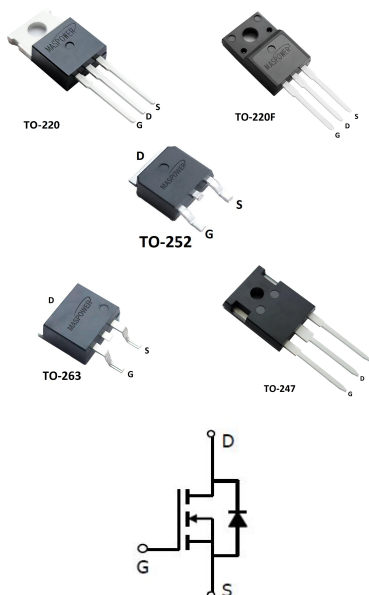


Features

- 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	
Continuous Gate- source voltage(DC)	V_{GSS}	± 20	
Drain current (continuous) at $T_C = 25\text{ }^{\circ}\text{C}$	I_D	6	A
Drain current (continuous) at $T_C = 100\text{ }^{\circ}\text{C}$		3.8	
Drain current (pulsed)	I_{DM}	24	
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ (TO-247/TO-220/TO-263)	P_{TOT}	160	W
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ (TO-220F)	P_{TOT}	32	W
Total dissipation at $T_C = 25\text{ }^{\circ}\text{C}$ (TO-252)	P_{TOT}	45	W
Operating junction temperature	T_J	-55 to 150	$^{\circ}\text{C}$
Storage temperature	T_{stg}		
Maximum lead temperature for soldering purpose	T_L	300	$^{\circ}\text{C}$
Avalanche characteristics			
Parameter	Symbol	Max value	Unit
Avalanche current, repetitive or not-repetitive (pulse width limited by T_J max)	I_{AR}	2.1	A
Single pulse avalanche energy (starting $T_J = 25\text{ }^{\circ}\text{C}$, $I_D = I_{AR}$, $V_{DD} = 50\text{ V}$)	E_{AS}	753	mJ

Electrical Characteristics (T_{vj} = 25°C unless otherwise specified)

On /off states						
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Drain-source breakdown voltage	V _{(BR)DSS}	I _D = 250 μA, V _{GS} = 0V	1200			V
Zero gate voltage drain current (V _{GS} = 0)	I _{DSS}	V _{DS} = Max rating V _{DS} =Max rating, T _C =125 °C			66	μA
Gate-body leakage current (V _{DS} = 0)	I _{GSS}	V _{GS} = ± 20 V			± 100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	3	-	6	V
Static drain-source on resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 1A		5	7	Ω
Forward transconductance	G _{fs}	V _{DS} =20V,I _D =1A	-	3	-	-
Dynamic						
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Forward transconductance	g _{fs}	V _{DS} = 15 V, I _D = 3 A		5.7		S
Input capacitance	C _{iss}	V _{DS} =25V,f=1MHz,V _{GS} =0		1121		pF
Output capacitance	C _{OSS}			97		
Reverse transfer capacitance	C _{rSS}			19		
Equivalent Output capacitance	C _{OSS eq.}	V _{GS} =0,V _{DS} =0 to 1200V		120		
Total gate charge	Q _g	V _{DD} =600V,I _D =3A V _{GS} =10V		85		nC
Gate-source charge	Q _{gs}			14		
Gate-drain charge	Q _{gd}			48		
Switching times						
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Turn-on delay time	t _{d(on)}	V _{DD} = 960V, I _D = 3 A, R _G = 4.7 Ω, V _{GS} = 10 V		33		ns
Rise time	t _r			26		
Turn-off-delay time	t _{d(off)}			46		
Fall time	t _f			21		
Source drain diode						
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Source-drain current	I _{SD}			6		A
Source-drain current (pulsed)	I _{SDM}			24		
Forward on voltage	V _{SD}	I _{SD} = 1A, V _{GS} = 0		0.76		V

Reverse recovery time	t_{rr}	$I_{SD} = 6A, di/dt = 100A/\mu s$ $V_{DD} = 600V$		360		ns
Reverse recovery charge	Q_{rr}			5.3		μC
Reverse recovery current	I_{RRM}			19		A
Reverse recovery time	t_{rr}	$I_{SD} = 6A, di/dt = 100A/\mu s$ $V_{DD} = 600V, T_J = 125^\circ C$		520		ns
Reverse recovery charge	Q_{rr}			7.6		μC
Reverse recovery current	I_{RRM}			17		A

Thermal data

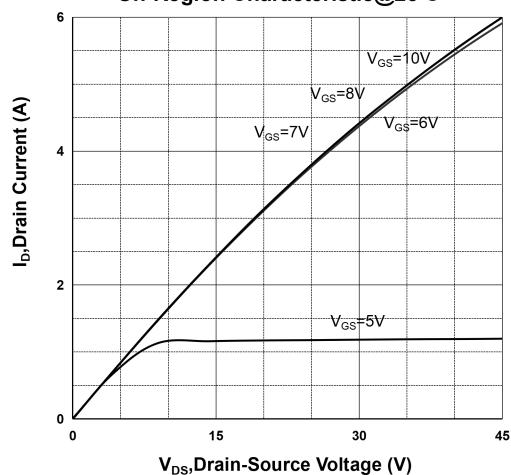
Parameter	Symbol	Value			Unit
		TO-247/TO-220 /TO-263	TO-220F	TO-252	
Thermal resistance junction-case max	R_{thj-c}	0.78	3.79	2.7	$^\circ C/W$
Thermal resistance junction-ambient max	R_{thj-a}	40	84	62.5	

Order information

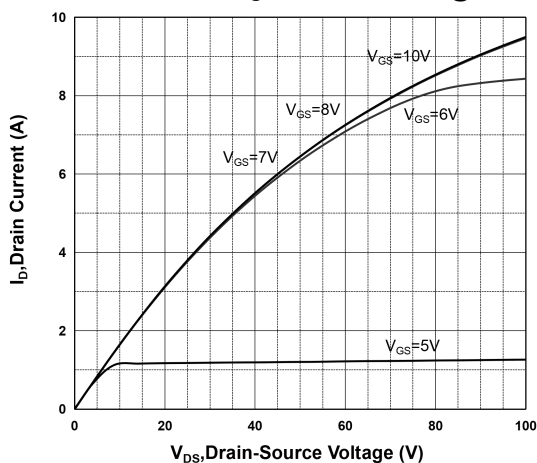
	Parking		
MS6N120FS	TO-220F	Tube	
MS6N120FT	TO-220	Tube	
MS6N120FC	TO-247	Tube	
MS6N120FE	TO-263	Tube	
MS6N120FD	TO-252	Tube	

Electrical characteristics

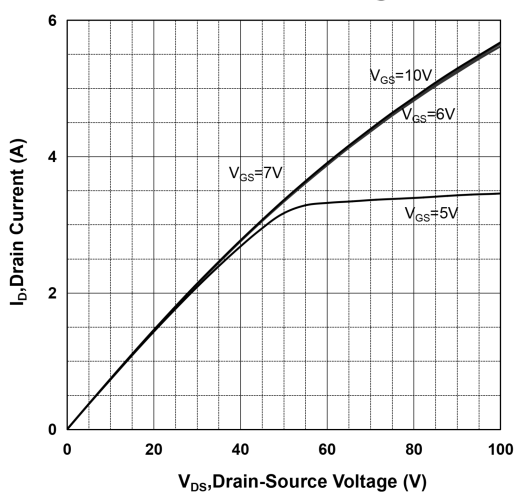
On-Region Characteristic@25°C



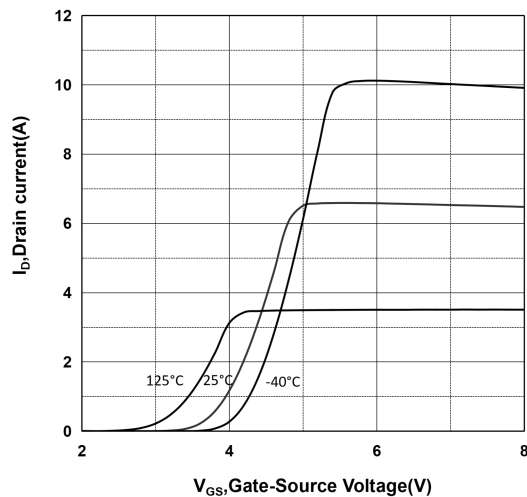
Extended On-Region Characteristic@25°C



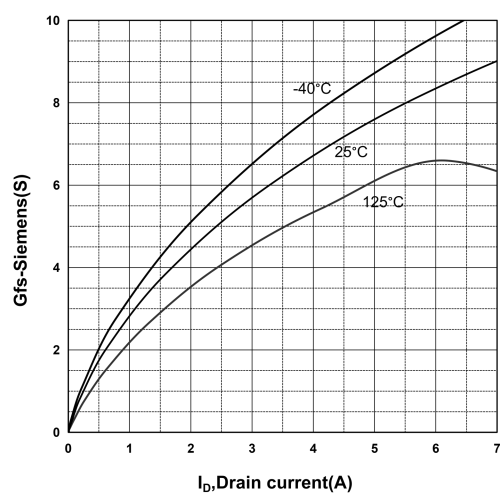
On-Region Characteristic@125°C



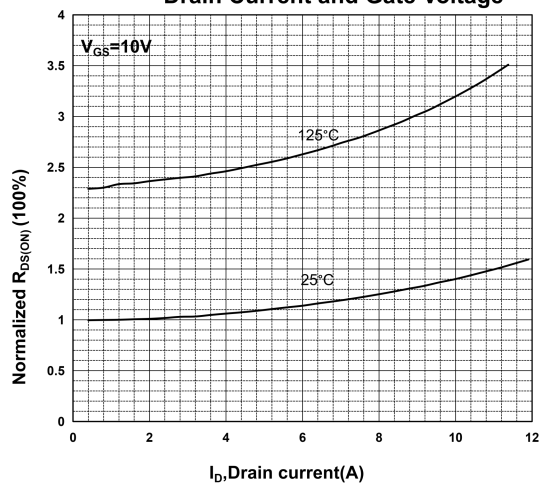
Transfer Characteristics

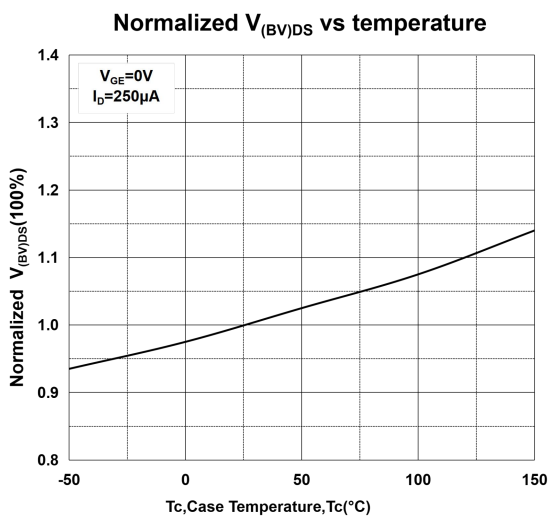
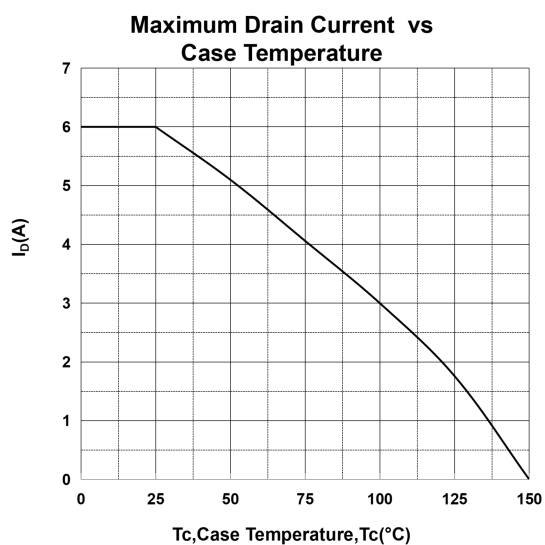
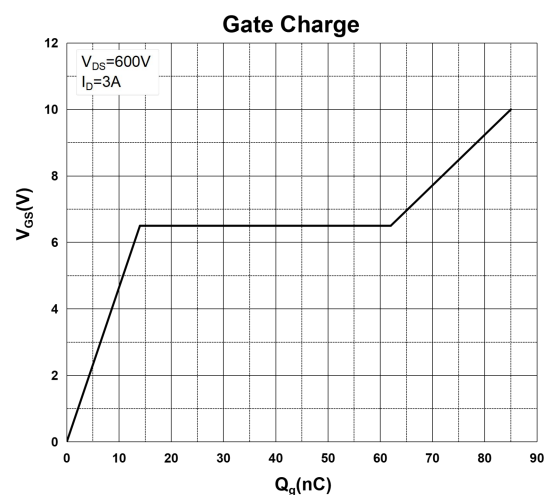
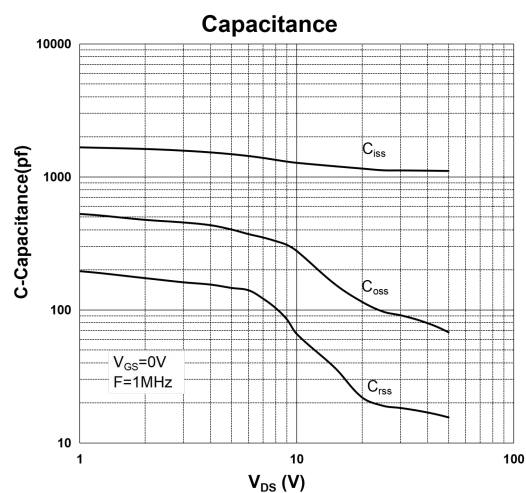
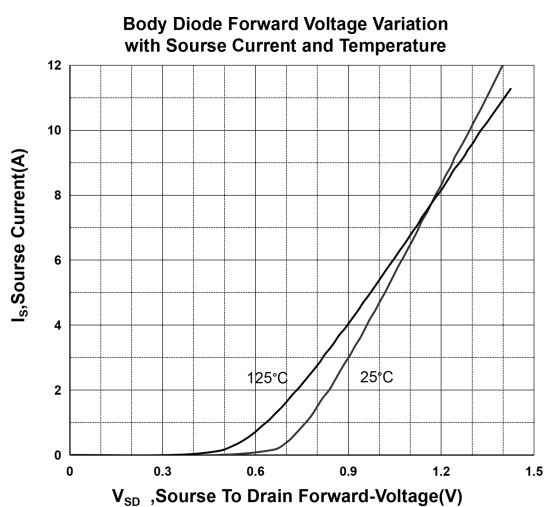
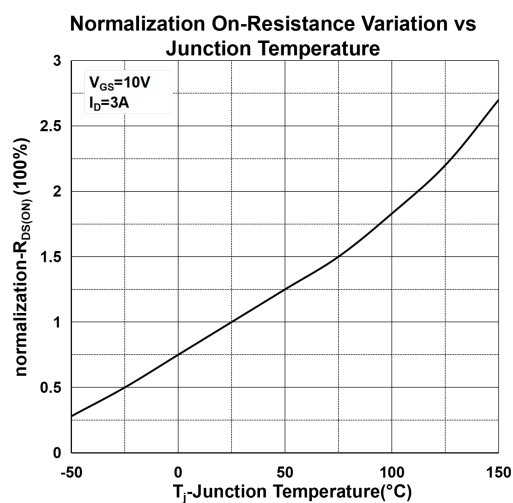


Transconductance

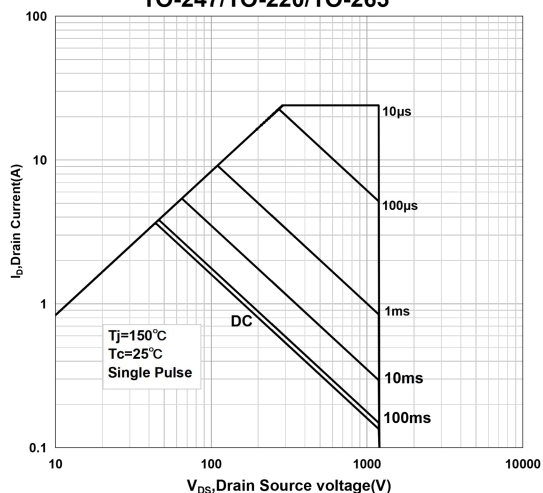


Normalized On-Resistance Variation vs Drain Current and Gate Voltage

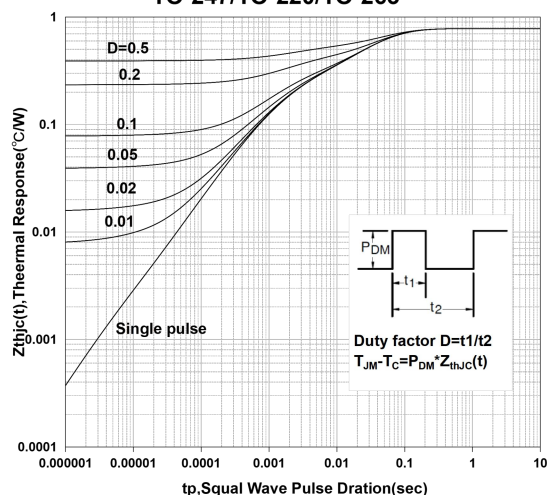




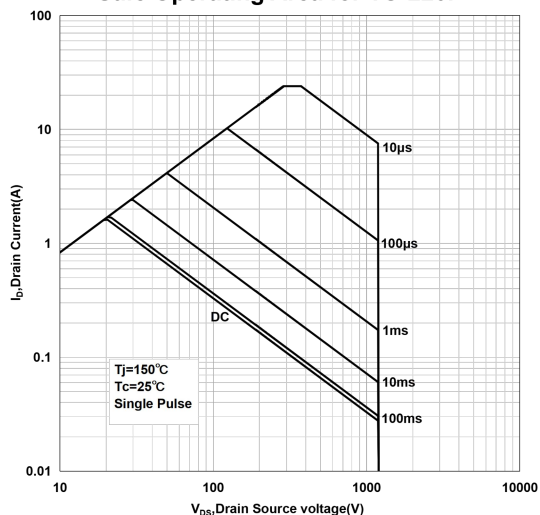
Safe Operating Area for TO-247/TO-220/TO-263



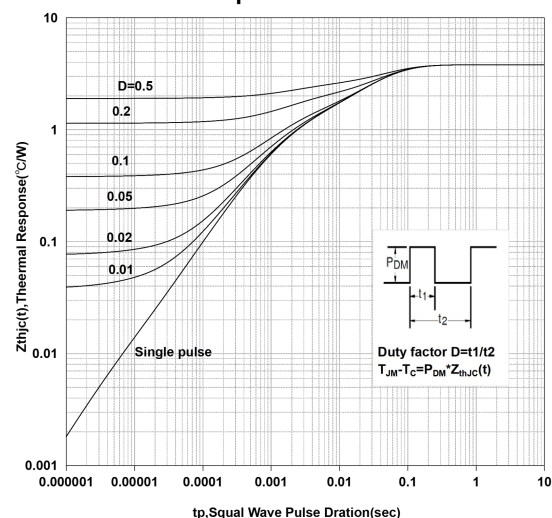
Transient response Curve for TO-247/TO-220/TO-263



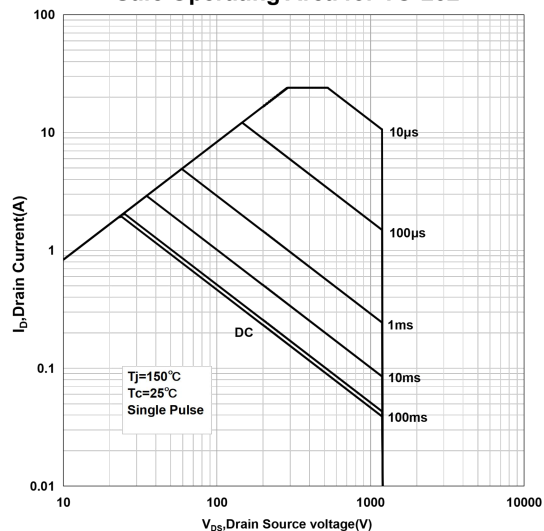
Safe Operating Area for TO-220F



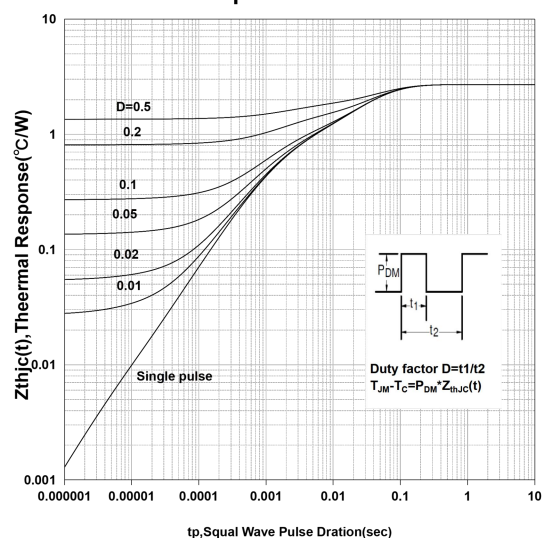
Transient response Curve for TO-220F



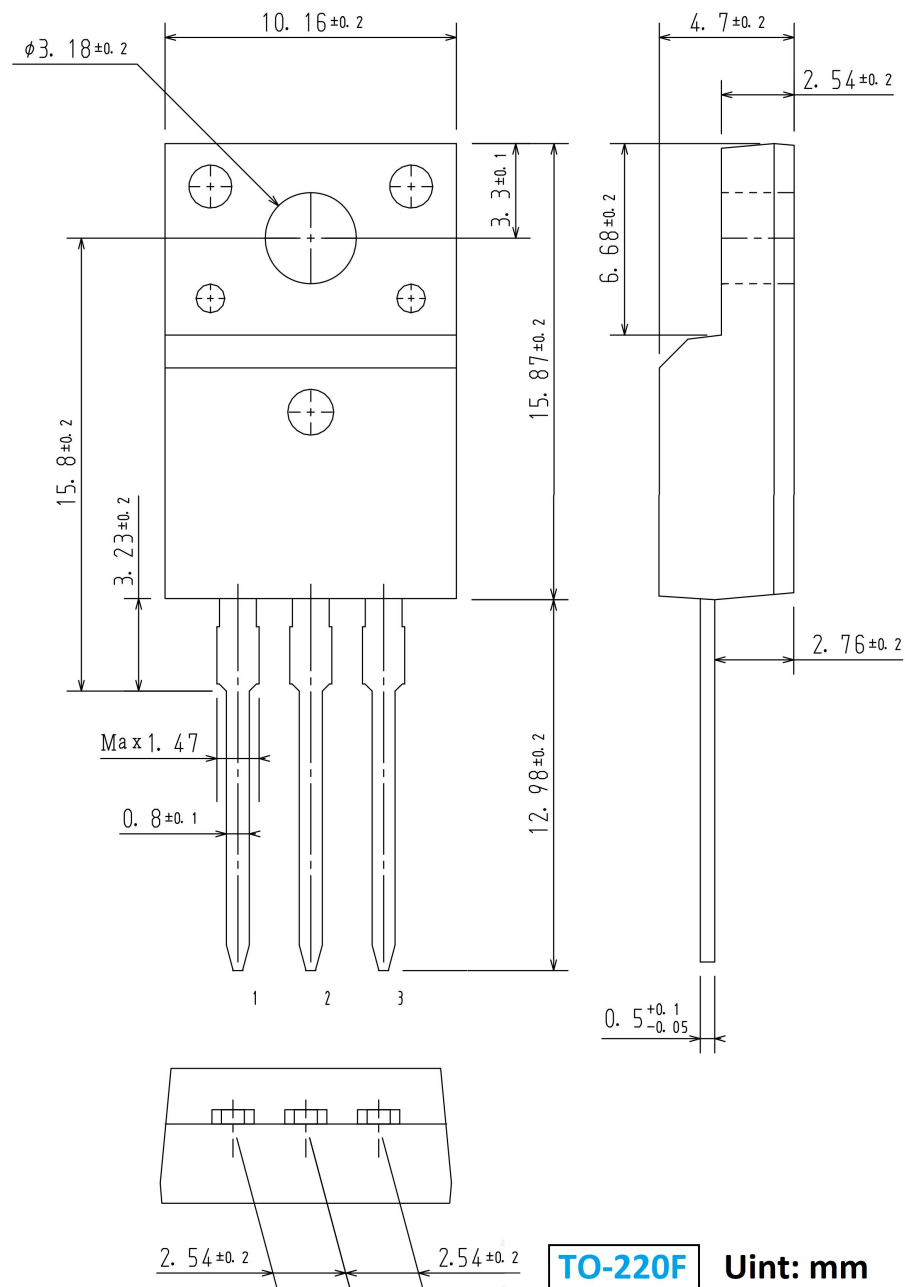
Safe Operating Area for TO-252

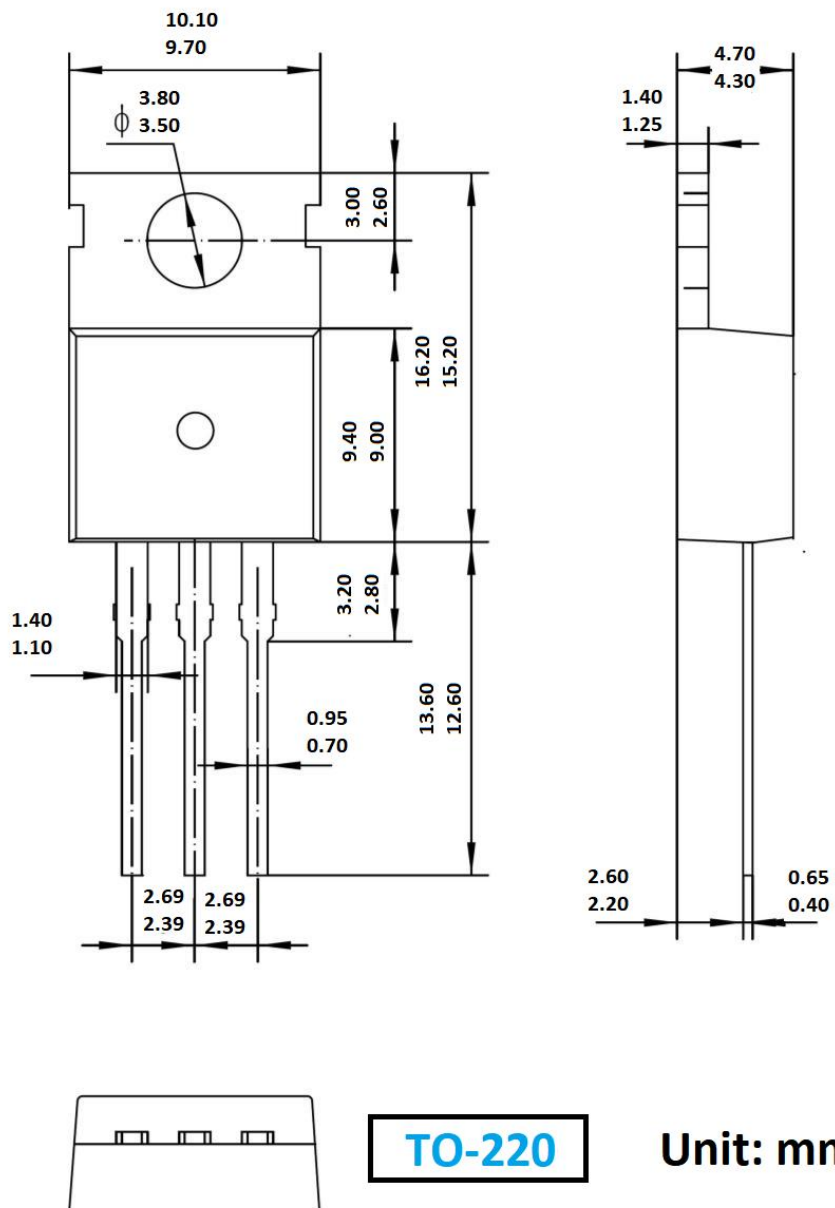


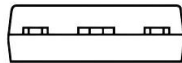
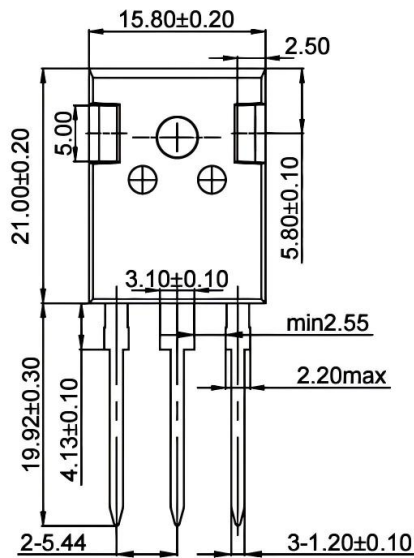
Transient response Curve for TO-252



Package outline dimension

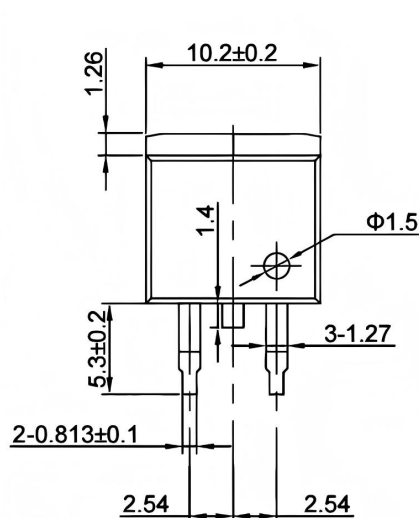






NOTES: 1. surface roughness $R_a = 1.14 \pm 0.20 \mu m$
 2. Unmarked tolerance ± 0.15
 3. unit: mm

TO-247



TO-263

The plastic sealing surface is bright



Notes:

1. Unmarked tolerance $\pm 0.15 mm$; unmarked $R < 0.15 mm$
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

