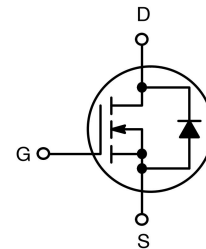
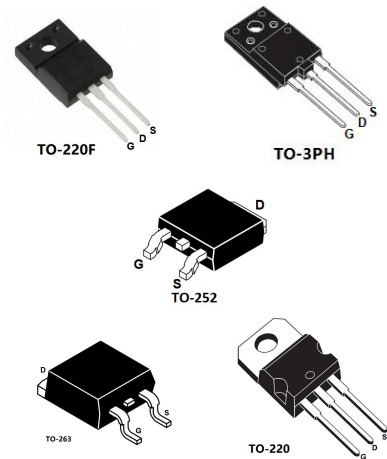


General features

Type	V _{DSS} (@T _{jmax})	R _{DS(on)}	I _D
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 _{GS} =0)	V _{DS}	1000				V
Gate-source voltage	V _{GS}	±30				
Drain current (continuous) at TC=25°C	I _D	5				A
Drain current (continuous) at TC=100°C	I _D	3				
Drain current (pulsed)	I _{DM}	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	μA
		$T_C=125^{\circ}C$			50	μA
Gate body leakage current ($V_{GS}=0$)	I_{GSS}	$V_{GS}=\pm 20V$			± 10	μA
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	Ω

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		Ω
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		

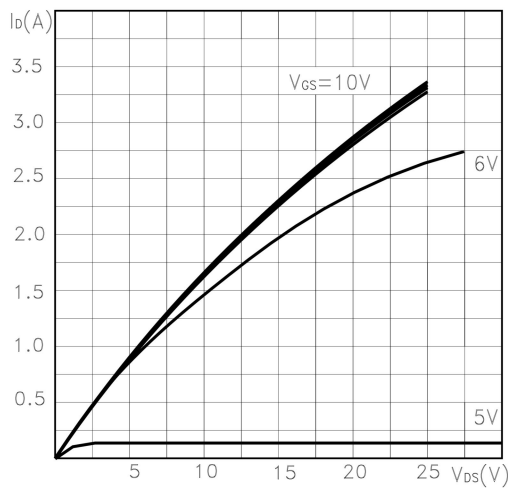
Source Drain Diode

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

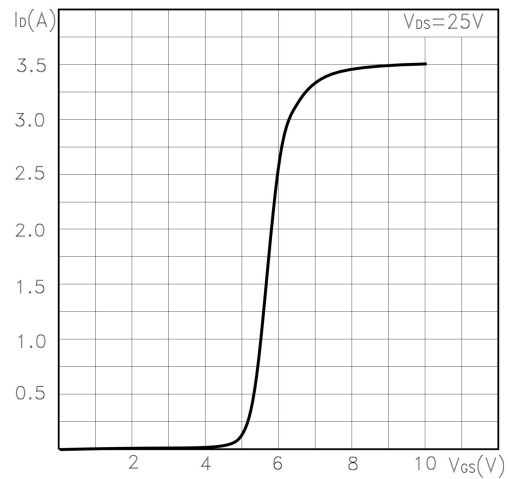
Source Drain Current(Pulsed)	I_{SDM}			20	A
Forward On Voltage	V_{SD}	$I_{SD}=5A, V_{GS}=0V$		1.2	V
Reverse Recovery Time	T_{rr}	$I_{SD}=4A, di/dt=100A/\mu S$	500		ns
Reverse Recovery Charge	Q_{rr}	$V_R=100V, T_j=150^\circ C$	4.3		μC
Reverse Recovery Current	I_{RRM}		20		A

Electrical characteristics (curves)

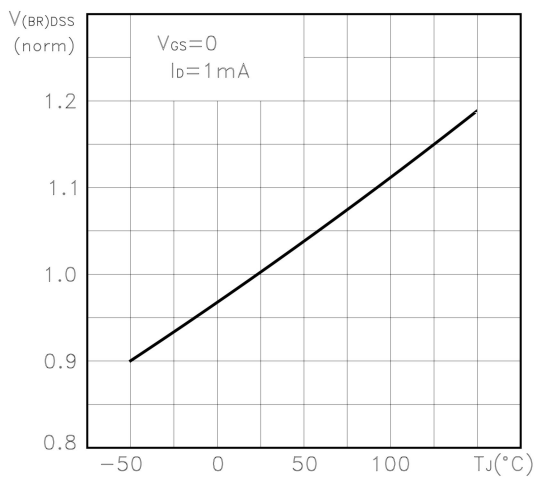
Output characteristics



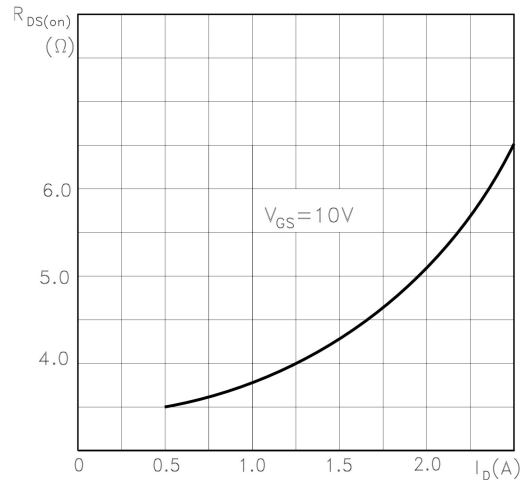
Transfer characteristics



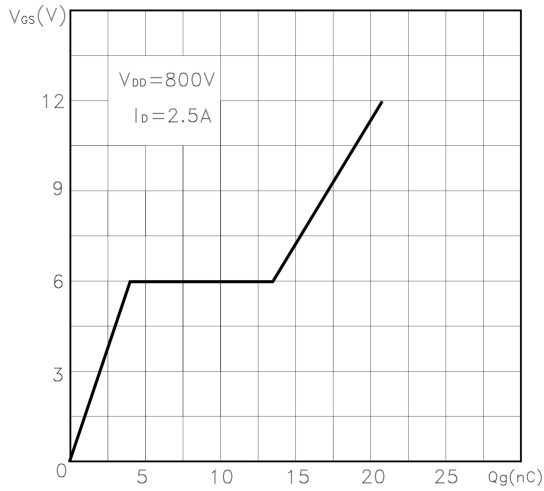
Normalized BV_{DSS} vs. temperature



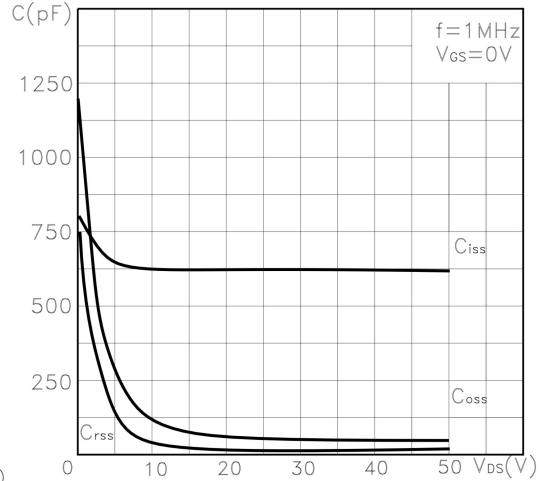
Static drain-source on resistance



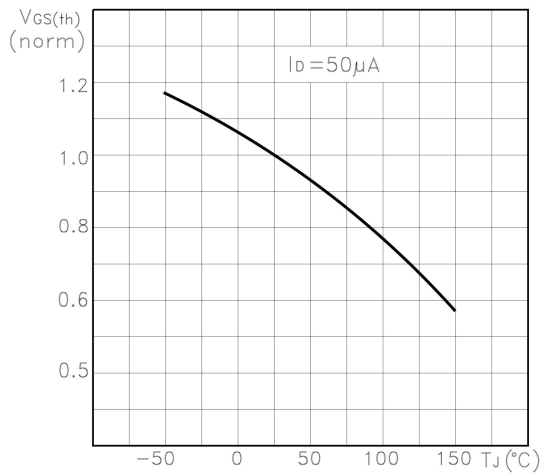
Gate charge vs. gate-source voltage



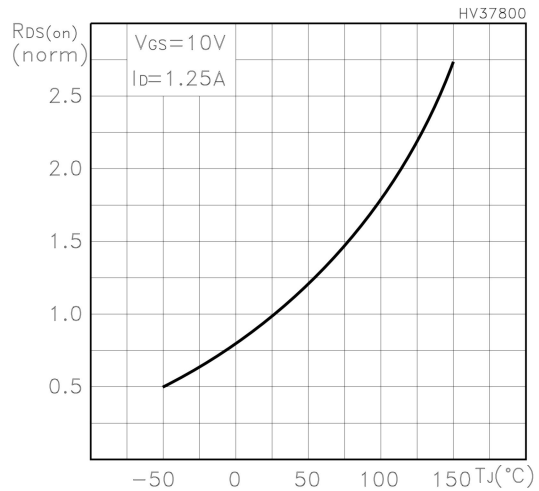
Capacitance variations



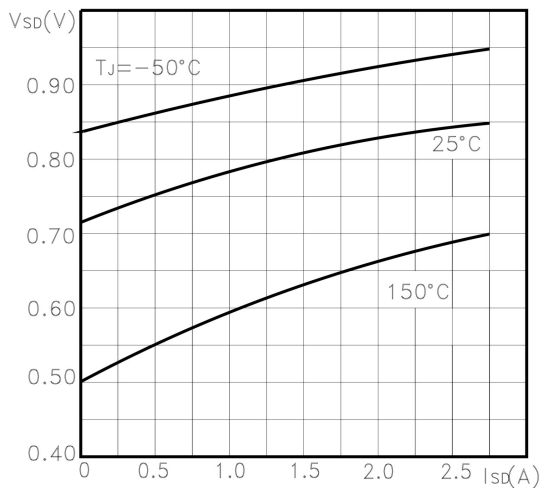
Normalized gate threshold voltage vs. temperature



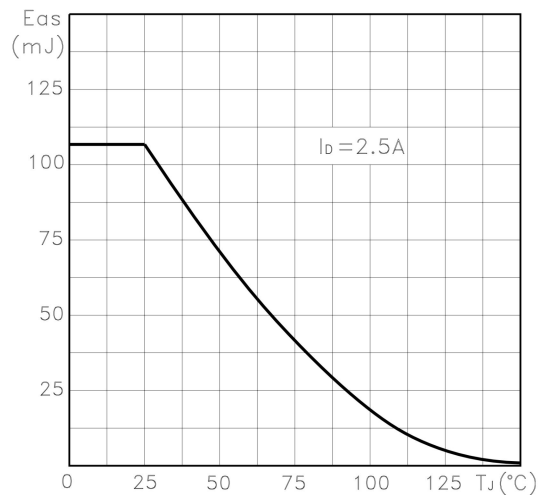
Normalized on resistance vs. temperature



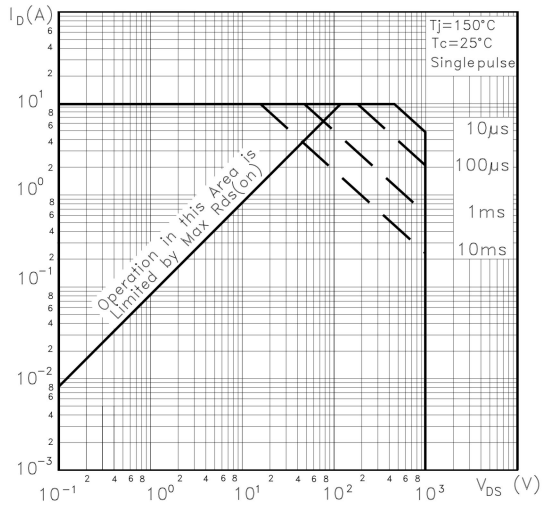
Source-drain diode forward characteristics



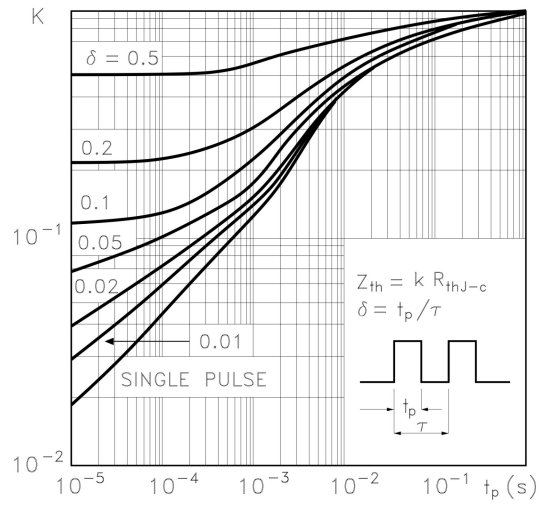
Maximum avalanche energy vs Tj



Safe operating area

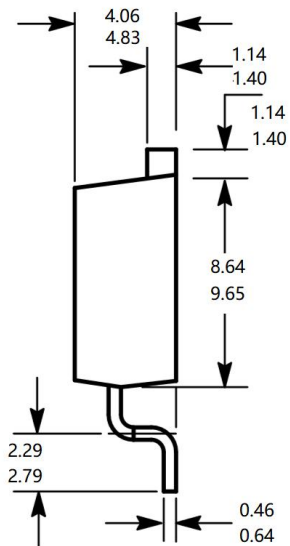
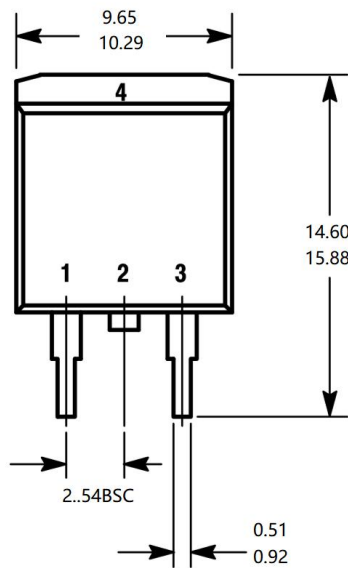


Thermal impedance

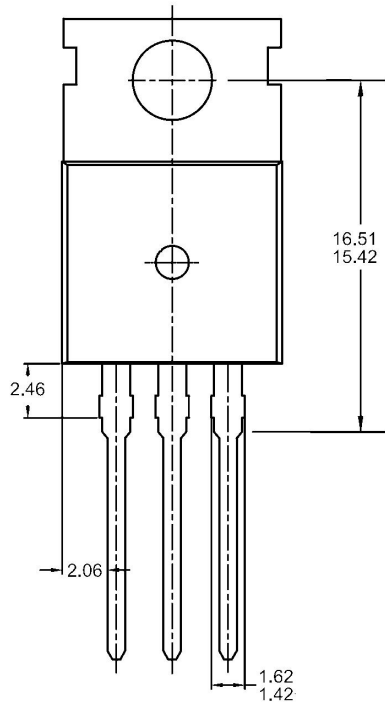


Package outline dimension

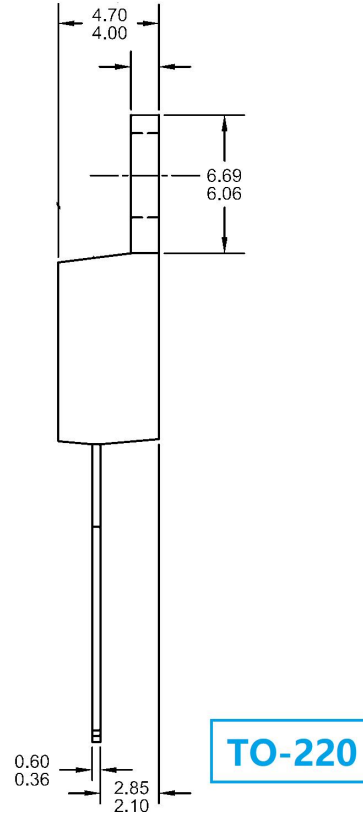
TO-263/D2PAK



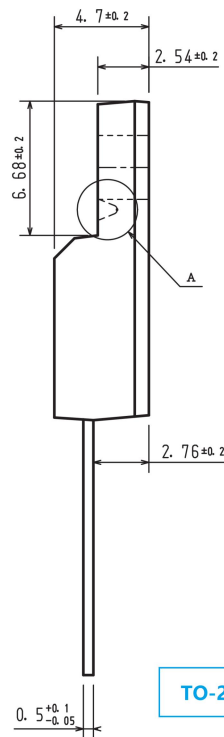
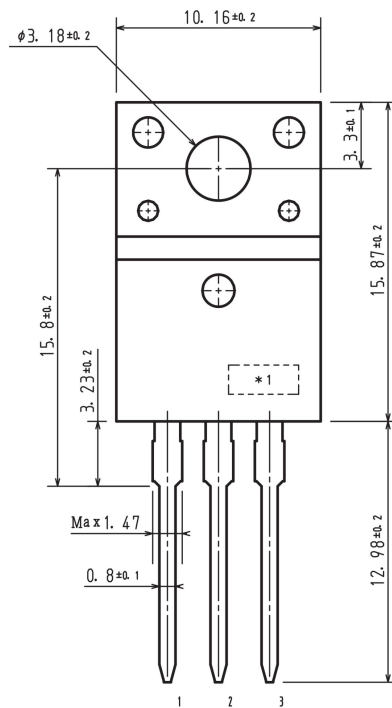
TO-263/D2PAK



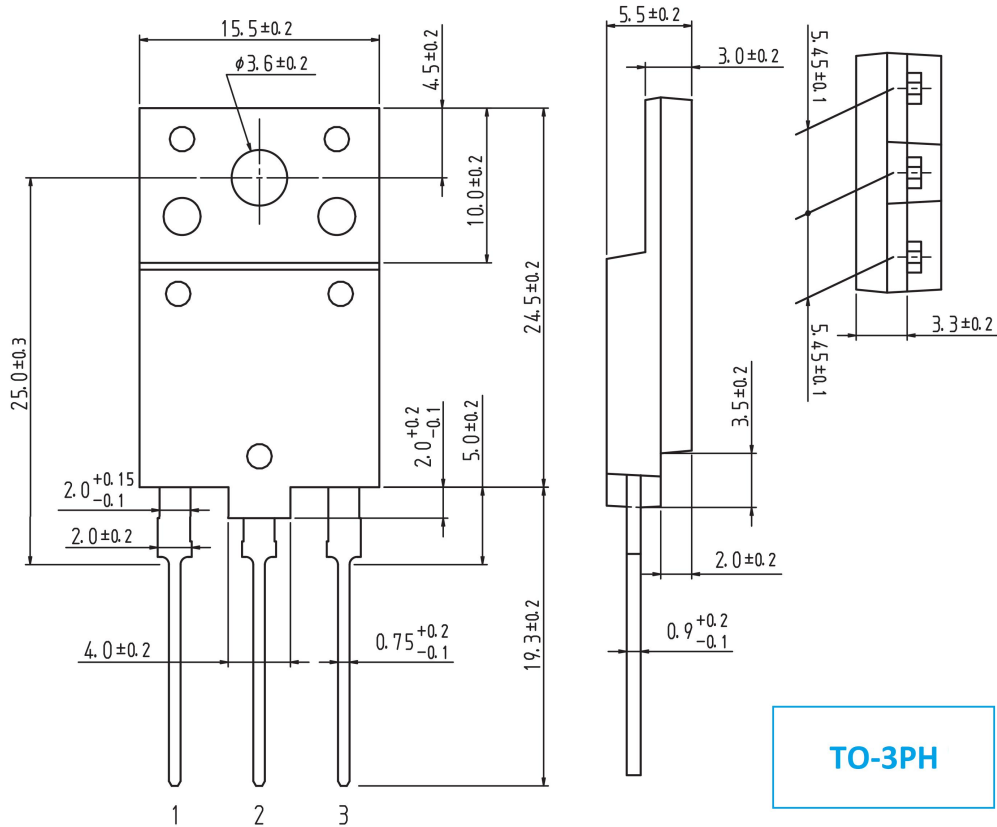
TO-220



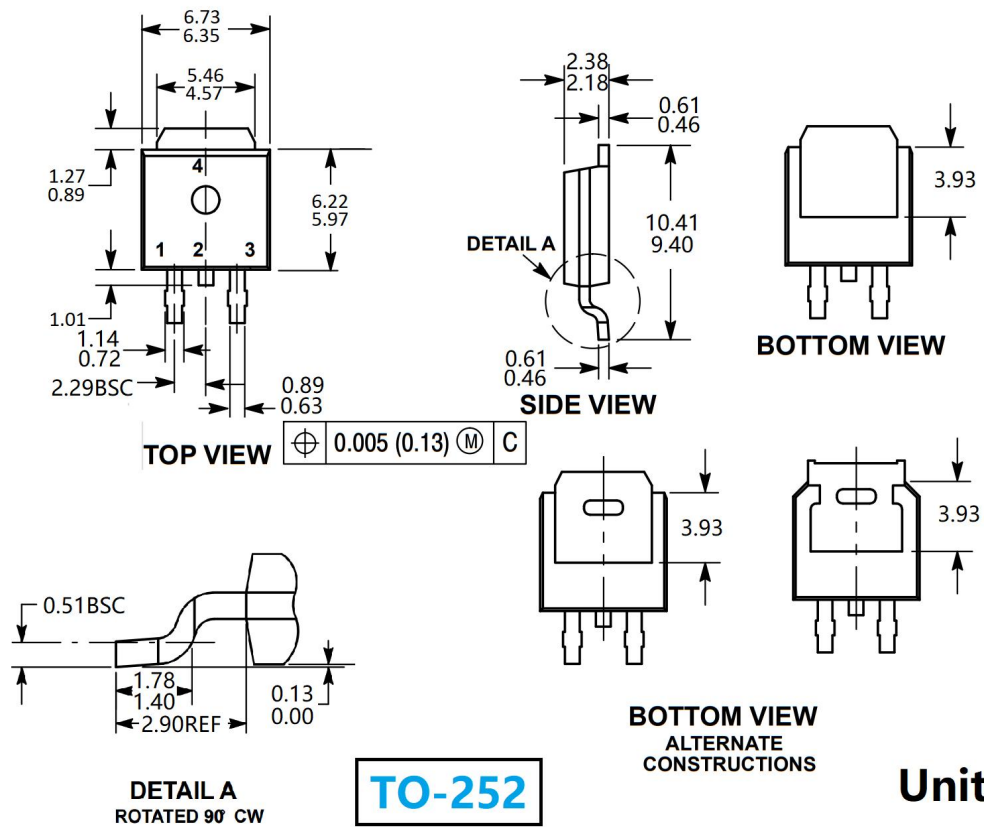
TO-220



TO-220F



TO-3PH



TO-252

Unit:mm