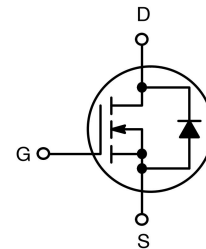
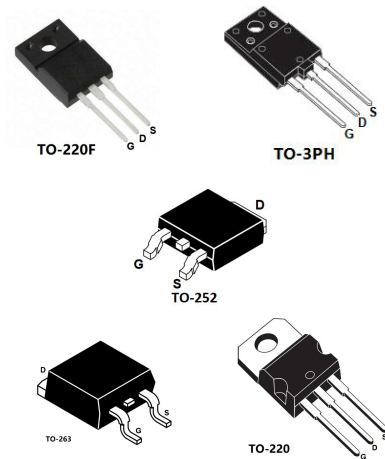


## General features

Type	V <sub>DSS</sub> (@T <sub>Jmax</sub> )	R <sub>DS(on)</sub>	I <sub>D</sub>
MS5N100	1000 V	< 4.2 Ω	5A
MS5N100S	1000 V	< 4.2 Ω	5A
MS5N100FT	1000 V	< 4.2 Ω	5A
MS5N100FE	1000 V	< 4.2 Ω	5A
MS5N100FD	1000 V	< 4.2 Ω	5A

- Extremely high dv/dt capability
- 100% avalanche tested
- Gate charge minimized
- Very low intrinsic capacitances
- Very good manufacturing repeatability



## Applications

- Switching application

## Order codes

Partnumber	Marking	Package
MS5N100	MS5N100	TO-3PH
MS5N100S	MS5N100S	TO-220F
MS5N100FT	MS5N100FT	TO-220
MS5N100FE	MS5N100FE	TO-263/D2PAK
MS5N100FD	MS5N100FD	TO-252/DPAK

## Electrical ratings

### Absolute maximum ratings

Parameter	Symbol	Value				Unit
		TO-3PH	TO-220FP	TO-220/ TO-252	TO-263	
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>	5				A
Drain current (continuous) at TC=100°C	I <sub>D</sub>	3				
Drain current (pulsed)	I <sub>DM</sub>	18	18	18	18	
Total dissipation at TC=25°C	PTOT	125	30	68	56	W
Derating factor		1	0.24	1	0.63	W/°C

Drain source ESD (HBM-C=100pF,R=1.5KΩ)	$V_{ESD(GS)}$	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)	$V_{ISO}$	2500	v
Operating junction temperature	$T_J$	-55 to 175	°C
Storage temperature	$T_{STG}$		

### Thermal data

Parameter	Symbol	Value				Unit
		TO-220FP	TO-3PH	TO-220/ TO-252	TO-263	
Thermal resistance junction max	Rthj-case	4.2	1	1	0.86	°C/W
Thermal resistance junction-ambient max	Rthj-case	5				A
Maximum lead temperature for soldering purpose	T	350				mJ

### Avalanche characteristics

Parameter	Symbol	Value	Unit
Avalanche current repetitive or not-repetitive (pulse width limited by Tj Max)	$I_{AR}$	5	A
Single pulse avalanche energy (starting Tj=25°C Id=Iar Vdd=50V)	$E_{AS}$	350	mJ

**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	$V_{(BR)DSS}$	$I_D=1mA$ $V_{GS}=0$	1000			V
Zero gate voltage drain current ( $V_{GS}=0$ )	$I_{DSS}$	$V_{DS}=\text{Max rating}$			1	$\mu A$
		$T_C=125^{\circ}C$			50	$\mu A$
Gate body leakage current ( $V_{GS}=0$ )	$I_{GSS}$	$V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=100\mu A$	3	3.5	4.5	V
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=1.75A$		3.5	4.2	$\Omega$

**Dynamic**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Forward transconductance	$g_{fs}$	$V_{DS} = 15 V, I_D = 1.75A$		3		S
Input capacitance	$C_{iss}$	$V_{DS}=25V, f=1MHz, V_{GS}=0$		1154		pF
Output capacitance	$C_{oss}$			106		
Reverse transfer capacitance	$C_{rss}$			21.3		
Equivalent Output capacitance	$C_{oss eq.}$	$V_{GS}=0, V_{DS}=0$ to 800V		46.8		
Gate input resistance	$R_g$	$f=1MHz$ Gate DC Bias=0 Test signal level=20mV open drain		2.2		$\Omega$
Total gate charge	$Q_g$	$V_{DD}=800V, I_D=3.5A$ $V_{GS}=10V$		42		nC
Gate-source charge	$Q_{gs}$			7.3		
Gate-drain charge	$Q_{gd}$			21.7		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 500 V, I_D = 1.75 A,$ $R_G = 4.7 \Omega, V_{GS} = 10 V$		22.5		ns
Rise time	$t_r$			7.7		
Turn-off-delay time	$t_{d(off)}$			51.5		
Fall time	$t_f$			19		

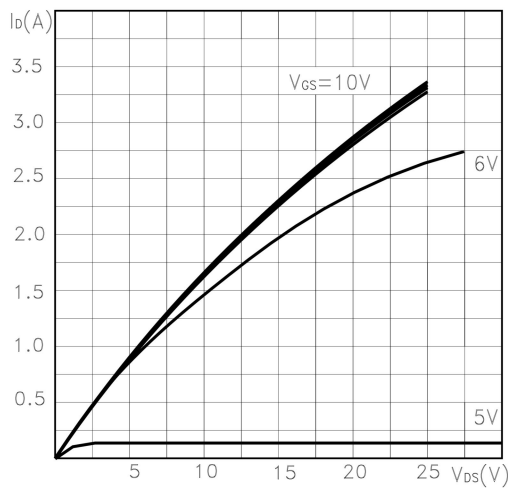
**Source Drain Diode**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Source Drain Current	$I_{SD}$				5	A

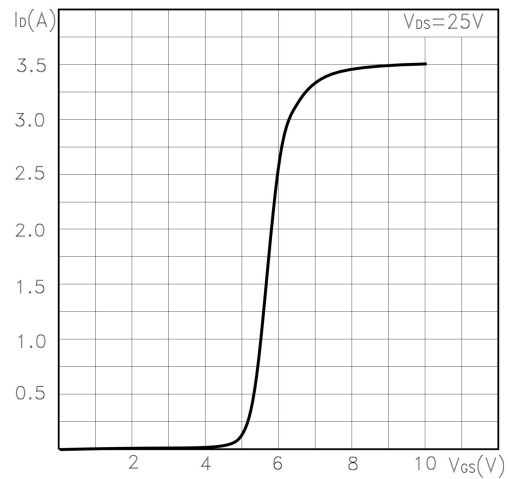
Source Drain Current(Pulsed)	$I_{SDM}$			20	A
Forward On Voltage	$V_{SD}$	$I_{SD}=5A, V_{GS}=0V$		1.2	V
Reverse Recovery Time	$T_{rr}$	$I_{SD}=4A, di/dt=100A/\mu S$	500		ns
Reverse Recovery Charge	$Q_{rr}$	$V_R=100V, T_j=150^\circ C$	4.3		$\mu C$
Reverse Recovery Current	$I_{RRM}$		20		A

## Electrical characteristics (curves)

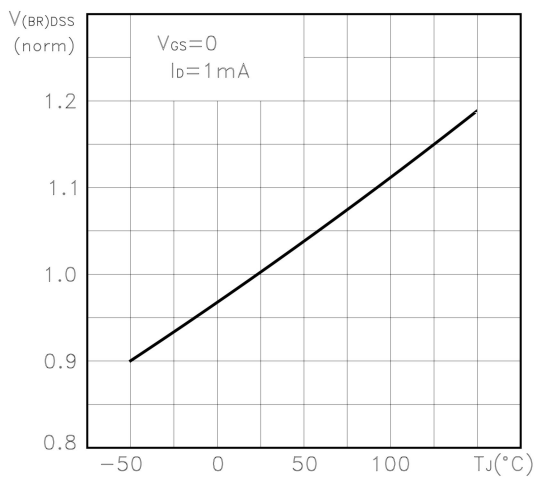
### Output characteristics



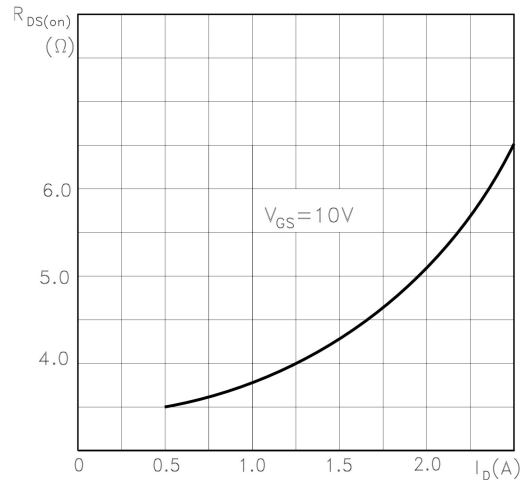
### Transfer characteristics



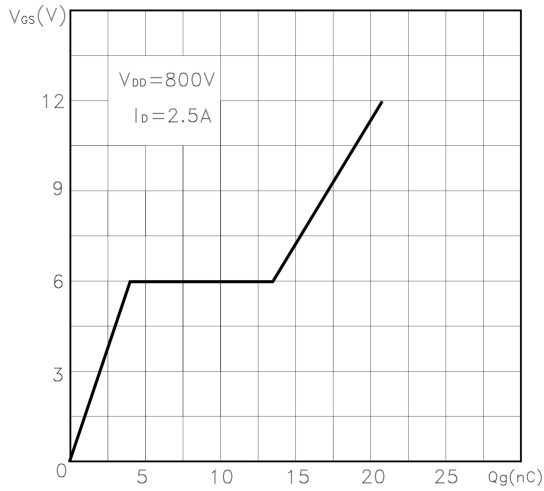
### Normalized $BV_{DSS}$ vs. temperature



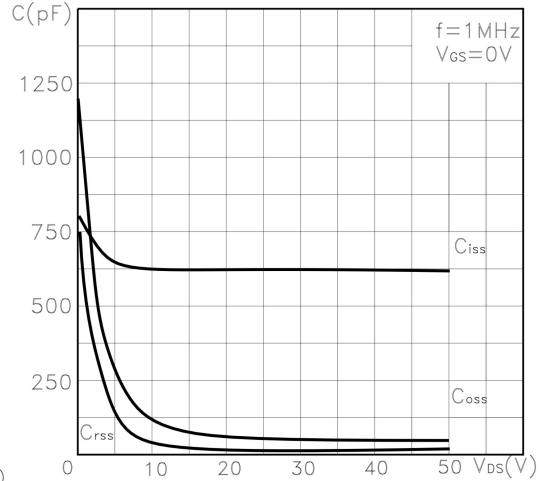
### Static drain-source on resistance



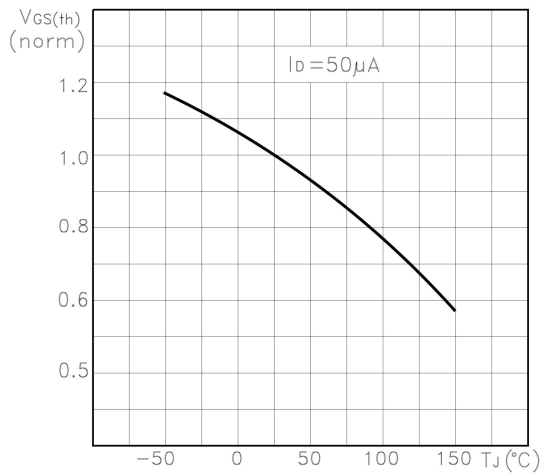
**Gate charge vs. gate-source voltage**



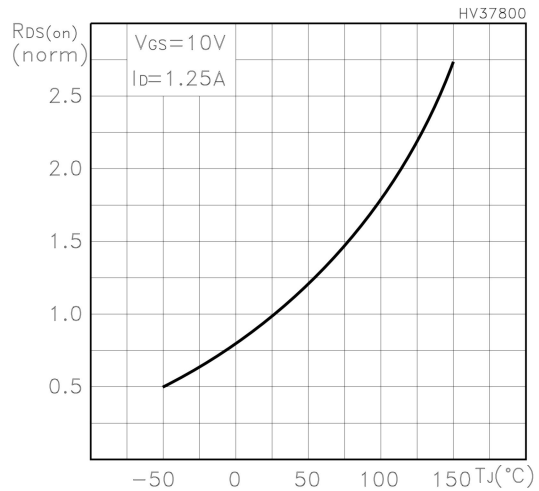
**Capacitance variations**



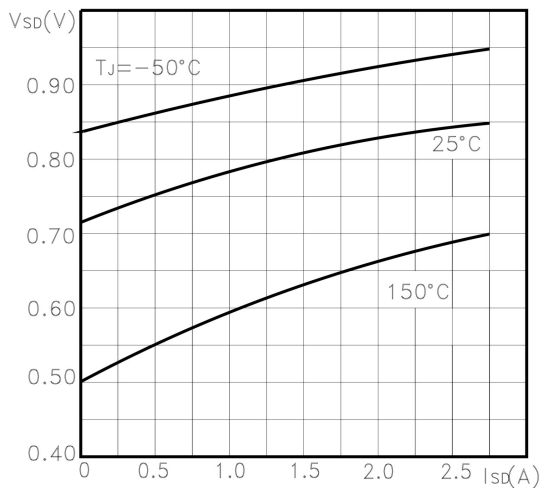
**Normalized gate threshold voltage vs. temperature**



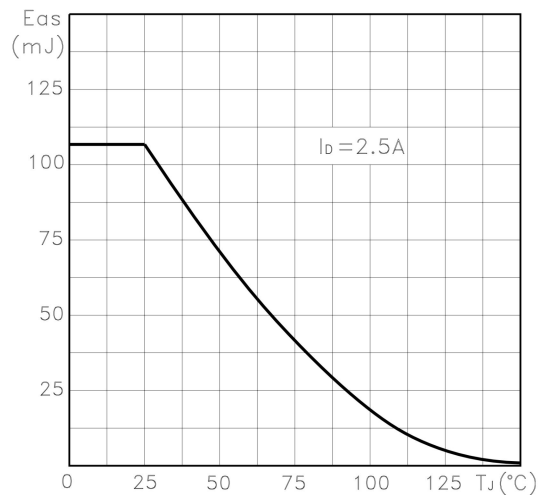
**Normalized on resistance vs. temperature**



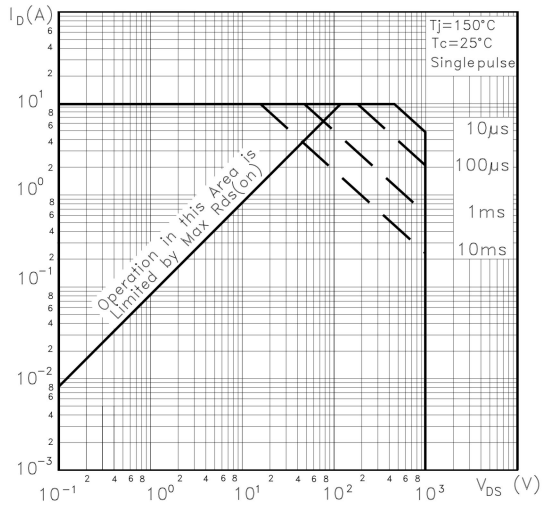
**Source-drain diode forward characteristics**



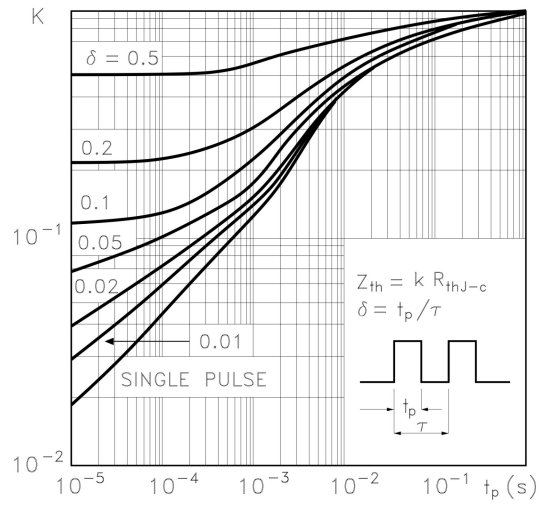
**Maximum avalanche energy vs Tj**



### Safe operating area

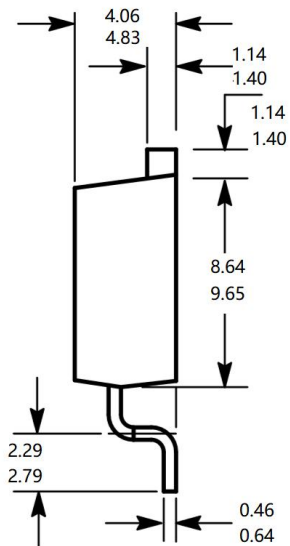
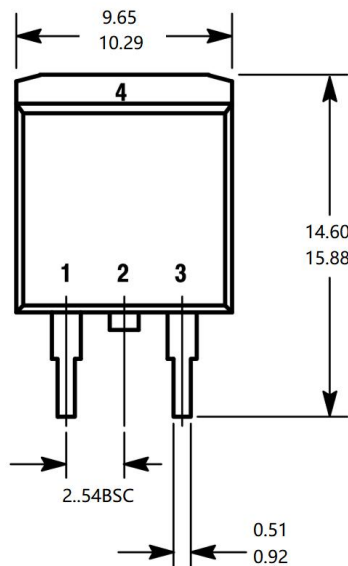


### Thermal impedance

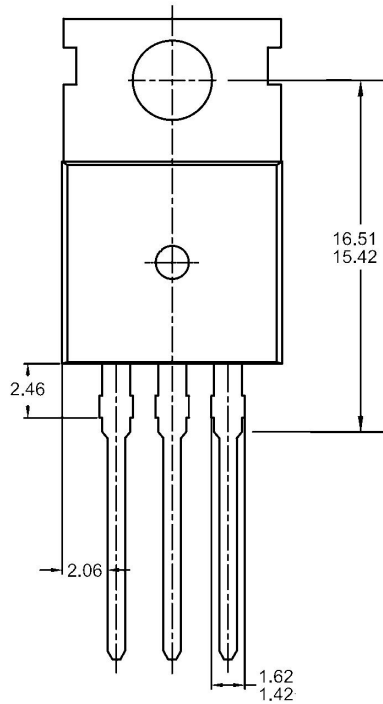


### Package outline dimension

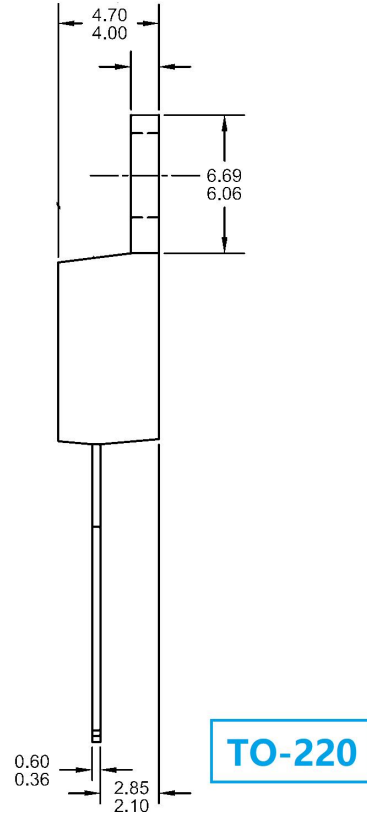
#### TO-263/D2PAK



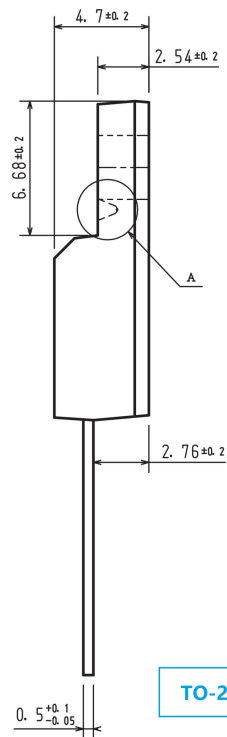
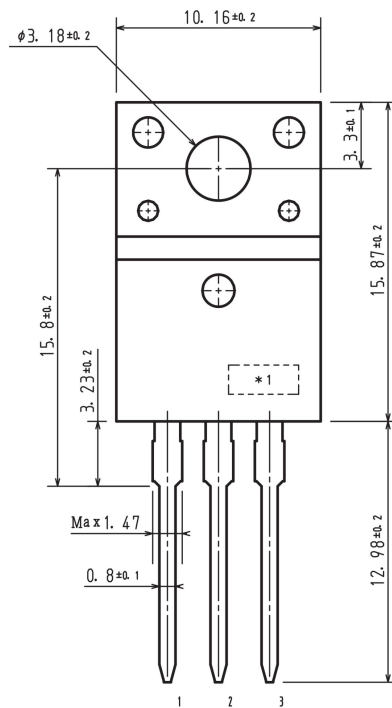
**TO-263/D2PAK**



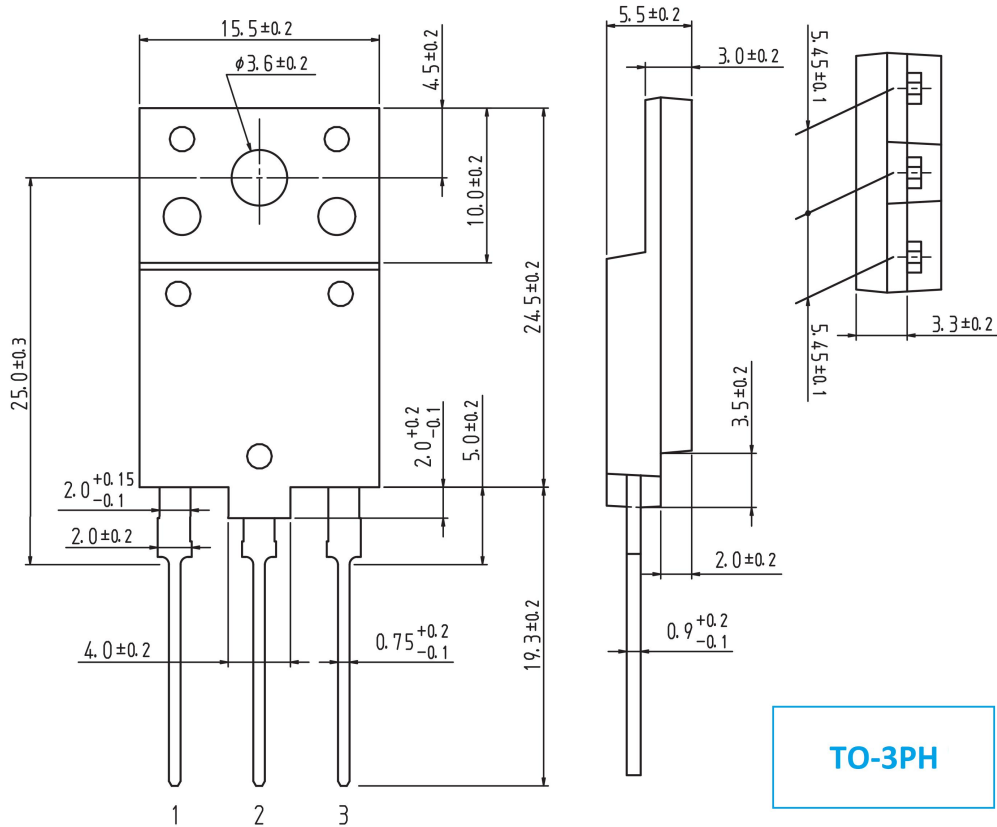
TO-220



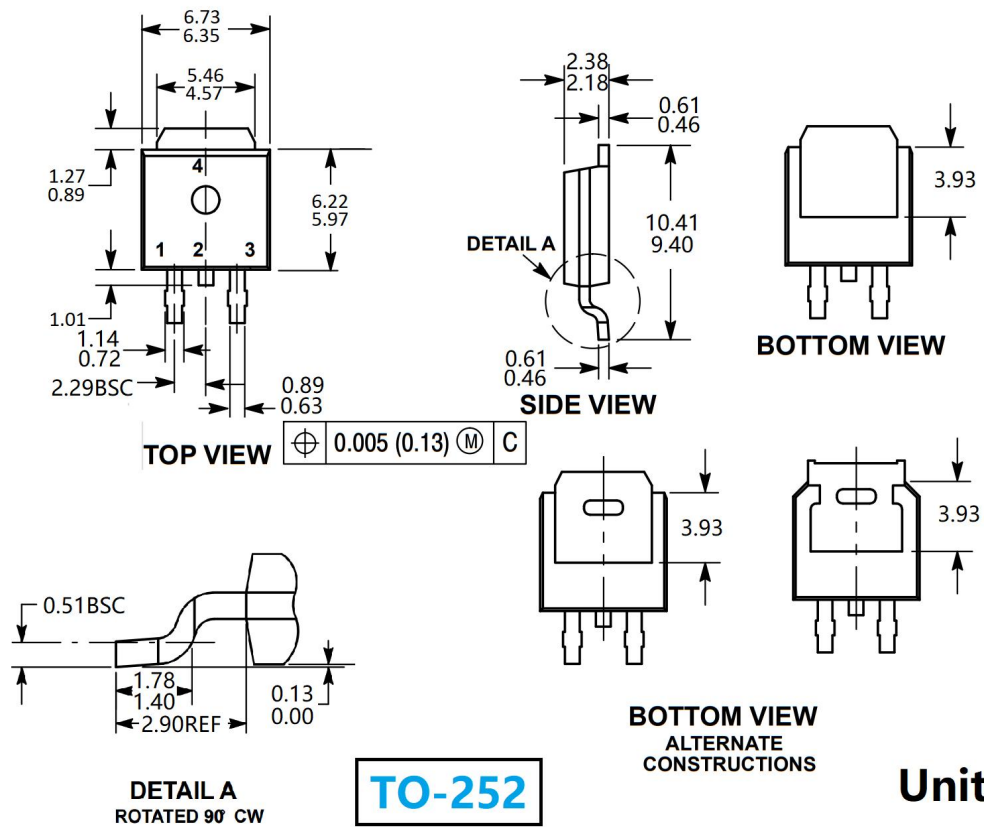
TO-220



TO-220F



**TO-3PH**



**TO-252**

**BOTTOM VIEW  
 ALTERNATE  
 CONSTRUCTIONS**

**Unit:mm**