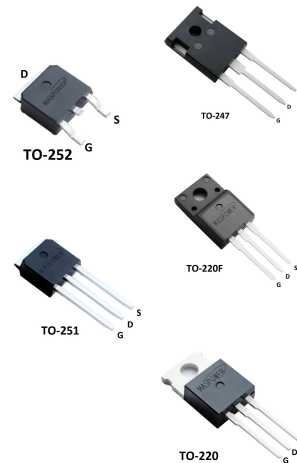
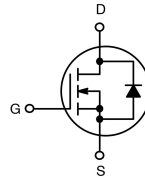


## features

- Low gate charge (typical 12nC)
- Low Crss (typical 5.5pF)
- 100% avalanche tested
- Fast switching
- Improved dv/dt capability



## Applications

- Switching application

## Electrical ratings

### Absolute maximum ratings

Parameter	Symbol	Value	Unit
Drain-source voltage (V <sub>GS</sub> =0)	V <sub>DS</sub>	1000	V
Gate-source voltage	V <sub>GS</sub>	±30	
Drain current (continuous) at TC=25°C	I <sub>D</sub>	3	A
Drain current (continuous) at TC=100°C	I <sub>D</sub>	2.1	
Drain current (pulsed)	I <sub>DM</sub>	12	A
Avalanche current repetitive or not-repetitive (pulse width limited by T <sub>J</sub> Max)	I <sub>AR</sub>	3	A
Single pulse avalanche energy (starting T <sub>J</sub> =25°C I <sub>D</sub> =I <sub>AR</sub> V <sub>DD</sub> =50V)	E <sub>AS</sub>	300	mJ
Total dissipation at TC=25°C (TO-247)	PD	272	W
Total dissipation at TC=25°C (TO-252/TO-251)	PD	50	W
Total dissipation at TC=25°C (TO-220F)	PD	74	W
Total dissipation at TC=25°C (TO-220)	PD	60	W
Drain source ESD (HBM-C=100pF,R=1.5KΩ)	V <sub>ESD(GS)</sub>	4000	V
Peak diode recovery voltage slope	dv/dt	4.5	V/ns
Insulation withstand voltage(RMS)from all three leads to external heat sink (t=1s TC=25°C)	V <sub>ISO</sub>	2500	v
Operating junction temperature	T <sub>J</sub>	-55 to 175	°C
Storage temperature	T <sub>STG</sub>		

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

**On/off states**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Drain-source breakdown voltage	V(BR)DSS	ID=1mA VGS=0	1000	-	-	V
Zero gate voltage drain current (VGS=0)	IDSS	VDS=Max rating	-	-	1	μA
		TC=125°C	-	-	100	μA
Gate body leakage current (VGS=0)	IGSS	VGS=±30V	-	-	±100	nA
Gate threshold voltage	VGS(th)	VDS=VGS ID=100μA	3.0	4.0	5.0	V
Static drain-source on resistance	RDS(on)	VGS=10V ID=1A	-	5.2	5.8	Ω

**Dynamic**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Forward transconductance	gfs	VDS = 15 V, ID = 1.75A	-	3	-	S
Input capacitance Output capacitance Reverse transfer capacitance	Ciss	VDS=25V, f=1MHz, VGS=0	-	390	500	pF
	Coss		-	45	60	
	Crss		-	5.5	7.0	
Total gate charge Gate-source charge Gate-drain charge	Qg	VDD=800V, ID=3A VGS=10V	-	12	15	nC
	Qgs		-	2.8	-	
	Qgd		-	6.1	-	
Turn-on delay time	td(on)	VDD = 500V, ID = 3A, RG = 25 Ω, VGS = 10V	-	15	40	ns
Rise time	tr		-	35	80	
Turn-off-delay time	td(off)		-	20	50	
Fall time	tf		-	30	70	

**Source Drain Diode**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Source Drain Current	ISD		-	-	3	A
Source Drain Current(Pulsed)	ISDM		-	-	12	A
Forward On Voltage	VSD	ISD=3A, VGS=0V	-	-	1.2	V
Reverse Recovery Time	Trr	ISD=3A, di/dt=100A/μS	-	400	-	ns
Reverse Recovery Charge	Qrr	ISD=3A, di/dt=100A/μS	-	1.6	-	μC

**Thermal data**

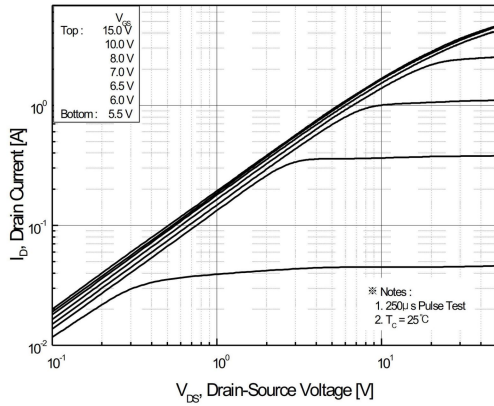
Parameter	Symbol	Value	Unit
Thermal resistance junction max(TO-247)	Rthj-case	0.46	°C/W
Thermal resistance junction max(TO-252/TO-251)	Rthj-case	2.5	°C/W
Thermal resistance junction max(TO-220F)	Rthj-case	1.69	°C/W
Thermal resistance junction max(TO-220)	Rthj-case	4.2	°C/W

**Order codes**

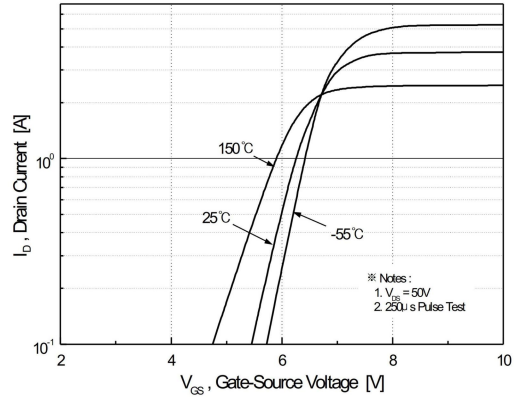
Partnumber	Marking	Package
MS3N100HGC0	MS3N100HGC0	TO-247
MS3N100HGD0	MS3N100HGD0	TO-252
MS3N100HGT1	MS3N100HGT1	TO-220F
MS3N100HGD1	MS3N100HGD1	TO-251
MS3N100HGT0	MS3N100HGT0	TO-220

## Electrical characteristics (curves)

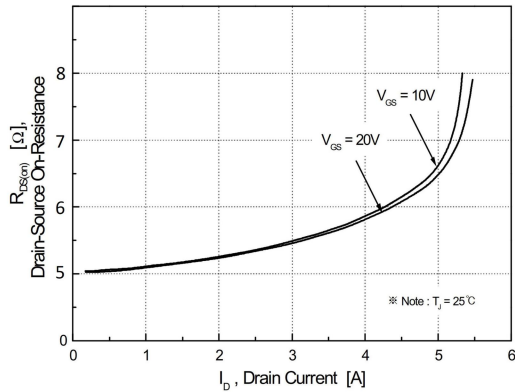
**On-Region Characteristics**



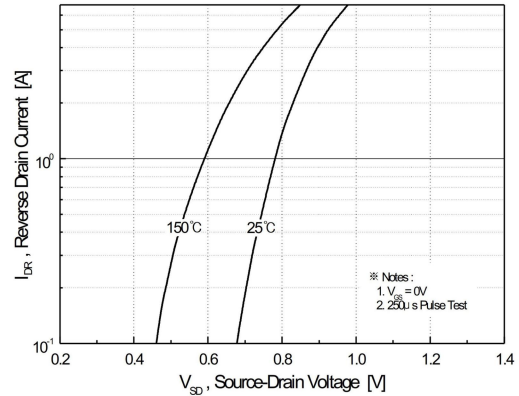
**Transfer Characteristics**



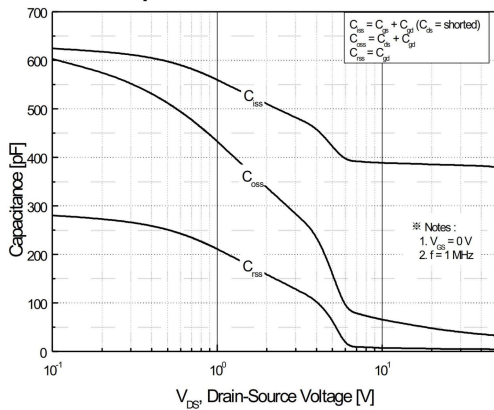
**On-Resistance Variation vs. Drain Current and Gate Voltage**



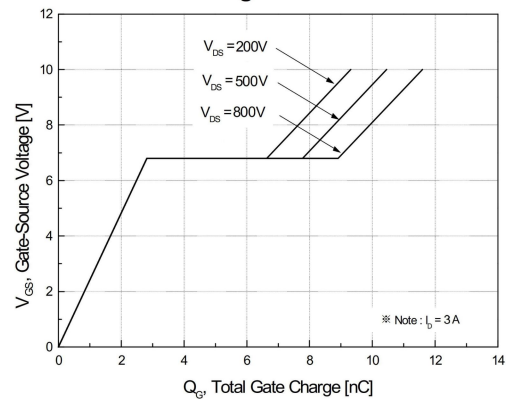
**Body Diode Forward Voltage Variation vs. Source Current and Temperature**



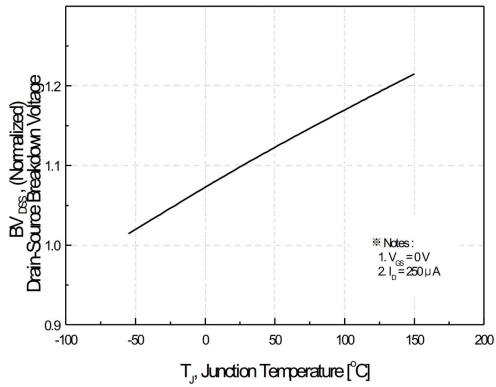
**Capacitance Characteristics**



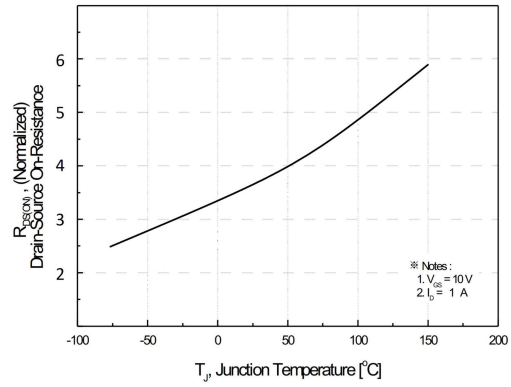
**Gate Charge Characteristics**



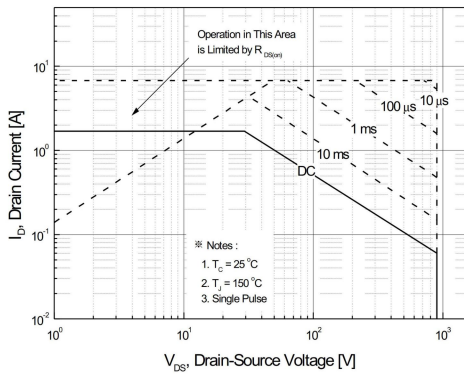
### Breakdown Voltage Variation vs. Temperature



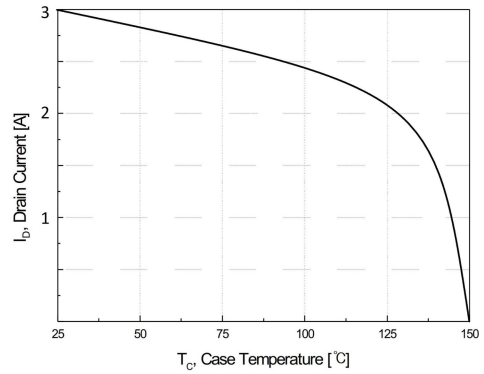
### On-Resistance Variation vs. Temperature



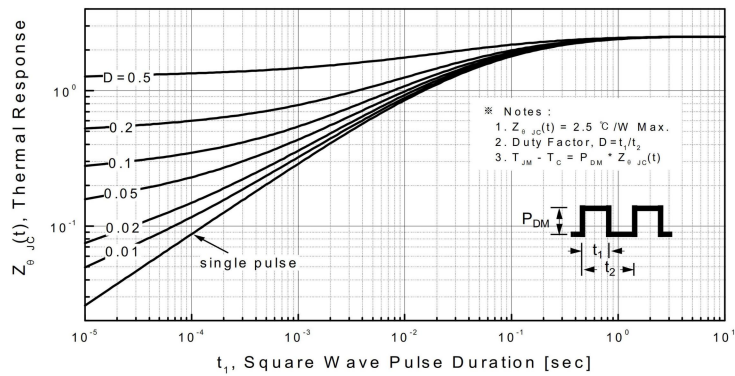
### Maximum Safe Operating Area



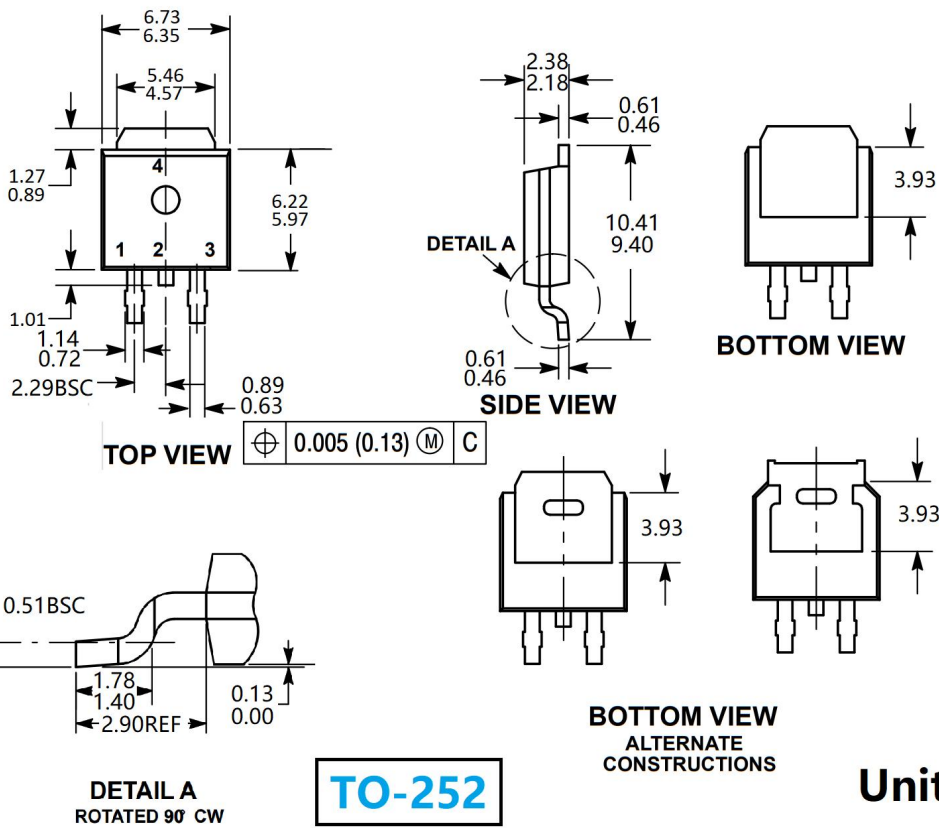
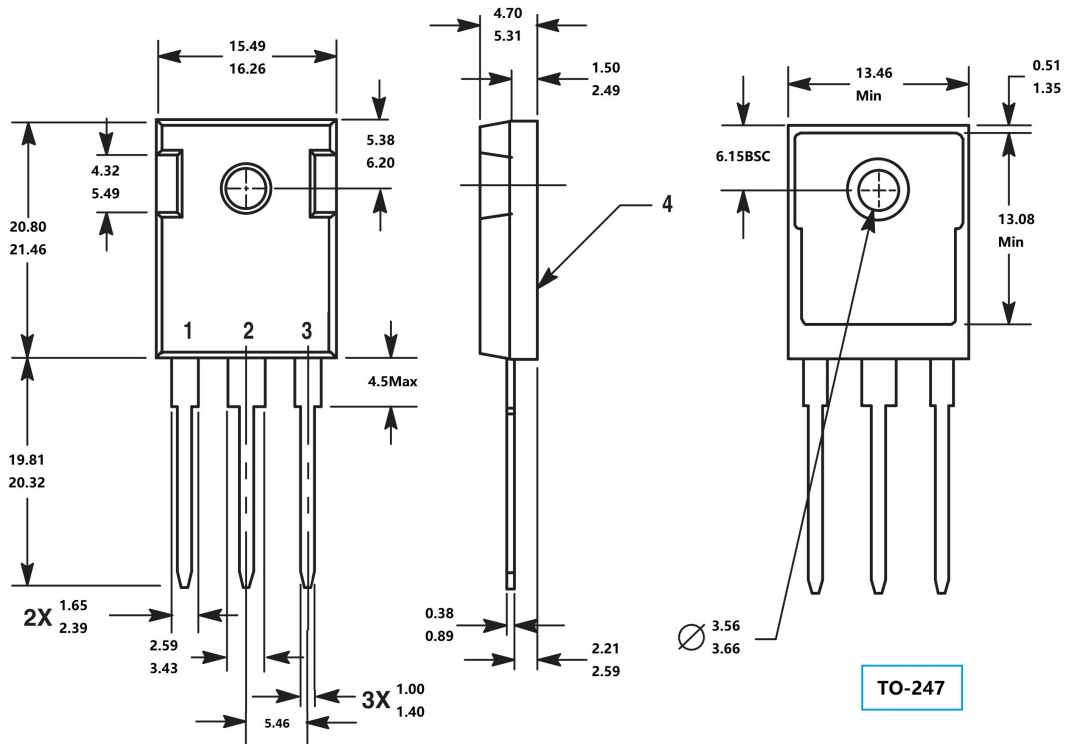
### Maximum Drain Current vs. Case Temperature



### Transient Thermal Response Curve

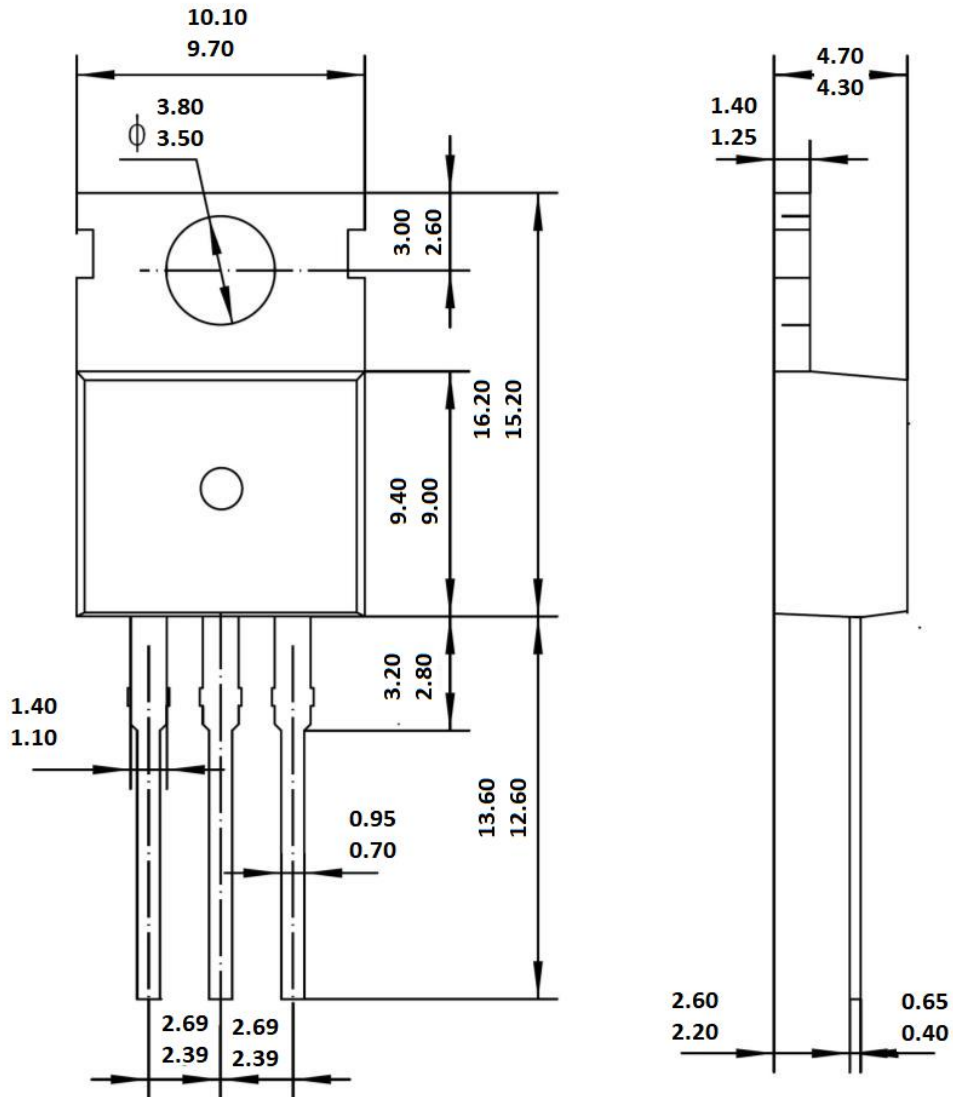


## Package outline dimension



Unit:mm





**TO-220**

**Unit: mm**