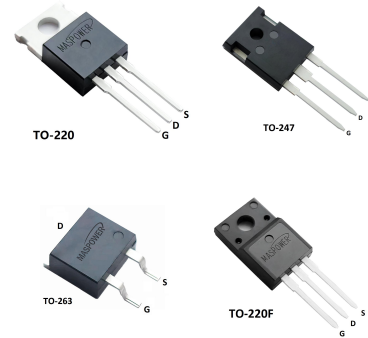


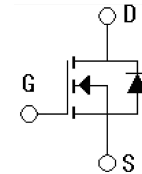
### Features

- Low gate charge
- Low  $C_{RSS}$  (typ 13pF)
- Fast switchin
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product



### Applications

- High frequency switching mode power supply
- Electronic ballast based on half bridge
- LED power supplies



### Absolute Ratings (Tc=25°C)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	1000	V
Drain Current-continuous	$I_D$ T=25°C T=100°C	12	A
		8	A
Drain Current-pulse (note 1)	$I_{DM}$	20*	A
Gate-Source Voltage	$V_{GS}$	±30	V
Single pulse avalanche energy (note 2)	$E_{AS}$	160	mJ
Avalanche Current (note 1)	$I_{AR}$	3	A
Repetitive Avalanche Energy(note 1)	$E_{AR}$	90	mJ
Power Dissipation (MS12N100FC/FT)	PD TC=25°C Derate above 25°C	367	W
		2.9	W/°C
Power Dissipation (MS12N100FE)	PD TC=25°C Derate above 25°C	100	W
		0.8	W/°C
Power Dissipation (MS12N100FS)	PD TC=25°C Derate above 25°C	68	W
		0.54	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	Type	Max	Units
Drain-Source Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	1000	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=800V, V_{GS}=0V, T_C=25^{\circ}C$	-	-	1	$\mu A$
		$V_{DS}=720V, T_C=125^{\circ}C$	-	-	10	$\mu A$
Gate body leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	$\pm 100$	nA

**On-Characteristics**

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	-	5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A, T_C=25^{\circ}C$	-	1.0	1.2	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=40V, I_D=6A$ (note 4)	-	16	-	S

**Dynamic Characteristics**

Input capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	1584	-	pF
Output capacitance	$C_{oss}$		-	166	-	pF
Reverse transfer capacitance	$C_{rss}$		-	12	-	pF

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

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
<b>Switching-Characteristics</b>						
Turn-On delay time	$t_{d(on)}$	$V_{DD}=600V, I_D=12A, R_{GEN}=25\Omega$ (note 4,5)	-	24	-	ns
Turn-On rise time	$t_r$		-	46	-	ns
Turn-Off delay time	$t_{d(off)}$		-	118	-	ns
Turn-Off rise time	$t_f$		-	58	-	ns
Total Gate Charge	$Q_g$	$V_{DS}=800V, I_D=12A,$	-	41	-	nC

Gate-Source charge	$Q_{gs}$	$V_{GS}=10V$ (note 4,5)	-	9	-	nC
Gate-Drain charge	$Q_{gd}$		-	16	-	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Diode Forward Voltage (note 3)	$V_{SD}$	$V_{GS}=0V, I_S=12A$	-	-	1.2	V
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	-	-	-	110	A
Maximum Continuous Drain Source Diode Forward Current	$I_S$	-	-	-	12	A
Reverse recovery time	$t_{rr}$	$V_{GS}=0V,$ $I_S=8A$ $di/dt=100A/\mu s$ (note 4)	-	620	-	ns
Reverse recovery charge	$Q_{rr}$		-	4.39	-	$\mu C$

### Thermal Characteristic

Parameter	Symbol	Value			Unit
		MS12N10 0FC/FT	MS12N10 0FE	MS12N100 FS	
Thermal Resistance, junction to Case	$R_{th(j-C)}$	0.4	1.25	1.84	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	36	62.5	62.5	$^{\circ}C/W$

### Order information

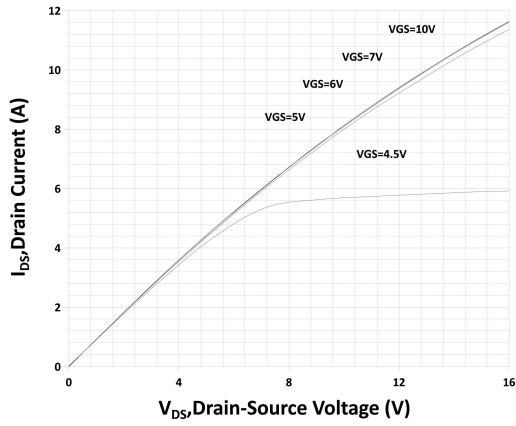
Order codes	Package	Packaging
MS12N100FC	TO-247	Tube
MS12N100FE	TO-263	Tube
MS12N100FT	TO-220	Tube
MS12N100FS	TO-220F	Tube

#### Notes:

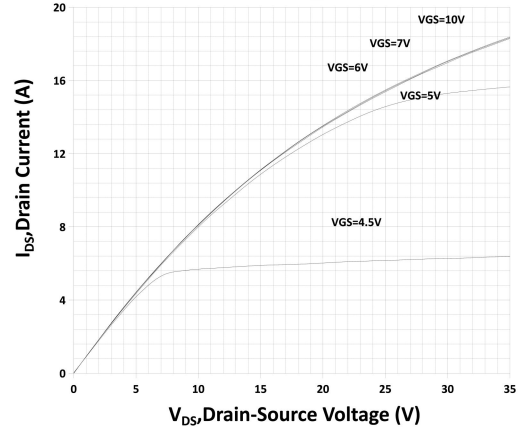
1. Pulse width limited by maximum junction temperature
2.  $L=20mH, I_{AS}=12A, V_{DD}=50V, R_G=25 \Omega, \text{Starting } T_J=25^{\circ}C$
3.  $I_{SD} \leq 12A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}, \text{Starting } T_J=25^{\circ}C$
4. Pulse Test: Pulse Width  $\leq 300\mu s, \text{Duty Cycle} \leq 2\%$
5. Essentially independent of operating temperature

### ELECTRICAL CHARACTERISTICS (curves)

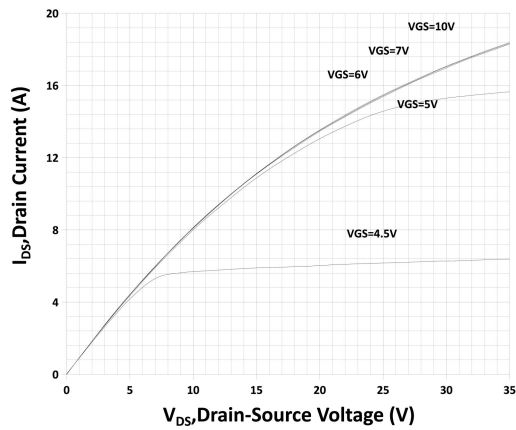
On-Region Characteristics@25°C



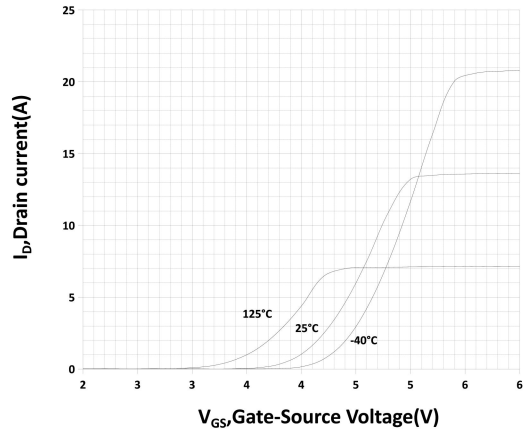
Extended On-Region Characteristics@25°C



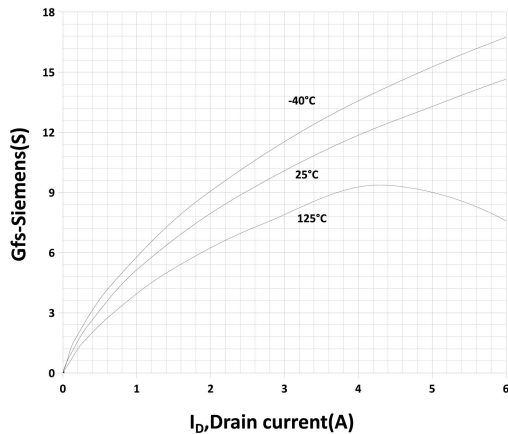
On-Region Characteristics@125°C



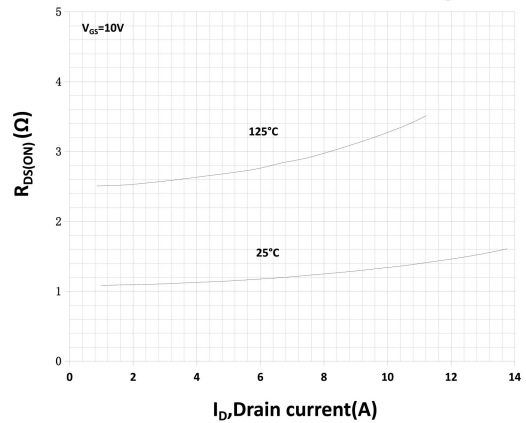
Transfer Characteristics

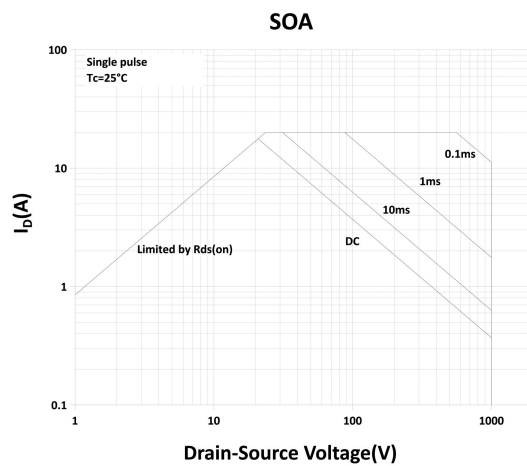
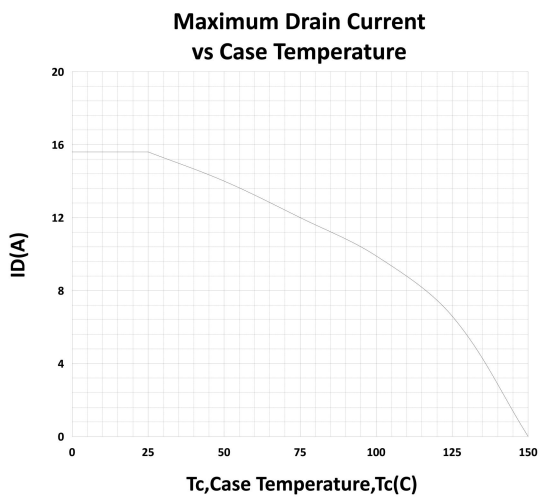
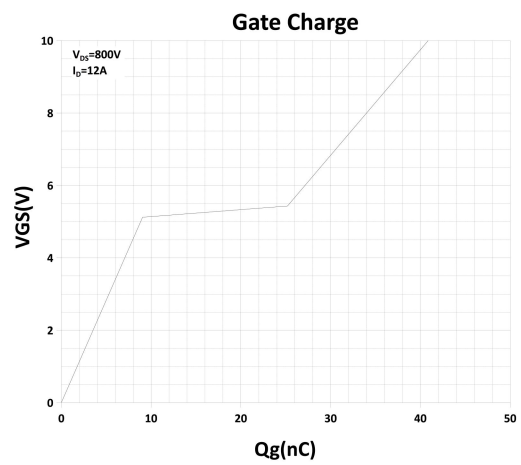
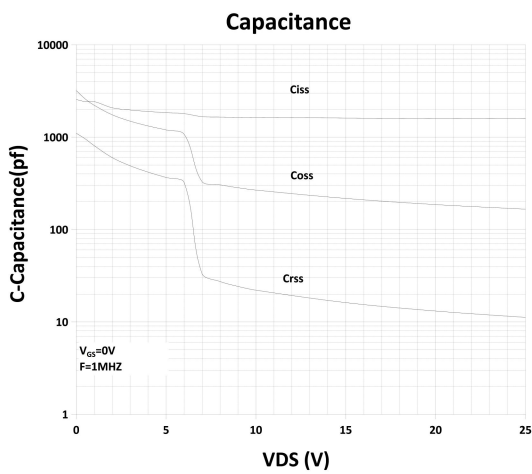
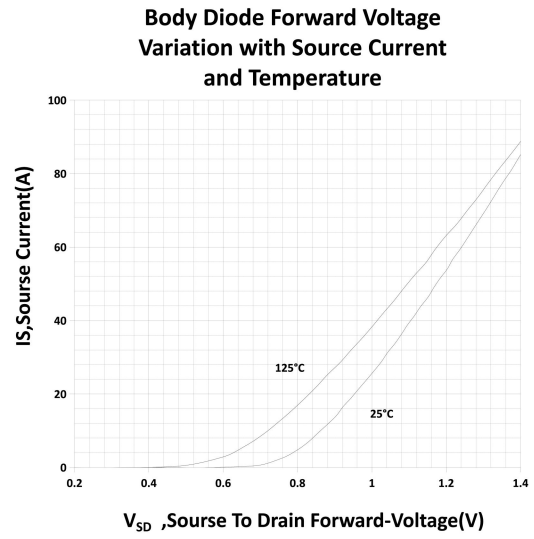
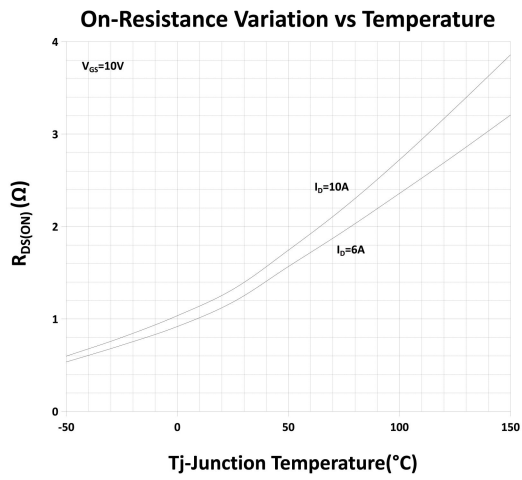


Transconductance

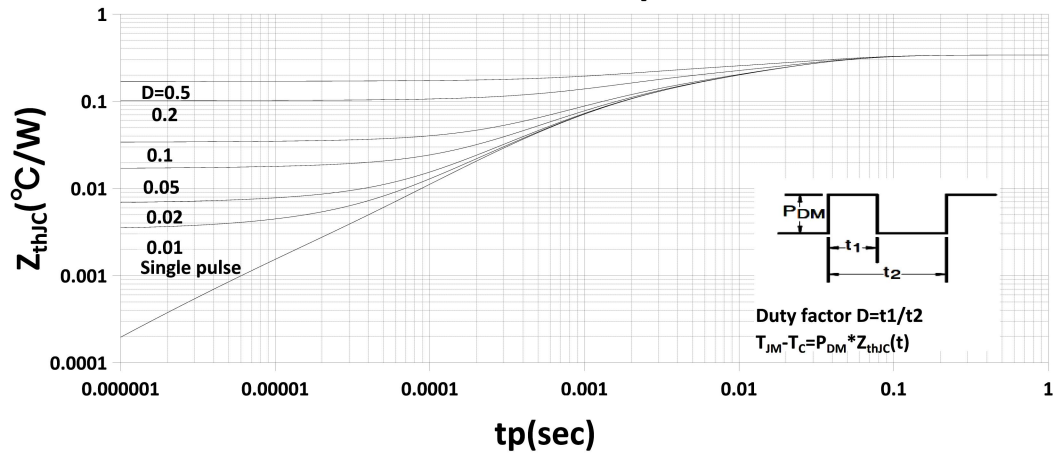


On-Resistance Variation vs Drain Current and Gate Voltage

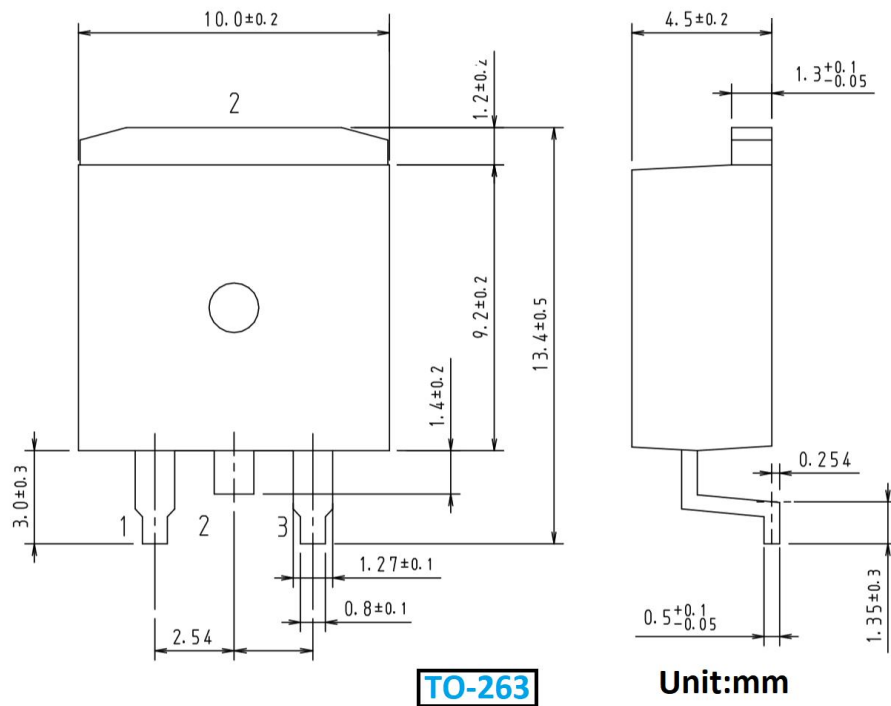
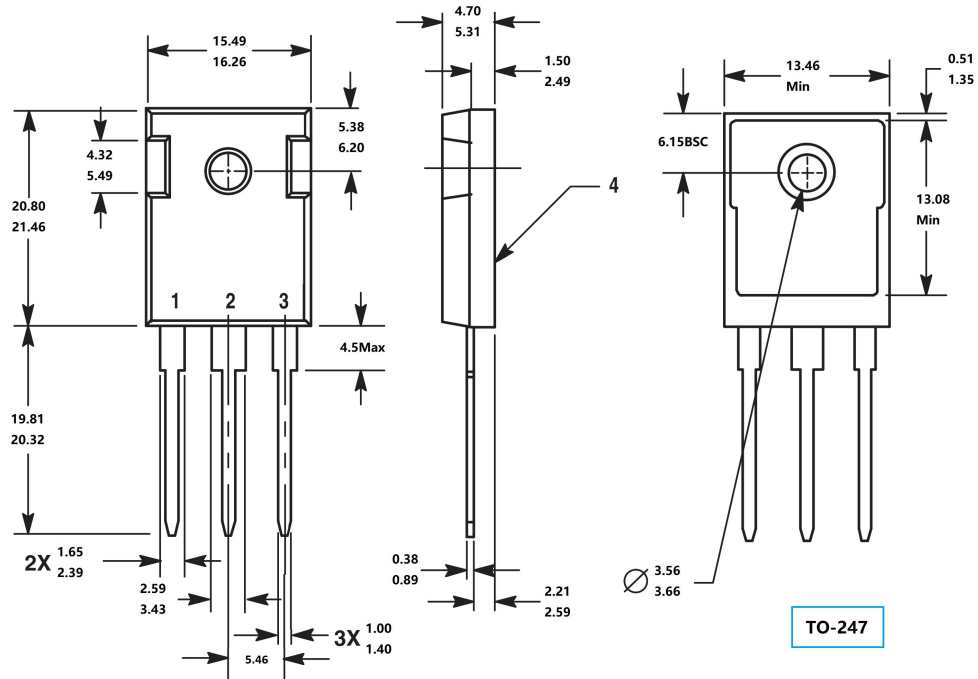


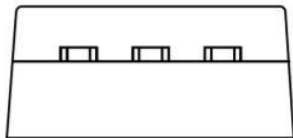
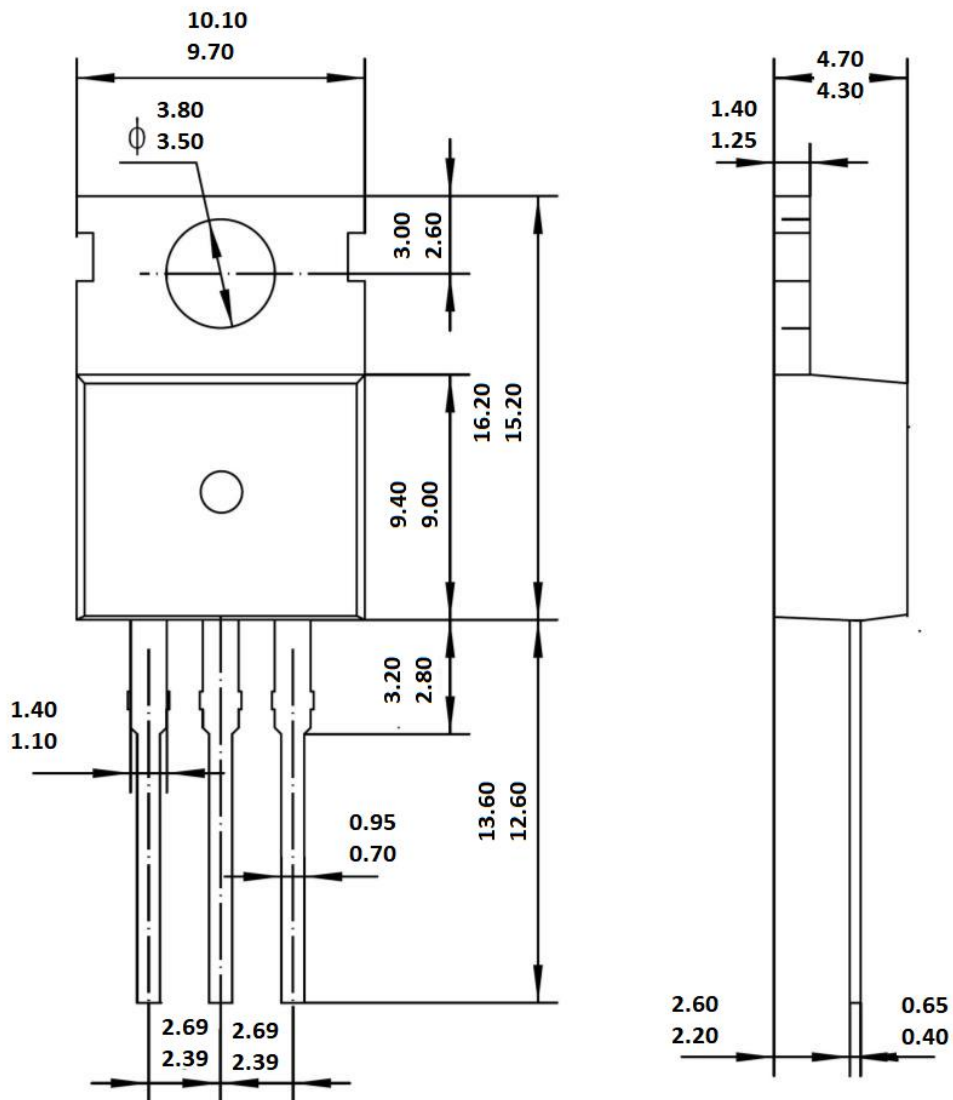


### Transient Thermal Response Curve



### PACKAGE MECHANICAL DATA





**TO-220**

**Unit: mm**



