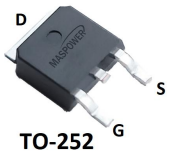
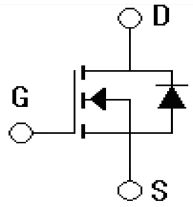
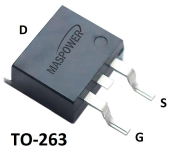
Features

- Low gate charge
- Low Crss (typical 25pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

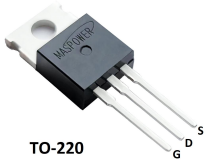


TO-252





TO-263



TO-220

Applications

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- UPS

Absolute Ratings (Tc=25℃)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	200	V
Drain Current -continuous		I_D,T=25℃	18	A
		T=100℃	16	A
Drain Current - pulse （note 1）		I_{DM}	72	A
Gate-Source Voltage		V_{GSS}	±30	V
Single Pulsed Avalanche Energy （note 2）		E_{AS}	259	mJ
Avalanche Current（note 1）		I_{AR}	18	A
Repetitive Avalanche Current（note 1）		E_{AR}	14	mJ
Peak Diode Recovery dv/dt （note 3）		dv/dt	5.5	V/ns
Power Dissipation	TO-252	PD	140	W
	TO-263		180	
	TO-220		140	
Operating and Storage Temperature Range		T_J,T_{STG}	-55~+150	℃
Maximum Lead Temperature for Soldering Purposes		T_L	300	℃

*Drain current limited by maximum junction temperature

Electrical Characteristics(T_{CASE}=25℃ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
Off-Characteristics						
Drain-Source Voltage	BV_{DSS}	I_D=250uA,V_{GS}=0V	200	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, referenced to 25℃	-	0.2	-	V/℃
Drain cut-off current	I_{DSS}	V_{DS}=200V,V_{GS}=0V Tj=25℃	-	-	1	μA
		V_{DS}=160V,Tj=125℃	-	-	10	
Gate-body leakage current,forward	I_{GSSF}	V_{DS}=0V,V_{GS}=30V	-	-	100	nA
Gate-body leakage current,reverse	I_{GSSR}	V_{DS}=0V,V_{GS}=-30V	-	-	-100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2.0	-	4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=9A 25℃	0.08	0.12	0.15	Ω
Forward Transconductance	g_{fs}	V_{DS} =40V , I_D=9A （note 4）	-	14.5	-	S
Dynamic Characteristics						
Gate resistance	Rg	F=1.0MHZ open drain	0.5	1.5	2.5	Ω
Input capacitance	Ciss	VDS=25V, VGS=0V, f=1.0MHZ	350	1001	1650	pF
Output capacitance	Coss		104	173	300	pF
Reverse transfer capacitance	Crss		15	25	40	pF

Switching Characteristics						
Turn-On delay time	td(on)	VDD=100V,ID=18A, RG=25Ω, VGS=10V(note 4,5)	9	15.2	21	ns
Turn-On rise time	tr		16.5	38.7	60	ns
Turn-Off delay time	td(off)		21.5	46.4	71.5	ns
Turn-Off Fall time	tf		6.8	12.8	18.8	ns
Total Gate Charge	Qg	V_{DS}=160V, I_D=18A, V_{GS}=10V(note4,5)	12	27.5	42	nC
Gate-Source charge	Qgs		2.5	5.7	8.9	nC
Gate-Drain charge	Qgd		5.8	10.8	15.8	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V_{SD}	VGS=0V,IS=18A	-	-	1.4	V
Maximum Continuous	I_S		-	-	18	A

Drain-Source Diode Forward Current						
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	72	A
Reverse recovery time	trr	VGS=0V,IS=18A dIF/dt=100A/us(note 4)	124	224	324	ns
Reverse recovery charge	Qrr		0.58	1.38	2.18	uC

Thermal Characteristic

Parameter	Symbol	Value		Unit
		TO-252/ TO-220	TO-263	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.89	0.69	℃/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.5	℃/W

Order codes	Package
MS18N20FD	TO-252
MS18N20FT	TO-220
MS18N20FE	TO-263

Notes:

1:Pulse width limited by maximum junction temperature

2:L=1.6mH,I_{AS}=18A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

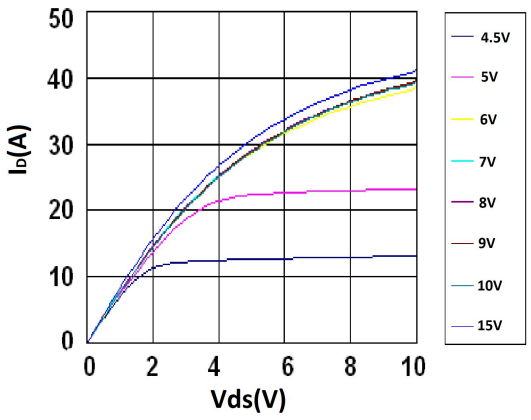
3:I_{SD}≤18A,di/dt≤200A/us,V_{DD}≤BV_{DSS},Starting T_J=25℃

4:Pulse Test:Pulse Width≤300us,Duty Cycle≤2%

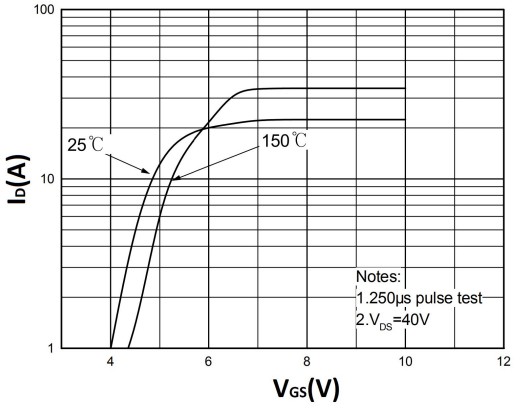
5:Essentially independent of operating temperature

Electrical Characteristics

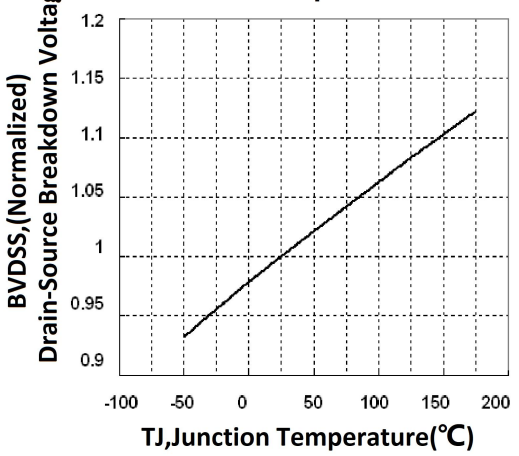
Typical Output Characteristics,TC=25℃



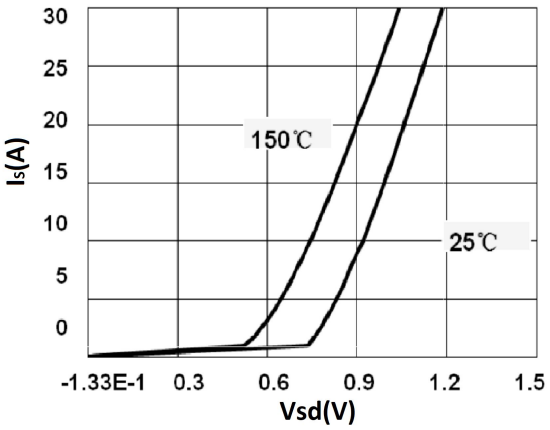
Transfer Characteristics



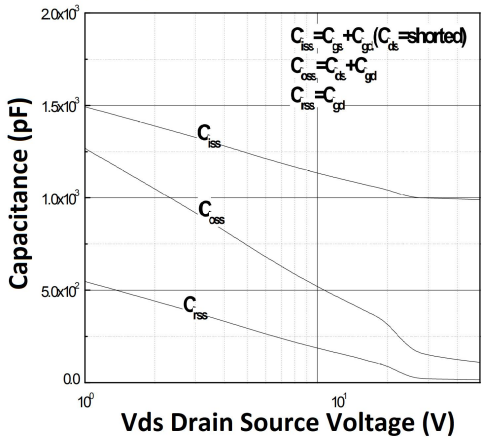
Breakdown Voltage Variation vs. Temperature



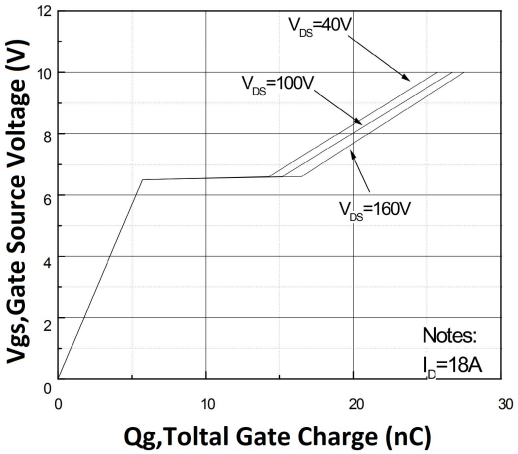
Body Diode Forward Voltage Variation vs. Source Current and Temperature



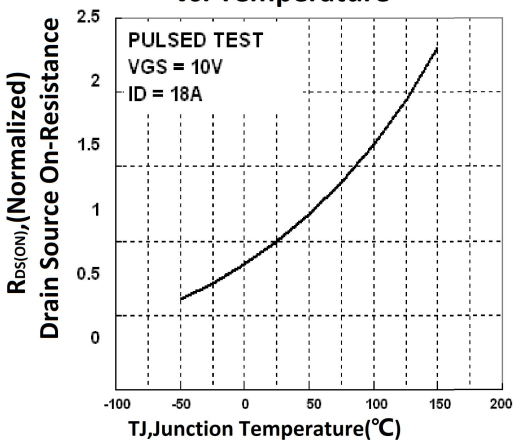
Capacitance Characteristics



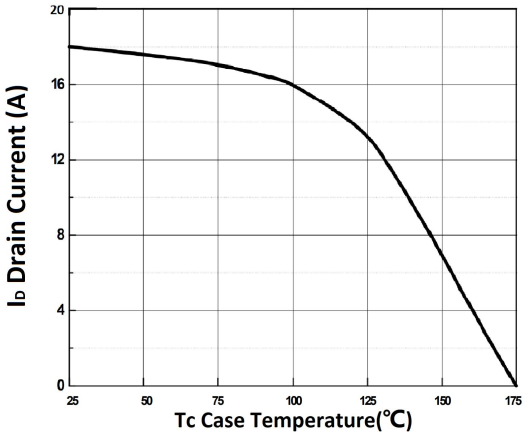
Gate Charge Characteristics



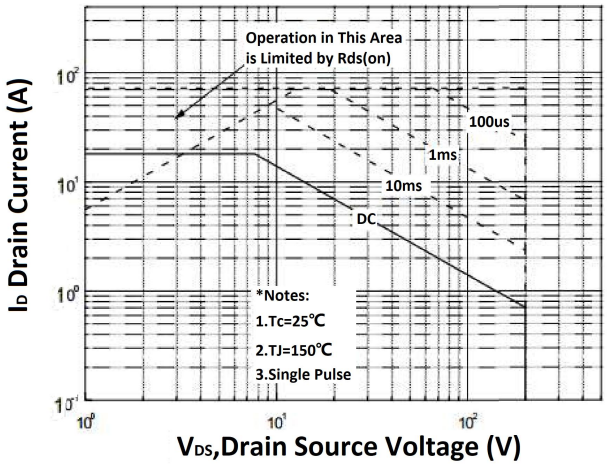
On-Resistance Variation vs. Temperature



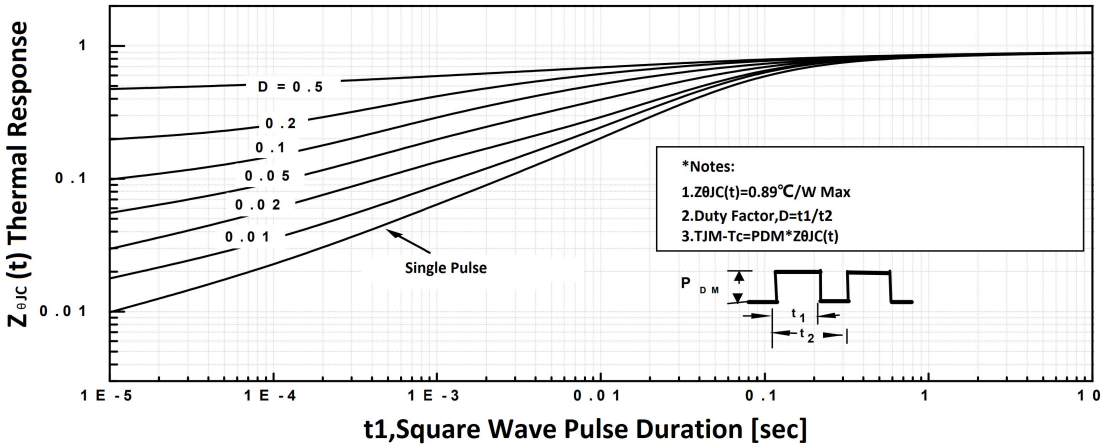
Maximum Drain Current vs.Case Temperature



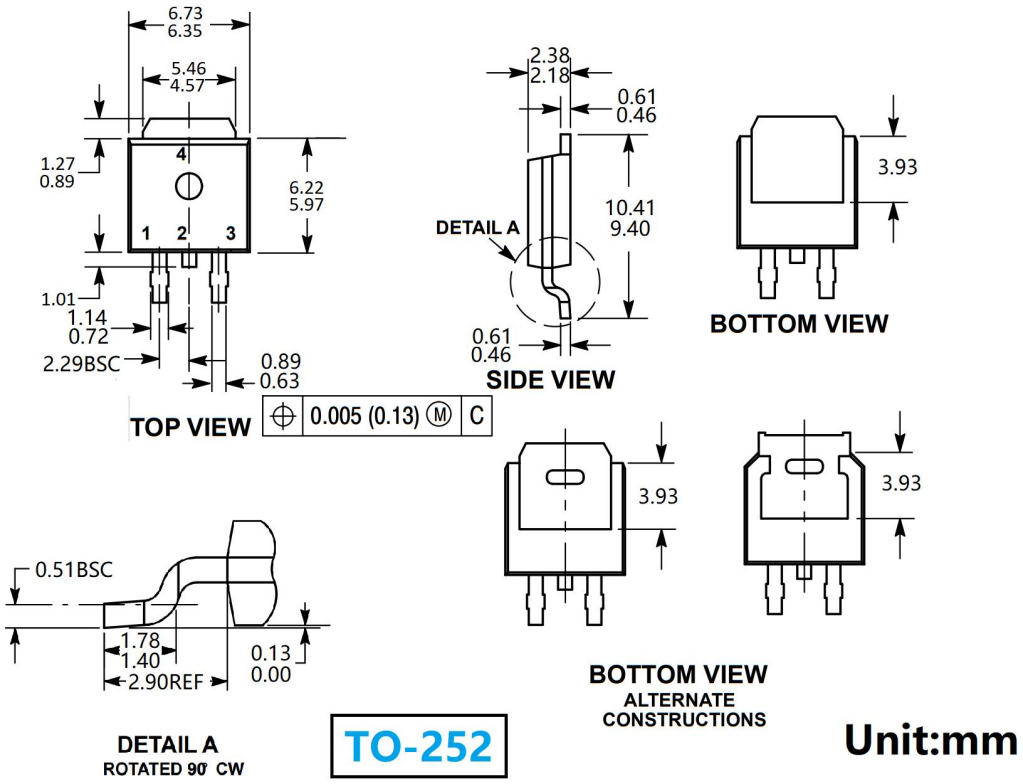
Maximum Safe Operating Area

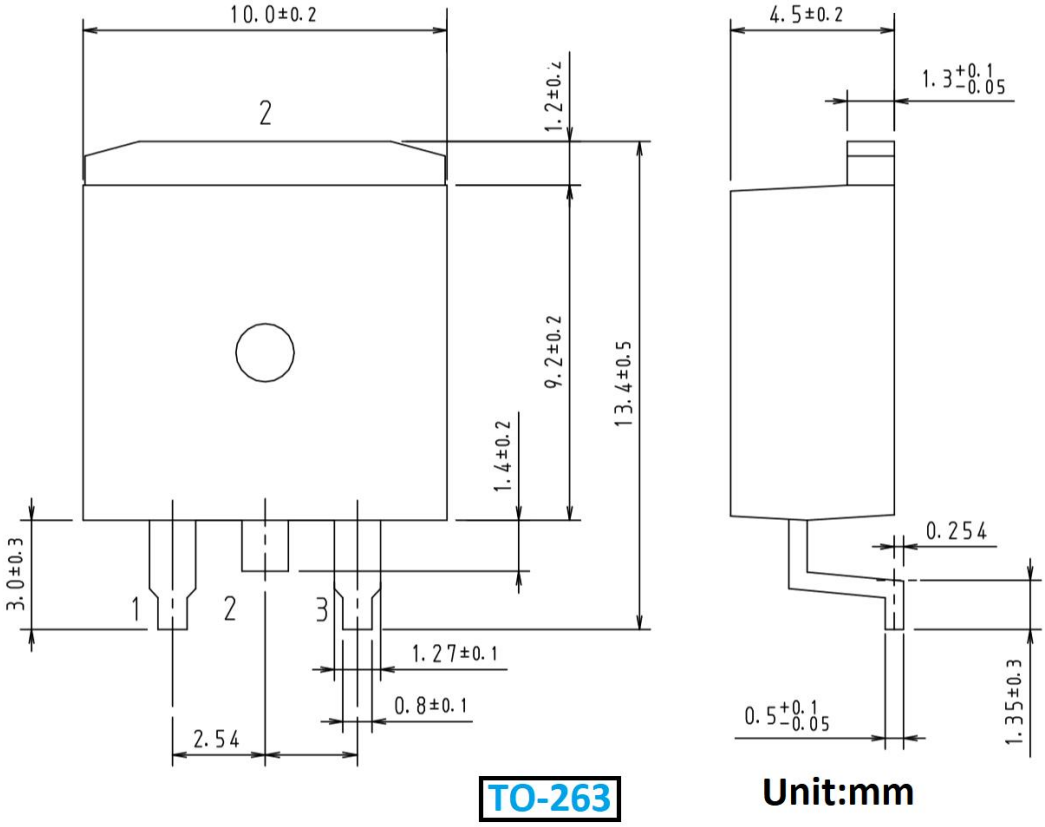


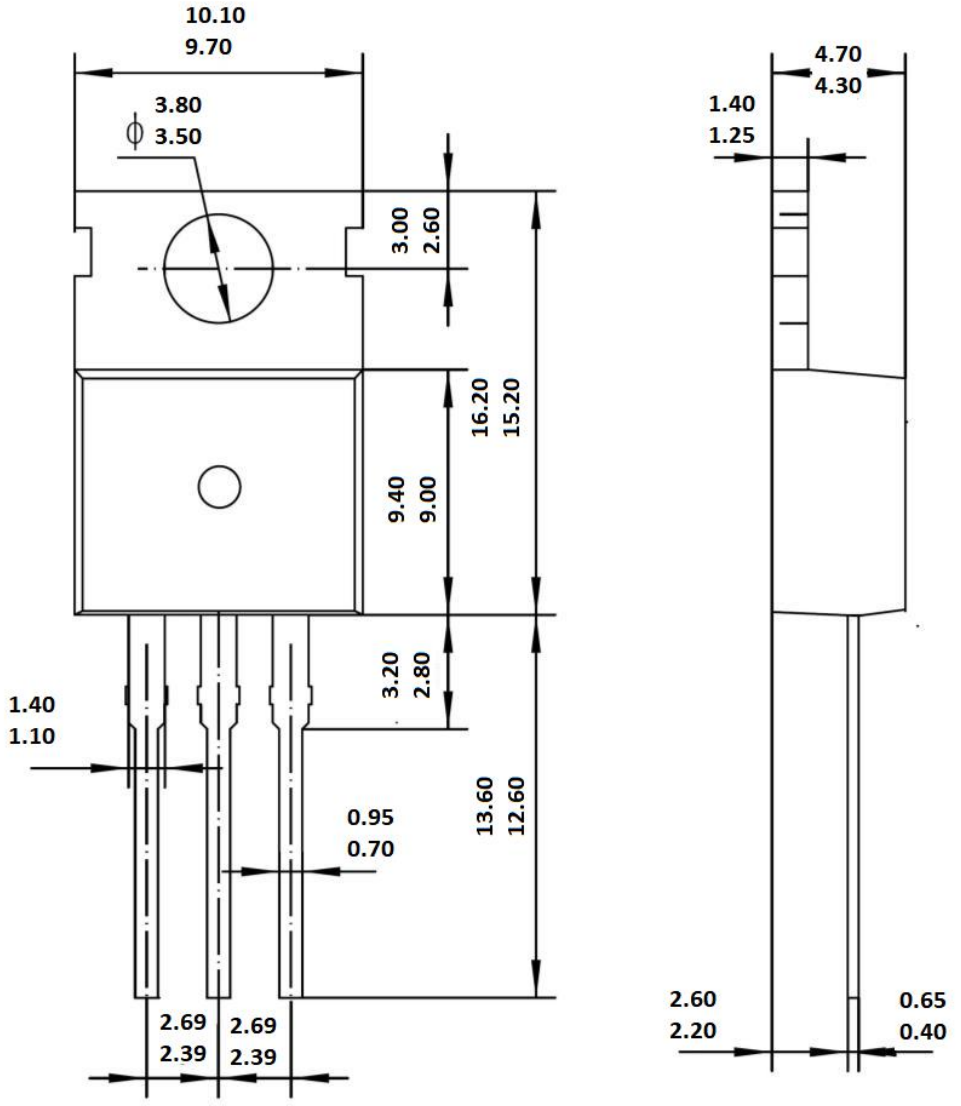
Transient Thermal Response Curve

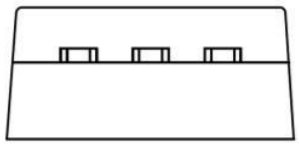


Package Mechanical DATA









TO-220

Unit: mm