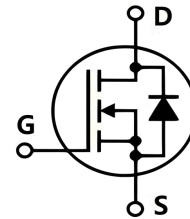
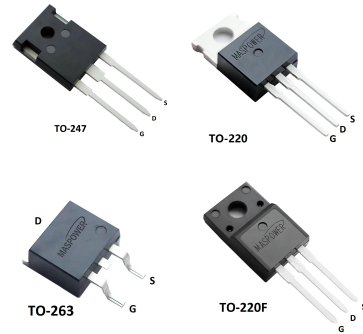


Features

- 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_{DSS}	1200	V
Transient Gate-source voltage	V_{GSM}	± 30	
Gate- source voltage(DC)	V_{GSS}	± 20	
Drain current (continuous) at $T_C = 25\text{ }^{\circ}\text{C}$	I_D	8	A
Drain current (continuous) at $T_C = 100\text{ }^{\circ}\text{C}$		5.5	
Drain current (pulsed) (pulse width limited by T_J max)	I_{DM}	24	
Peak Diode Recovery dv/dt	dv/dt	5	V/ns
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ (TO-247,TO-263)	P_{TOT}	320	W
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ (TO-220)	P_{TOT}	250	W
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ (TO-220F)	P_{TOT}	67	W
Operating junction temperature	T_J	-55 to 150	$^{\circ}\text{C}$
Storage temperature	T_{stg}		
Maximum lead temperature for soldering purpose	T_J	300	

Thermal data					
Parameter	Symbol	Value			Unit
		TO-247/ TO-263	TO-220	TO-220F	

Thermal resistance junction-case max	$R_{thj-case}$	0.39	0.5	1.84	$^{\circ}C/W$
Thermal resistance junction-ambient max	$R_{thj-amb}$	50	62.5	62.5	

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

Electrical Characteristics ($T_{vj} = 25^{\circ}C$ 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}	$V_{DS} = \text{Max rating}$ $V_{DS} = \text{Max rating}$, $T_C = 125^{\circ}C$	-	-	10	μA
Gate-body leakage current ($V_{DS} = 0$)	I_{GSS}	$V_{GS} = \pm 20$ V	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μA	3.5	4.5	5.5	V
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 1$ A	-	2.9	3.8	Ω

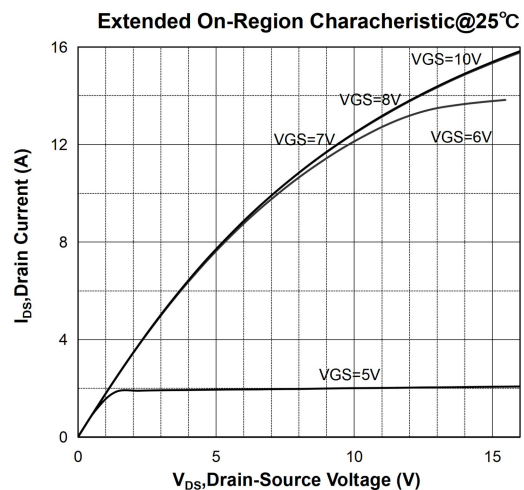
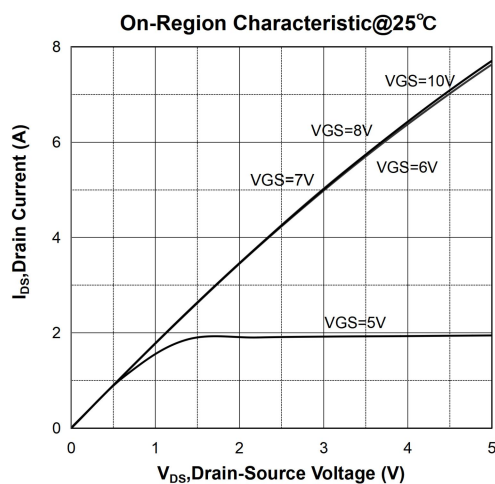
Dynamic						
Parameter	Symbol	Test conditions	Min	Type	Max	Unit
Forward transconductance	g_{fs}	$V_{DS} = 30$ V, $I_D = 2$ (note 4)	-	4.2	-	S
Input capacitance	C_{iss}	$V_{DS} = 25$ V, $f = 1$ MHz, $V_{GS} = 0$	-	833	-	pF
Output capacitance	C_{oss}		-	150	-	
Reverse transfer capacitance	C_{rss}		-	98	-	
Gate input resistance	R_g	$f = 1$ MHz Gate DC Bias = 0 Test signal level = 20 mV open drain	-	2.61	-	Ω
Total gate charge	Q_g	$V_{DD} = 960$ V, $I_D = 4$ A $V_{GS} = 10$ V (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, R _G = 25 Ω, V _{GS} = 10 V	-	29	-	ns
Rise time	t _r		-	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} = 1A, V _{GS} = 0	-	-	1.2	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

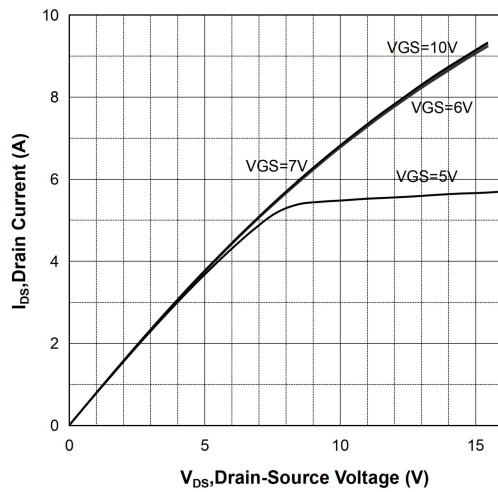
Order information

Ordering Code	Silkscreen	Package
MS8N120FC	MS8N120FC	TO-247
MS8N120FT	MS8N120FT	TO-220
MS8N120FE	MS8N120FE	TO-263
MS8N120FS	MS8N120FS	TO-220F

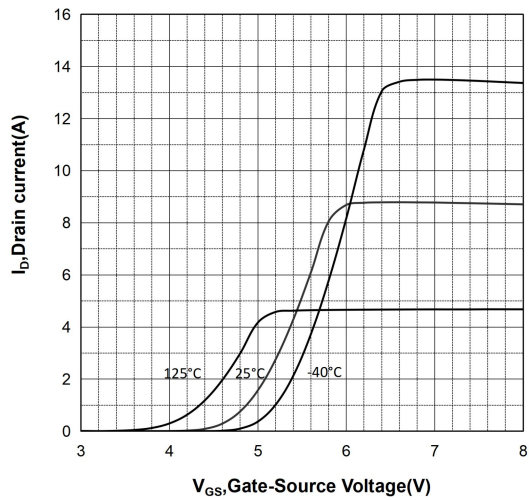
Electrical characteristics



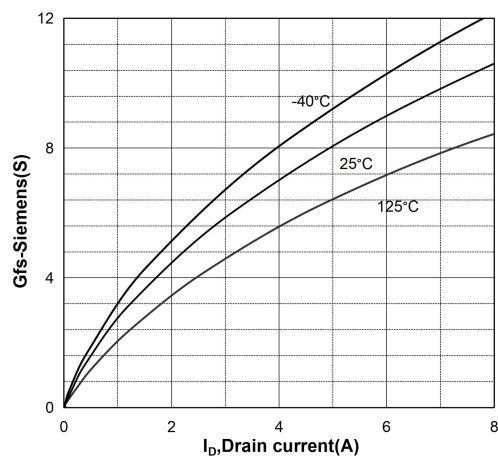
On-Region Characteristic@125°C



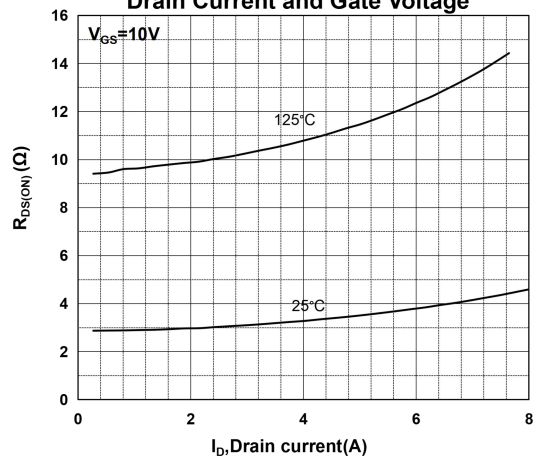
Transfer Characteristics



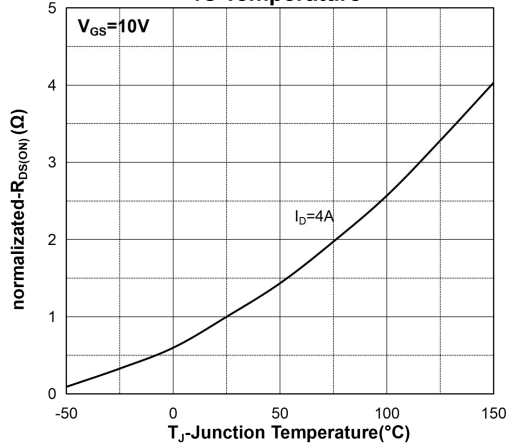
Transconductance



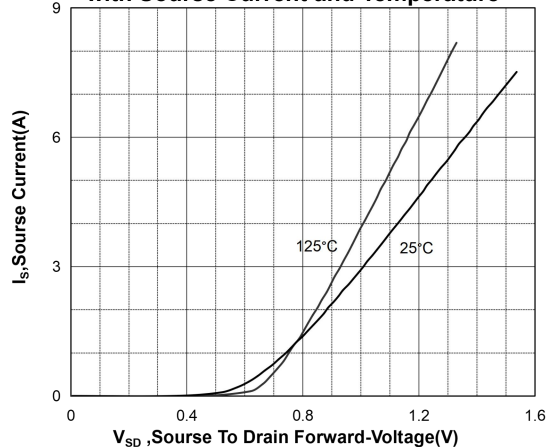
On-Resistance Variation vs Drain Current and Gate Voltage

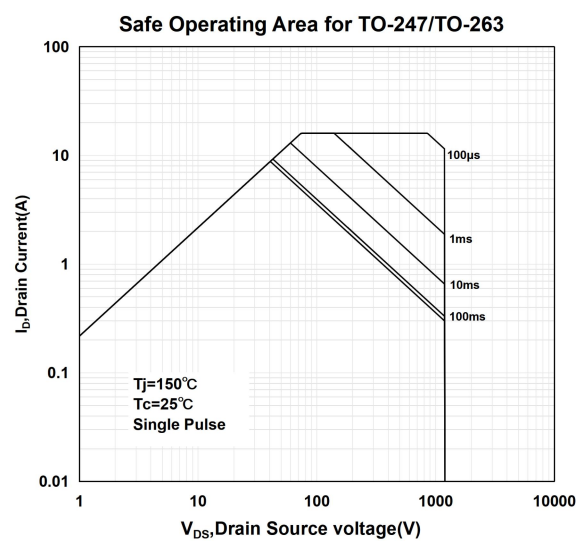
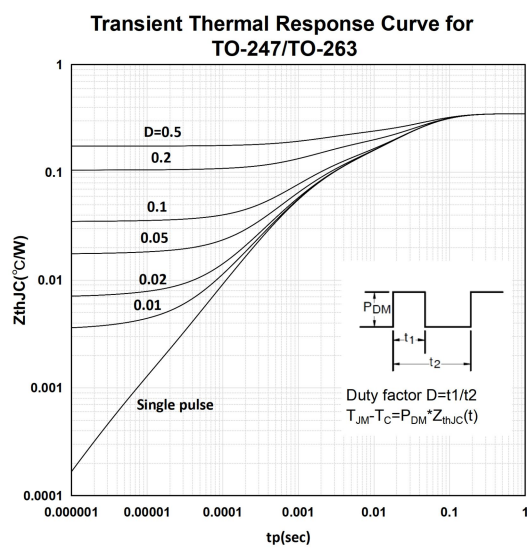
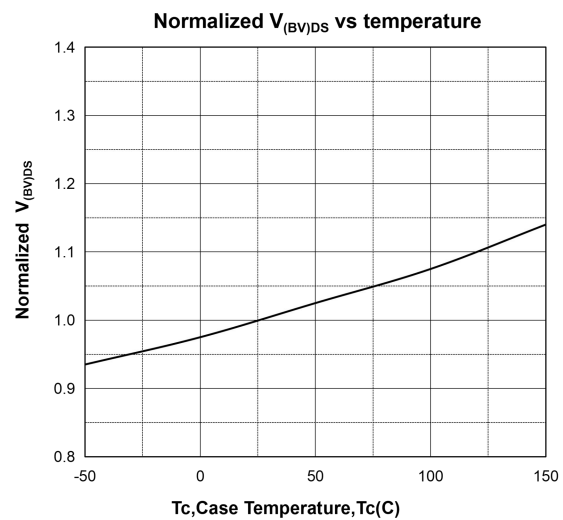
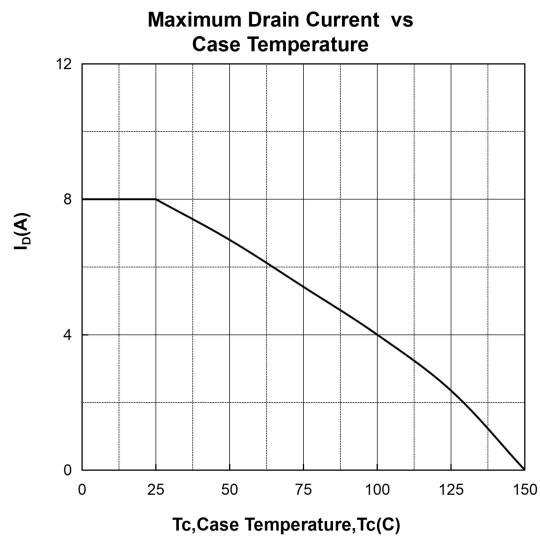
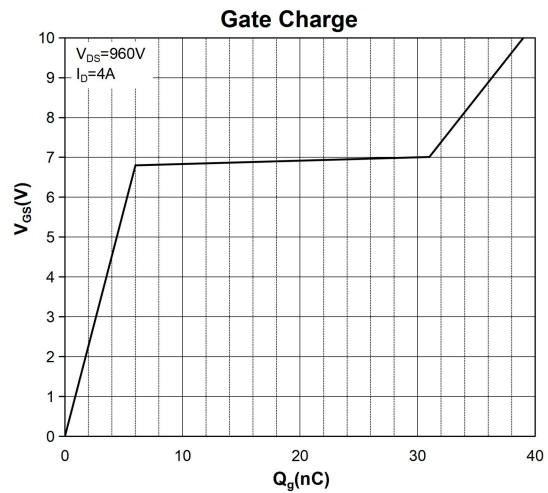
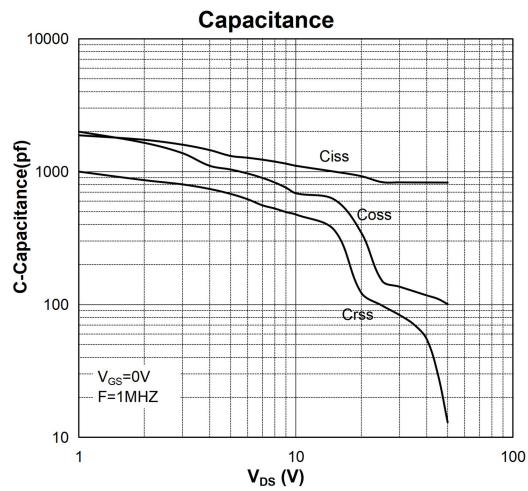


Normalized On-Resistance Variation vs Temperature

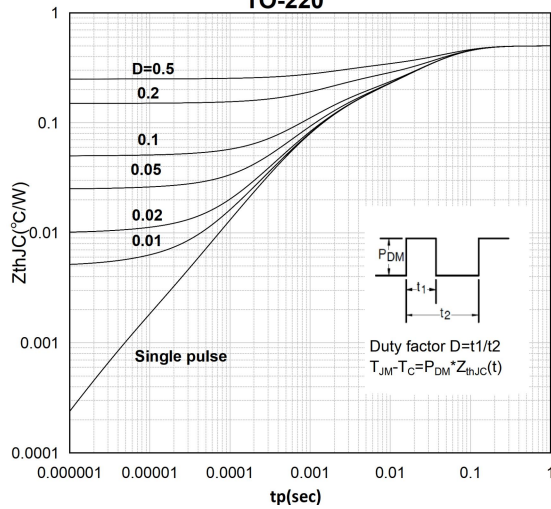


Body Diode Forward Voltage Variation with Source Current and Temperature

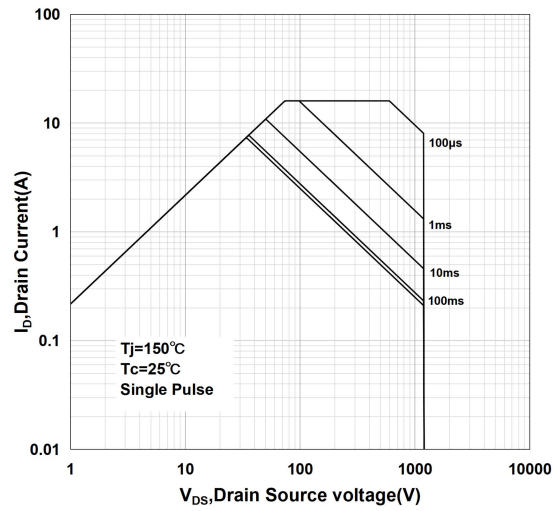




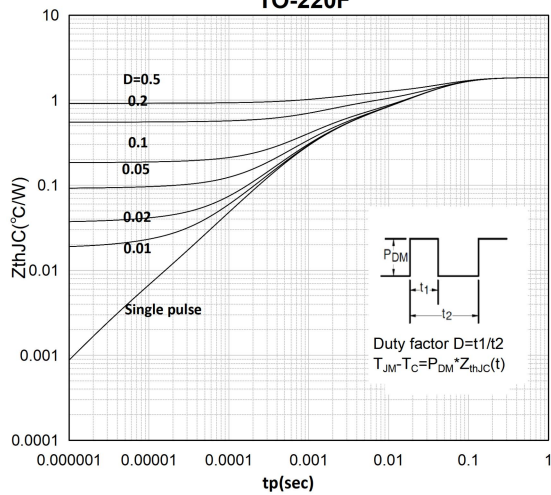
Transient Thermal Response Curve for TO-220



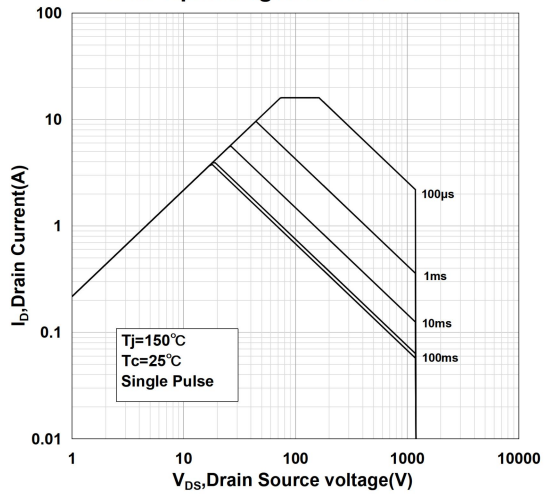
Safe Operating Area for TO-220



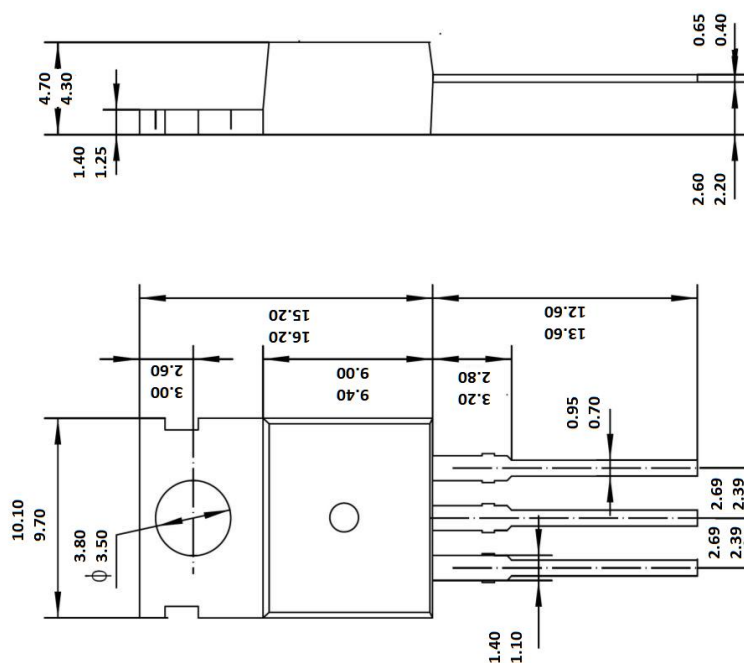
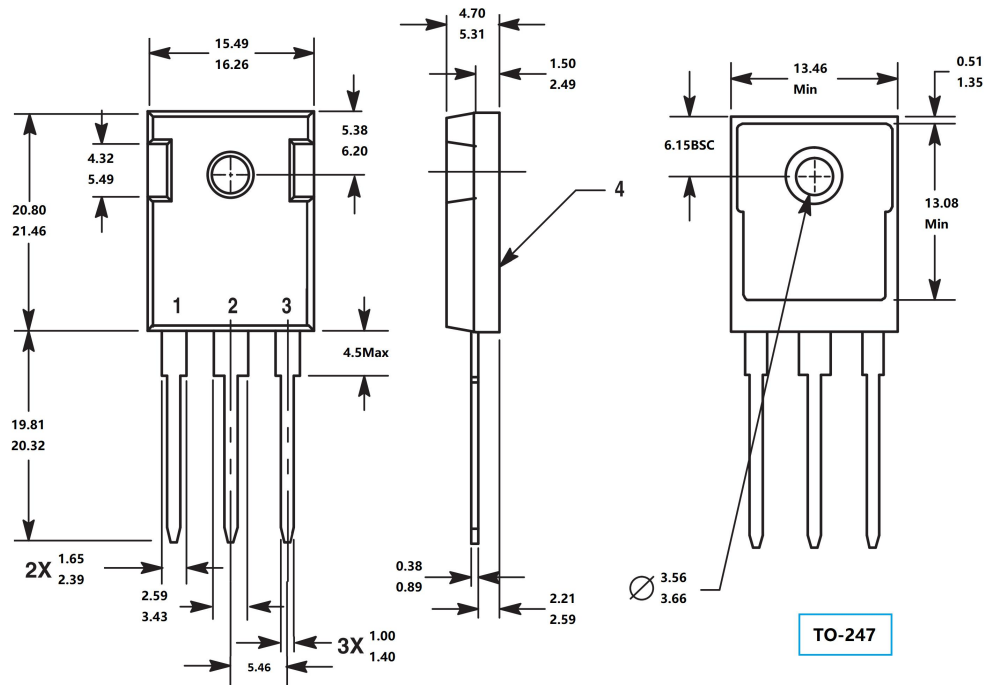
Transient Thermal Response Curve for TO-220F



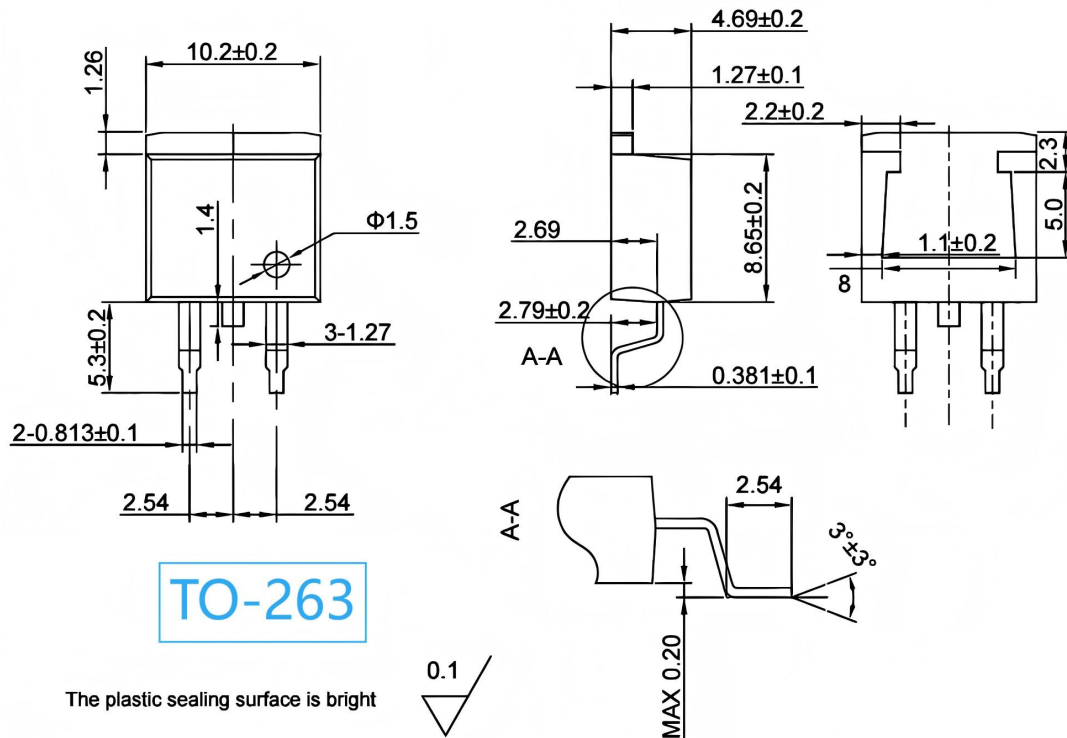
Safe Operating Area for TO-220F



Package outline dimension



Unit: mm



Notes:

1. Unmarked tolerance $\pm 0.15\text{mm}$; unmarked $R < 0.15\text{mm}$
2. The resin body is not allowed to have defects, shrinkage holes, cracks, bubbles and other harmful defects
3. The drawing indicates that the leg has reinforcement
4. Unit : mm

