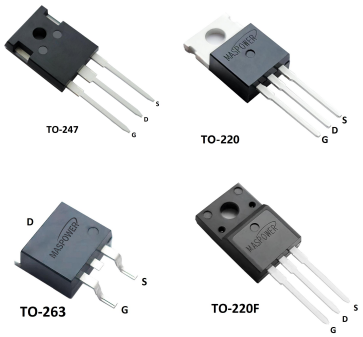
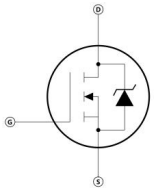
Features

- 100% avalanche tested
- Avalanche ruggedness
- Very low intrinsic capacitances
- High speed switching
- Very low on-resistance



Applications

- Welder
- UPS
- PV Inverter
- Switching applications



Electrical ratings

Absolute maximum ratings			
Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage (V_{GS} = 0)	V_{DS}	1200	V
Gate- source voltage	V_{GS}	± 30	
Drain current (continuous) at T_C = 25 °C	I_D	8	A
Drain current (continuous) at T_c = 100 °C		5.5	
Drain current (pulsed) (note1)	I_{DM}	16	
Peak Diode Recovery dv/dt (note3)	dv/dt	5	V/ns
Total dissipation at T_C = 25 °C	P_{TOT}	260	W
Total dissipation at T_C = 25 °C(TO-220F)	P_{TOT}	68	W
Operating junction temperature	T_J	-55 to 150	℃
Storage temperature	T_{stg}		

Thermal data					
Parameter	**Symbol**	**Value**			**Unit**
		TO-247/ TO-263	**TO-220**	**TO-220F**	
Thermal resistance junction-case max	$R_{thj\text{-}case}$	0.39	0.5	1.84	W/℃
Thermal resistance junction-ambient max	$R_{thj\text{-}amb}$	50	62.5	62.5	
Maximum lead temperature for soldering purpose	T_J	300			

Avalanche characteristics			
Parameter	**Symbol**	**Max value**	**Unit**
Avalanche current, repetitive or not-repetitive (pulse width limited by T_J max) (note1)	I_{AR}	8	A
Single pulse avalanche energy (starting T_J = 25 °C, I_D = I_{AR}, V_{DD} = 50 V) (note2)	E_{AS}	83	mJ

Electrical Characteristics (Tvj = 25°C unless otherwise specified)

On /off states						
Parameter	**Symbol**	**Test conditions**	**Min**	**Type**	**Max**	**Unit**
Drain-source breakdown voltage	$V_{(BR)DSS}$	I_D = 1 mA, V_{GS} = 0	1200	-	-	V
Zero gate voltage drain current (V_{GS} = 0)	I_{DSS}	V_{DS} = Max rating V_{DS}=Max rating, T_C=125 °C	-	-	10	μA
Gate-body leakage current (V_{DS} = 0)	I_{GSS}	V_{GS} = ± 30 V	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	3	4	5	V
Static drain-source on resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4A	-	2.3	3.5	Ω

Dynamic						
Parameter	**Symbol**	**Test conditions**	**Min**	**Type**	**Max**	**Unit**
Forward transconductance	g_{fs}	V_{DS} = 30 V, I_D = 2 (note 4)	-	4.2	-	S
Input capacitance	C_{iss}	V_{DS}=25V,f=1MHz,V_{GS}=0	-	833	-	pF
Output capacitance	C_{oss}		-	150	-	
Reverse transfer capacitance	C_{rss}		-	98	-	
Gate input resistance	R_g	f=1MHz Gate DC Bias=0 Test signal level=20mV open drain	-	2.61	-	Ω
Total gate charge	Q_g	V_{DD}=960V,I_D=4A V_{GS}=10V (note 4,5)	-	39	-	nC
Gate-source charge	Q_{gs}		-	6	-	
Gate-drain charge	Q_{gd}		-	25	-	

Switching times						
Parameter	**Symbol**	**Test conditions**	**Min**	**Type**	**Max**	**Unit**
Turn-on delay time	$t_{d(on)}$	V_{DD} = 600 V, I_D = 4 A,	-	29	-	ns

Rise time	t_r	R_G = 25 Ω, V_{GS} = 10 V	-	55	-	
Turn-off-delay time	$t_{d(off)}$		-	94	-	
Fall time	t_f		-	88	-	

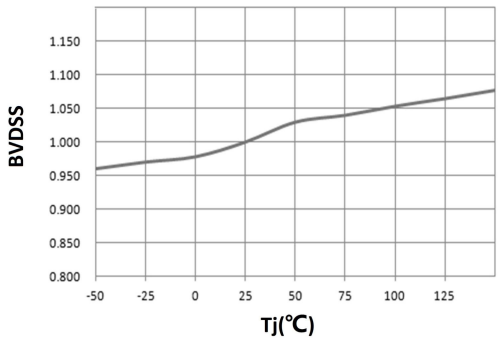
Source drain diode						
Parameter	**Symbol**	**Test conditions**	**Min**	**Type**	**Max**	**Unit**
Source-drain current	I_{SD}		-	8	-	A
Source-drain current (pulsed)	I_{SDM}		-	22	-	
Forward on voltage	V_{SD}	I_{SD}= 4A, V_{GS}= 0	-	-	1.6	V
Reverse recovery time	t_{rr}	I_{SD}= 4A, di/dt= 100A/μs T_J=25°C(note 4)	-	595	-	nS
Reverse recovery charge	Q_{rr}		-	4.9	-	μC

Order information

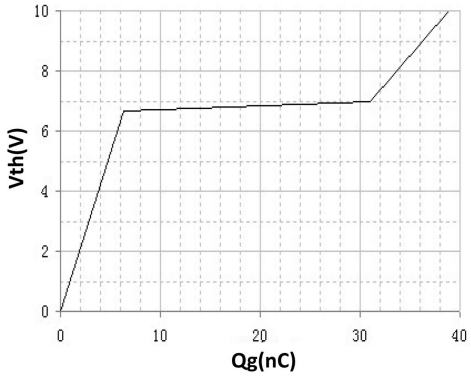
MS8N120FC	TO-247		
MS8N120FT	TO-220		
MS8N120FE	TO-263		
MS8N120FS	TO-220F		

Electrical characteristics

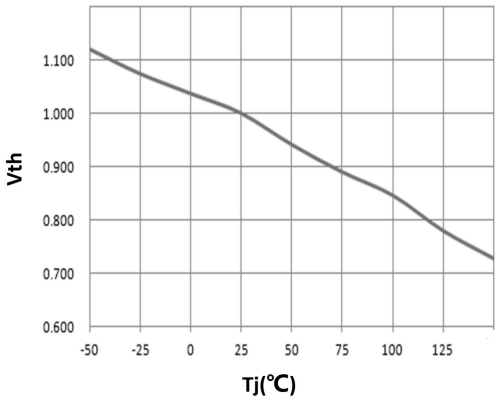
Normalized BV_{DSS} vs. temperature



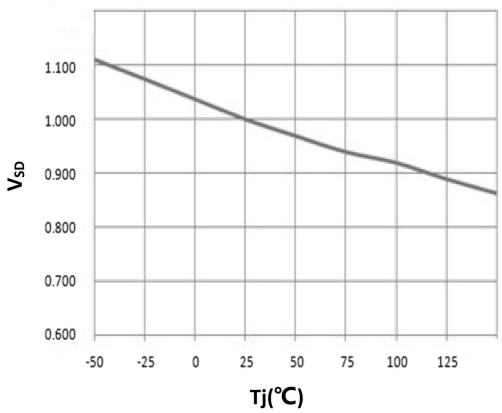
Gate charge vs. V_{GS}



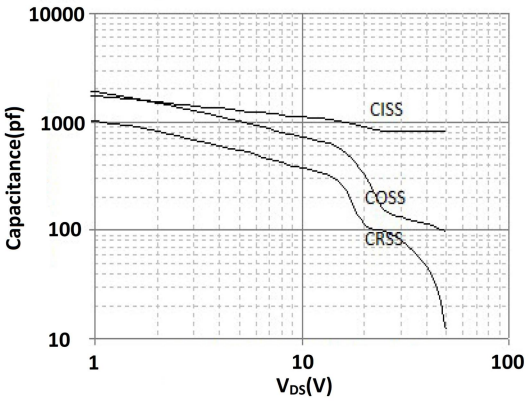
Normalized Vth vs. temperature



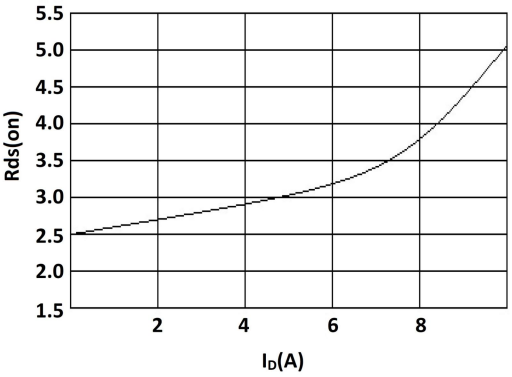
Normalized V_{SD} vs. temperature



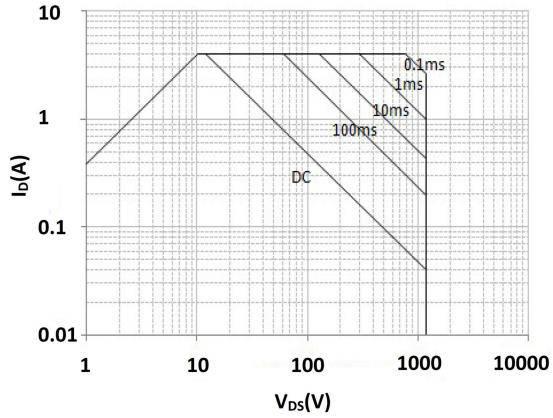
Capacitance Characteristics



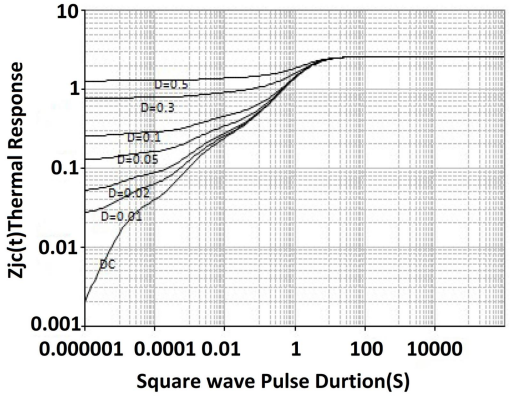
On-Resistance Variation vs ID



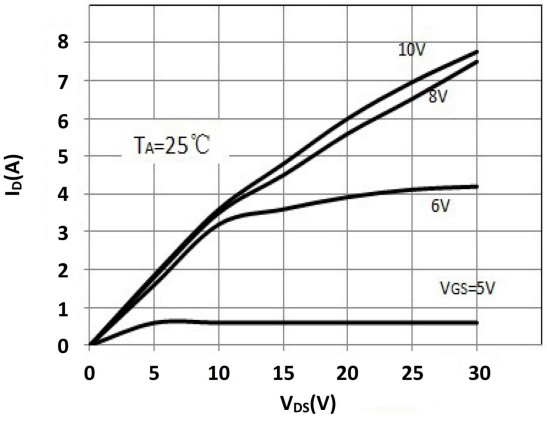
SOA



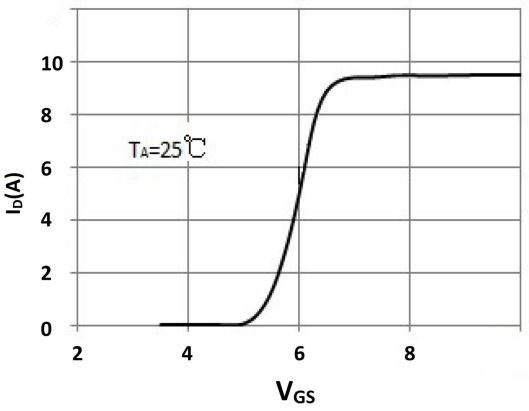
Thermal impedance



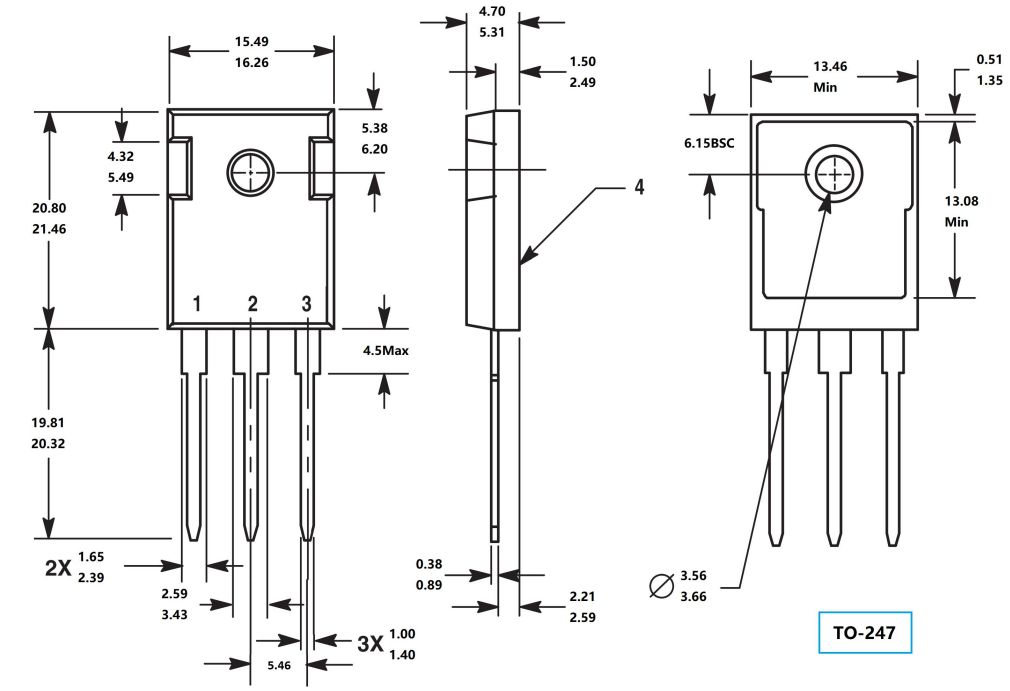
Output characteristics

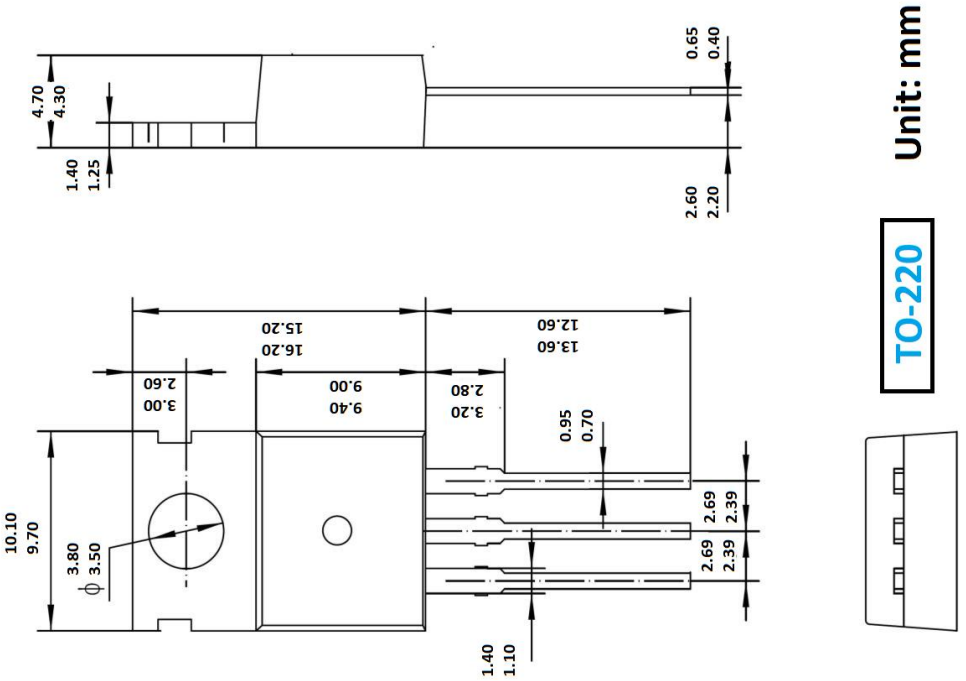


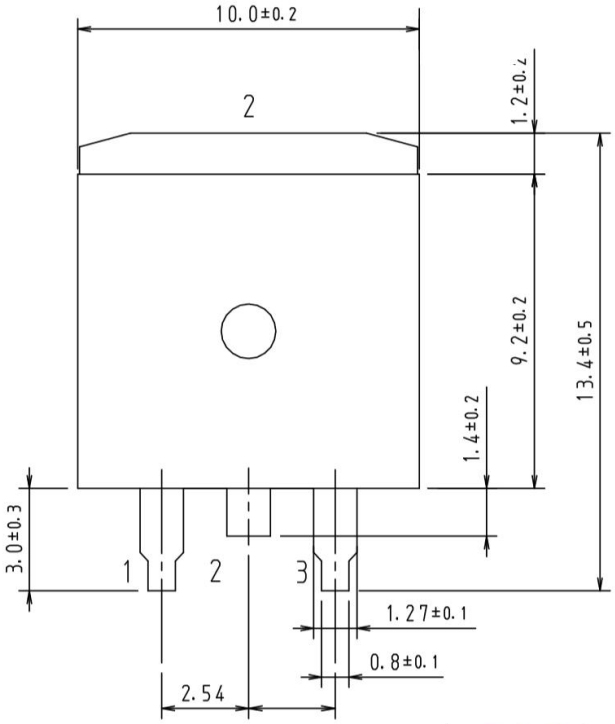
Transfer characteristics



Package outline dimension

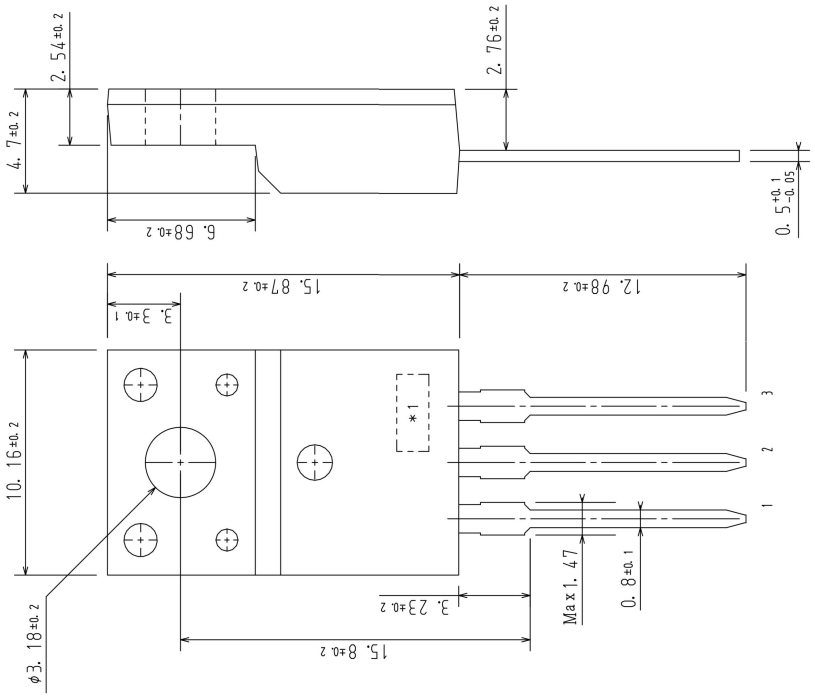






TO-263

Unit:mm



Uint: mm

TO-220F