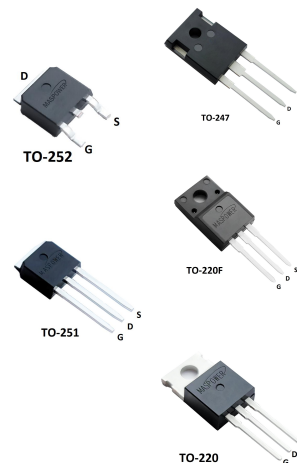
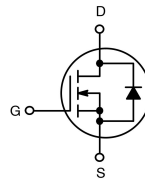


features

- Low gate charge (typical 22nC)
- Low C_{RSS} (typical 10pF)
- 100% avalanche tested
- Fast switching
- Improved dv/dt capability



Applications

- Switching application

Electrical ratings ($T_C=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit	
Drain-source voltage ($V_{GS}=0$)	V_{DSS}	1000	V	
Transient Gate-source voltage	V_{GSM}	± 30		
Continuous Gate-source voltage(DC)	V_{GS}	± 20		
Drain current (continuous)	I_D	$T_C=25^\circ\text{C}$	3	A
		$T_C=100^\circ\text{C}$	2.1	
Drain current-pulsed(note 1)	I_{DM}	12	A	
Avalanche current repetitive or not-repetitive (note 1)	I_{AR}	3	A	
Single pulse avalanche energy (note 2)	E_{AS}	300	mJ	
Total dissipation at $T_C=25^\circ\text{C}$ (TO-247/TO-220)	PD	272	W	
Total dissipation at $T_C=25^\circ\text{C}$ (TO-252/TO-251)	PD	50	W	
Total dissipation at $T_C=25^\circ\text{C}$ (TO-220F)	PD	74	W	
Peak diode recovery voltage slope (note 3)	dv/dt	4.5	V/ns	
Operating junction temperature	T_J	-55 to 150	$^\circ\text{C}$	
Storage temperature	T_{STG}			
Maximum Lead Temperature for Soldering Purposes	T_L			300

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

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
On/off states						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=1mA, V_{GS}=0$	1000	-	-	V
Zero gate voltage drain current ($V_{GS}=0$)	I_{DSS}	$V_{DS}=\text{Max rating}$	-	-	1	μA
		$T_C=125^{\circ}C$	-	-	100	μA
Gate body leakage current ($V_{GS}=0$)	I_{GSS}	$V_{GS}=\pm 20V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	3.5	4.5	V
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=1A$	-	4.8	6.0	Ω
Dynamics						
Forward transconductance	g_{fs}	$V_{DS} = 10 V,$ $I_D = 1 A$	-	2.3	-	S
Input capacitance	C_{iss}	$V_{DS}=25V, f=1MHz, V_{GS}=0$	-	670	800	pF
Output capacitance	C_{oss}		-	50	70	
Reverse transfer capacitance	C_{rss}		-	10	15	
Total gate charge	Q_g	$V_{DD}=800V, I_D=3A$ $V_{GS}=10V$	-	22	30	nC
Gate-source charge	Q_{gs}		-	3.5	-	
Gate-drain charge	Q_{gd}		-	14	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 500V,$ $I_D = 3A,$ $R_G = 25 \Omega,$ $V_{GS} = 10 V$	-	15	40	ns
Rise time	t_r		-	35	80	
Turn-off-delay time	$t_{d(off)}$		-	20	50	
Fall time	t_f		-	30	70	
Source Drain Diode						
Source Drain Current	I_{SD}		-	-	3	A
Source Drain Current(Pulsed)	I_{SDM}		-	-	12	A
Forward On Voltage	V_{SD}	$I_{SD}=1A, V_{GS}=0V$	-	-	1.2	V
Reverse Recovery Time	T_{rr}	$I_{SD}=3A,$ $di/dt=100A/\mu s$	-	400	-	ns
Reverse Recovery Charge	Q_{rr}	$I_{SD}=3A,$ $di/dt=100A/\mu s$	-	1.6	-	μC

Note:

1. Pulse width limited by maximum junction temperature
2. $L=0.5mH, I_{AS}=I_{AR}, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$
3. $I_{SD} \leq I_{DM}, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, 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

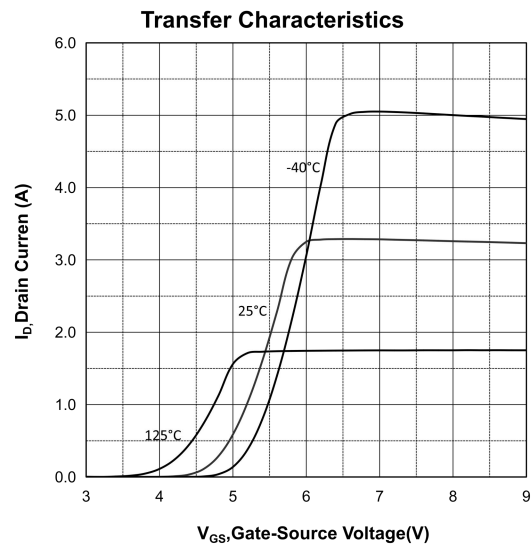
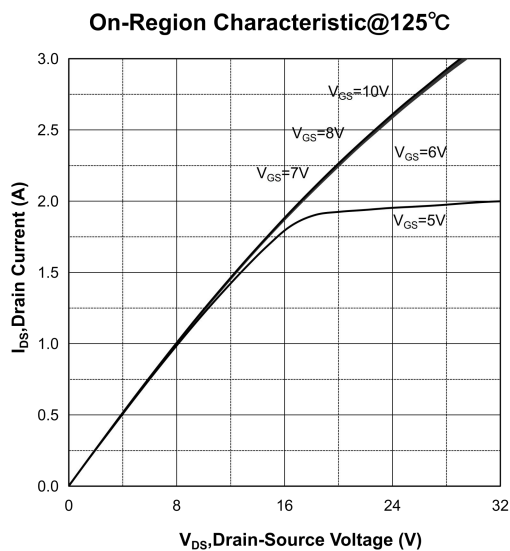
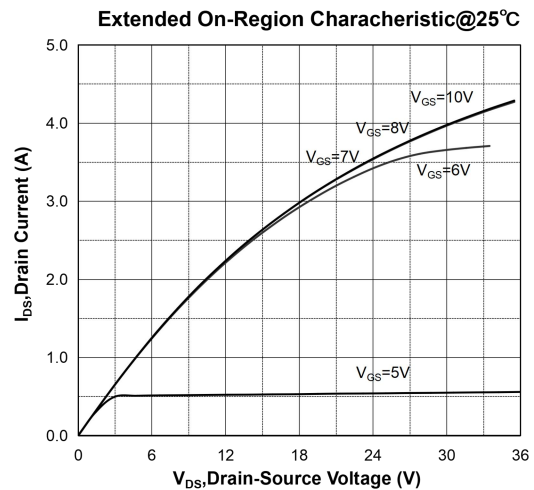
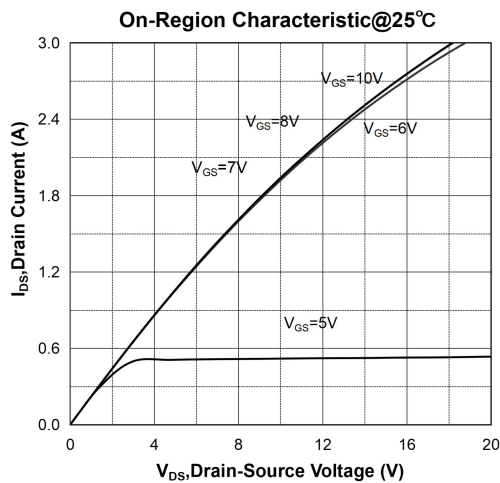
Thermal data

Parameter	Symbol	Value			Unit
		TO-247/ TO-220	TO-252/ TO-251	TO-220F	
Thermal resistance junction max	R_{thj-C}	0.46	2.5	1.69	$^{\circ}C/W$
Thermal resistance junction to ambient	R_{thj-A}	40	65	52	$^{\circ}C/W$

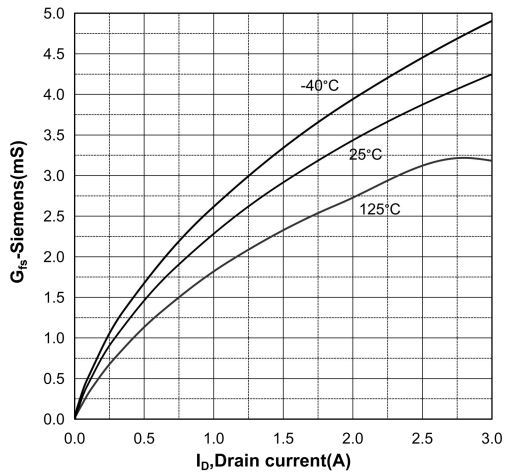
Order codes

Part number	Marking	Package
MS3N100HGC0	MS3N100HGC0	TO-247
MS3N100HGD0	MS3N100HGD0	TO-252
MS3N100HGT1	MS3N100HGT1	TO-220F
MS3N100HGD1	MS3N100HGD1	TO-251
MS3N100HGT0	MS3N100HGT0	TO-220

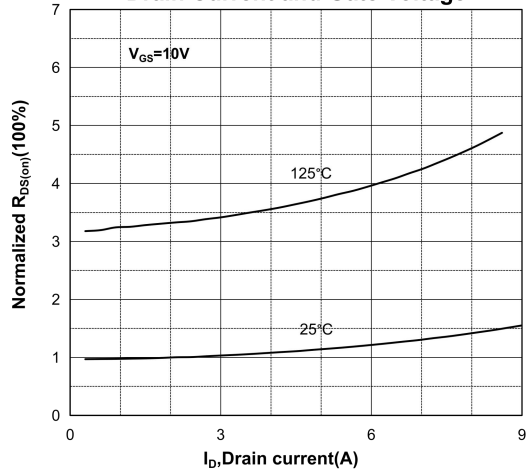
Electrical characteristics (curves)



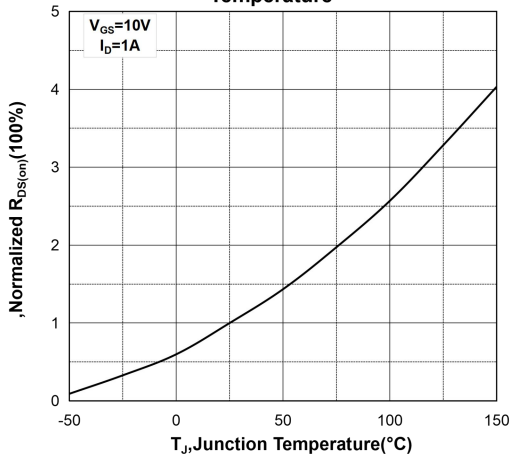
Transconductance



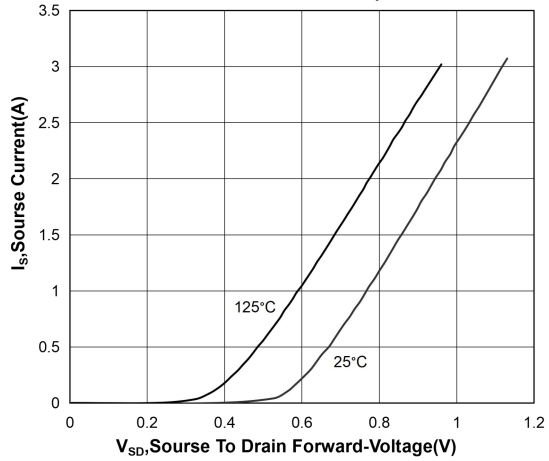
Normalized On-Resistance Variation vs Drain Current and Gate Voltage



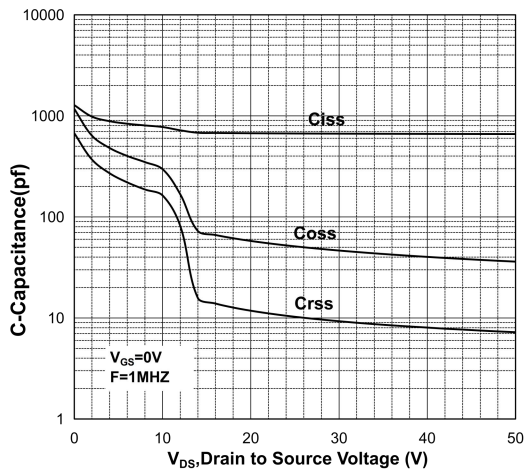
Normalized On-Resistance Variation vs Temperature



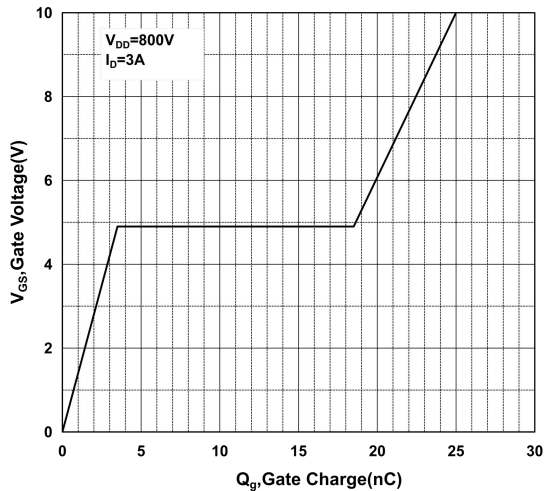
Body Diode Forward Voltage Variation with Source Current and Temperature



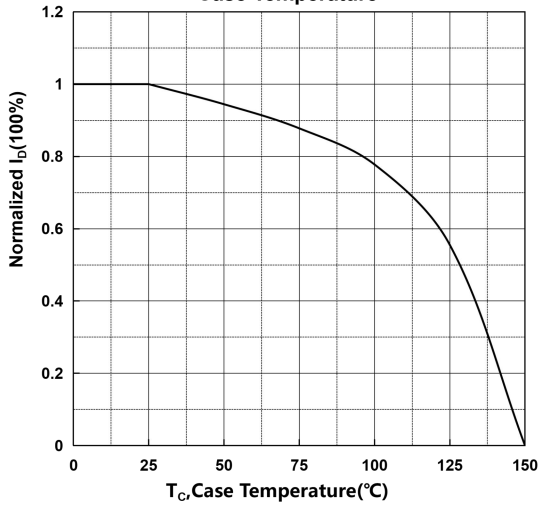
Capacitance



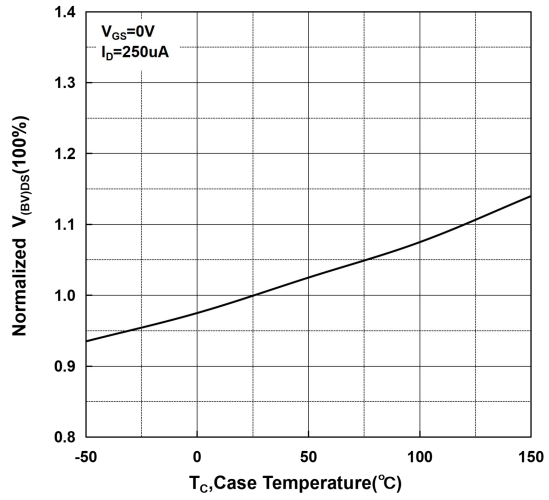
Gate Charge



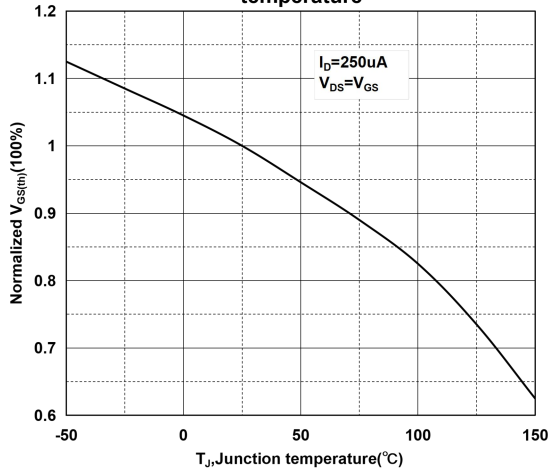
Normalized Maximum Drain Current vs Case Temperature



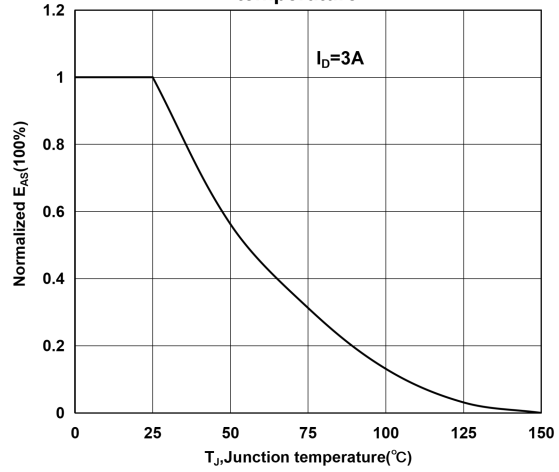
Normalized V_{(BV)DS} vs temperature



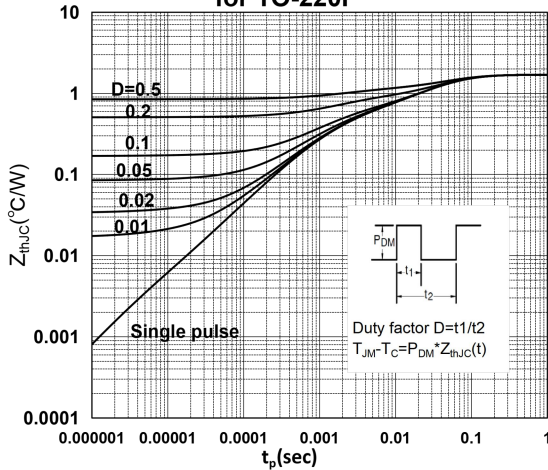
Normalized gate threshold voltage vs temperature



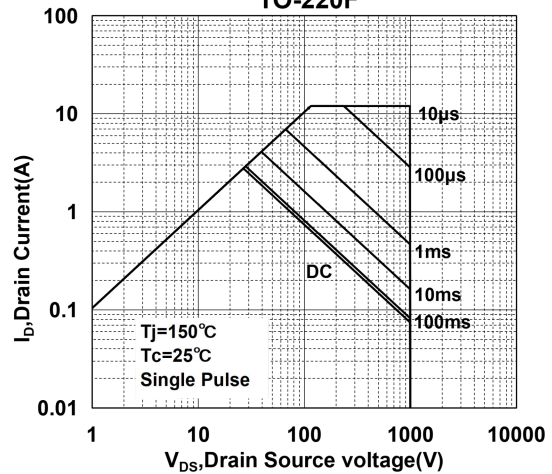
Normalized Maximum avalanche energy vs temperature



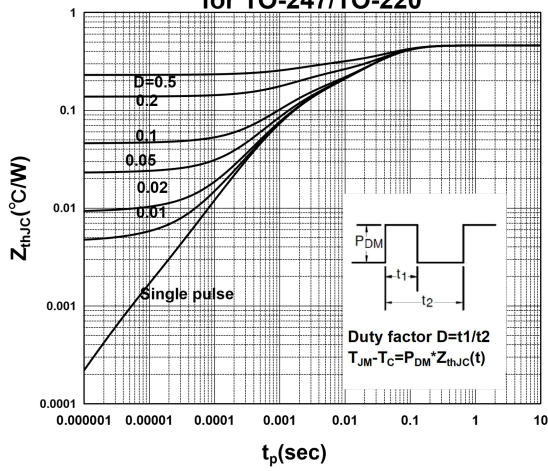
Transient Thermal Response Curve for TO-220F



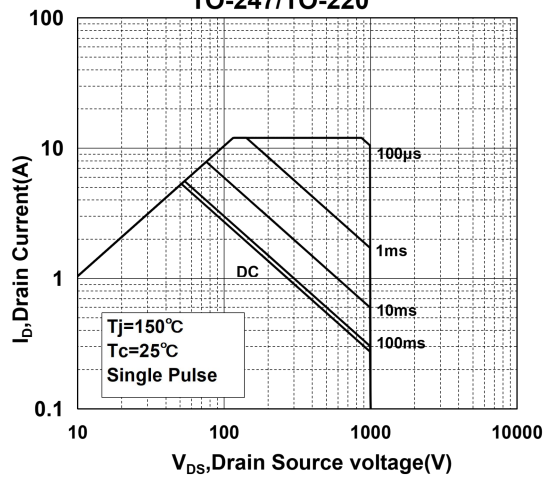
Safe Operating Area for TO-220F



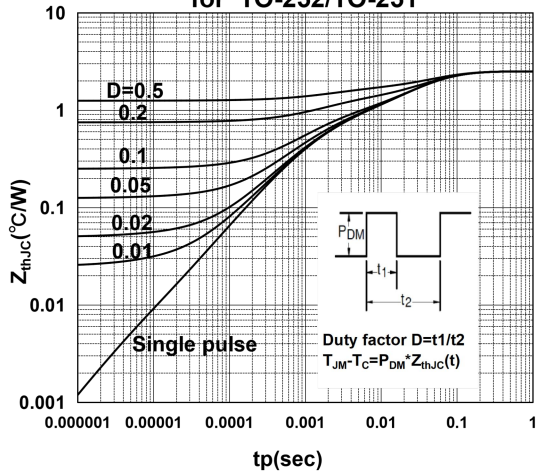
Transient Thermal Response Curve for TO-247/TO-220



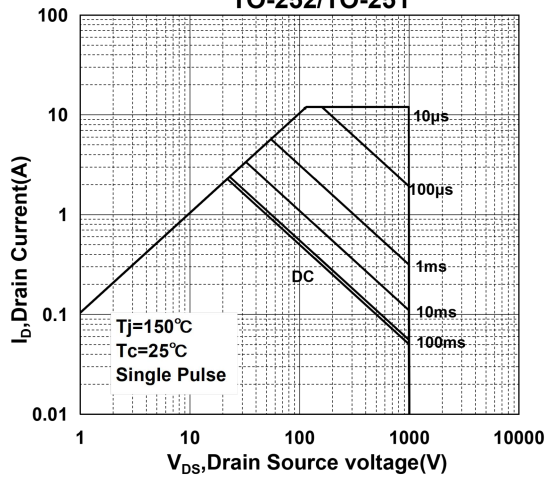
Safe Operating Area for to TO-247/TO-220

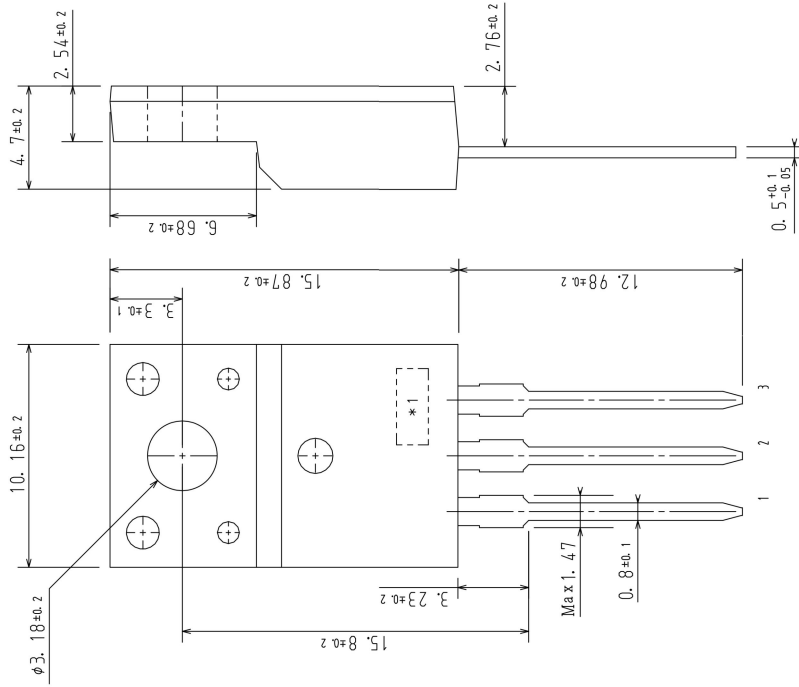


Transient Thermal Response Curve for TO-252/TO-251



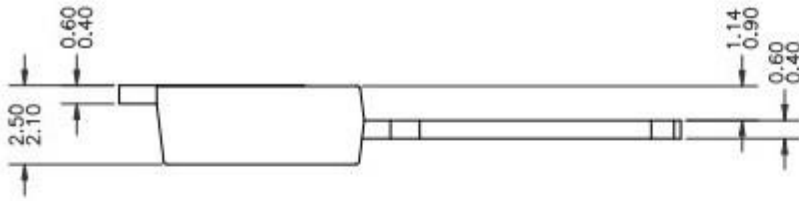
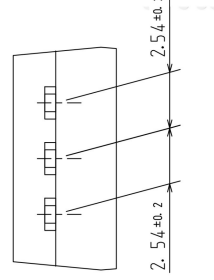
Safe Operating Area for TO-252/TO-251



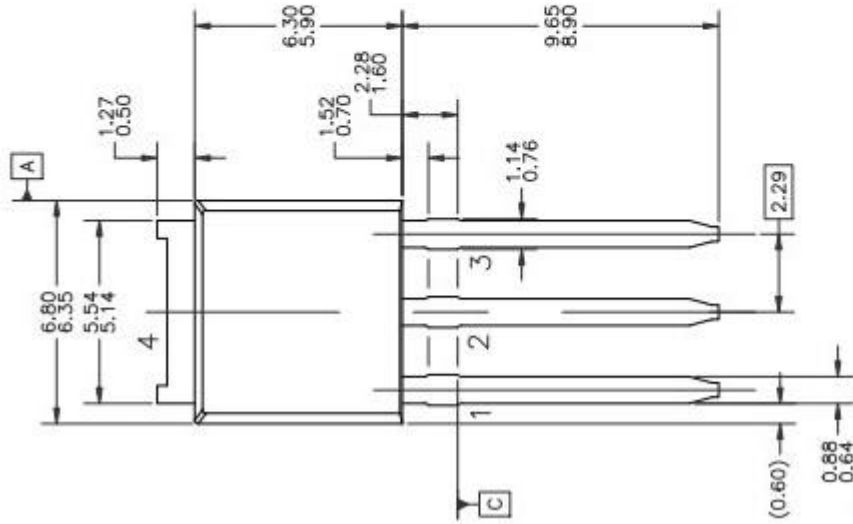


Uint: mm

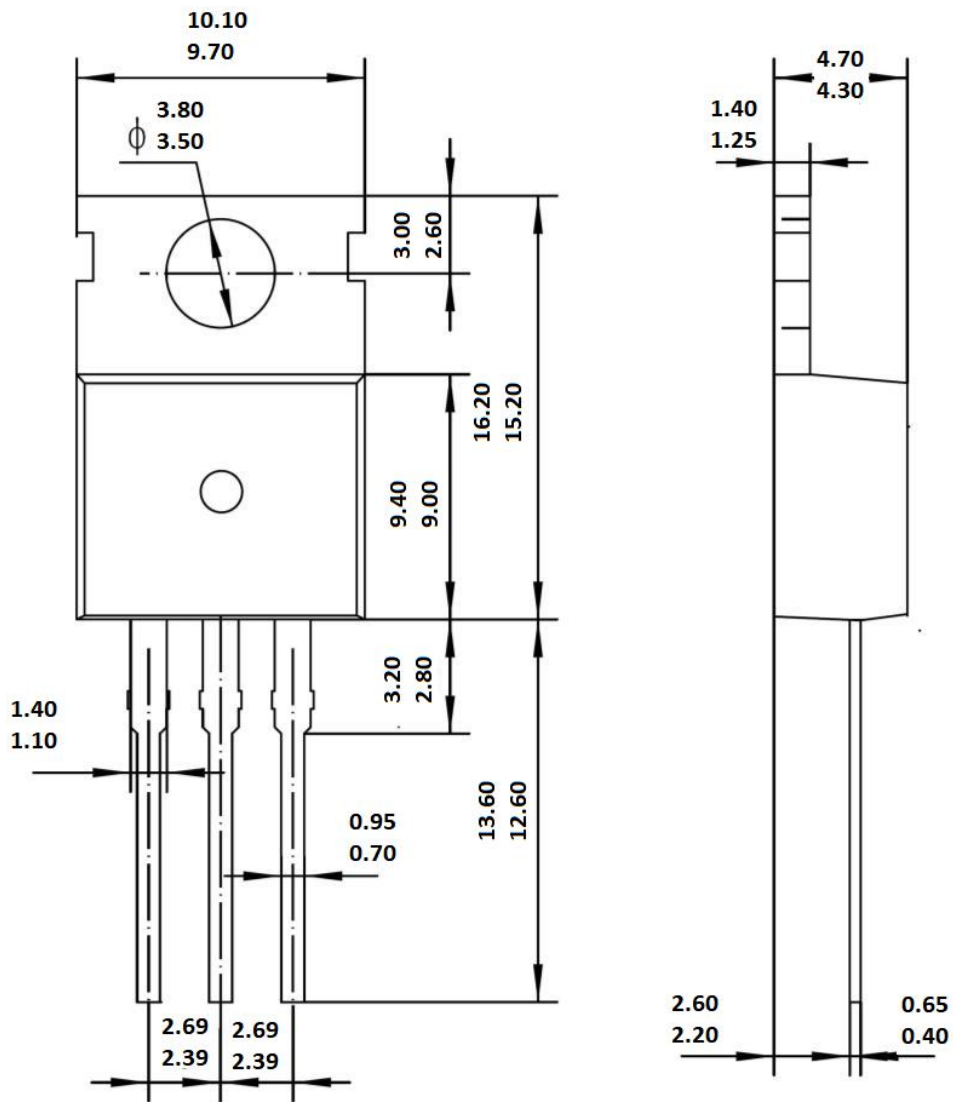
TO-220F



TO-251



3 PLCS



TO-220

Unit: mm