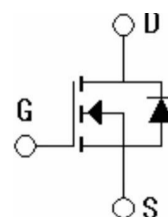
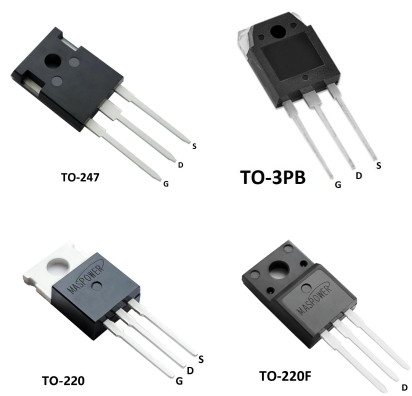


Features

- Low gate charge
- Low C_{rss} (typical 85pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Applications

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- LED power supplies



Absolute Ratings (Tc=25°C)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	600	V
Transient Gate-Source Voltage	V_{GSM}	±30	V
Continuous Gate-Source Voltage	V_{GSS}	±20	V
Drain Current -continuous	I_D , T=25°C T=100°C	20*	A
		12.5*	A
Drain Current - pulse (note 1)	I_{DM}	60*	A
Single Pulsed Avalanche Energy (note 2)	E_{AS}	1090	mJ
Avalanche Current (note 1)	I_{AR}	20	A
Repetitive Avalanche Current (note 1)	E_{AR}	20.7	mJ
Peak Diode Recovery dv/dt (note 3)	dv/dt	50	V/ns
Power Dissipation (TO-3PB\TO-247\TO-220)	P_D	272	W
		2.17	W/°C
Power Dissipation(TO-220F)	P_D	31.7	W
		0.25	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes	T_L	300	°C

*Drain current limited by maximum junction temperature

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

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						
Drain-Source Voltage	BV _{DSS}	I _D =250uA,V _{GS} =0V	600	-	-	V
Breakdown Voltage	ΔBV _{DSS} / ΔT _J	I _D =250uA,referenced to 25℃	-	0.5	-	V/℃
Temperature Coefficient		V _{DS} =600V,V _{GS} =0V, T _C =25℃	-	-	1	uA
Zero Gate Voltage		V _{DS} =480V,T _C =125℃	-	-	10	uA
Drain Current						
Gate-body leakage current, forward	I _{GSSF}	V _{DS} =0V,V _{GS} =30V	-	-	100	nA
Gate-body leakage current,reverse	I _{GSSR}	V _{DS} =0V,V _{GS} =30V	-	-	-100	nA
On-Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250uA	2	-	4	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V,I _D =10A	-	0.3	0.35	Ω
		V _{GS} =10V,I _D =10A 100℃	-	0.35	0.39	Ω
Forward Transconductance	g _{fs}	V _{DS} =40V,I _D =4.5A (note 4)	-	18	-	S
Dynamic Characteristics						
Gate resistance	R _g	F=1.0MHZ open drain	3	-	6	Ω
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ	-	2310	2920	pF
Output capacitance	C _{oss}		-	1270	1660	pF
Reverse transfer capacitance	C _{rss}		-	85	120	pF
Switching Characteristics						
Turn-On delay time	td(on)	V _{DD} =250V,ID=20A,R G=25Ω(note 4,5)	-	60	128	ns
Turn-On rise time	tr		-	130	270	ns
Turn-Off delay time	td(off)		-	220	445	ns
Turn-Off Fall time	tf		-	70	145	ns
Total Gate Charge	Q _g	V _{DS} =480V, I _D =20A, V _{GS} =10V(note4,5)	-	50	80	nC
Gate-Source charge	Q _{gs}		-	15	-	nC
Gate-Drain charge	Q _{gd}		-	23	-	nC
Drain-Source Diode Characteristics						
Continuous Drain	I _s		-	-	20	A

-Source Diode Forward Current					
Pulsed Drain-Source Diode Forward Current	ISM		-	-	80 A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$	-	-	1.2 V
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=20A$ $di_F/dt=100A/\mu s$ (note 4)	-	460	- ns
Reverse recovery charge	Q_{rr}		-	5.1	- μC

Parameter	Symbol	Value		Unit
		MS20N60FC/FB/FT	MS20N60FS	
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.46	3.94	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	40	80	$^{\circ}C/W$

Order codes	Package	Packaging
MS20N60FC	TO-247	Tube
MS20N60FB	TO-3PB	Tube
MS20N60FT	TO-220	Tube
MS20N60FS	TO-220F	Tube

Notes:

1:Pulse width limited by maximum junction temperature

2: $L=5.0mH, I_{AS}=20A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$

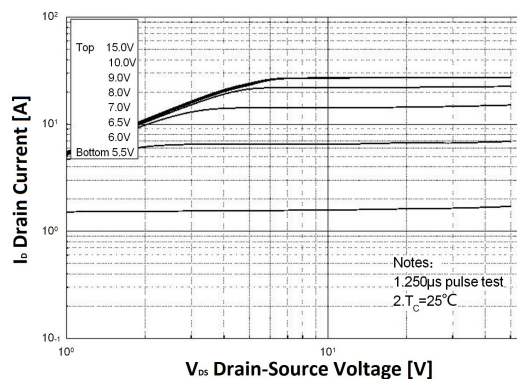
3: $I_{SD}\leq 20A, di/dt\leq 200A/\mu s, V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}C$

4:Pulse Test:Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

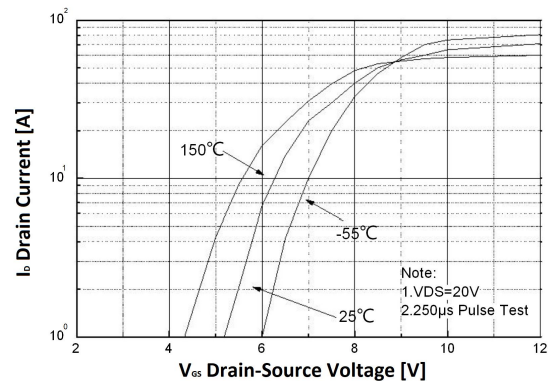
5:Essentially independent of operating temperature

Electrical Characteristics

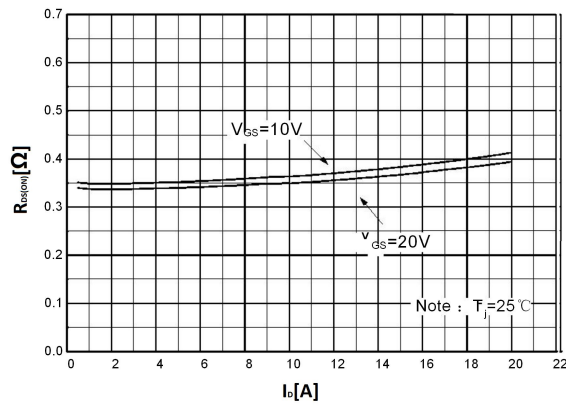
On-Region Characteristics



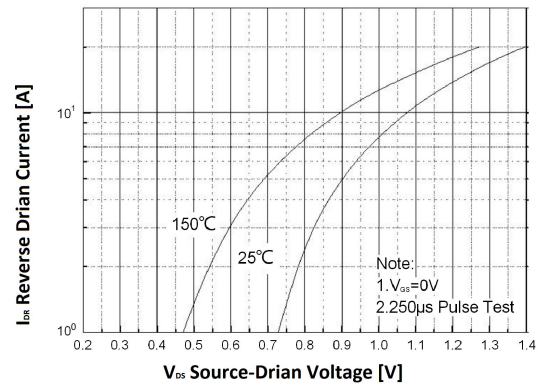
Transfer Characteristics



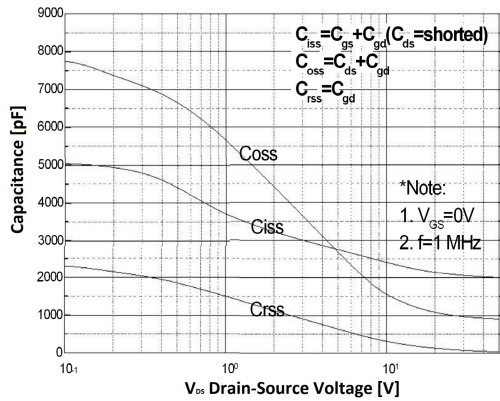
On-Resistance Variation vs Drain Current and Gate Voltage



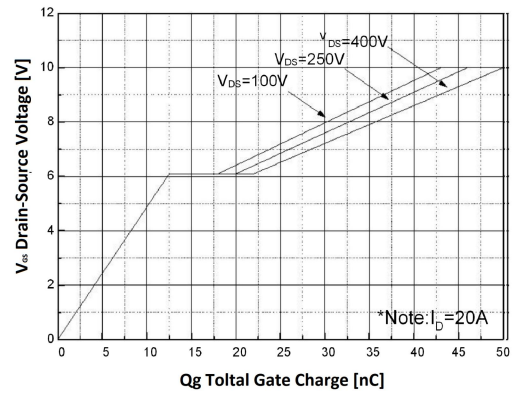
Body Diode Forward Voltage Variation vs. Source Current and Temperature



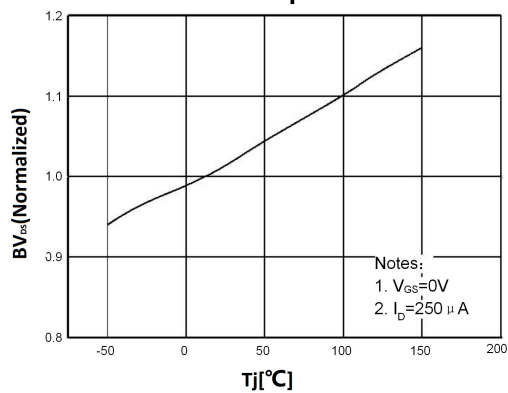
On-Region Characteristics



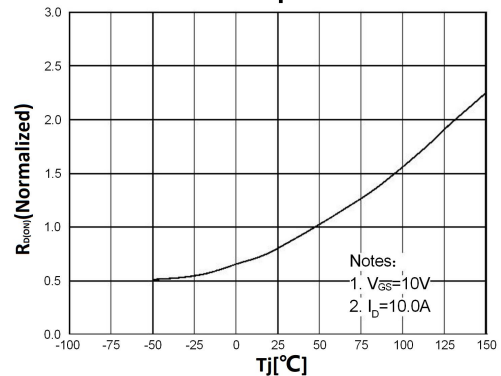
Capacitance Characteristics



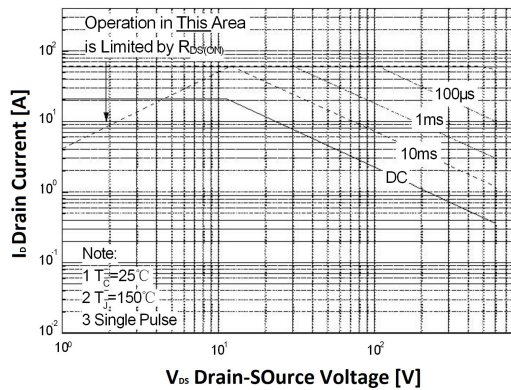
Breakdown Voltage Variation vs. Temperature



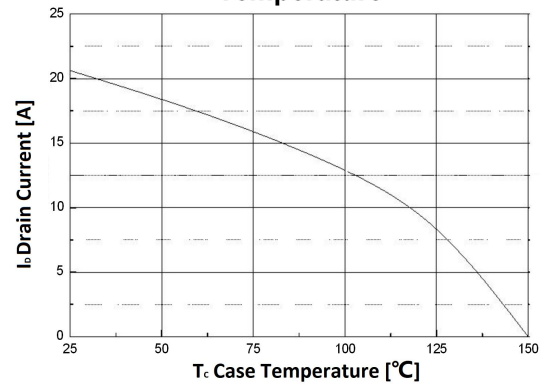
On-Resistance Variation vs. Temperature



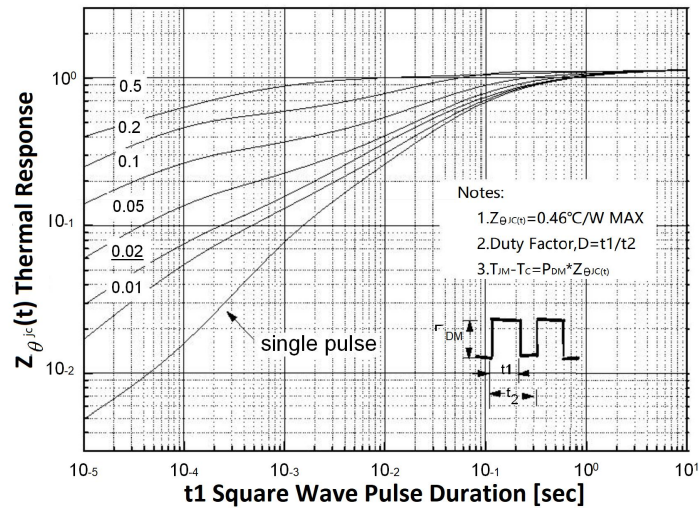
Maximum Safe Operating Area



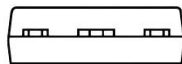
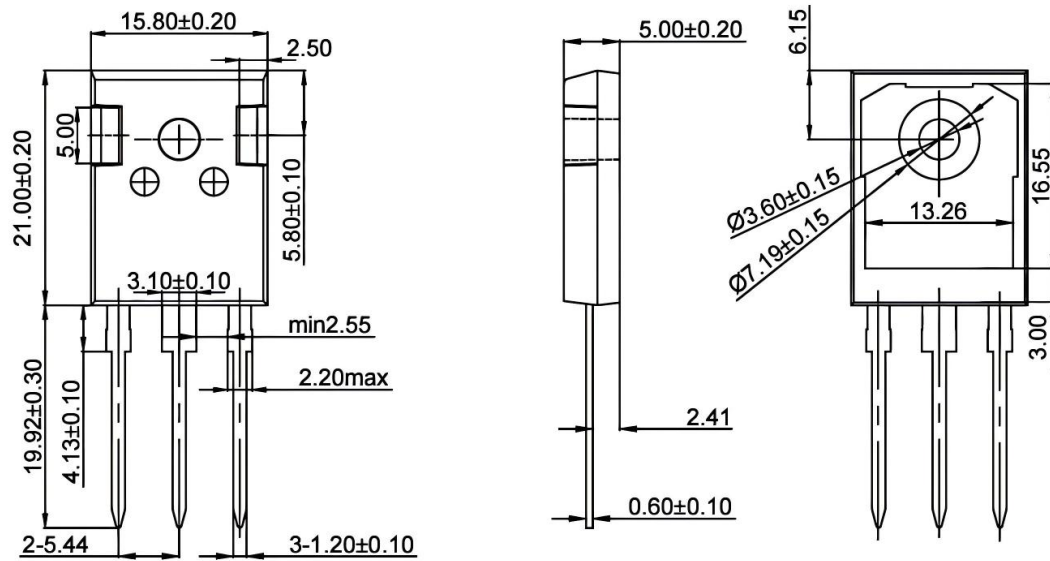
Maximum Drain Current vs. Case Temperature



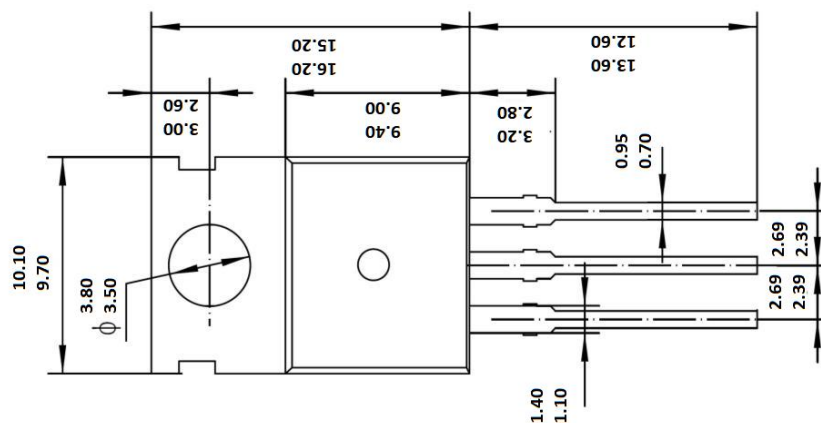
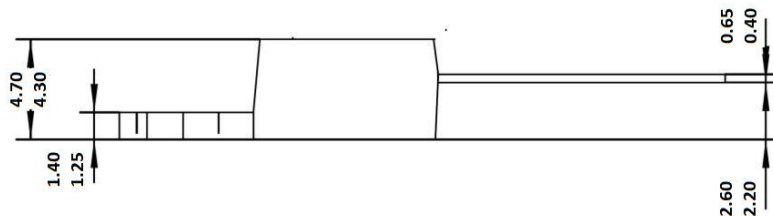
Transient Thermal Response Curve



Package Mechanical DATA



NOTES: 1. surface roughness Ra = 1.14±0.20µm
2. Unmarked tolerance ±0.15
3. unit:mm



Unit: mm

TO-220



