MT60G008T

N-Channel Enhancement Mode Power MOSFET

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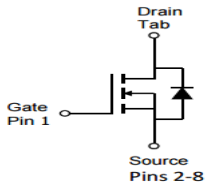
Feature Description

- 60V/235A

  $R_{DS(ON)}$= 0.8mΩ(typ.)@V_{GS} = 10V
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available
- SGT MOSFET

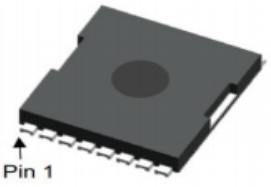
Simplified Schematic



Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Power Tool Application
- Networking DC-DC Power System

MARKING DIAGRAM & PIN ASSIGNMENT



Maximum ratings, at T_A =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage		60	V
V_{GS}	Gate-source voltage		±20	V
I_S	Diode continuous forward current (Wire bond limited)	T_C = 25°C	235	A
I_D	Continuous drain current @VGS=10V (Wire bond limited)	T_C = 25°C	235	A
I_D	Continuous drain current @VGS=10V (Wire bond limited)	T_C = 100°C	235	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	1255	A
I_{DSM}	Continuous drain current @VGS=10V	T_A=25°C	41	A
		T_A=70°C	35	A
EAS	Maximum avalanche energy, single pulsed ②		1766	mJ
P_D	Maximum power dissipation ③	T_C = 25°C	316	W
		T_C = 100°C	153	W
P_{DSM}	Maximum power dissipation ④	T_A=25°C	3.5	W
		T_A=70°C	2.4	W
T_J,T_{STG}	Operating junction and storage temperature range		-55 to 175	°C

Thermal Characteristics

Symbol	Parameter	Typical	Max	Unit
$R_{\theta JC}$	Thermal resistance, junction-to-case ⑤	0.38	0.46	°C/W
$R_{\theta JA}$	Thermal resistance, junction-to-ambient ⑥	36	43	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-source breakdown voltage	V_{GS}=0V, I_D=250μA	60	--	--	V
I_{DSS}	Zero gate voltage drain current(Tj=25℃)	V_{DS}=60V,V_{GS}=0V	--	--	1	μA
	Zero gate voltage drain current(Tj=125℃)⑦	V_{DS}=60V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-body leakage current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS}=V_{GS},I_D=250μA	2	--	4	V
$R_{DS(on)}$	Drain-source on-state resistance ⑧	V_{GS}=10V, I_D=80A	--	0.8	1.3	mΩ
		(Tj=100℃) ⑦	--	1.1	--	mΩ
G_{FS}	Forward transconductance	V_{DS}=5V, I_D=40A	--	75	--	S
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
Ciss	Input capacitance ⑦	V_{DS}=30V,V_{GS}=0V, f=100kHz	--	11505	--	pF
Coss	Output capacitance ⑦		--	2890	--	pF
Crss	Reverse transfer capacitance ⑦		--	165	--	pF
Rg	Gate resistance	f=1MHz	--	2.2	--	Ω
Qg	Total gate charge ⑦	V_{DS}=30V,I_D=80A, V_{GS}=10V	--	187	--	nC
Qgs	Gate-source charge ⑦		--	49	--	nC
Qgd	Gate-drain charge ⑦		--	48	--	nC
Switching Characteristics ⑦						
Td(on)	Turn-on delay time	V_{DD}=30V, I_D=80A, R_G=3Ω, V_{GS}=10V	--	25	--	ns
Tr	Turn-on rise time		--	117	--	ns
Td(off)	Turn-off delay time		--	104	--	ns
Tf	Turn-off fall time		--	70	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=80A,V_{GS}=0V	--	0.79	1	V
Trr	Reverse recovery time ⑦	V_{DD}=60V, I_{sd}=80A, V_{GS}=0V di/dt=100A/μs	--	136	--	ns
Qrr	Reverse recovery charge ⑦		--	149	--	nC

NOTE:

① Single pulse; pulse width ≤ 100μs.

② This maximum value is based on starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 85A, V_{GS} =10V； 100% FT tested at L = 0.3mH, I_{AS} = 80A.

③ The power dissipation Pd is based on Tj(max), using junction-to-case thermal resistance RθJC.

④ The power dissipation Pdsm is based on Tj(max), using junction-to-ambient thermal resistance RθJA.

⑤ Thermal resistance from junction to soldering point (on the exposed drain pad). These tests are performed on a cool plate.

⑥ These tests are performed with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with TA=25°C.

⑦ Guaranteed by design, not subject to production testing.

⑧ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

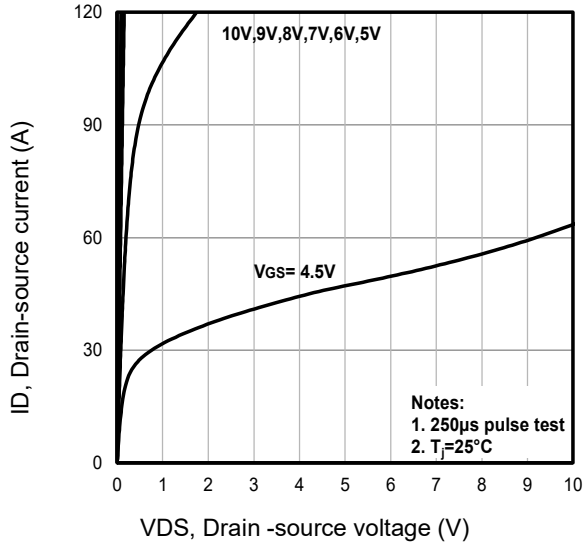


Fig1. Typical output characteristics

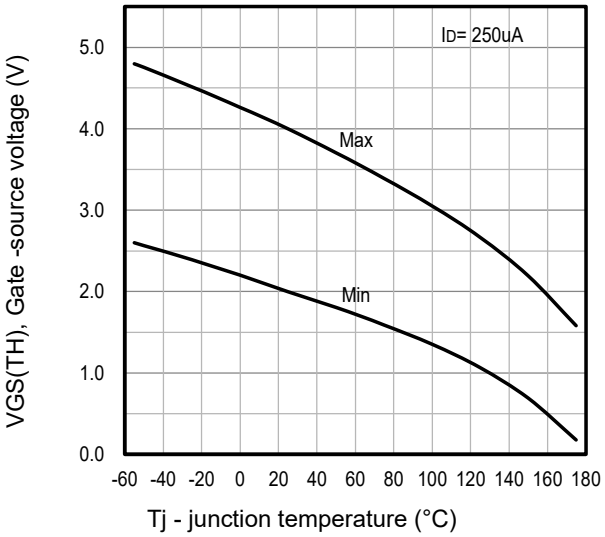


Fig2. Typical $V_{GS(TH)}$ gate -source voltage Vs. Tj

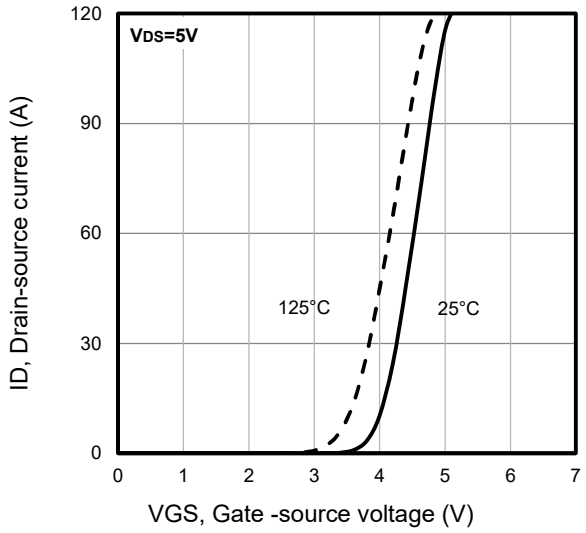


Fig3. Typical transfer characteristics

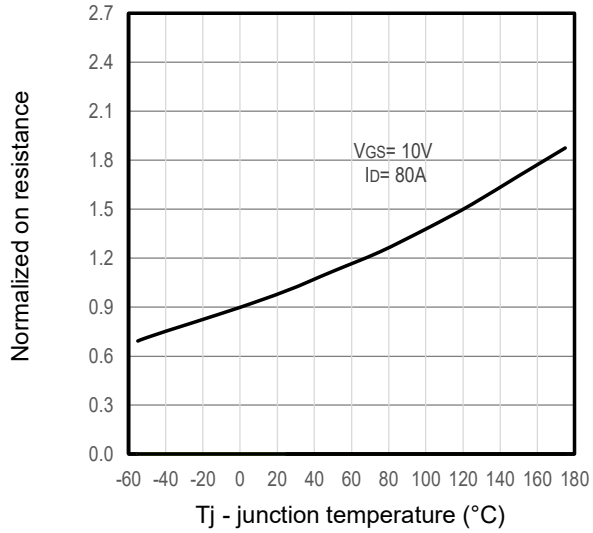


Fig4. Typical normalized on-resistance Vs. Tj

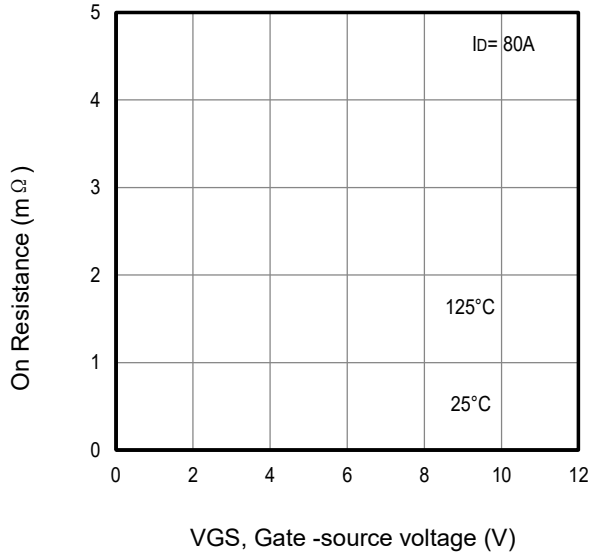


Fig5. Typical on resistance Vs gate -source voltage

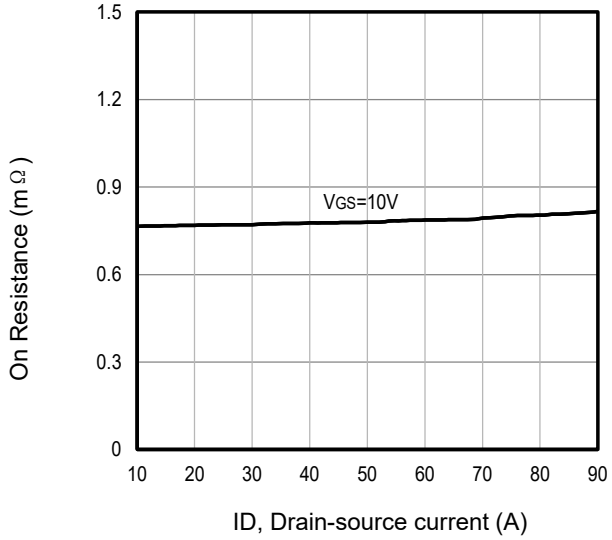


Fig6. Typical on resistance Vs drain current

Typical Characteristics

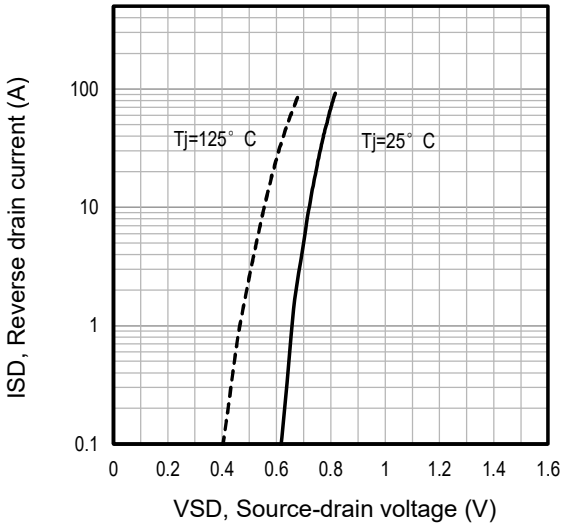


Fig7. Typical source-drain diode forward voltage

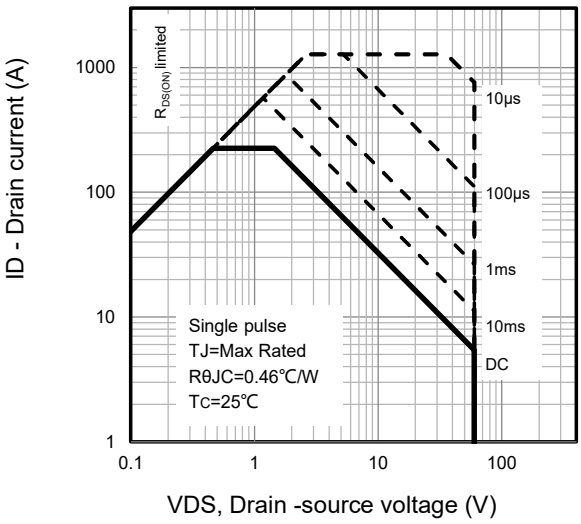


Fig8. Maximum safe operating area

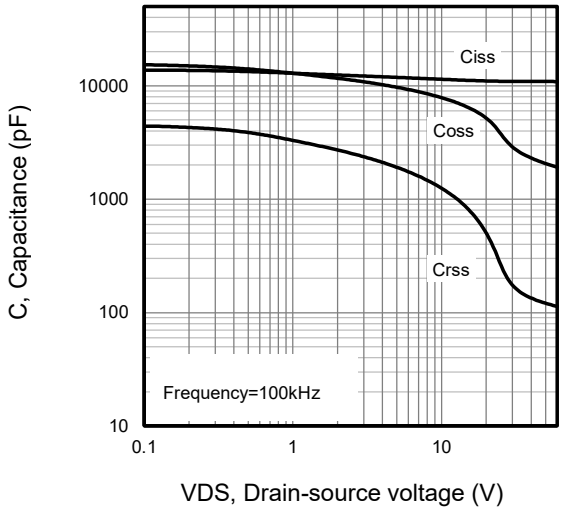


Fig9. Typical capacitance Vs. drain-source voltage

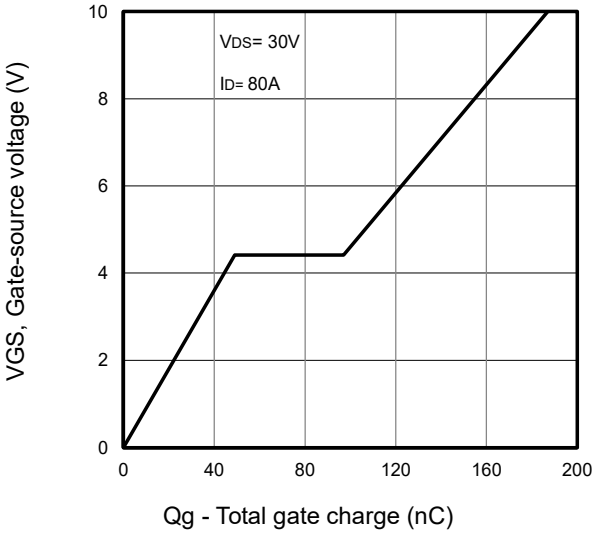


Fig10. Typical gate charge Vs. gate-source voltage

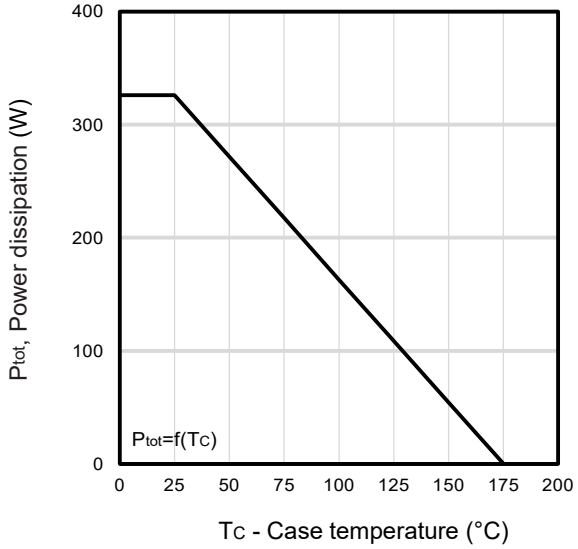


Fig11. Power dissipation Vs. case temperature

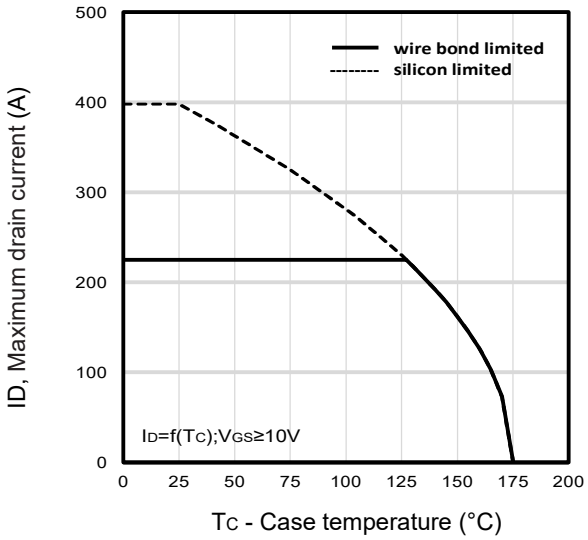


Fig12. Maximum drain current Vs. case temperature

Typical Characteristics

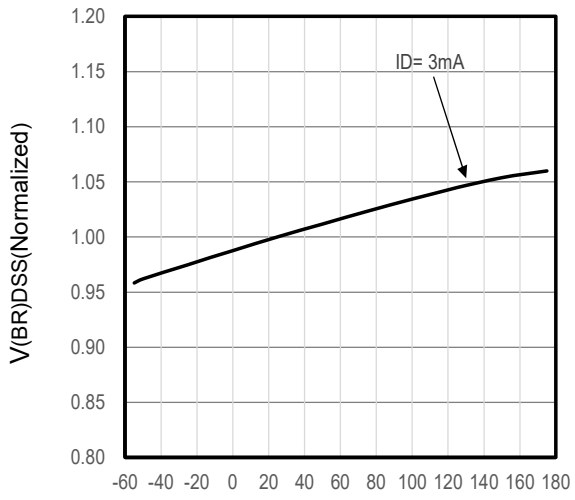


Fig13. Typical $V_{(BR)DSS}$ Vs Tj

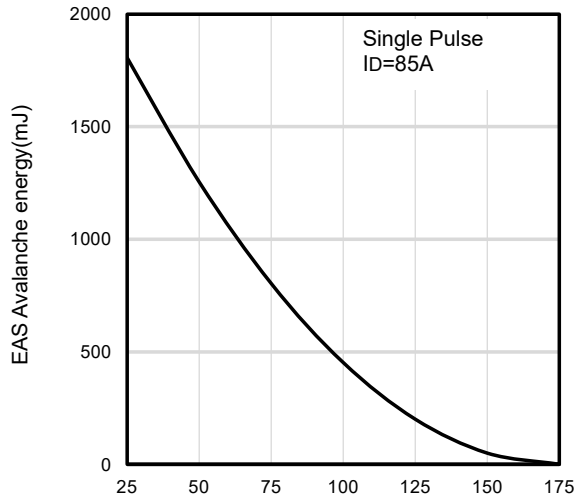


Fig14. Maximum avalanche energy vs temperature (°C)

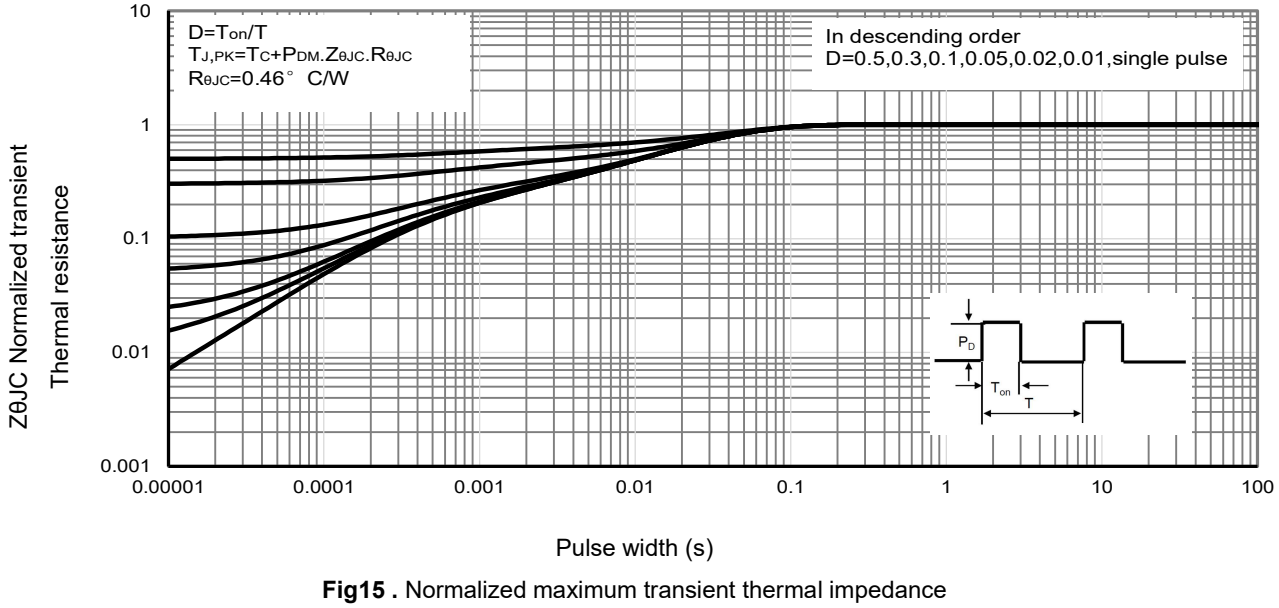


Fig15 . Normalized maximum transient thermal impedance

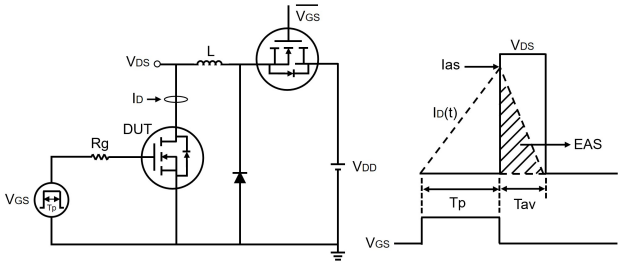


Fig16. Unclamped inductive test circuit and waveforms

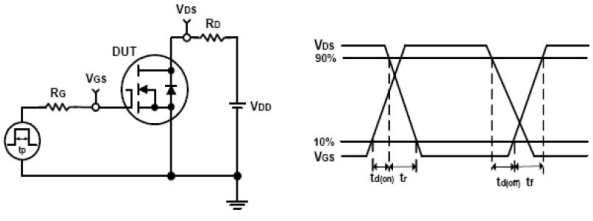
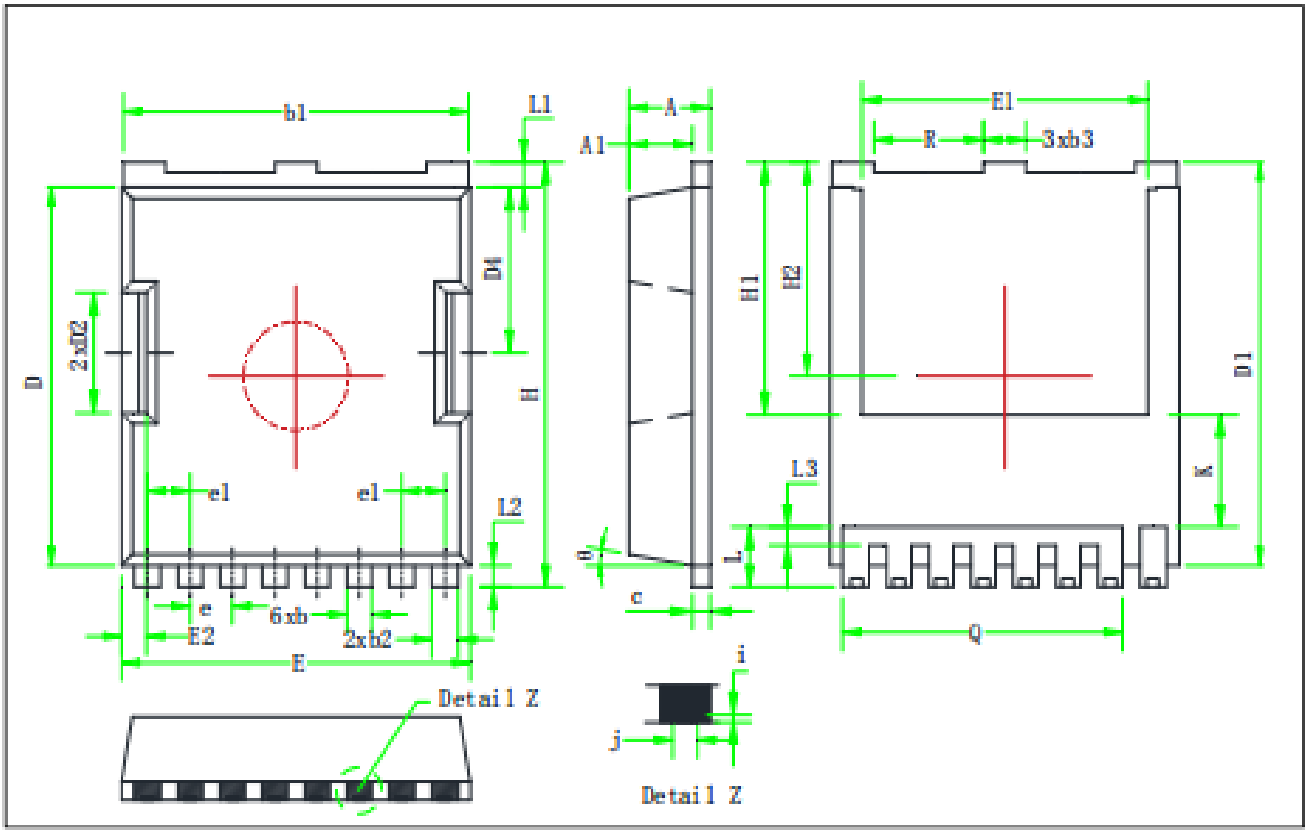


Fig17. Switching time test circuit and waveforms

Package Mechanical Data(TOLL)



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					

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.