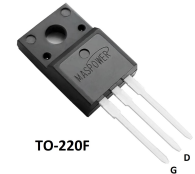
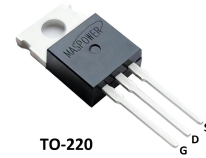
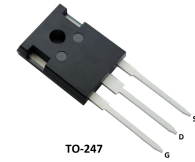
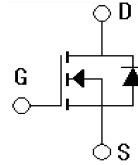


Features

- Very low FOM $R_{DS(on)} \times Q_g$
- 100% avalanche tested
- Easy to use/drive
- RoHS compliant

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Low Power Chargers and Adapters



Absolute Ratings (Tc=25°C)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V _{DSS}		850	V
Transient Gate-Source Voltage	V _{GSM}		±30	V
Continuous Gate-Source Voltage	V _{GSS}		±20	V
Drain Current-continuous	I _D	T _C =25℃	20	A
		T _C =100℃	10	A
Drain Current-pulse (note 1)	I _{DM}		80	A
Single Pulsed Avalanche Energy (note 2)	E _{AS}		1125	mJ
Repetitive Avalanche Energy(note 2)	E _{AR}		27.8	mJ
Avalanche Current	I _{AR}		4.6	A
MOSFET dv/dt Ruggedness, VDS = 0...480V	dv/dt		50	V/ns
Continuous Diode Forward Current	I _S		20	A
Diode Pulsed Current(note 1)	I _{S,pulse}		69	A
Reverse Diode dv/dt(note 3)	dv/dt		15	V/ns
Maximum Diode Commutation Speed(note 3)	di/dt		500	A/μs
Power Dissipation (TO-247/TO-220)	PD		183	W
Power Dissipation (TO-220F)	PD		67	W

Operating and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C
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Electrical Characteristics($T_{CASE}=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	850	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=V_{DSS}, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=V_{DSS}, V_{GS}=0V, T_C=150^{\circ}C$	-	-	100	μA
Gate body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA

On-Characteristics

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	-	4.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	-	320	380	m Ω
Gate Resistance	R_G	f = 1.0MHz open drain	-	1.5	-	Ω

Dynamic Characteristics

Input capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V, f=1.0MHZ$	-	2468.4	-	pF
Output capacitance	C_{oss}		-	56.81	-	pF
Reverse transfer capacitance	C_{rss}		-	5.2	-	pF

Electrical Characteristics($T_{CASE}=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching-Characteristics						
Turn-On delay time	$t_{d(on)}$	$V_{DD}=400V, I_D=20A, R_G=25\Omega$	-	68.45	-	ns
Turn-On rise time	t_r		-	76.9	-	ns
Turn-Off delay time	$t_{d(Off)}$		-	180.2	-	ns
Turn-Off rise time	t_f		-	58.35	-	ns
Total Gate Charge	Q_g	$V_{DS}=640V, I_D=20A, V_{GS}=10V$	-	54.9	-	nC
Gate-Source charge	Q_{gs}		-	10.4	-	nC

Gate-Drain charge	Q_{gd}		-	21.5	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Source-Drain Current (Body Diode)	I_{SD}	$T_C=25^{\circ}\text{C}$	-	-	10	A
Reverse recovery time	t_{rr}	$V_R=400, I_F=20\text{A}$ $di_F/dt=100\text{A}/\mu\text{s}$	-	405.4	-	ns
Reverse recovery charge	Q_{rr}		-	4.633	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	22.83	-	A

Thermal Characteristic

Parameter	Symbol	Value		Unit
		TO-247/ TO-220	TO-220F	
Thermal Resistance, junction to Case, Max	$R_{th(j-C)}$	0.68	1.84	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, junction to Ambient, Max	$R_{th(j-A)}$	62.5	62.5	$^{\circ}\text{C}/\text{W}$

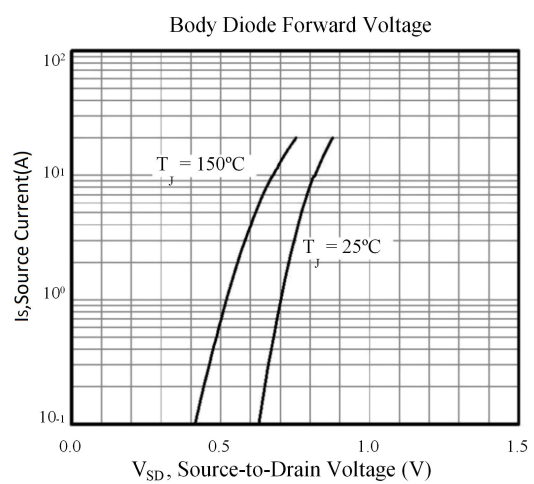
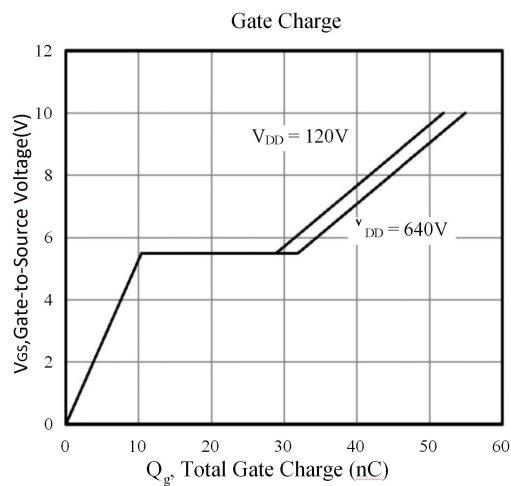
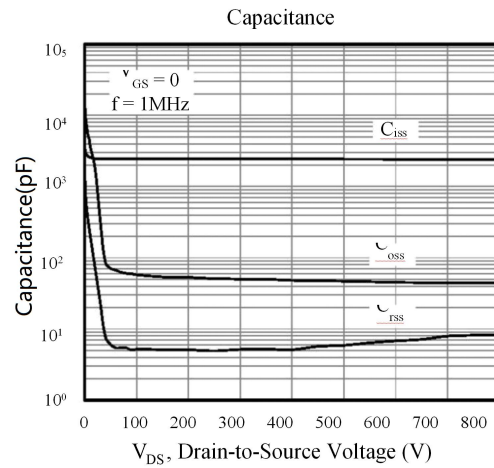
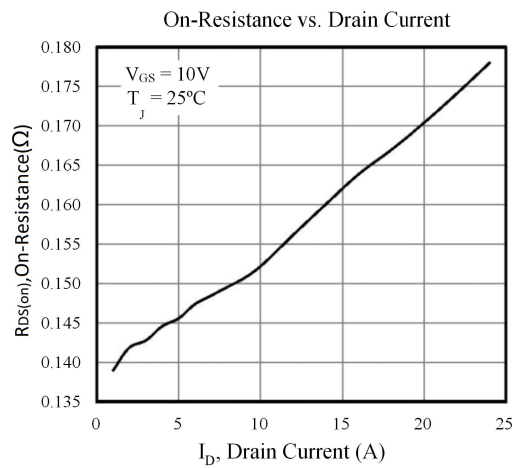
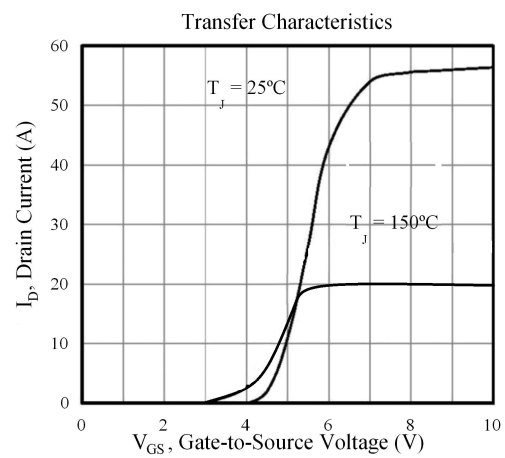
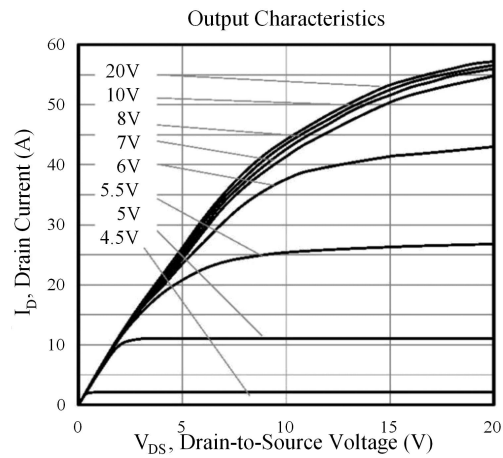
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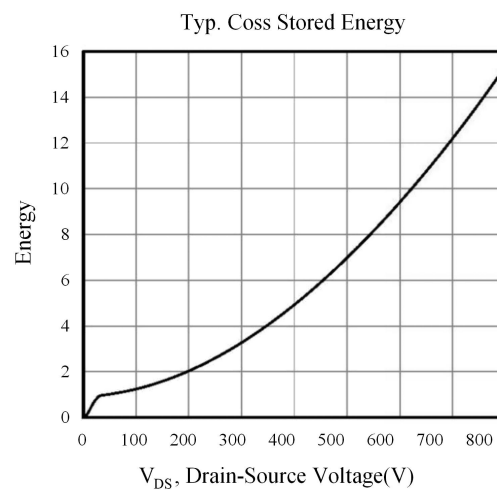
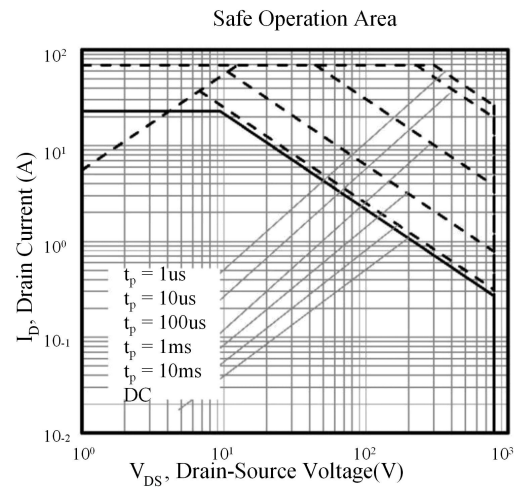
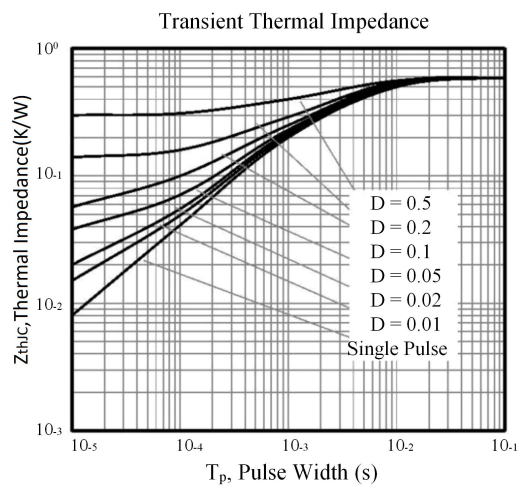
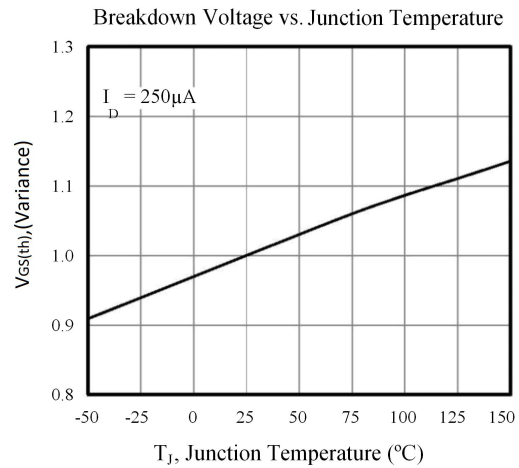
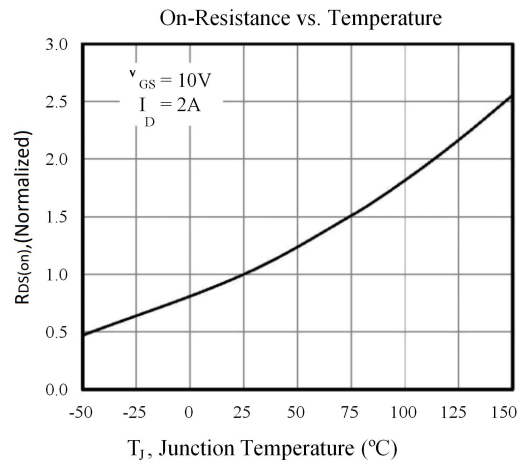
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_D = 10\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$
3. Identical low side and high side switch with identical R_G

Order information

Order codes	Package	Packaging
MS20N85ICC0	TO-247	Tube
MS20N85ICT0	TO-220	Tube
MS20N85ICT1	TO-220F	Tube

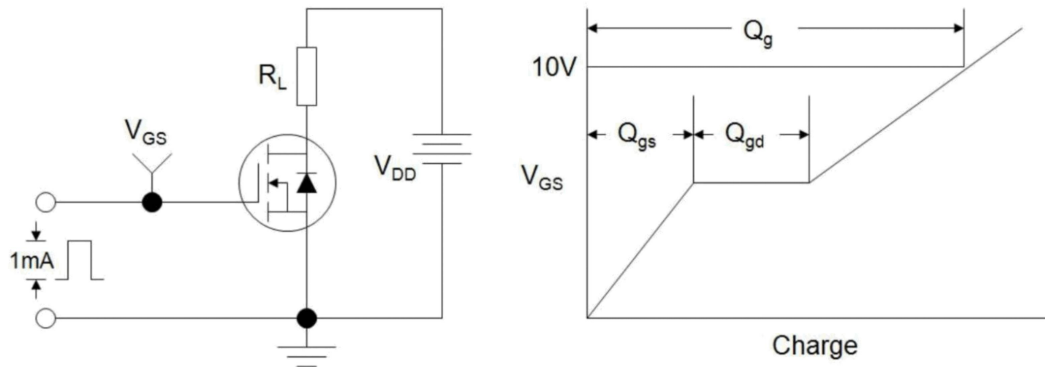
Typical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)



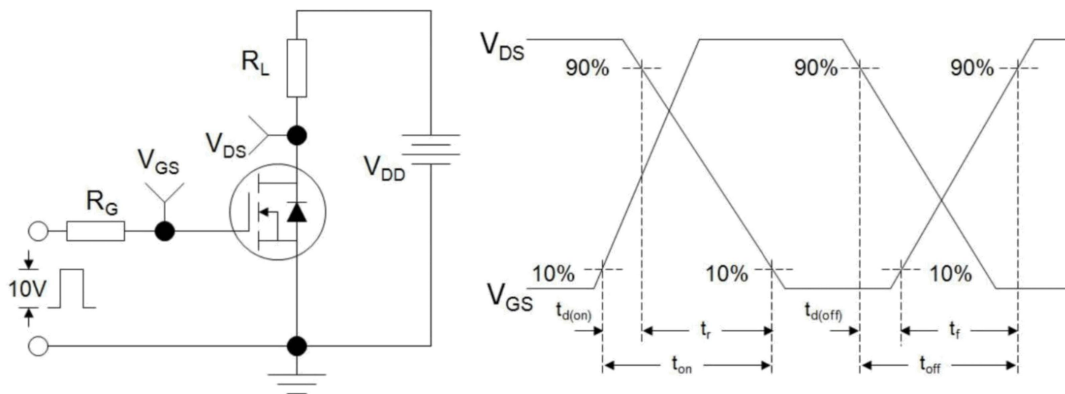


Test Circuit

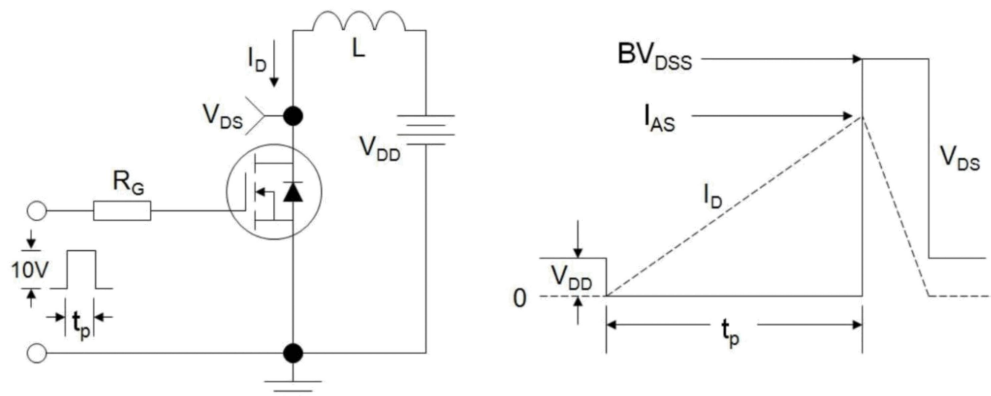
Gate Charge Test Circuit and Waveform



Resistive Switching Test Circuit and Waveform



Unclamped Inductive Switching Test Circuit and Waveform



Package Mechanical DATA

