

Features

- Optimized Body Diode Reverse Recovery Performance
- Low On-resistance and Low Conduction Losses
- Ultra Low Gate Charge Cause Lower Driving Requirement
- 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

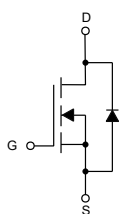
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 0.81°C/W Junction to Case

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°C	20
		T _C =100°C	12
Pulsed Drain Current (Note 2)	I _{DM}	60	A
Single Pulse Avalanche Energy (Note 3)	E _{AS}	485	mJ
Repetitive Avalanche Energy	E _{AR}	0.7	mJ
Total Power Dissipation	P _D	151	W

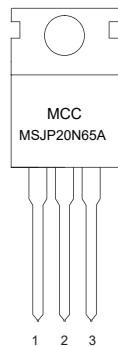
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Repetitive Rating; Pulse Width Limited by Maximum Junction Temperature.
3. I_{AS}=3.5A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C.

Internal Structure and Marking Code

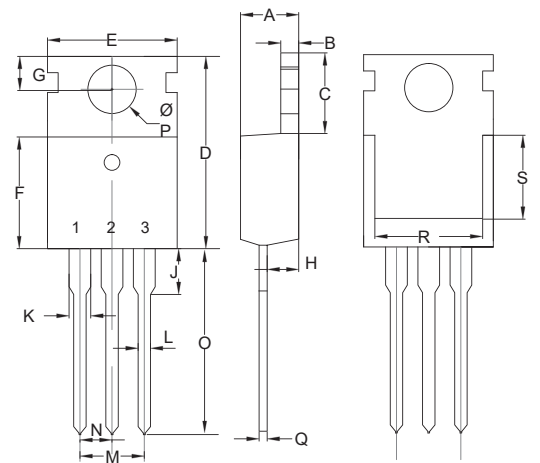


1. Gate
2. Drain
3. Source



**N-CHANNEL
Super-Junction
Power MOSFET**

TO-220AB(H)



DIM	INCHES		MM		NOTE
	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
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_C=25^\circ C$			1	μA
Gate-Threshold Voltage ^(Note 4)	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-Resistance ^(Note 4)	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		170	190	m Ω
Gate Resistance ^(Note 4)	R_G	f = 1.0MHz Open Drain		3		Ω
Dynamic Characteristics ^(Note 5)						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		1860		pF
Output Capacitance	C_{oss}			1425		
Reverse Transfer Capacitance	C_{rss}			76		
Total Gate Charge	Q_g	$V_{DS}=560V, V_{GS}=10V, I_D=20A$		53		nC
Gate-Source Charge	Q_{gs}			13		
Gate-Drain Charge	Q_{gd}			20		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=350V, I_D=20A$ $V_{GS}=10V, R_{GEN}=25\Omega$		40		ns
Turn-On Rise Time	t_r			75		
Turn-Off Delay Time	$t_{d(off)}$			172		
Turn-Off Fall Time	t_f			54		
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$			1.4	V
Continuous Body Diode Current	I_S				20	A
Reverse Recovery Time	t_{rr}	$V_{DD}=100V, I_S=20,$ $di_F/dt = 100A/\mu s$		524		ns
Reverse Recovery Charge	Q_{rr}			9.4		μC
Peak Reverse Recovery Current	I_{rrm}			35.7		A

Note:

4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1\%$.
5. Guaranteed by Design, not Subject to Production.

Curve Characteristics

Fig. 1 - Typical Output Characteristics

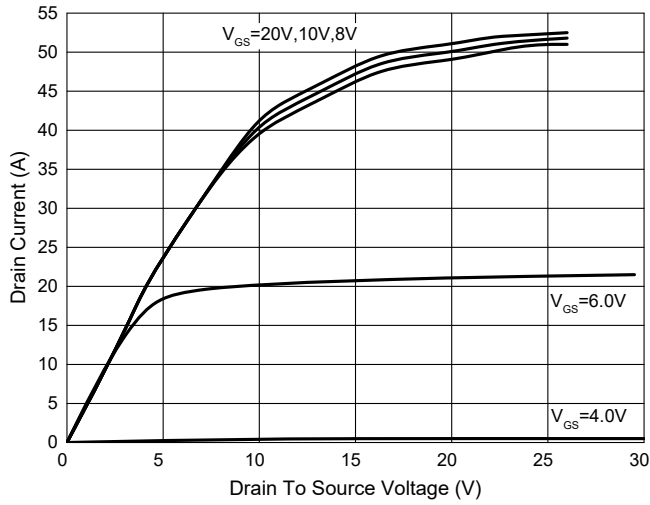


Fig. 2 - Normalized On Resistance Characteristics

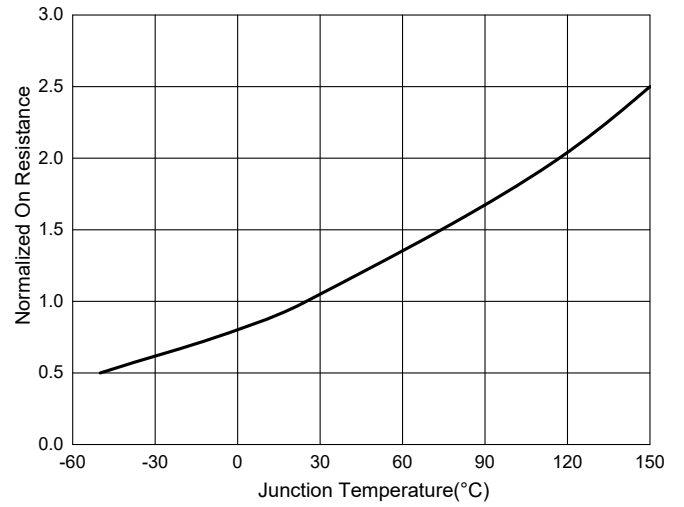


Fig. 3 - $R_{DS(ON)} - I_D$

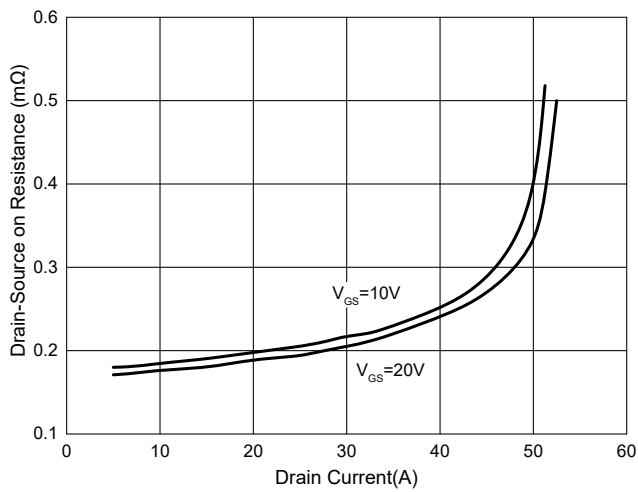


Fig. 4 - Capacitance Characteristics

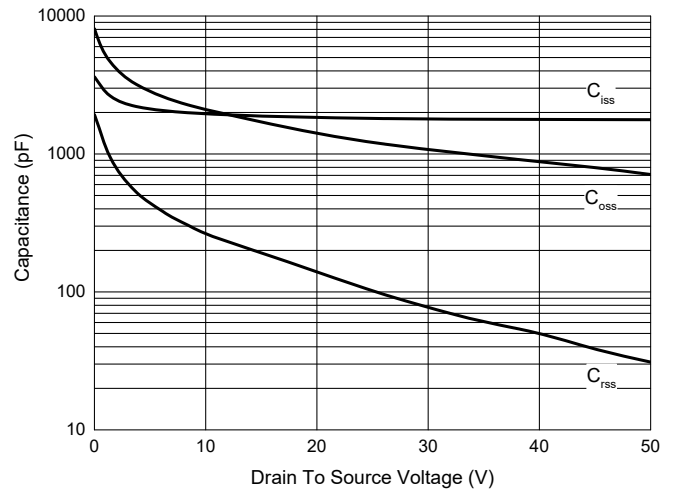


Fig. 5- Gate Charge

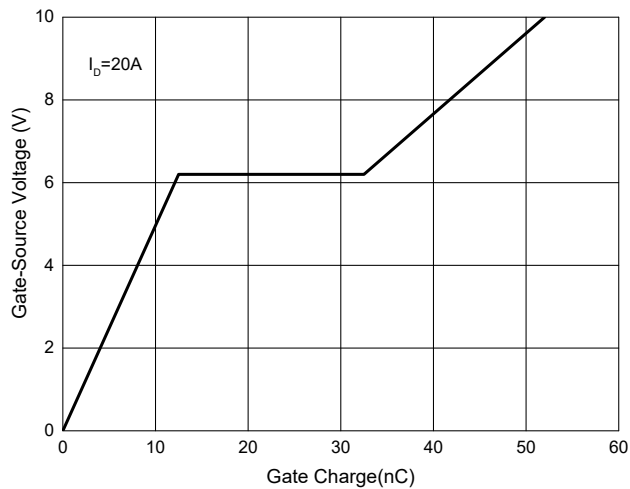
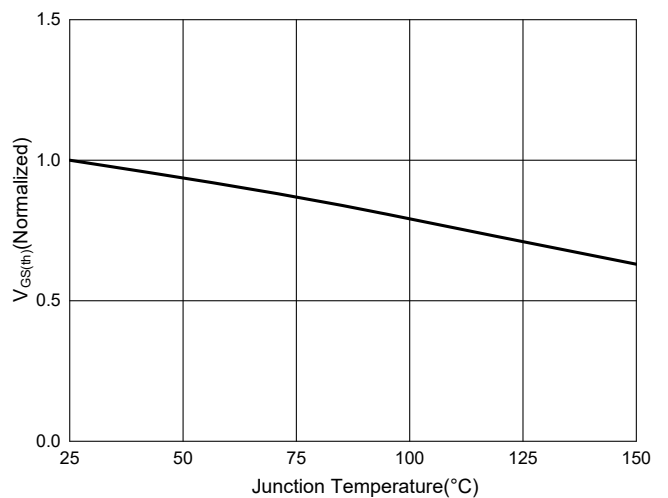
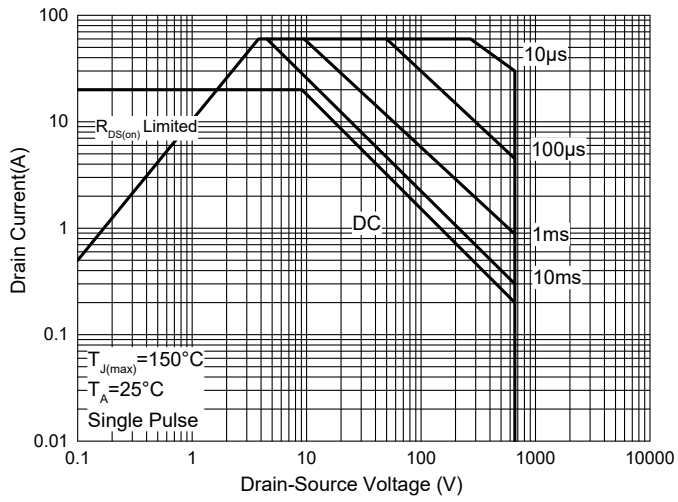


Fig. 6 - Normalized On Resistance Characteristics



Curve Characteristics

Fig. 7 - Safe Operation Area



Ordering Information

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

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