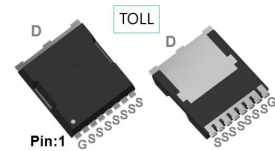
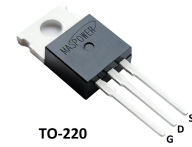


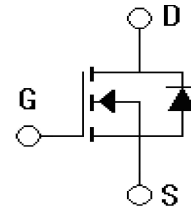
Features

- 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 ($T_c=25^\circ\text{C}$)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V _{DSS}		100	V
Transient Gate-Source Voltage	V _{GSM}		±30	V
Continuous Gate-Source Voltage	V _{GSS}		±20	V
Drain Current -continuous	I _D	T=25℃	220	A
		T=100℃	117	A
Drain Current - pulse (note 1)	I _{DM}		890	A
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°C 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, T _J =25℃	-	-	1	μA
		V _{DS} =100V, T _J =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	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$

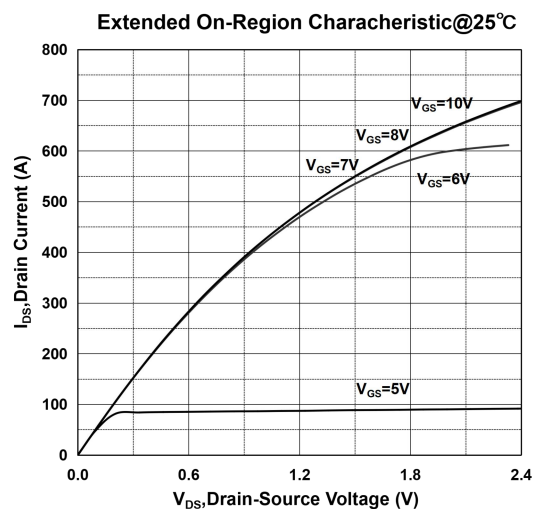
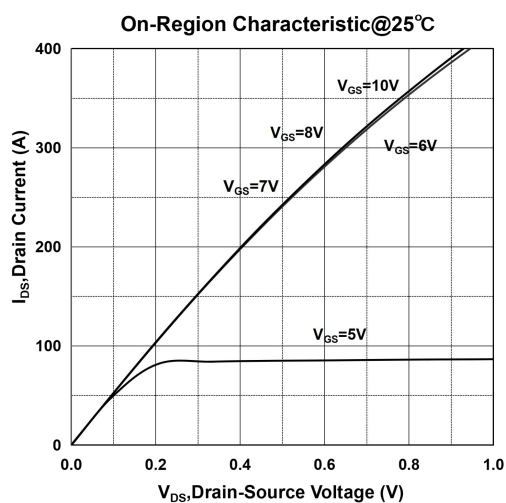
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: $L=0.5\text{mH}$, $I_{AS}=87\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J=25^{\circ}\text{C}$
- 3: $I_{SD} \leq I_{DM}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$
- 4: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- 5: Essentially independent of operating temperature

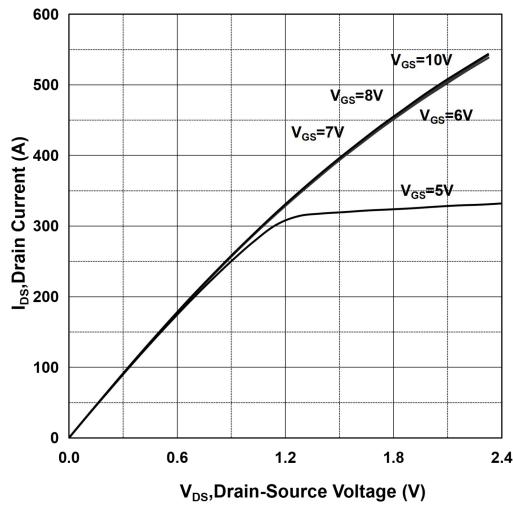
Ordering Information

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

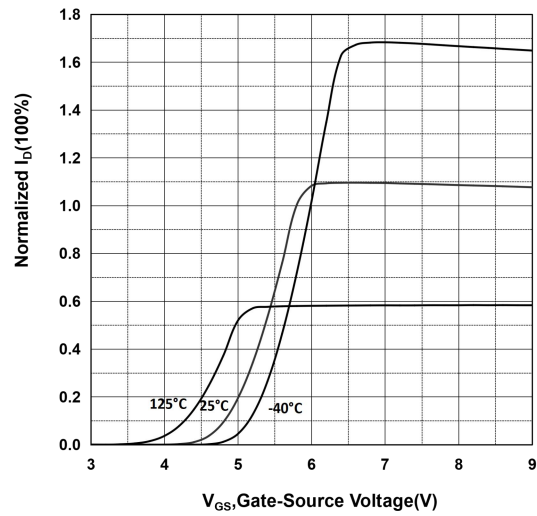
Electrical Characteristics



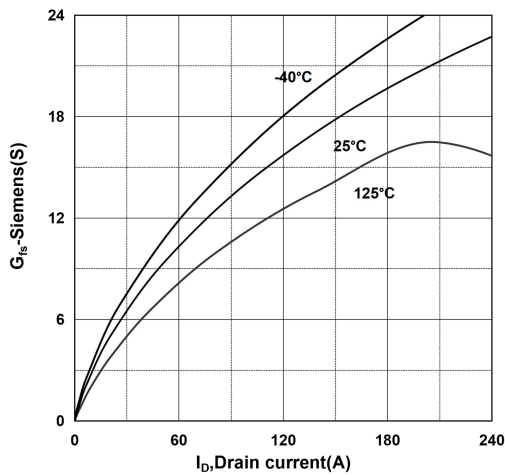
On-Region Characteristic@125°C



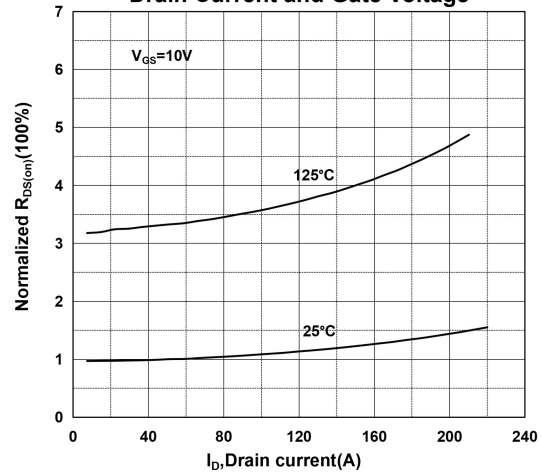
Normalized Transfer Characteristics



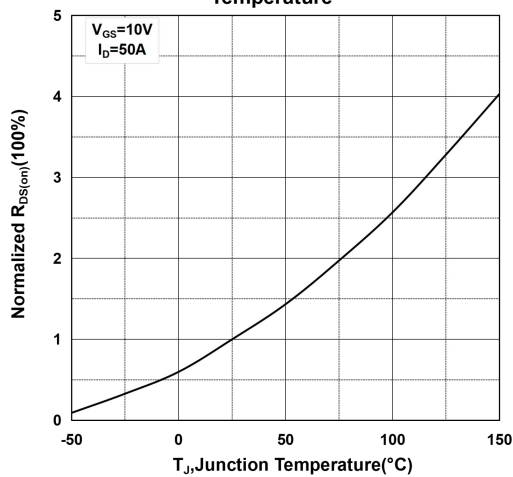
Transconductance



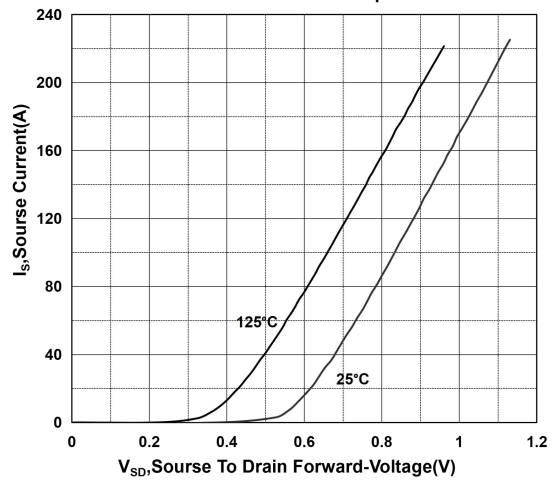
Normalized On-Resistance Variation vs Drain Current and Gate Voltage

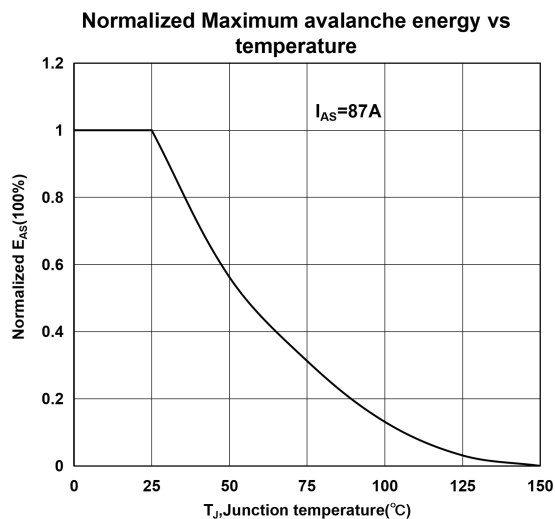
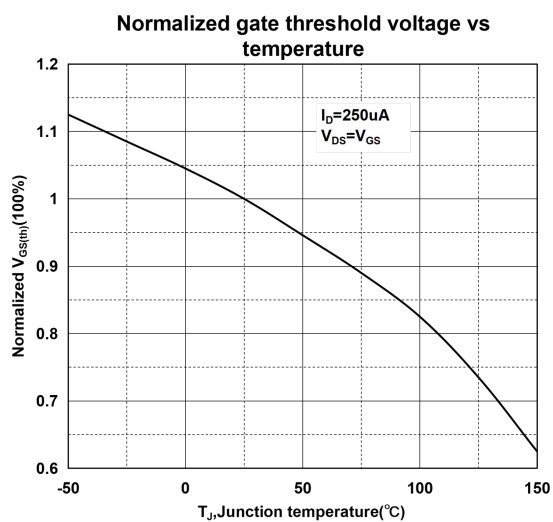
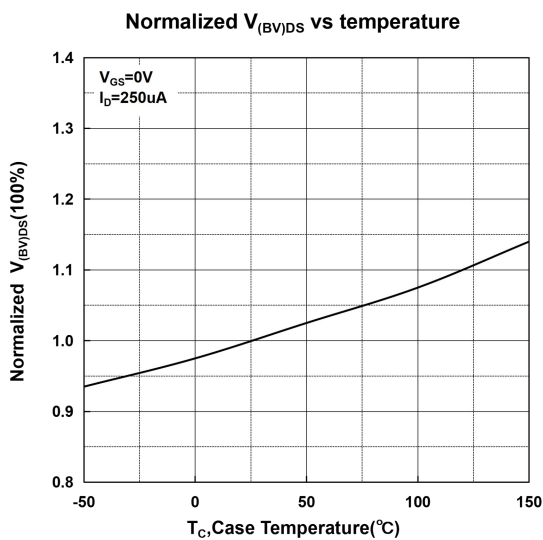
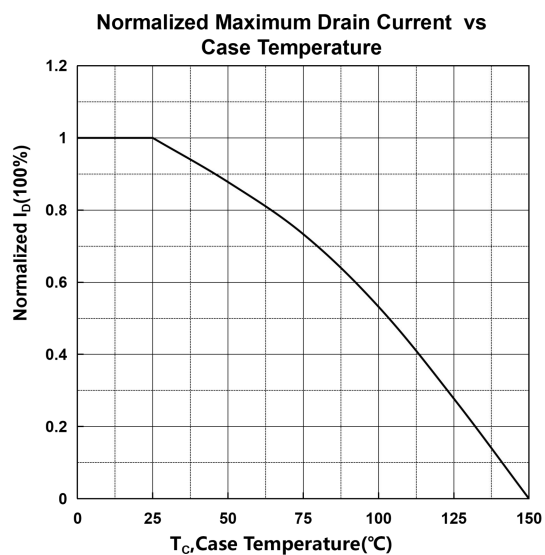
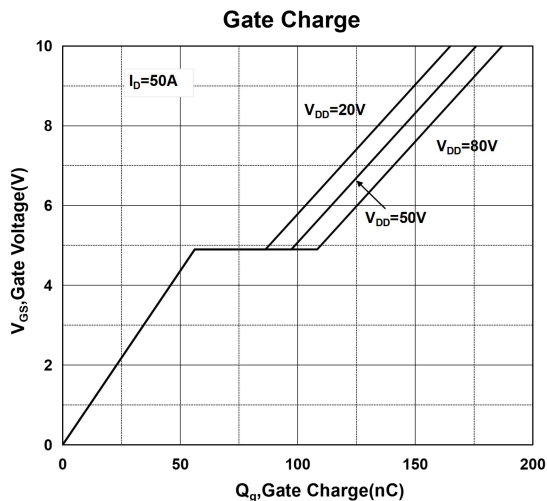
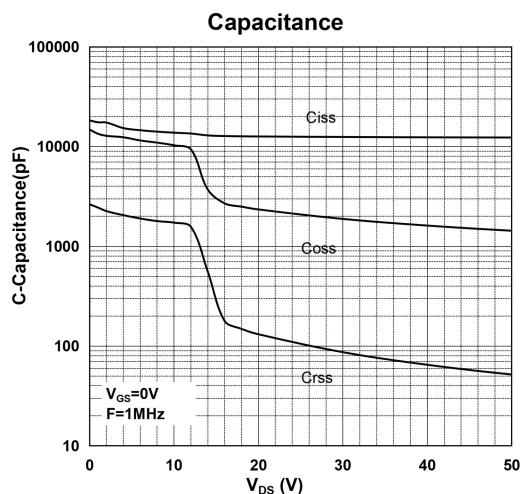


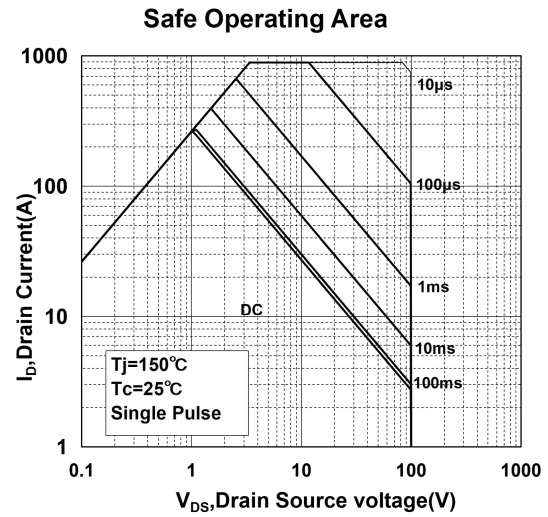
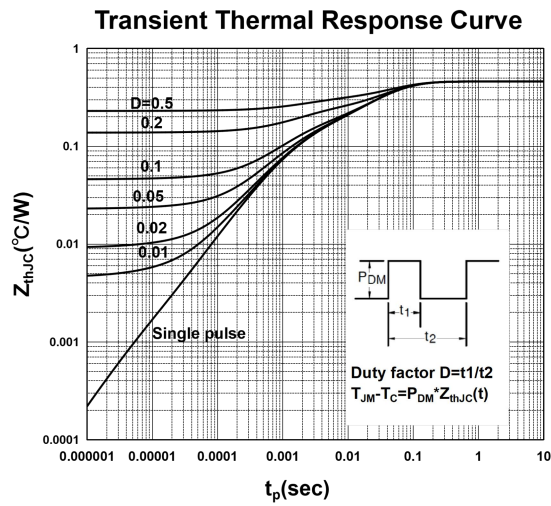
Normalized On-Resistance Variation vs Temperature



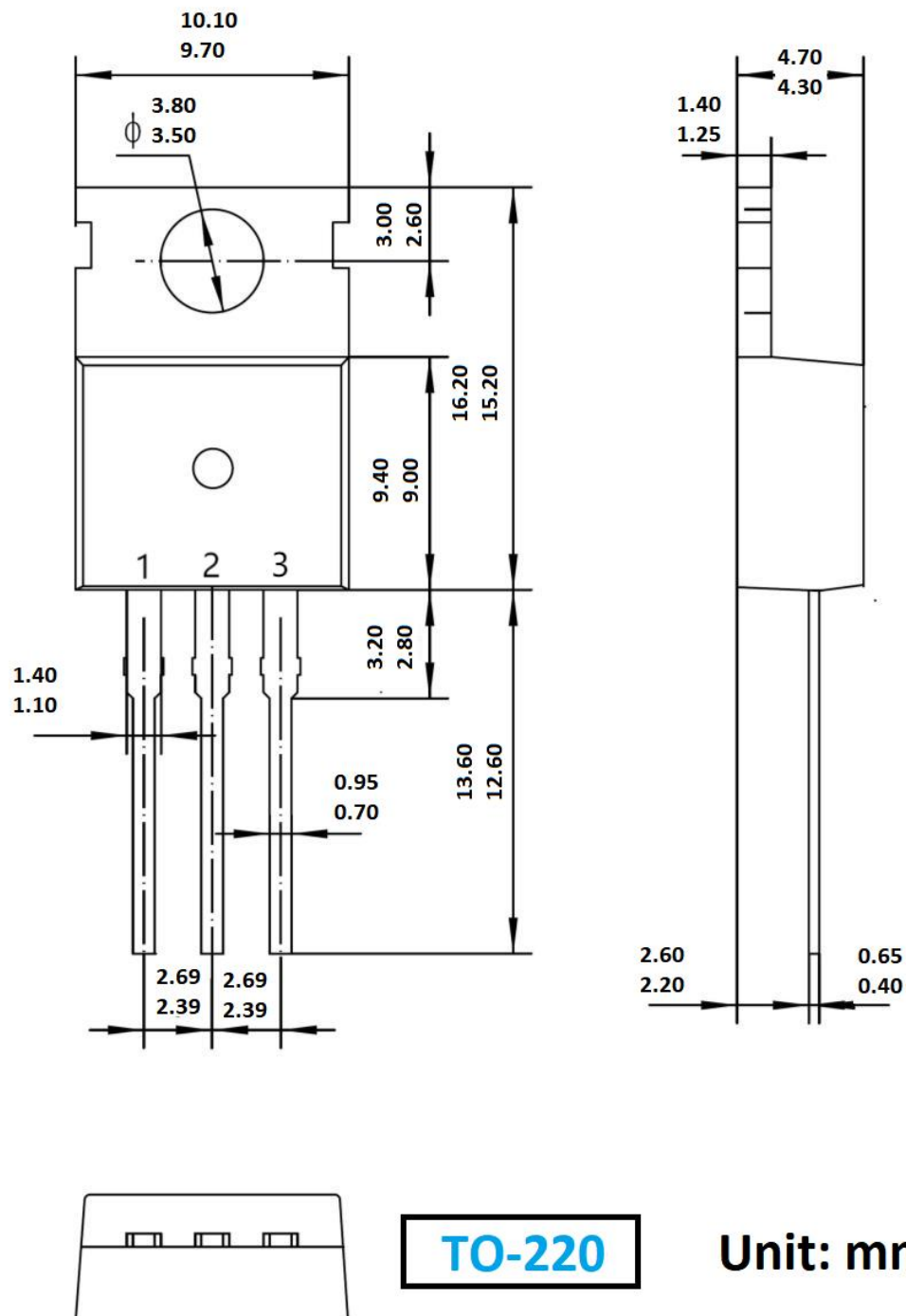
Body Diode Forward Voltage Variation with Source Current and Temperature

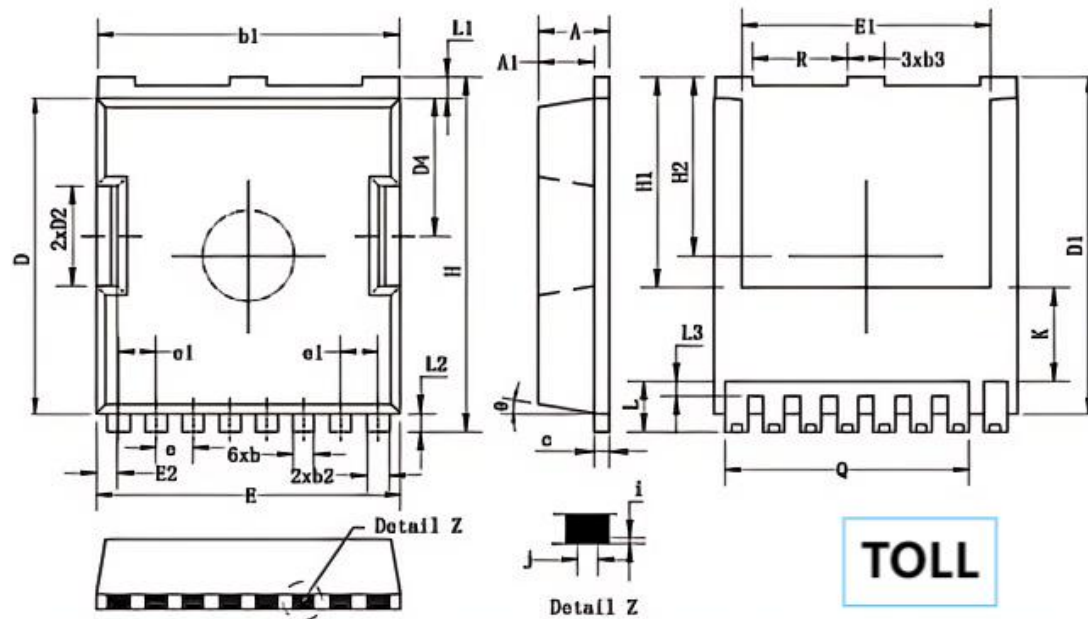






Package Mechanical DATA





Symbol	Min	Typ	Max
A	2.25	2.30	2.35
A1	1.75	1.80	1.85
b	0.65	0.70	0.75
b1	9.75	9.80	9.85
b2	0.70	0.75	0.80
b3	1.15	1.20	1.25
c	0.45	0.50	0.55
D	10.35	10.40	10.45
D1	11.00	11.10	11.20
D2	3.25	3.30	3.35
D4	4.50	4.55	4.60
e	1.20 BSC		
e1	1.225 BSC		
E	9.85	9.90	9.95
E1	8.00	8.10	8.20

Symbol	Min	Typ	Max
E2	0.65	0.70	0.75
H	11.60	11.70	11.80
H1	6.95 BSC		
H2	5.90 BSC		
i	0.10 REF		
j	0.35 REF		
K	3.10 REF		
L	1.55	1.65	1.75
L1	0.65	0.70	0.75
L2	0.50	0.60	0.70
L3	0.40	0.50	0.60
Q	7.95 REF		
R	3.05	3.10	3.15
θ	10°REF		