

## Features

- Low On-resistance and Low Conduction Losses
- New technology for high voltage device
- Ultra Low Gate Charge Cause Lower Driving Requirement
- Halogen Free."Green "Device<sup>(Note 1)</sup>
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

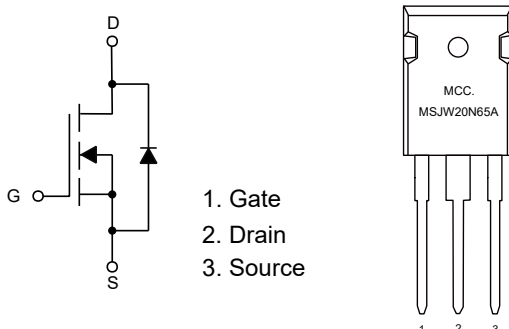
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 40°C/W Junction to Ambient<sup>(Note 2)</sup>
- Thermal Resistance:0.5°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	20
		$T_C=100^\circ\text{C}$	12.6
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	80	A
Total Power Dissipation <sup>(Note 4)</sup>	$P_D$	250	W
Single Pulsed Avalanche Energy <sup>(Note 5)</sup>	$E_{AS}$	485	mJ

Note:

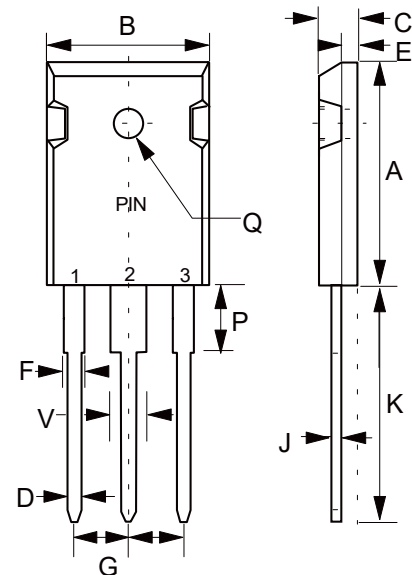
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
- 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. $T_J=25^\circ\text{C}$ ,  $V_{DD}=50\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $R_g=25\Omega$ ,  $L=79\text{mH}$ .

## Internal Structure and Marking Code



# N-CHANNEL Super-Junction Power MOSFET

## TO-247



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.787	0.866	20.00	22.00	
B	0.598	0.638	15.20	16.20	
C	0.185	0.208	4.70	5.30	
D	0.035	0.059	0.90	1.50	
E	0.059	0.094	1.50	2.40	
F	0.067	0.091	1.70	2.30	
J	0.019	0.031	0.48	0.80	
K	0.748	0.833	19.00	21.15	
P	0.122	0.189	3.10	4.80	
Q	0.118	0.150	3.00	3.80	Φ
V	0.106	0.134	2.70	3.40	
G	0.197	0.224	5.00	5.70	

**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	3.5	5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		167	190	m $\Omega$
Gate Resistance	$R_g$	f=1 MHz, Open drain		3		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				20	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$			1.4	V
Reverse Recovery Time	$t_{rr}$	$I_F=100A, di_F/dt=100A/\mu s$		378		ns
Reverse Recovery Charge	$Q_{rr}$			6036		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=100V, V_{GS}=0V, f=1MHz$		1740		pF
Output Capacitance	$C_{oss}$			71		
Reverse Transfer Capacitance	$C_{rss}$			4		
Total Gate Charge	$Q_g$	$V_{DS}=520V, V_{GS}=10V, I_D=20A$		54		nC
Gate-Source Charge	$Q_{gs}$			9		
Gate-Drain Charge	$Q_{gd}$			27		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=350V, V_{GS}=10V$ $R_{GEN}=25\Omega, I_{DS}=20A$		38		ns
Turn-On Rise Time	$t_r$			93		
Turn-Off Delay Time	$t_{d(off)}$			169		
Turn-Off Fall Time	$t_f$			75		

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

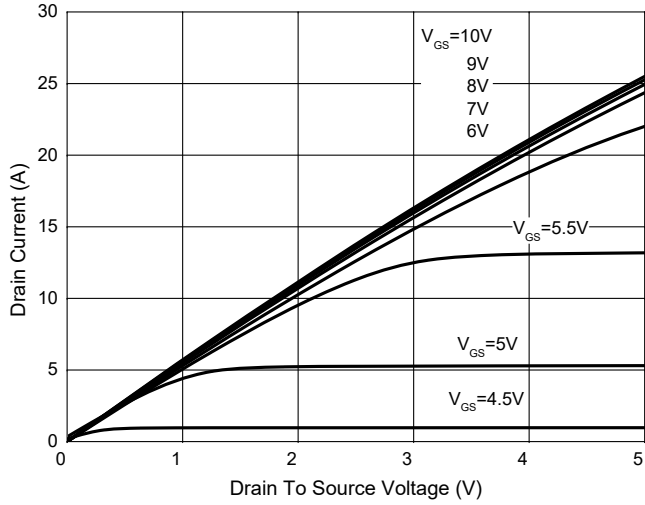


Fig. 2 - Transfer Characteristics

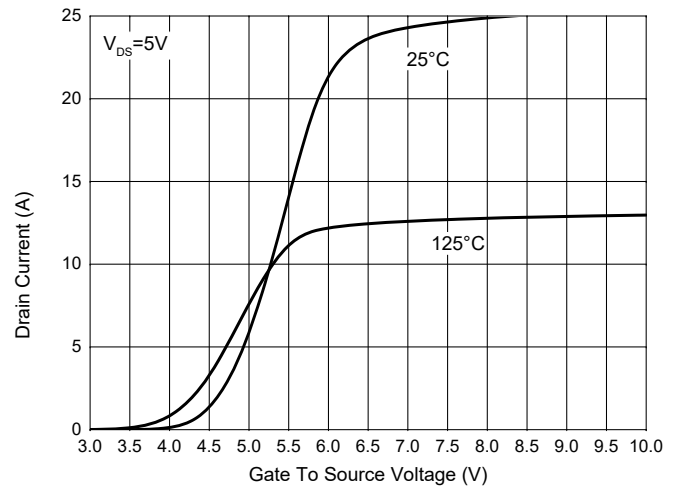


Fig. 3 -  $R_{DS(ON)} - I_D$

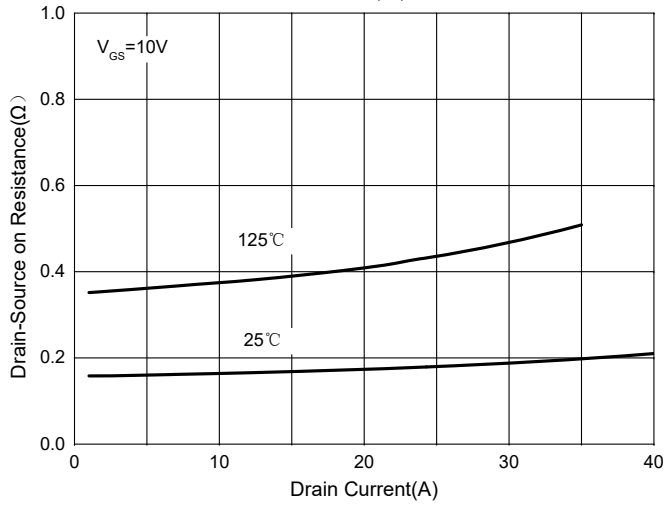


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

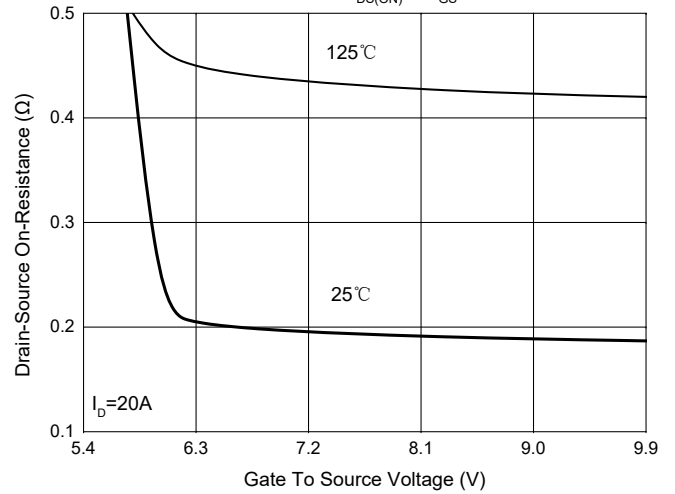


Fig. 5 - Capacitance Characteristics

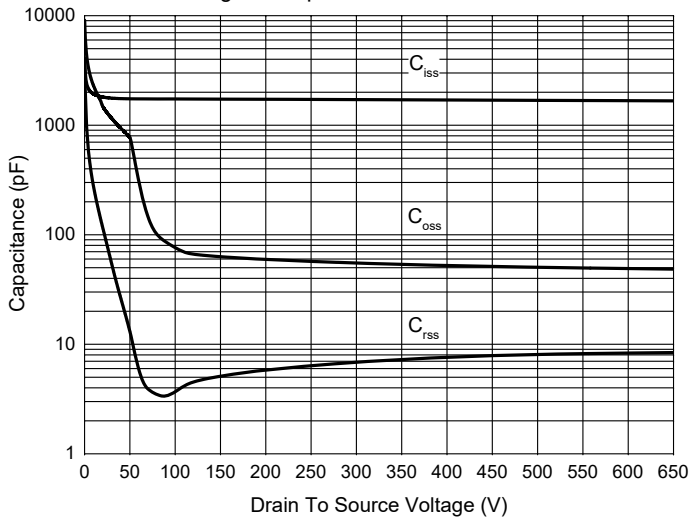
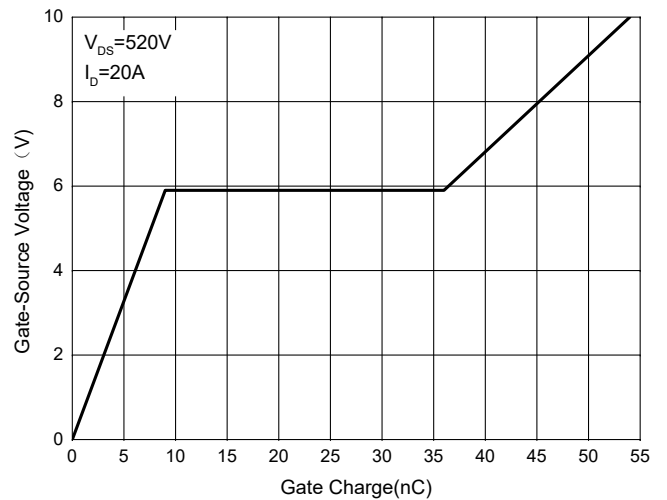


Fig. 6 - Gate Charge



**Curve Characteristics**

Fig. 7 - Normalized Threshold Voltage

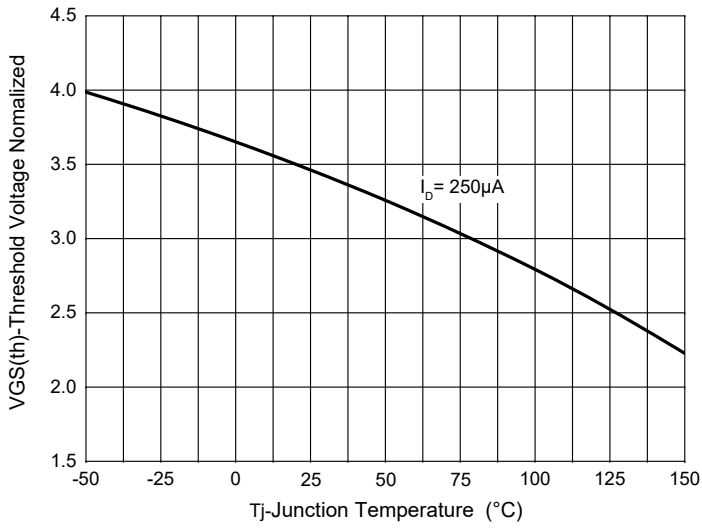


Fig.8-Normalized On Resistance Characteristics

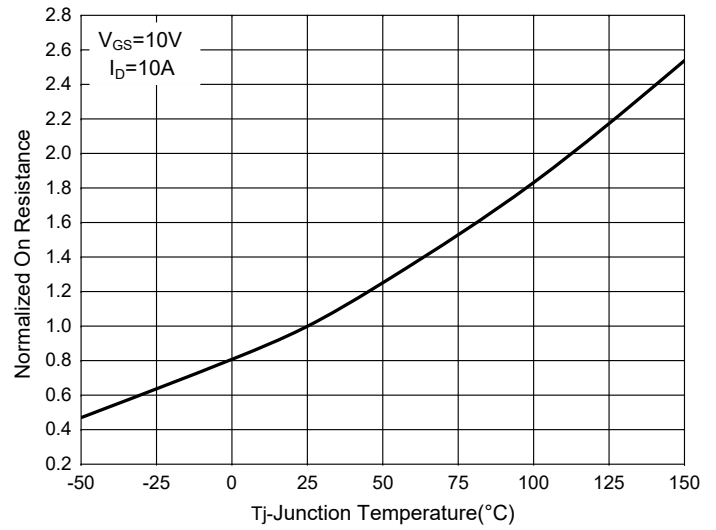


Fig. 9 - I<sub>s</sub>—V<sub>SD</sub>

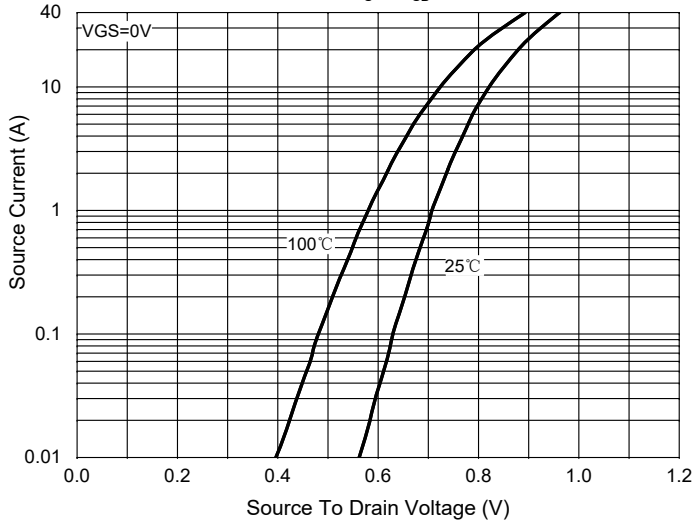


Fig. 10 - Drain Current

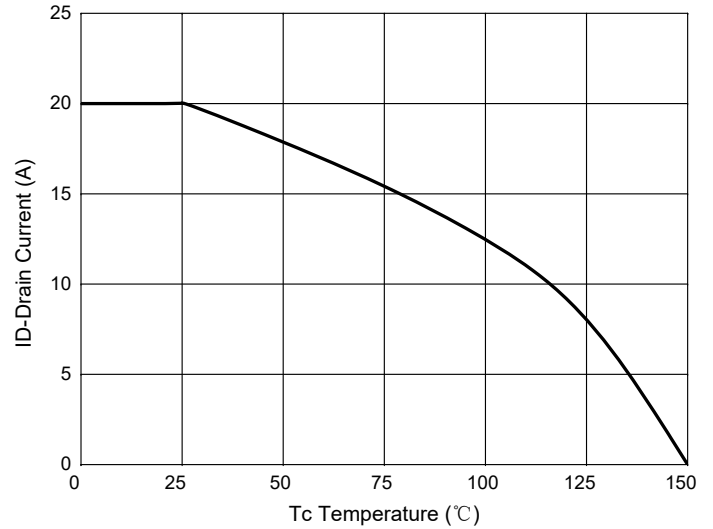
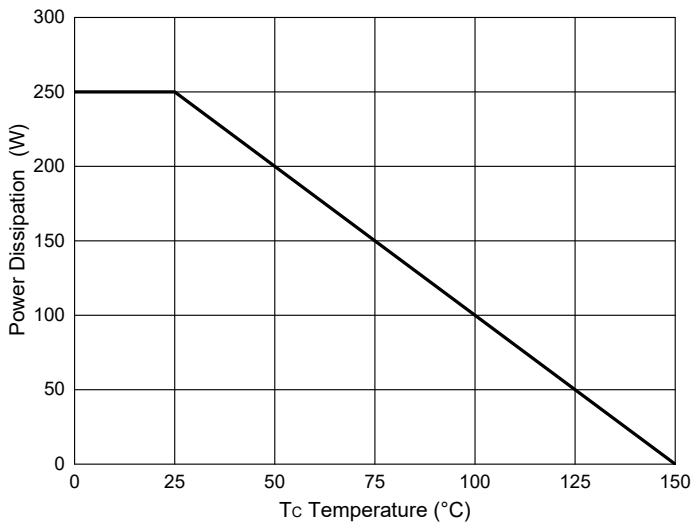


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

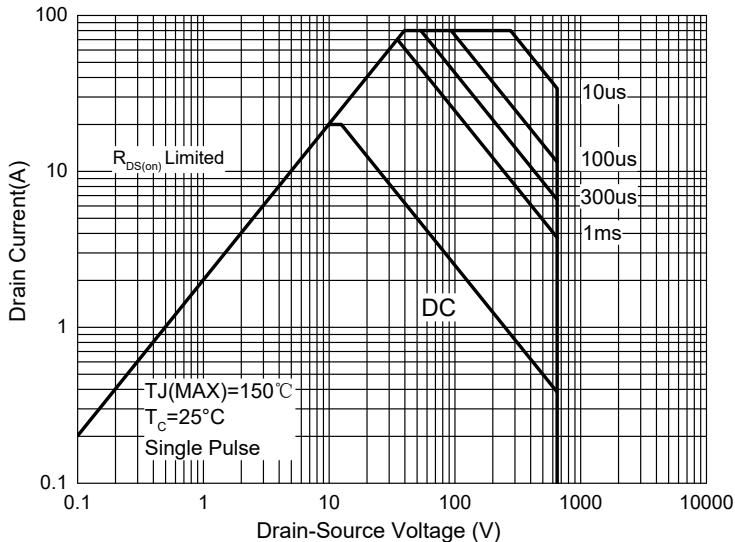
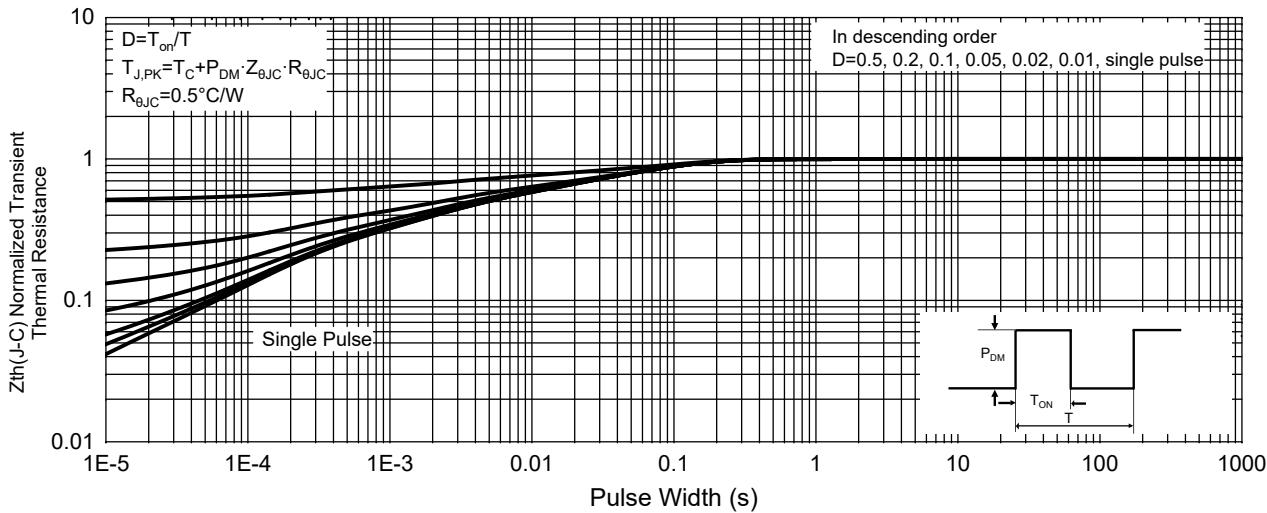


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
MSJW20N65A-BP	Tube:30pcs/Tube, 360pcs/Box,1.8K/Ctn;

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