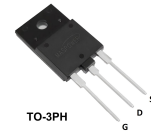
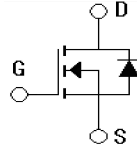


Features

- $V_{DS}=1500V, I_D=4A$
 $R_{DS(on)} < 7\Omega @ V_{GS}=10V$
- 100% avalanche tested
- Intrinsic capacitances and Q_g minimized
- High speed switching



Applications

- Switching applications

Absolute Ratings ($T_c=25^\circ C$)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	1500	V
Transient Gate-Source Voltage	V_{GSM}	± 30	V
Continuous Gate-Source Voltage(DC)	V_{GSS}	± 20	V
Drain Current-continuous	I_D	4	A
Drain Current-pulse*	I_{DM}	16	A
Single Pulsed Avalanche Energy	E_{AS}	460	mJ
Maximum Power Dissipation (TO-3PH)	PD	73	W
Maximum Power Dissipation (TO-263)	PD	336	W
Maximum Power Dissipation (TO-220)	PD	336	W
Operating and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +150$	$^\circ C$

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

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	1500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=V_{DSS}, V_{GS}=0V$	-	-	10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.5	-	5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=1A$	-	5.5	7	Ω
Forward Transconductance	g_{fs}	$V_{DS}=30V, I_D=3A$	-	5.8	-	S

Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	824	-	pF
Output capacitance	C_{oss}		-	127	-	pF
Reverse transfer capacitance	C_{rss}		-	29	-	pF

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

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching-Characteristics						
Turn-On delay time	t _{d(on)}	V _{DS} =750V, I _D =3A, V _{GS} =10V R _G =25Ω	-	31	-	ns
Turn-On rise time	t _r		-	56	-	ns
Turn-Off delay time	t _{d(Off)}		-	105	-	ns
Turn-Off rise time	t _f		-	115	-	ns
Total Gate Charge	Q _g	V _{DS} =750V,I _D =3A, V _{GS} =10V R _G =25Ω	-	37	-	nC
Gate-Source charge	Q _{gs}		-	6	-	nC
Gate-Drain charge	Q _{gd}		-	22	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain-Source Diode Forward Current	V _{SD}	V _{GS} =0V,I _S =4A	-	-	1.4	V
Diode Forward Current	I _S	TC=25℃	-	-	4	A
Reverse recovery time	T _{rr}	I _S =3A, dI/dT=100A/μS	-	376	-	nS
Reverse recovery charge	Q _{rr}		-	2.1	-	μC

Thermal Characteristics

Parameter	Symbol	Value			Unit
		TO-3PH	TO-263	TO-220	
Thermal Resistance, junction to Case	$R_{th(j-C)}$	1.7	0.371		$^{\circ}C/W$
Thermal Resistance, junction to Ambient	$R_{th(j-A)}$	50	35	50	$^{\circ}C/W$

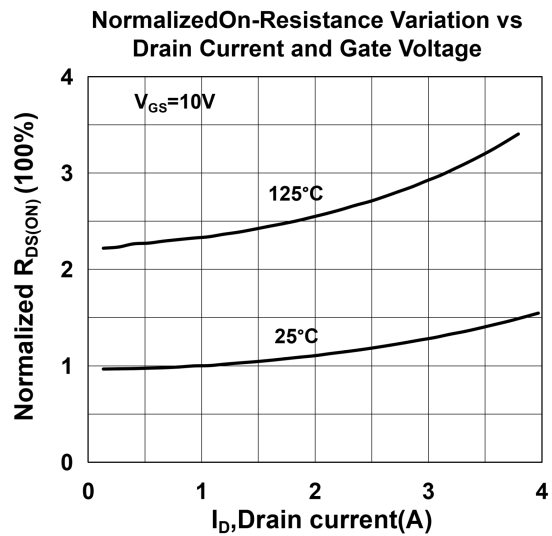
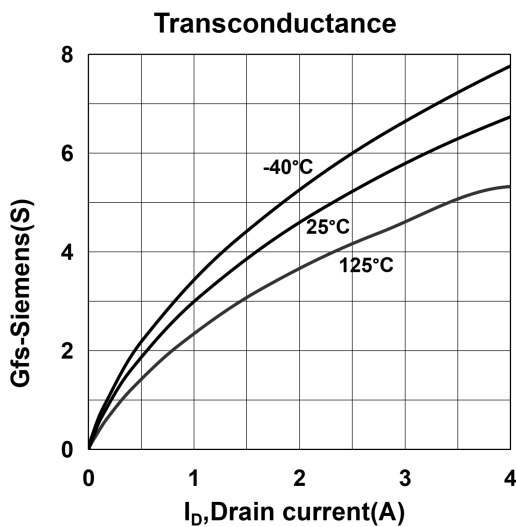
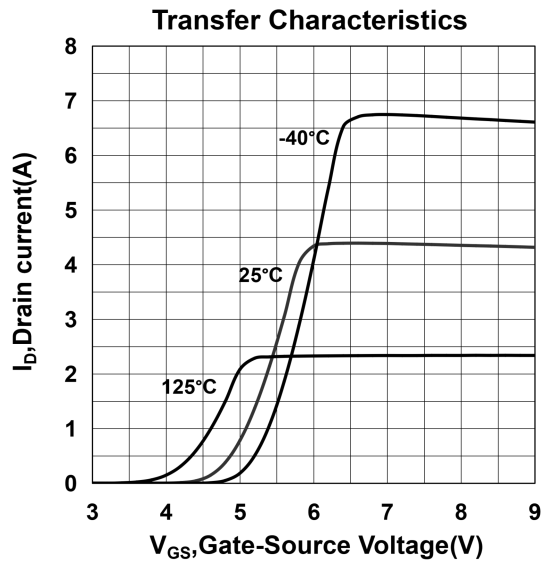
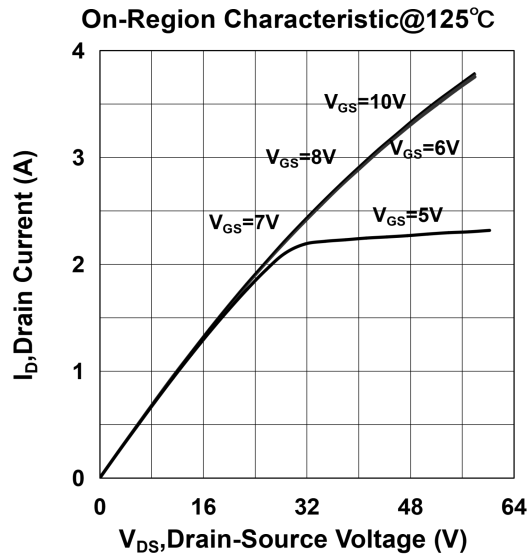
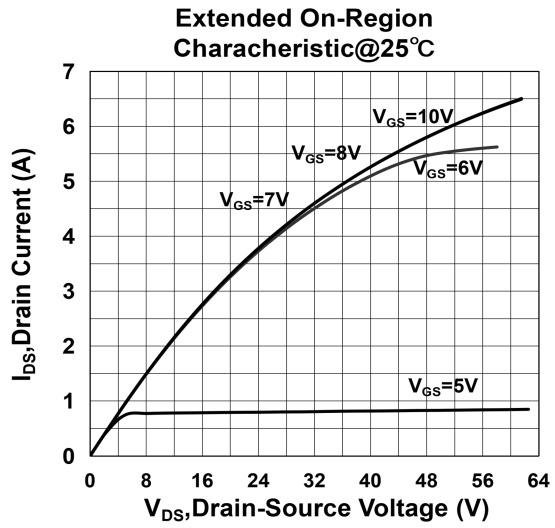
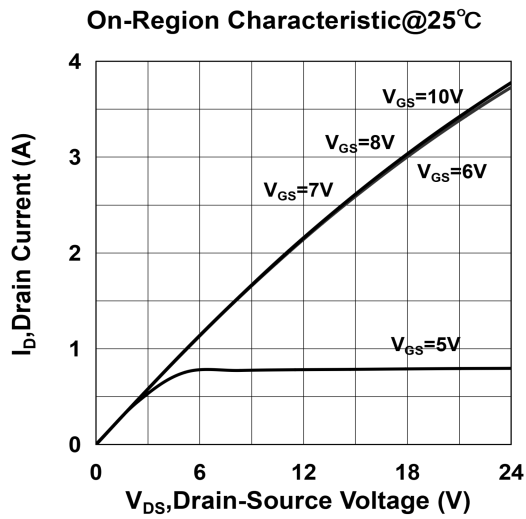
Note:

1. Pulse width limited by maximum junction temperature
2. $L=57.5mH, I_{AS}=4A, R_G=25\Omega$, starting $T_J=25^{\circ}C$
3. Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

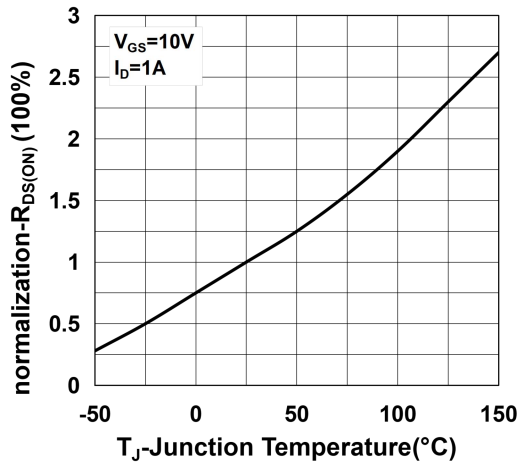
Order Message

Marking	Package
MS4N1350HGB2	TO-3PH
MS4N1350HGE0	TO-263
MS4N1350HGT0	TO-220

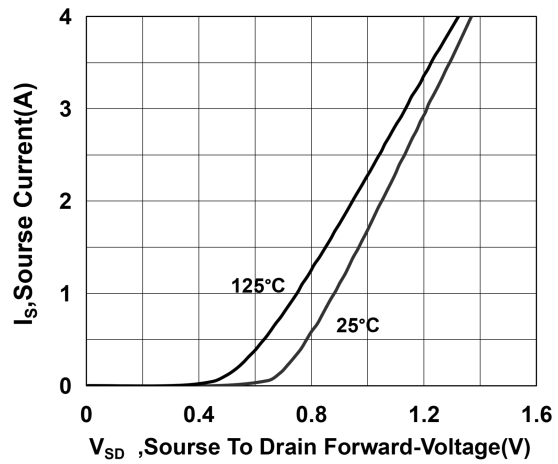
Electrical Characteristics



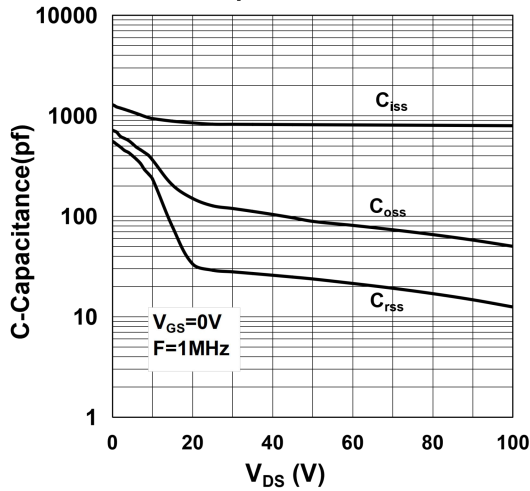
Normalization On-Resistance
Variation vs Junction Temperature



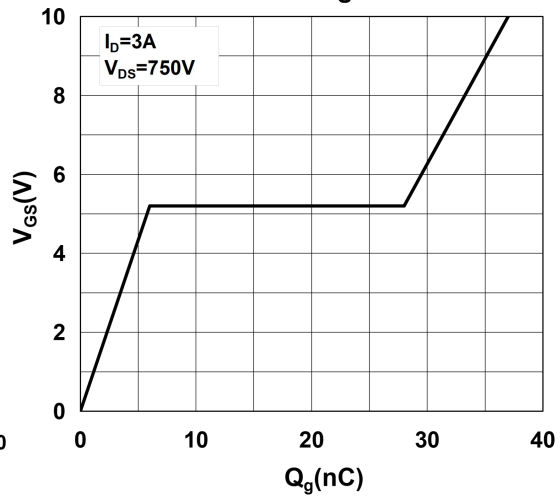
Body Diode Forward Voltage Variation
with Source Current and Temperature



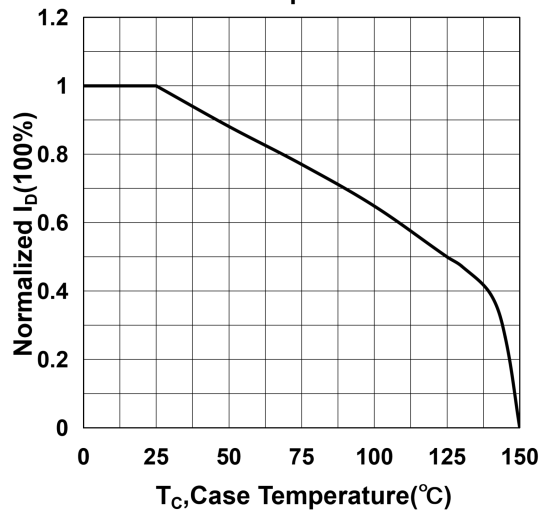
Capacitance



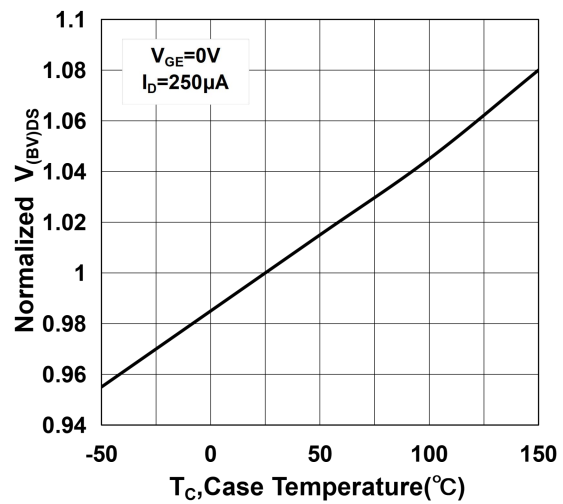
Gate Charge



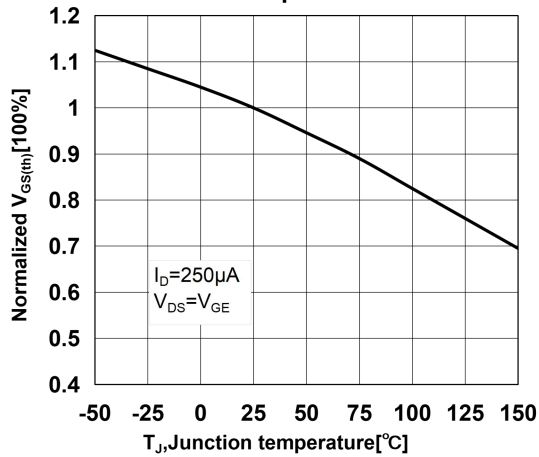
Maximum Drain Current vs
Case Temperature



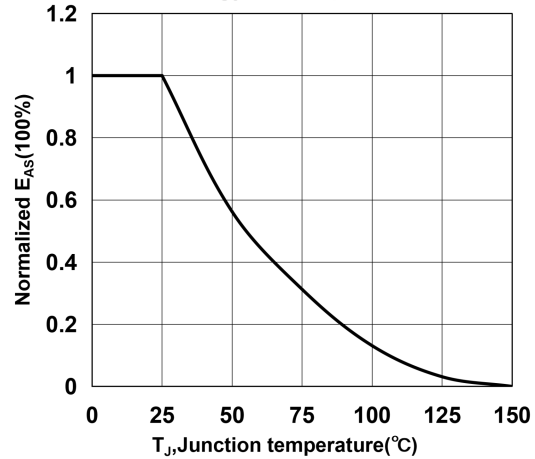
Normalized $V_{(BV)DS}$ vs temperature



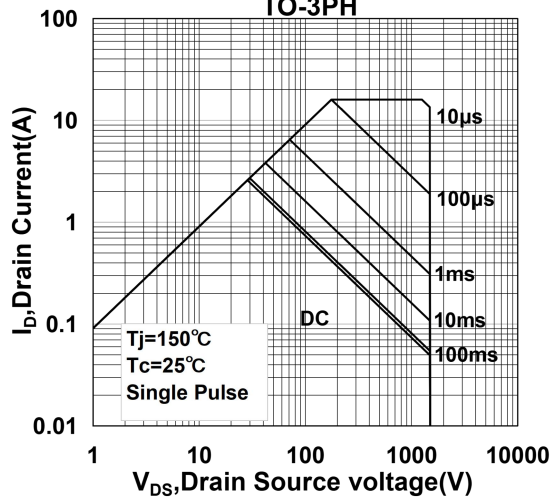
Normalized gate threshold voltage vs temperature



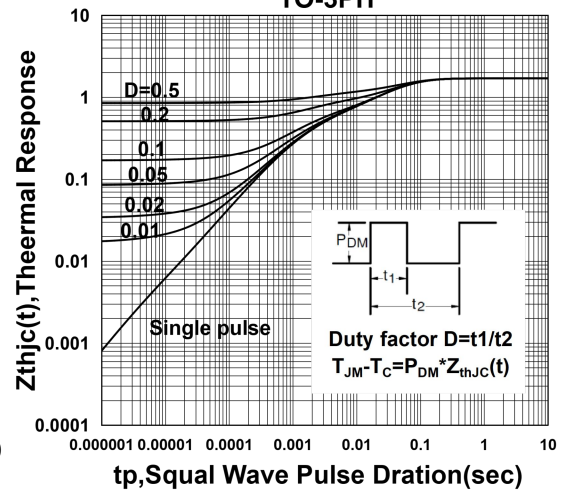
Normalized maximum avalanche energy vs temperature



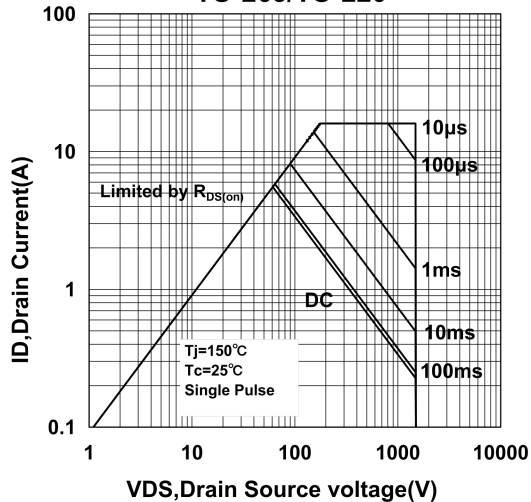
Safe Operating Area for TO-3PH



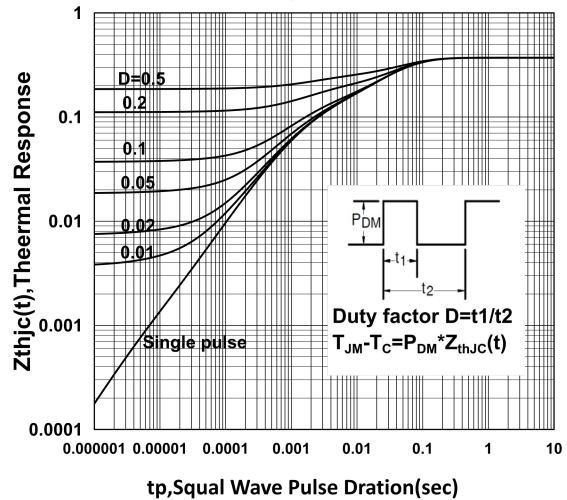
Transient response Curve for TO-3PH



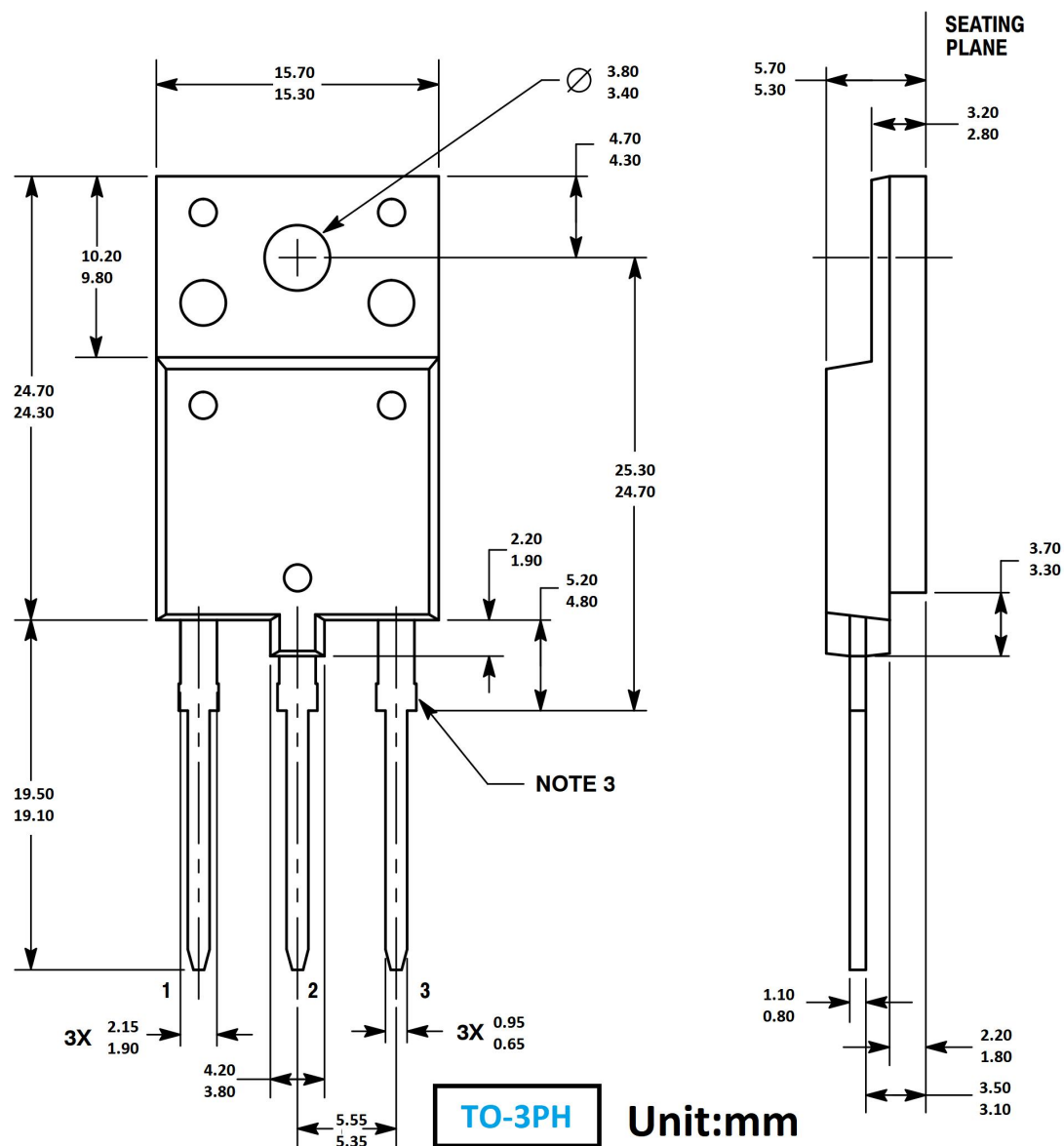
Safe Operating Area for TO-263/TO-220

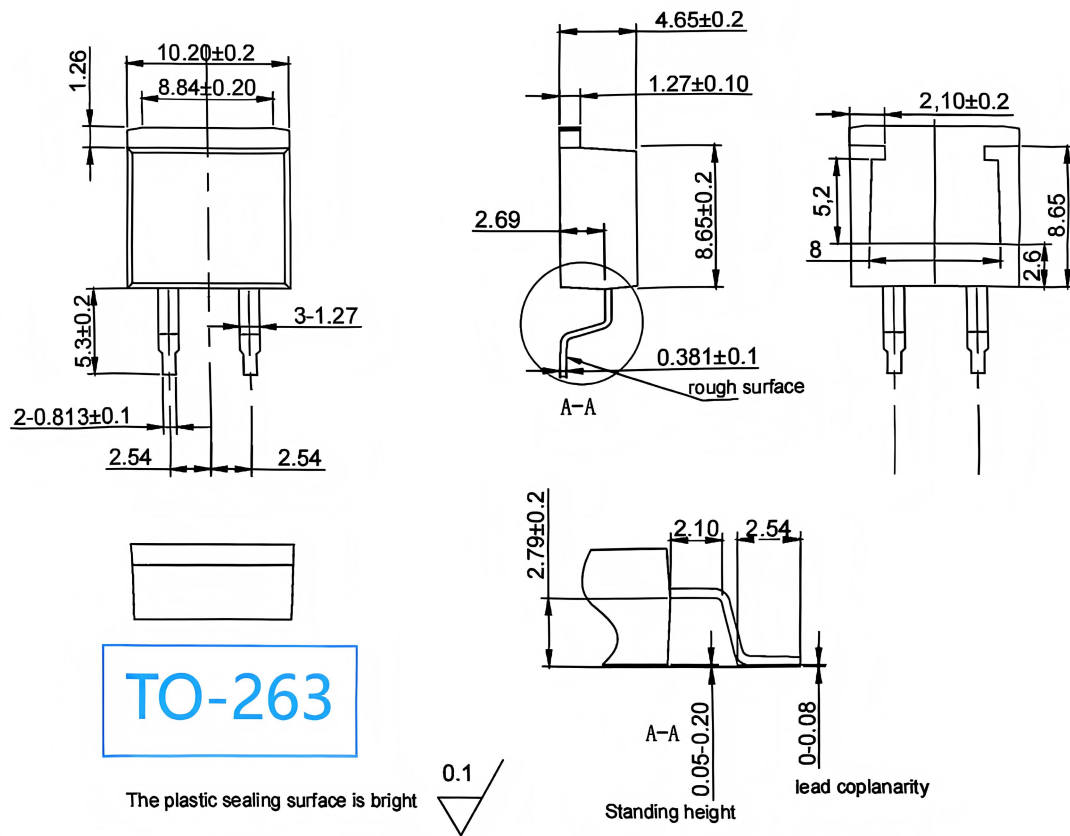


Transient response Curve for TO-263/TO-220



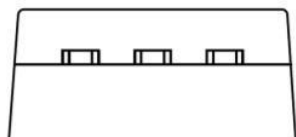
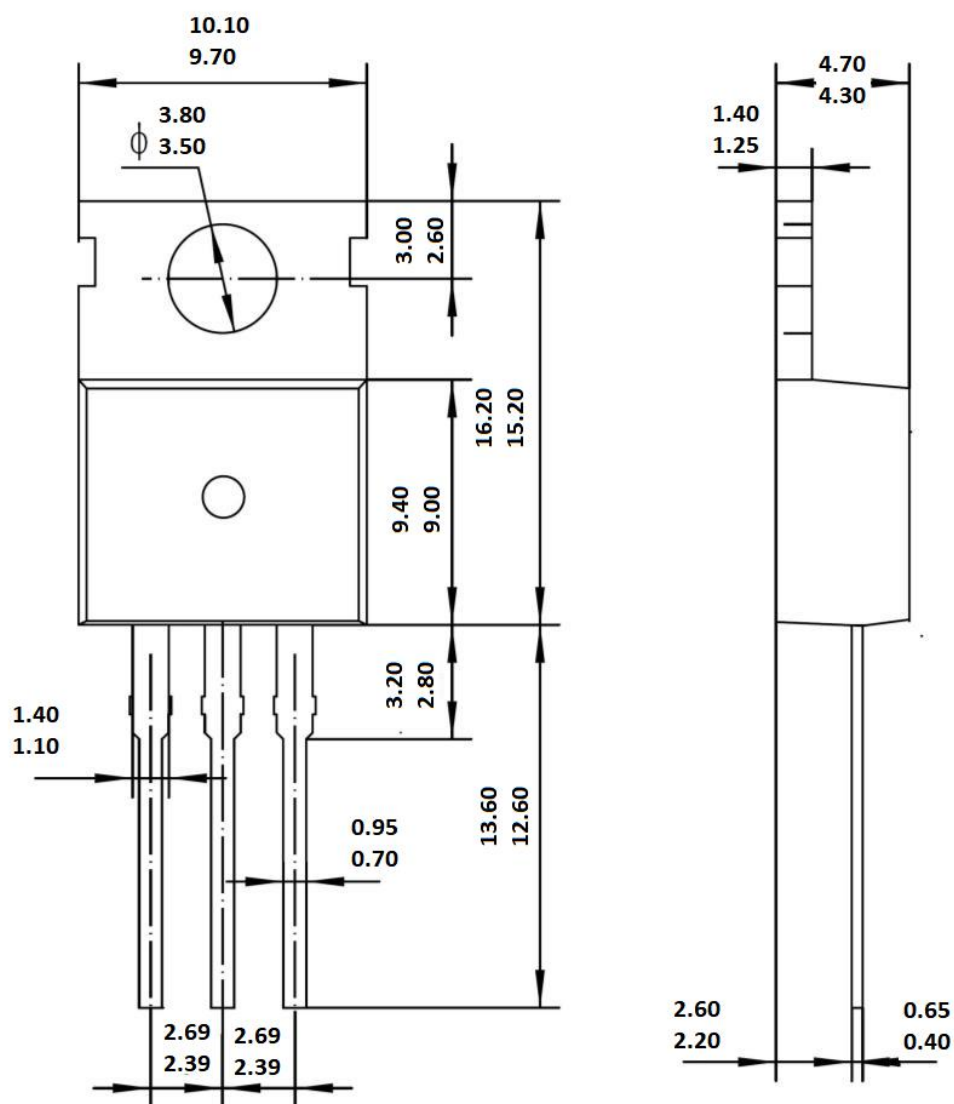
Package Mechanical DATA





Notes:

1. unmarked tolerance±0.15mm;unmarked R<0.15mm
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. The top pinhole is not allowed to protrude the surface of the plastic sealing body
5. Unit: mm



TO-220

Unit: mm