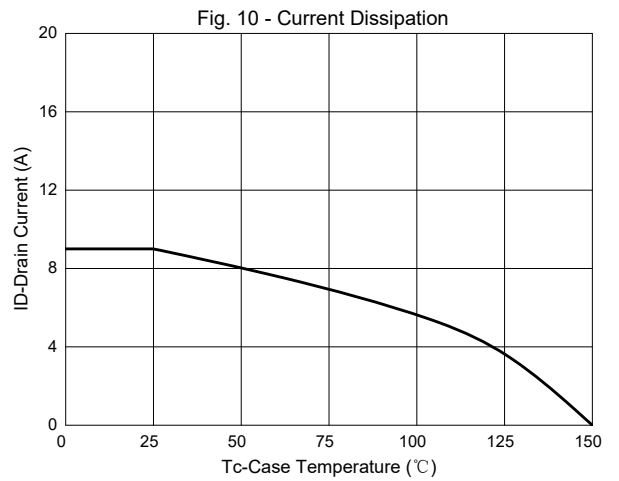
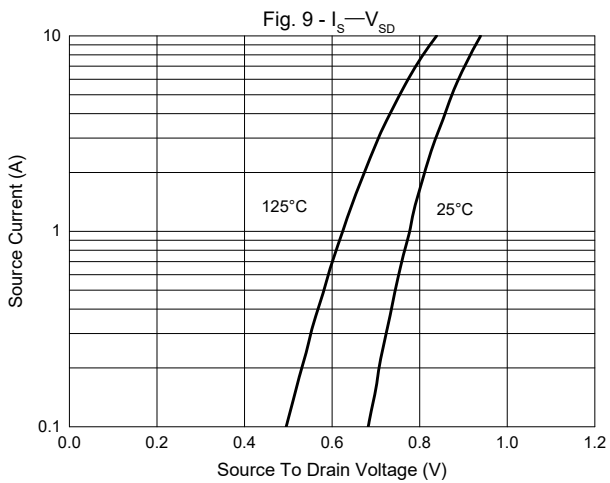
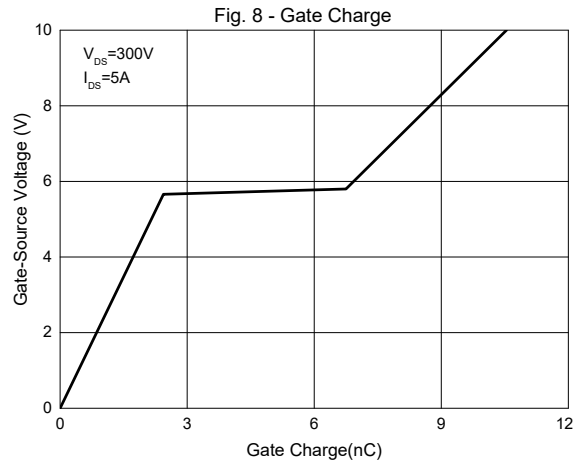
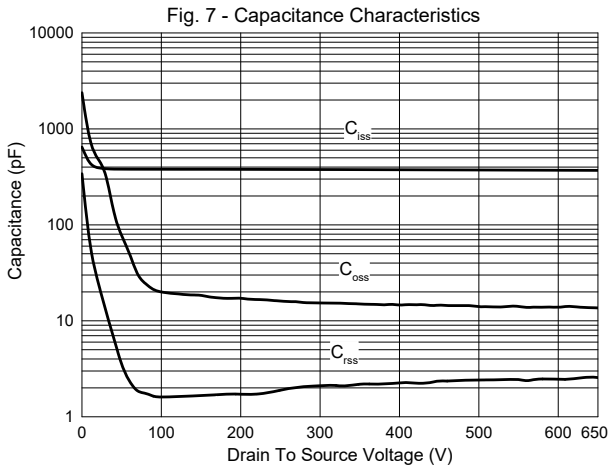


Fig. 6 - Threshold Voltage



Curve Characteristics



Curve Characteristics

Fig. 12 - Safe Operation Area

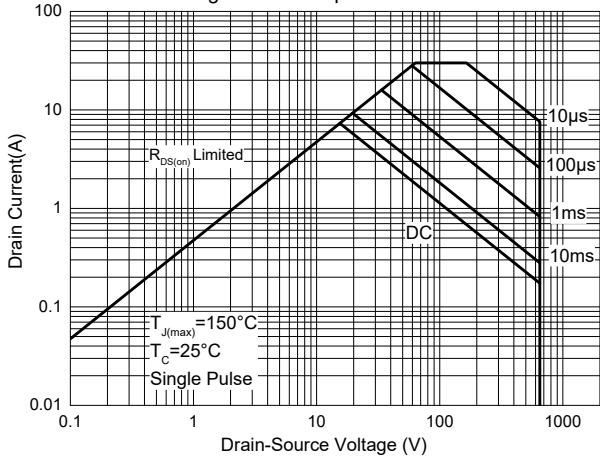
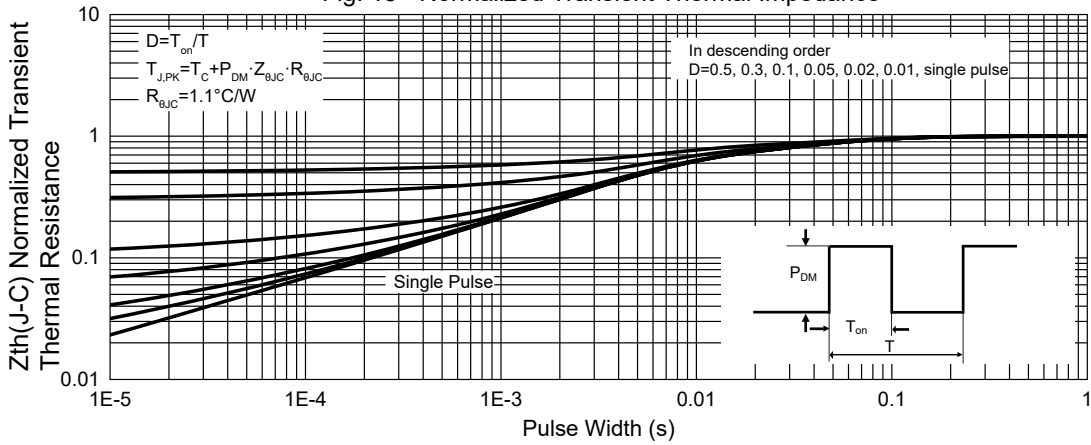


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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