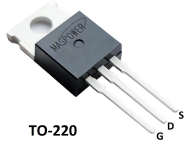
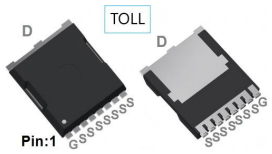
Features

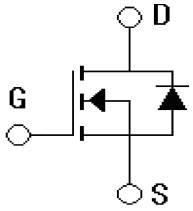
- Low $R_{DS(on)}$
- Fast switching
- 100% avalanche tested
- Low package inductance
- Low intrinsic Rectifier
- High current handing diode





Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC chopper
- AC motor drives
- Uninterruptible power supplies
- Linear current regulators



Absolute Ratings (Tc=25℃)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V_{DSS}		100	V
Drain Current -continuous	I_D	T=25℃	220	A
		T=100℃	117	A
Drain Current - pulse (note 1)	I_{DM}		890	A
Gate-Source Voltage	V_{GSS}		±20	V
Single Pulsed Avalanche Energy (note 2)	E_{AS}		1881.6	mJ
Avalanche Current(note 1)	I_{AR}		87	A
Peak Diode Recovery dv/dt(note 3)	dv/dt		45	V/ns
Power Dissipation	PD	T_C=25℃	272	W
		T_C=100℃	132	W
Operating Temperature and Storage Temperature Range	T_j,T_{STG}		-55~+150	℃
Maximum Lead Temperature for Soldering Purposes	T_L		300	℃

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	100	-	-	V
Drain cut-off current	I_{DSS}	V_{DS}=100V,Tj=25℃	-	-	1	μA
		V_{DS}=100V,Tj=125℃	-	-	500	
Gate-body leakage current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V	-	-	±100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=50A (note 4)	-	1.9	2.45	mΩ
Forward Transconductance	g_{fs}	V_{DS} =10V , I_D=50A (note 4)	-	9	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, f=1.0MHz	-	12.3	-	nF
Output capacitance	C_{oss}		-	1435	-	pF
Reverse transfer capacitance	C_{rss}		-	52	-	pF
Gate Resistance	R_g	F=1MHz	-	2.0	-	Ω
Switching Characteristics						
Turn-On delay time	$t_{d(on)}$	V_{DD}=50V,I_D=20A, R_G=2Ω, V_{GS}=10V	-	36	-	ns
Turn-On rise time	t_r		-	25	-	ns
Turn-Off delay time	$T_{d(off)}$		-	52	-	ns
Turn-Off Fall time	t_f		-	29	-	ns
Total Gate Charge	Q_g	V_{DS}=50V,I_D=50A, V_{GS}=10V(note5)	-	176	-	nC
Gate-Source charge	Q_{gs}		-	56.2	-	nC
Gate-Drain charge	Q_{gd}		-	41.1	-	nC
Drain-Source Diode Characteristics						
Drain-Source Voltage	V_{SD}	V_{GS}=0V,I_S=50A (note 4)	-	-	1.2	V
Continuous Drain-Source Current	I_S		-	-	220	A
Pulsed Drain-Source Current	I_{SM}		-	-	890	A
Reverse recovery time	t_{rr}	V_{GS}=0V,I_F=50A dI_F/dt=100A/us	-	35	-	ns
Reverse recovery charge	Q_{rr}		-	123	-	nC

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.46	℃/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	℃/W

Notes:

1：Pulse width limited by maximum junction temperature

2：L=0.5mH, I_{AS}=87A, V_{DD}=50V, RG=25 Ω,Starting T_J=25℃

3：I_{SD} ≤I_{DM},di/dt ≤300A/μs,V_{DD}≤BV_{DSS}, Starting T_J=25℃

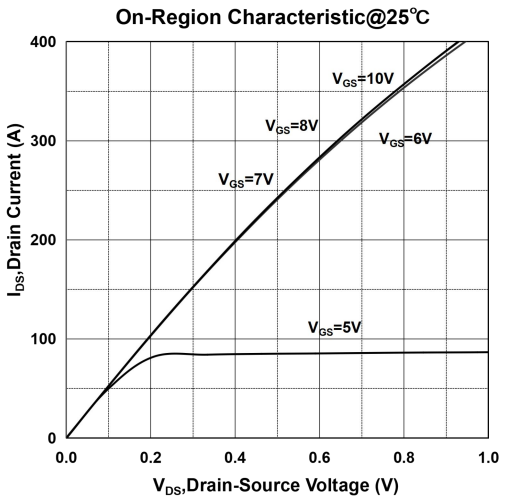
4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%

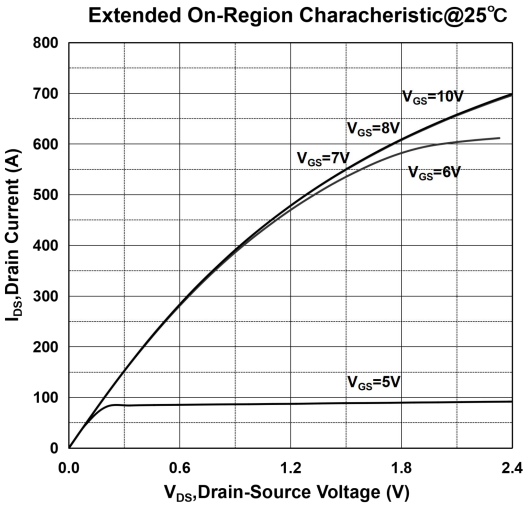
5：Essentially independent of operating temperature

Ordering Information

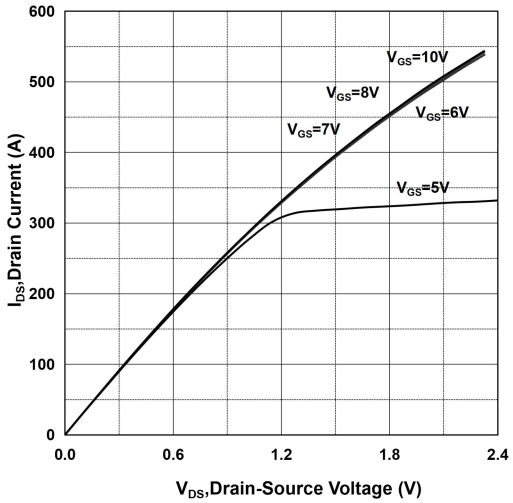
Part number	Silkscreen	Package
MS220N10JDT0	MS220N10JDT0	TO-220
MS220N10JDP0	MS220N10JDP0	TOLL

Electrical Characteristics

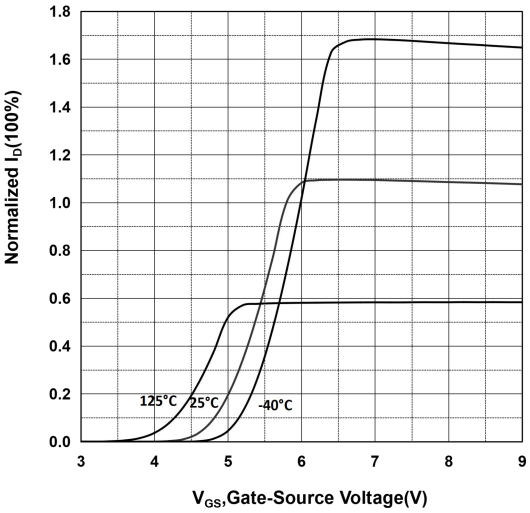




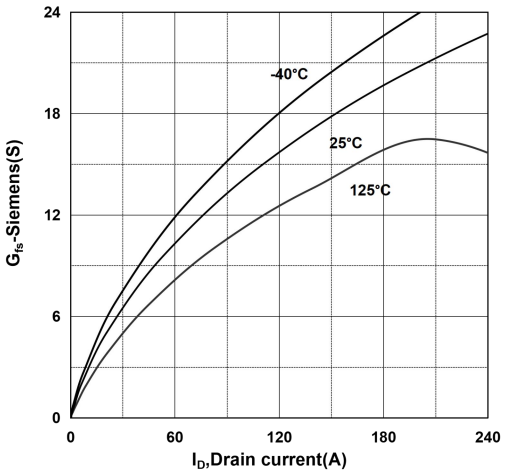
On-Region Characteristic@125℃



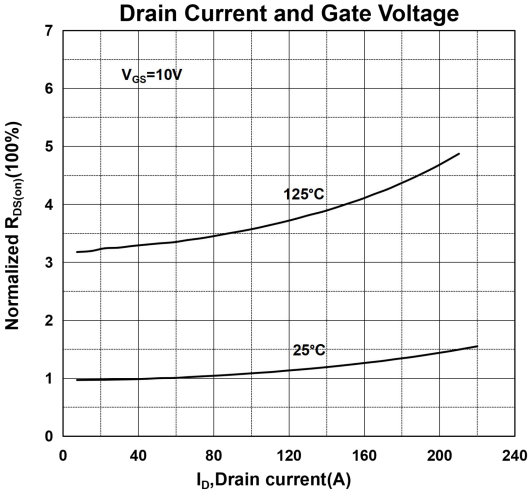
Normalized Transfer Characteristics



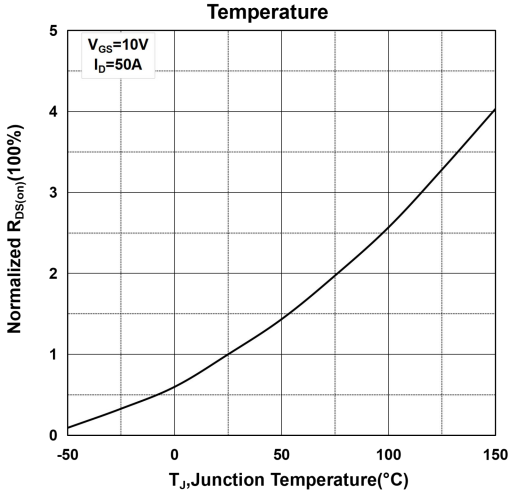
Transconductance



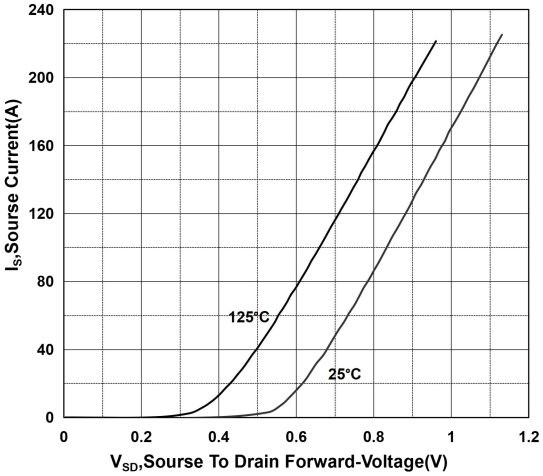
Normalized On-Resistance Variation vs Drain Current and Gate Voltage



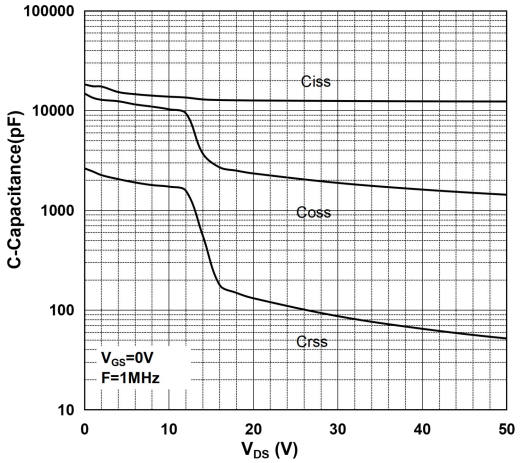
Normalized On-Resistance Variation vs Temperature



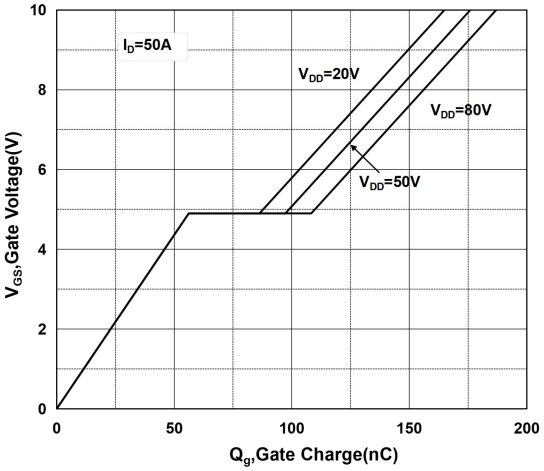
Body Diode Forward Voltage Variation with Sourse Current and Temperature



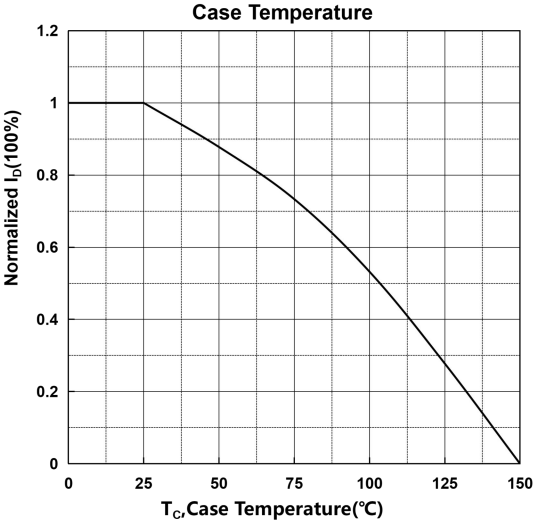
Capacitance



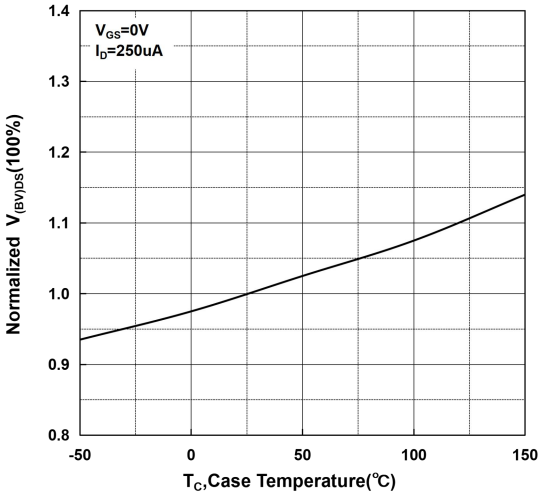
Gate Charge



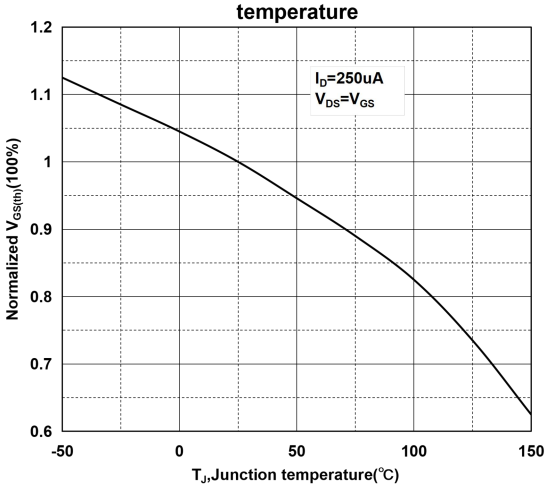
Normalized Maximum Drain Current vs Case Temperature



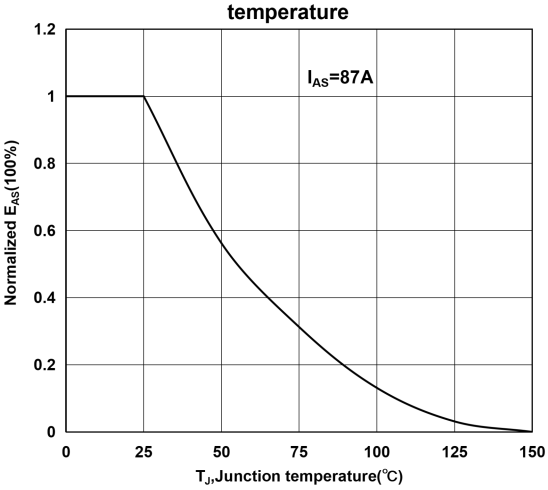
Normalized $V_{(BV)DS}$ vs temperature



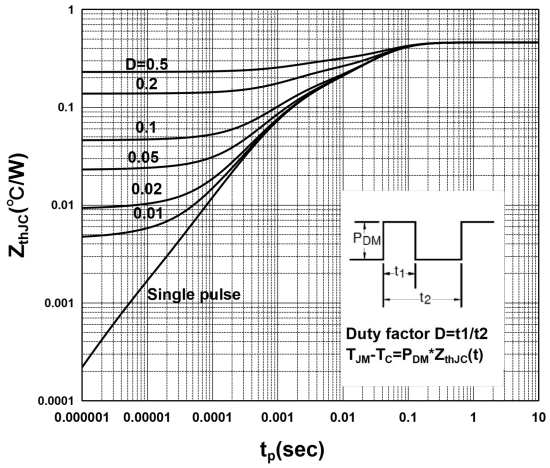
Normalized gate threshold voltage vs temperature



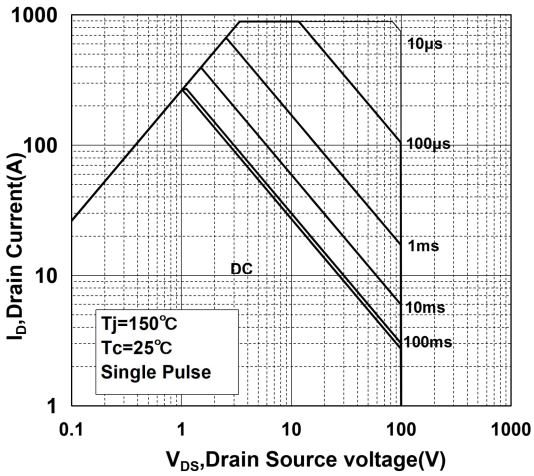
Normalized Maximum avalanche energy vs temperature



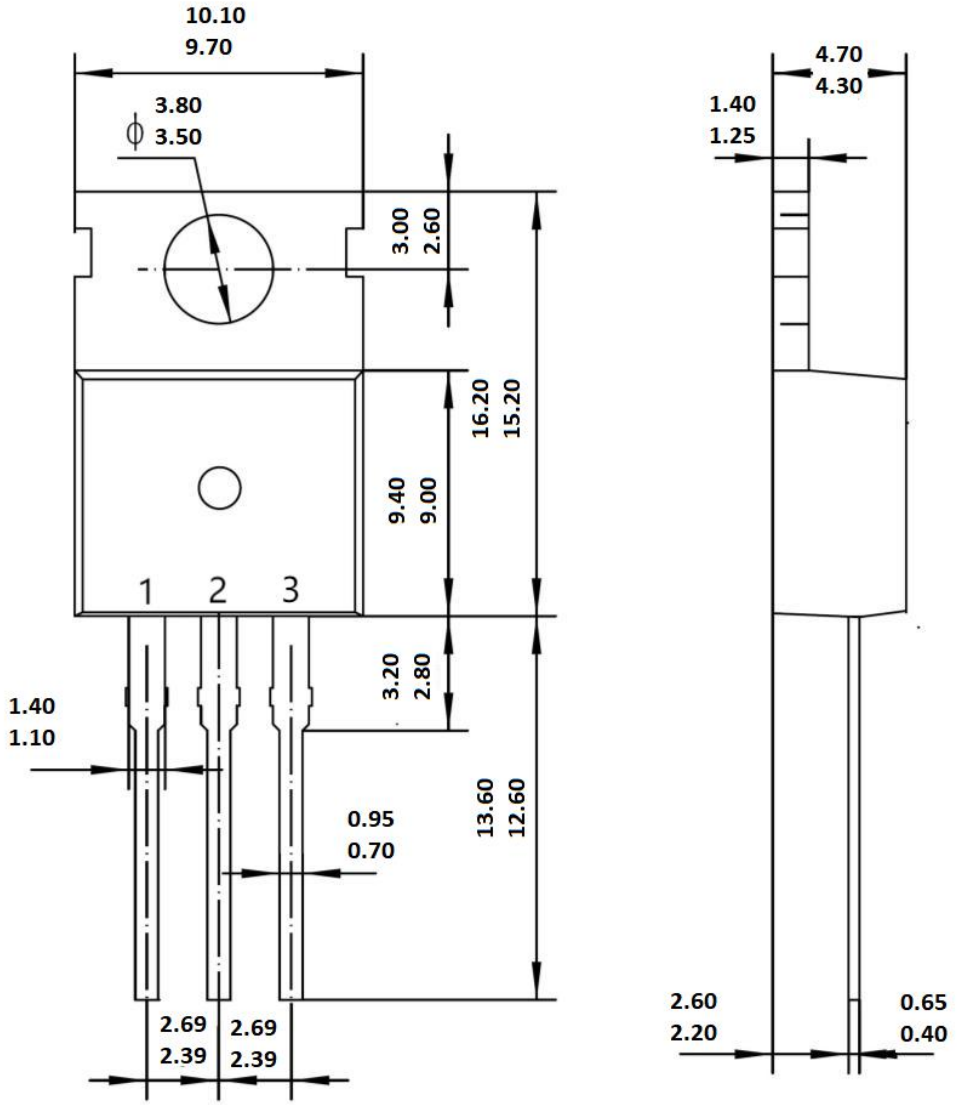
Transient Thermal Response Curve

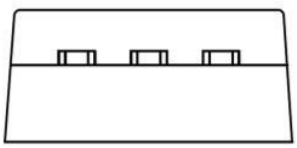


Safe Operating Area



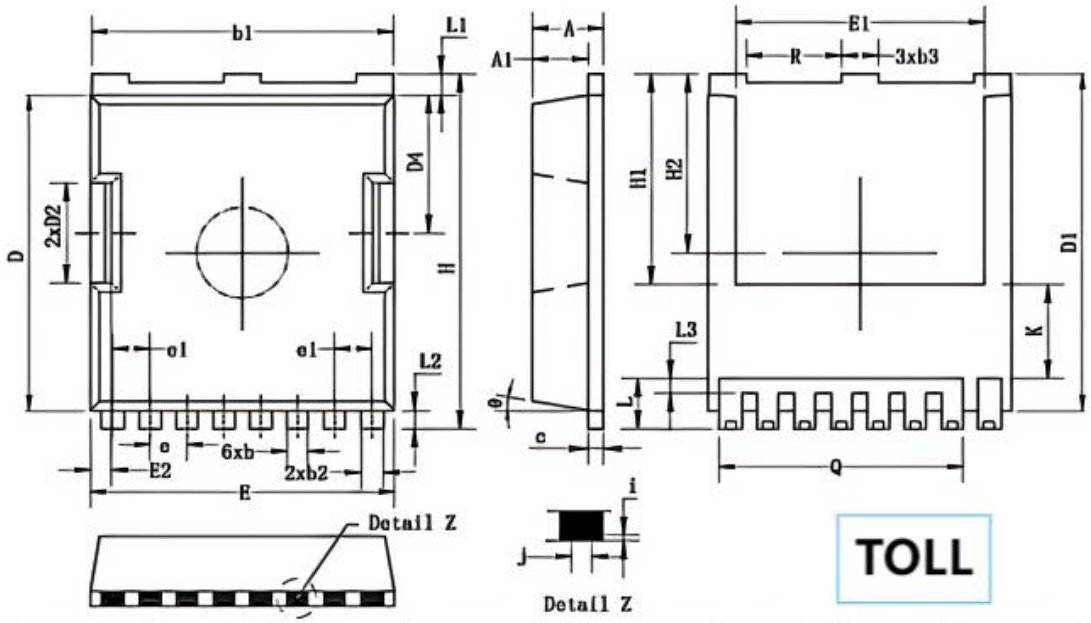
Package Mechanical DATA





TO-220

Unit: mm



Symbol	Min	Typ	Max		Symbol	Min	Typ	Max
A	2.25	2.30	2.35		E2	0.65	0.70	0.75
A1	1.75	1.80	1.85		H	11.60	11.70	11.80
b	0.65	0.70	0.75		H1	6.95 BSC		
b1	9.75	9.80	9.85		H2	5.90 BSC		
b2	0.70	0.75	0.80		i	0.10 REF		
b3	1.15	1.20	1.25		j	0.35 REF		
c	0.45	0.50	0.55		K	3.10 REF		
D	10.35	10.40	10.45		L	1.55	1.65	1.75
D1	11.00	11.10	11.20		L1	0.65	0.70	0.75
D2	3.25	3.30	3.35		L2	0.50	0.60	0.70
D4	4.50	4.55	4.60		L3	0.40	0.50	0.60
e	1.20 BSC				Q	7.95 REF		
e1	1.225 BSC				R	3.05	3.10	3.15
E	9.85	9.90	9.95		θ	10°REF		
E1	8.00	8.10	8.20					