

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^(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

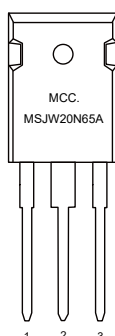
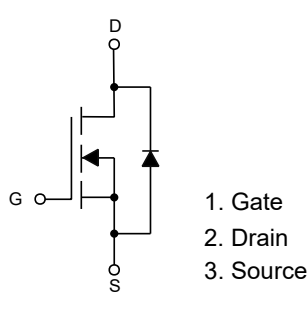
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 40°C/W Junction to Ambient^(Note 2)
- Thermal Resistance:0.5°C/W Junction to Case

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

Note:

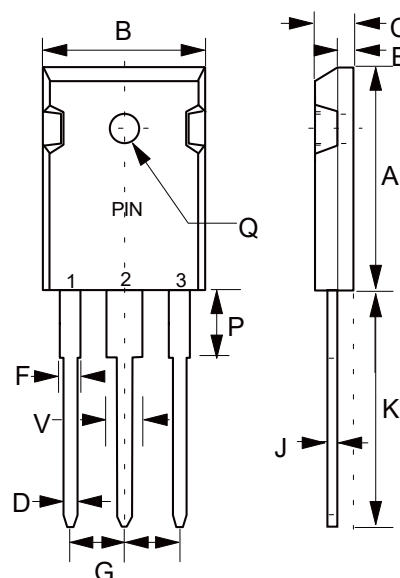
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.
- 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. $T_J=25^{\circ}\text{C}$, $V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$, $L=79\text{mH}$.

Internal Structure and Marking Code



N-CHANNEL Super-Junction Power MOSFET

TO-247



DIMENSIONS

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
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	3.5	5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A		167	190	mΩ
Gate Resistance	R _g	f=1 MHz, Open drain		3		Ω
Diode Characteristics						
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/μs		378		ns
Reverse Recovery Charge	Q _{rr}			6036		nC
Dynamic Characteristics						
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} =25Ω, 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

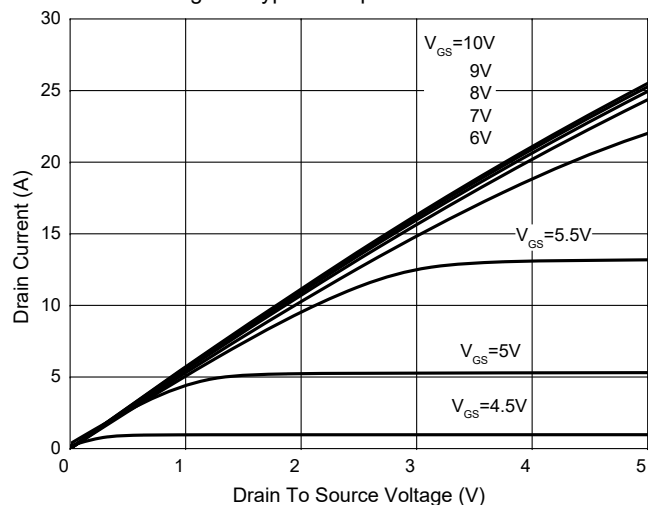


Fig. 2 - Transfer Characteristics

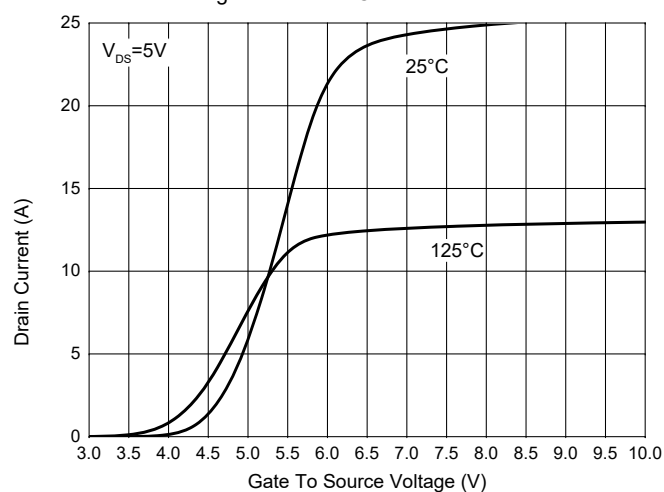


Fig. 3 - $R_{DS(ON)} - I_D$

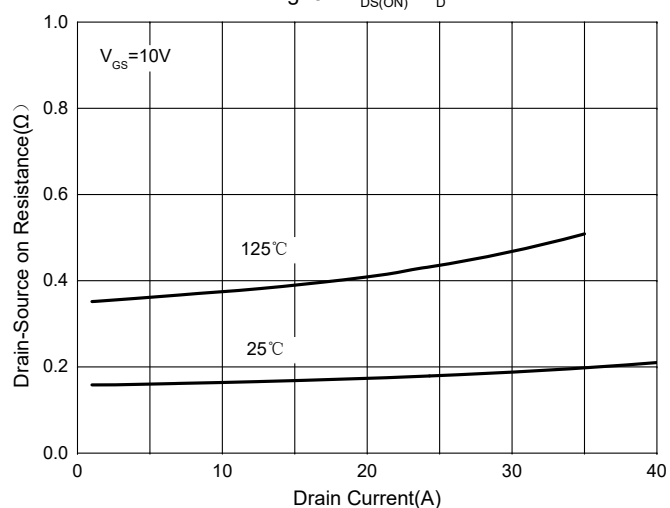


Fig. 4 - $R_{DS(ON)} - V_{GS}$

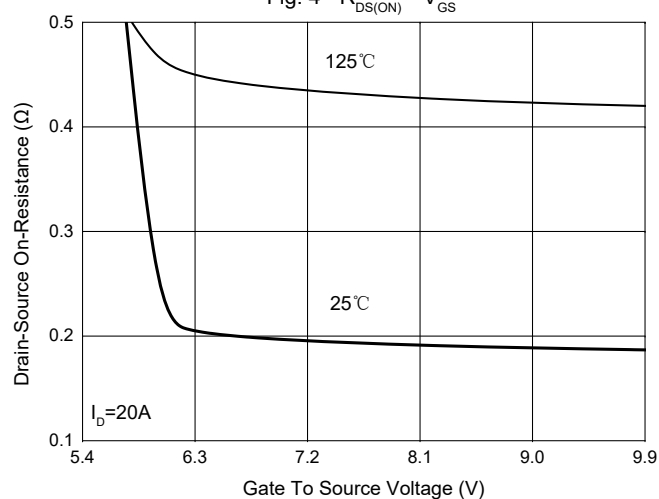


Fig. 5 - Capacitance Characteristics

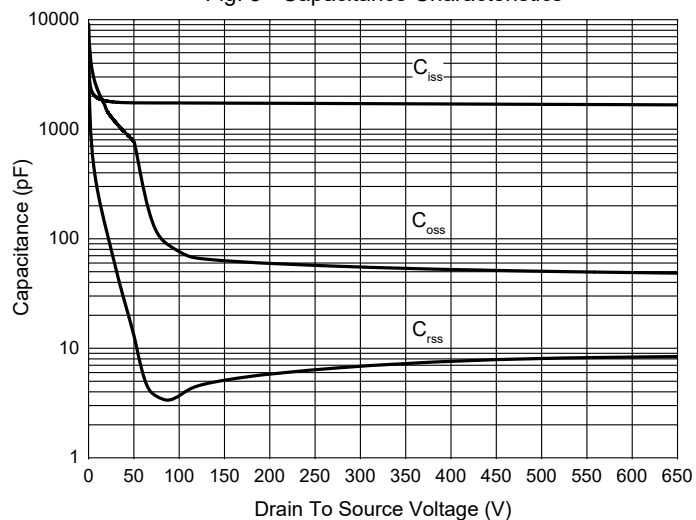
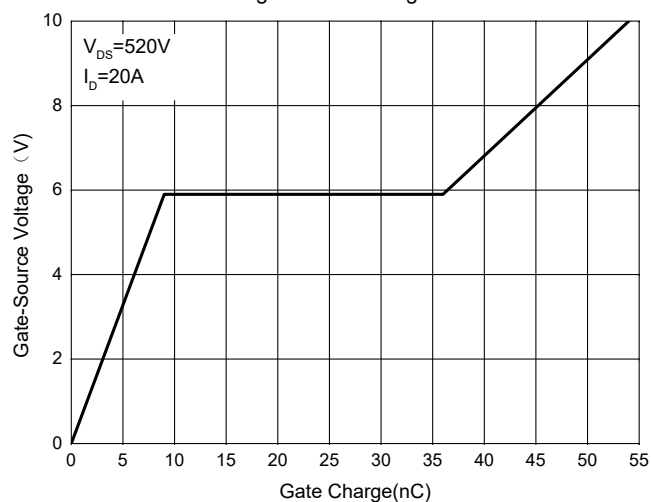


Fig. 6 - GateCharge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

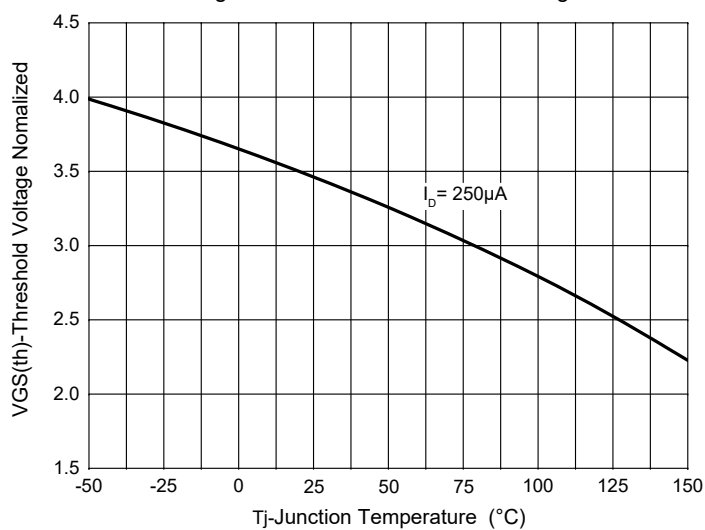


Fig.8-Normalized On Resistance Characteristics

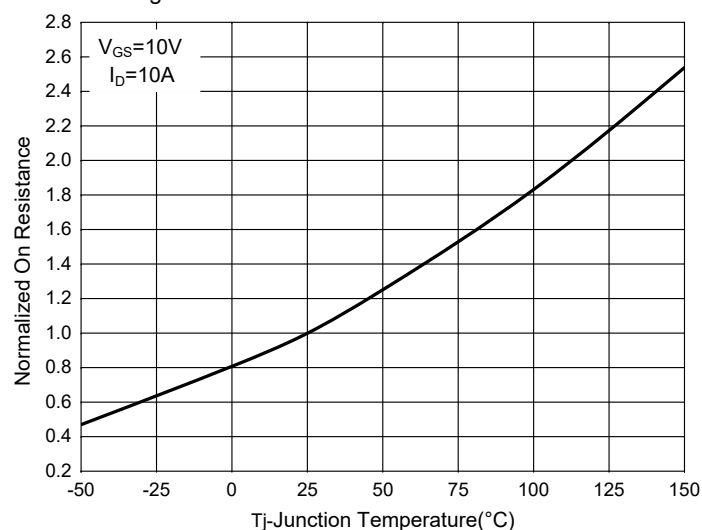


Fig. 9 - $I_S - V_{SD}$

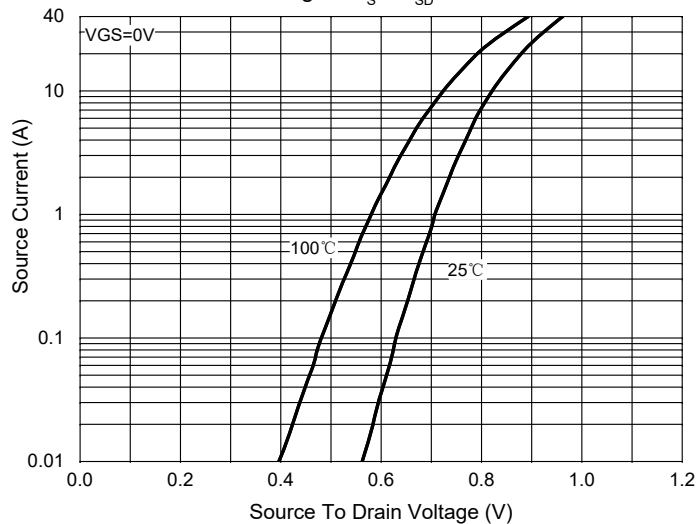


Fig. 10 - Drain Current

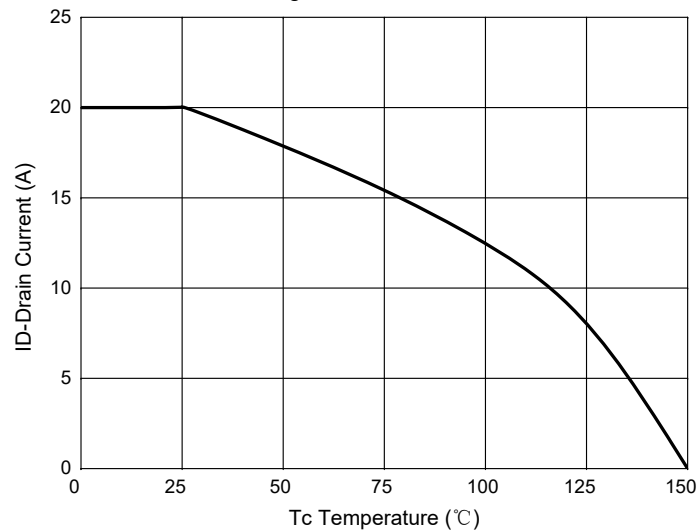
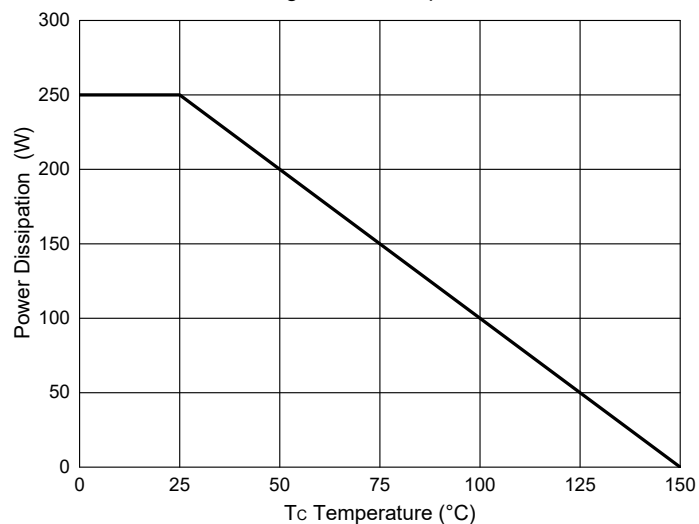


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

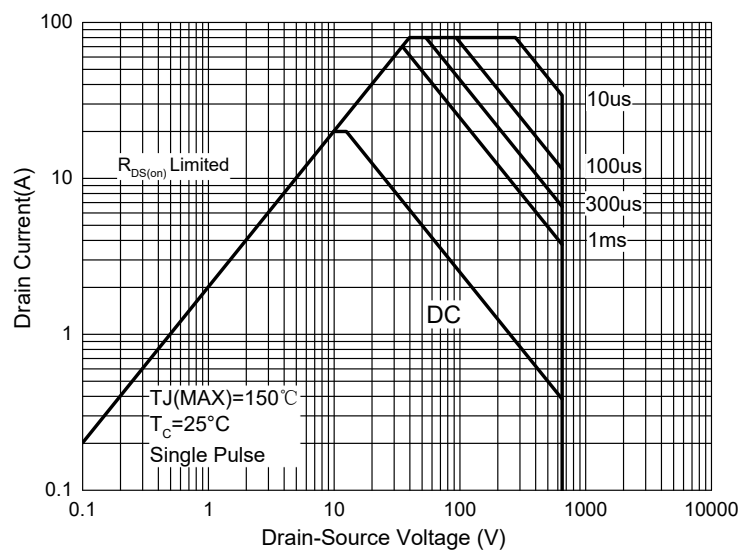
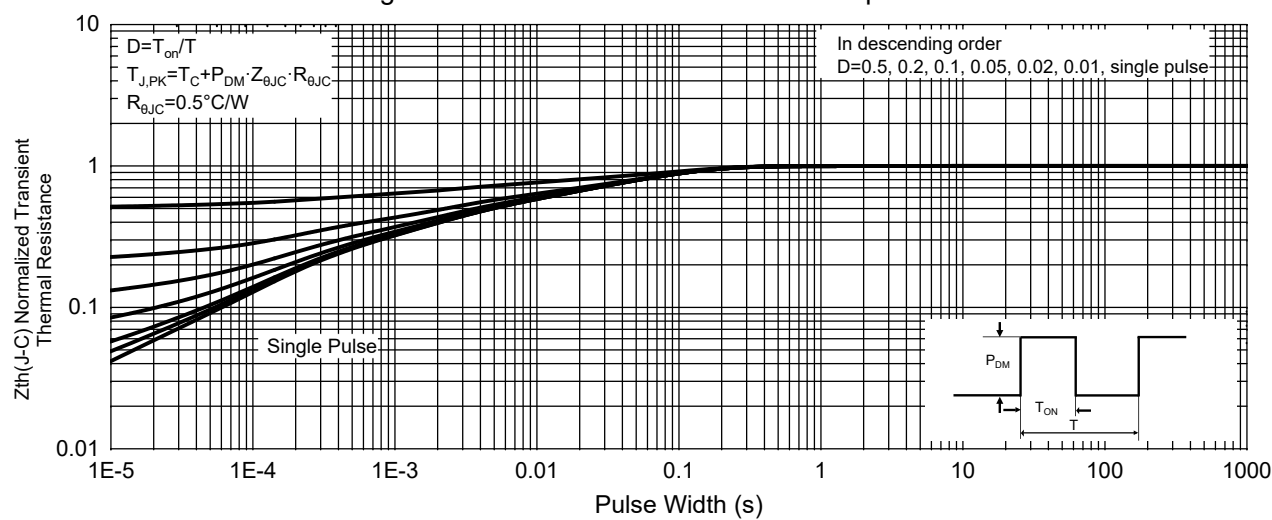


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

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

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