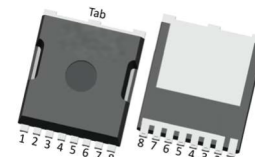
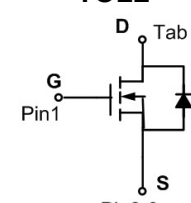


Description RST Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency. Features ● Ultra low $R_{DS(on)}$ ● Ultra low gate charge (typ. $Q_g = 73.7nC$) ● 100% UIS tested ● RoHS compliant Applications ● Power factor correction (PFC). ● Switched mode power supplies (SMPS). ● Uninterruptible power supply (UPS).	Product Summary <table> <tr> <td>V_{DSS}</td><td>650V</td></tr> <tr> <td>$R_{DS(on), max}$</td><td>99mΩ</td></tr> <tr> <td>I_{DM}</td><td>120A</td></tr> <tr> <td>$Q_{g,typ}$</td><td>73.7nC</td></tr> </table> Pin Configuration  TOLL  N-Channel MOSFET 	V_{DSS}	650V	$R_{DS(on), max}$	99mΩ	I_{DM}	120A	$Q_{g,typ}$	73.7nC
V_{DSS}	650V								
$R_{DS(on), max}$	99mΩ								
I_{DM}	120A								
$Q_{g,typ}$	73.7nC								

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current ($T_C = 25^\circ C$)	I_D	40	A
($T_C = 100^\circ C$)		25	A
Pulsed drain current ¹⁾	I_{DM}	120	A
Gate-Source voltage	V_{GSS}	± 30	V
Avalanche energy, single pulse ²⁾	E_{AS}	750	mJ
Power Dissipation	P_D	368	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$
Continuous diode forward current	I_S	40	A
Diode pulse current	$I_{S,pulse}$	120	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.34	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient ³⁾	$R_{\theta JA}$	62	$^\circ C/W$
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{solder}	260	$^\circ C$

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
RST65R099HP	TOLL	RST65R099HP	2000

Electrical Characteristics

 $T_c = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	650	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	3	3.85	5	V
Drain cut-off current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _J =25°C	-	-	10	μA
Gate leakage current, Forward	I _{GSSF}	V _{GS} =30V, V _{DS} =0V	-	-	100	nA
Gate leakage current, Reverse	I _{GSSR}	V _{GS} =-30V, V _{DS} =0V	-	-	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =20A T _J = 25°C T _J = 150°C	- - -	 81.7 196	 99 -	 mΩ
Gate resistance	R _G	f=1 MHz, open drain	-	1.12	-	Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =100V, V _{GS} =0V, f=100kHz	-	3443	-	pF
Output capacitance	C _{oss}		-	106.5	-	
Reverse transfer capacitance	C _{rss}		-	2.46	-	
Turn-on delay time	t _{d(on)}	V _{DD} =400V, I _D =20A R _G = 10Ω, V _{GS} =10V	-	118.3	-	ns
Rise time	t _r		-	16.9	-	
Turn-off delay time	t _{d(off)}		-	95.5	-	
Fall time	t _f		-	5.1	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =520V, I _D =20A, V _{GS} =0 to 10 V	-	18.4	-	nC
Gate to drain charge	Q _{gd}		-	28.4	-	
Gate charge total	Q _g		-	73.7	-	
Gate plateau voltage	V _{plateau}		-	5.7	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0V, I _F =20A	-	-	1.1	V
Reverse recovery time	t _{rr}	V _R =400V, I _F =20A, dI _F /dt=100 A/μs	-	105.4	-	ns
Reverse recovery charge	Q _{rr}		-	543.7	-	nC
Peak reverse recovery current	I _{rrm}		-	9.04	-	A

Notes:

- Limited by maximum junction temperature, maximum duty cycle is 0.75.
- $I_{AS}=5A, L=60\text{mH}, V_{DD}=60V$, Starting $T_j=25^\circ\text{C}$.
- The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

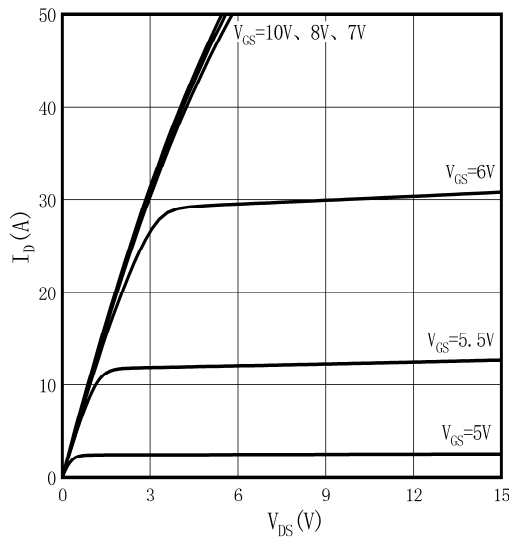


Figure 2. Transfer Characteristics

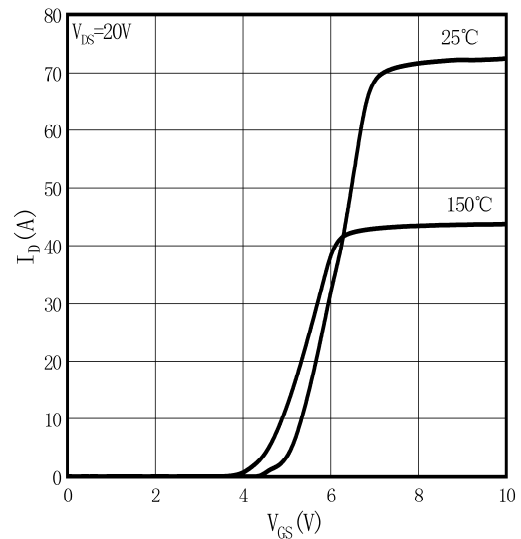


Figure 3. On-Resistance vs. Drain Current

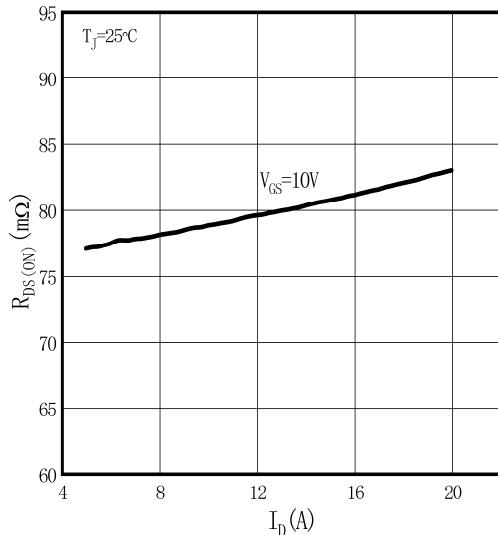


Figure 4. On-Resistance vs. Temperature

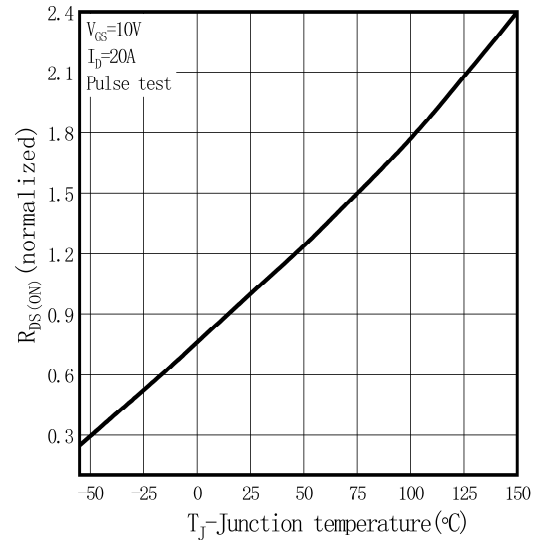


Figure 5. Breakdown Voltage vs. Temperature

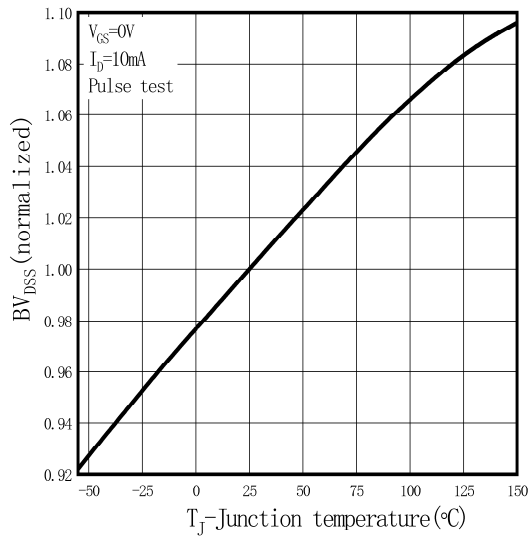


Figure 6. Threshold Voltage vs. Temperature

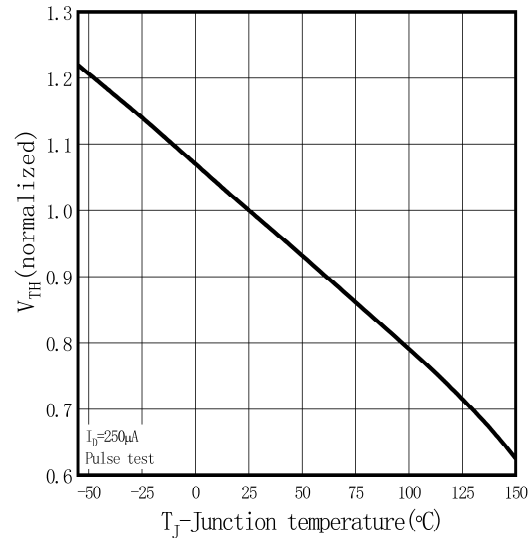


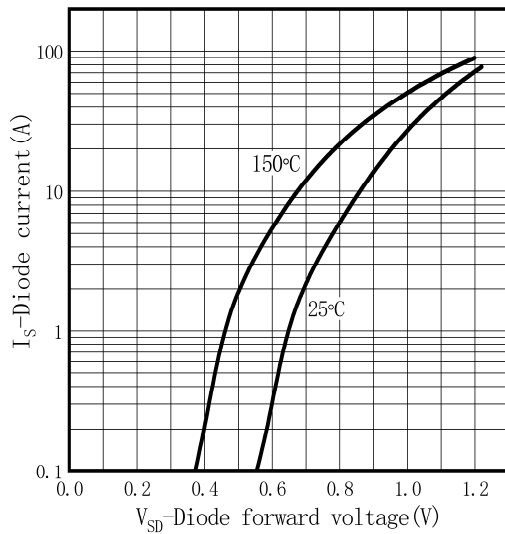
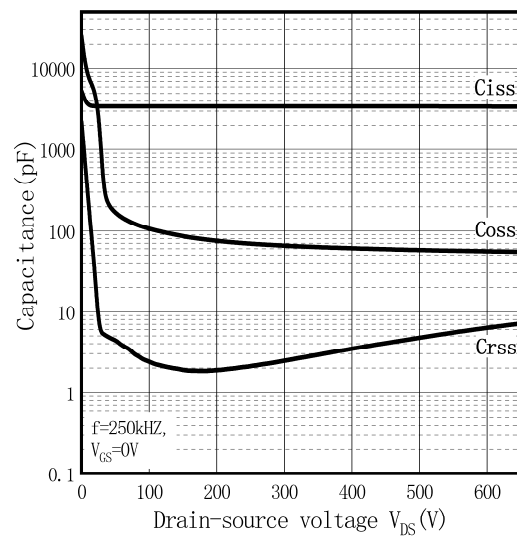
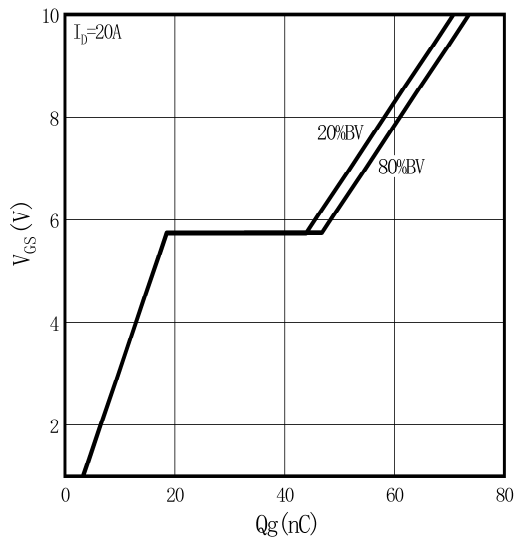
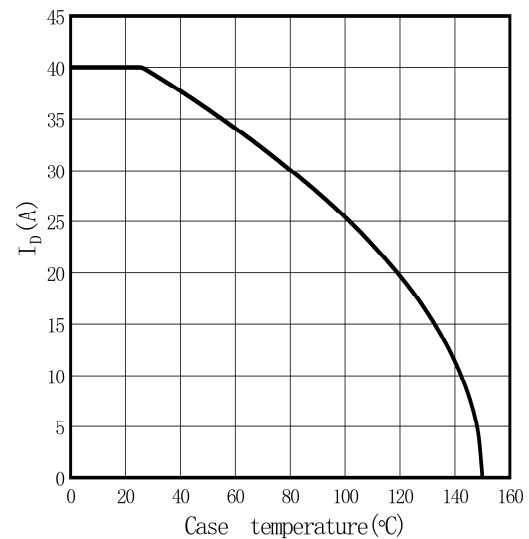
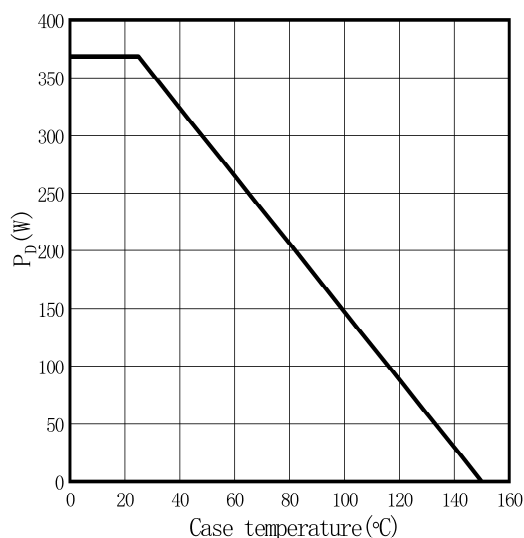
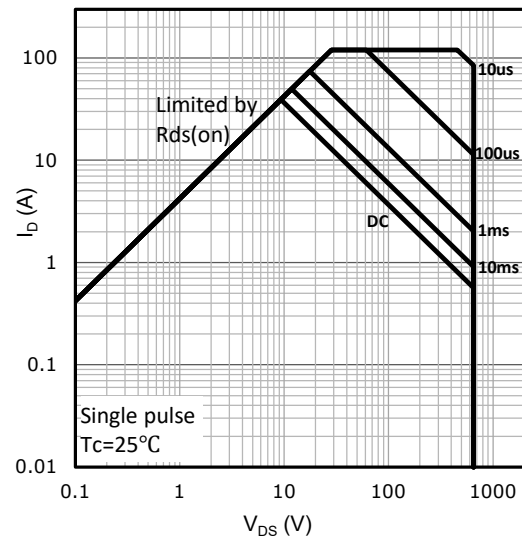
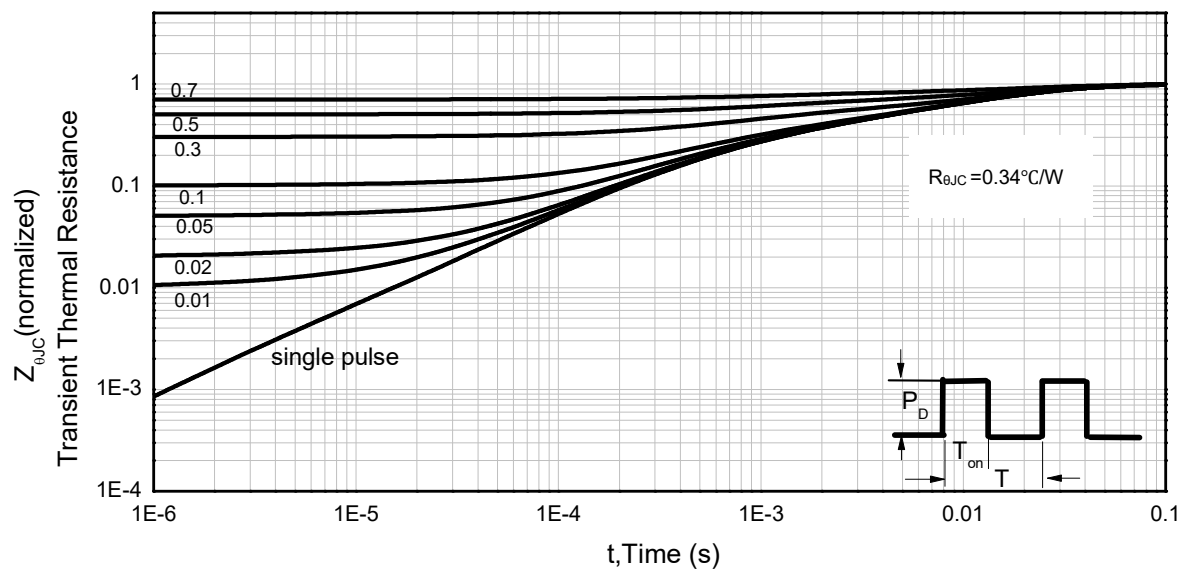
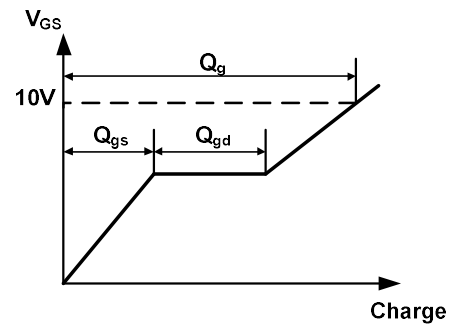
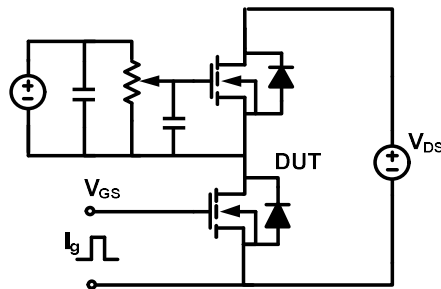
Figure 7.Body-Diode Characteristics

Figure 8.Capacitance Characteristics

Figure 9.Gate Charge Characteristics

Figure 10.Drain Current Derating

Figure 11.Power Dissipation vs.Temperature

Figure 12. Safe Operating Area


Figure 13. Normalized Maximum Transient Thermal Impedance (R_{thJC})

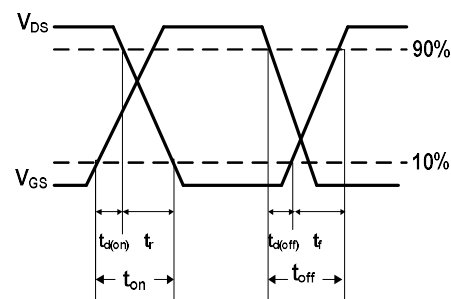
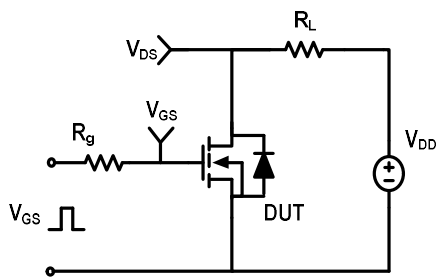


Test Circuit & Waveforms

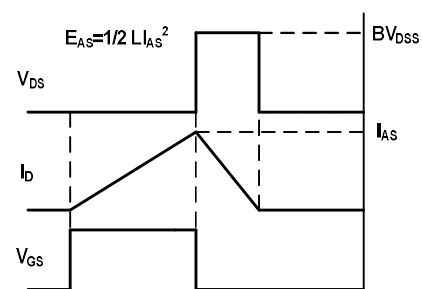
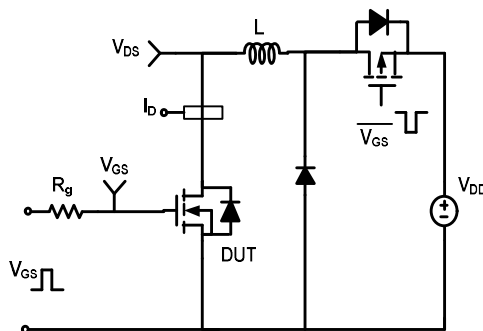
Gate Charge Test Circuit & Waveform



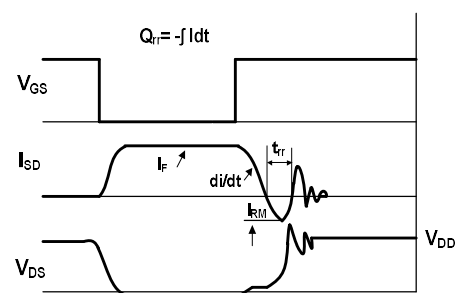
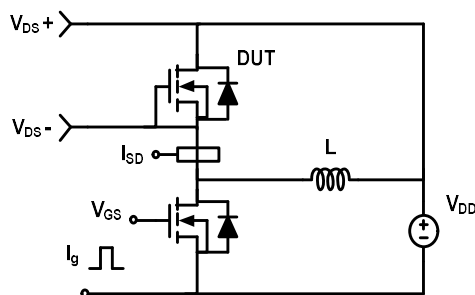
Resistive Switching Test Circuit & Waveform



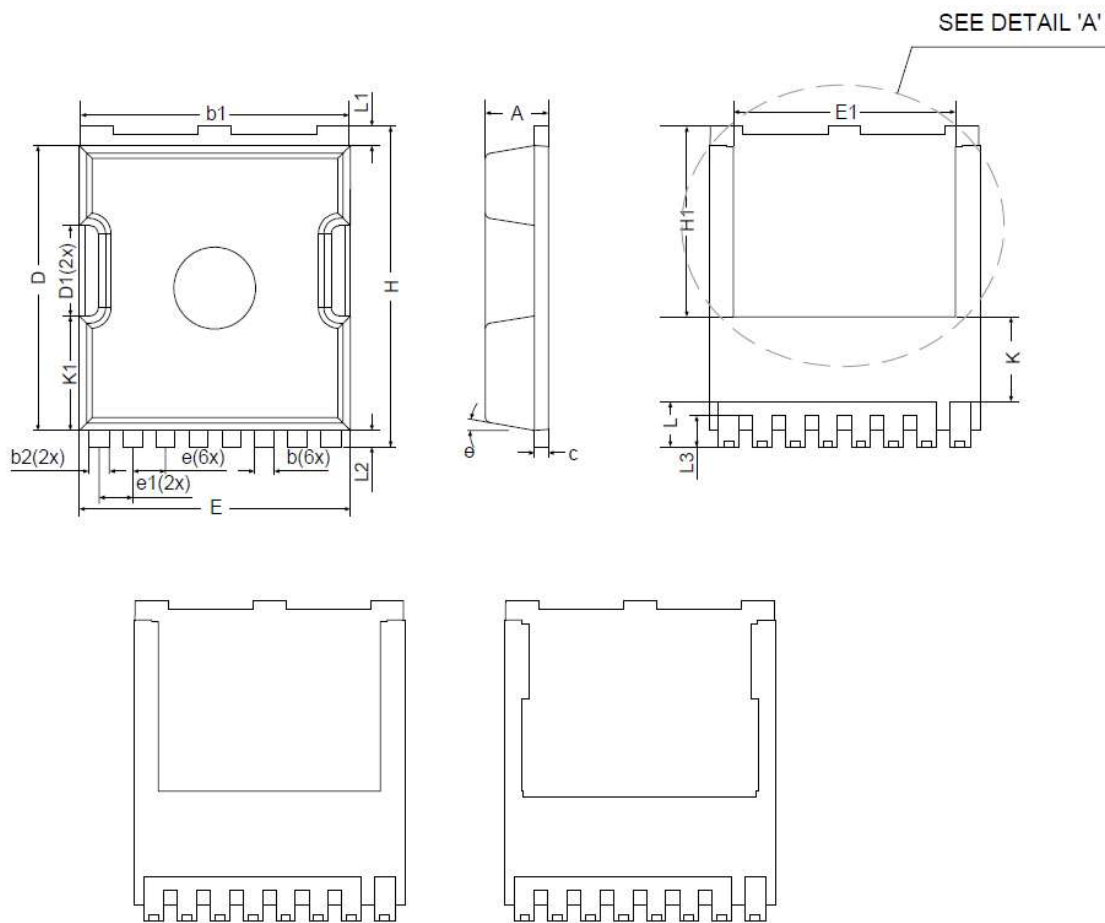
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TOLL



DETAIL 'A'
SCALE: 1/1

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.15	2.45	0.085	0.096
b	0.60	0.90	0.024	0.035
b1	9.65	9.95	0.380	0.392
b2	0.65	0.90	0.026	0.035
c	0.40	0.60	0.016	0.024
D	10.18	10.58	0.401	0.417
D1	3.15	3.45	0.124	0.136
E	9.70	10.10	0.382	0.398
E1	7.90	8.40	0.311	0.331
e	1.10	1.30	0.043	0.051
e1	1.10	1.30	0.043	0.051
H	11.48	11.88	0.452	0.468
H1	6.75	7.30	0.266	0.287
K	2.45	3.33	0.096	0.131
K1	4.03	4.33	0.159	0.170
L	1.50	2.10	0.059	0.083
L1	0.50	0.90	0.020	0.035
L2	0.45	0.75	0.018	0.030
L3	1.00	1.30	0.039	0.051
θ	10° REF		10° REF	