N-Channel 100V MOSFET

E100N4P5AH1

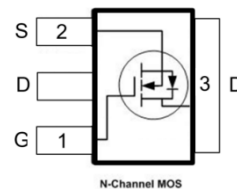| V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
100V	4.5 @ V_{GS} = 10V	130

TO-220

Features

- Low $R_{DS(on)}$ trench technology

- Low thermal impedance

- Fast switching speed

- 100% avalanche tested

Applications

- DC/DC conversion

- Power switch

- PD charger

- Moto driver

Package And Ordering Information

Ordering code	Package	Marking
E100N4P5AH1	TO-220	E100N4P5AH1

Ordering Information

Package	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box
TO-220	50	20	1000

Key Performance Parameters

Parameter	Value	Unit
VDS, min @ Tj(max)	100	V
ID, pulse	675	A
RDS(ON), max @ VGS=10V	4.5	mΩ
Qg	91	nC

Absolute Maximum Ratings at Tj=25°C Unless Otherwise Noted

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25°C	I_D	130	A
	T_C=100°C		110	
Pulsed drain current		$I_{D,pulse}$	675	
Avalanche energy, single pulse		E_{AS}	484	mJ
Power dissipation	T_C=25°C	P_D	250	W
	T_A=25°C		-	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 175	℃

Thermal Characteristics

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.6	°C/W
Thermal resistance, junction-to-ambient	Steady state	$R_{\theta JA}$	60	

Electrical Characteristics at Tj=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	$V_{(BR)DSS}$	100			V	V_{GS} = 0, I_D = 250 μA
Gate-source threshold voltage	$V_{GS(th)}$	2.2	2.8	3.2	V	V_{DS} = V_{GS}, I_D = 250 μA
Gate-body leakage	I_{GSS}			±100	nA	V_{DS} = 0 V, V_{GS} = ±20 V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS} = 100 V, V_{GS} = 0 V
Drain-source on-resistance	$R_{DS(on)}$		3.5	4.5	mΩ	V_{GS} = 10 V, I_D = 40 A
Forward transconductance	gfs		-		S	V_{DS} = 5 V, I_D = 30 A

Gate resistance	R_g		1.8		Ω	f=1MHz
Gate Charge						
Total gate charge	Q_g		91			
Gate-source charge	Q_{gs}		25		nC	V_{DS} = 50 V, I_D = 40 A, V_{GS} = 10 V
Gate-drain charge	Q_{gd}		25			
Dynamic						
Turn-on delay time	$t_{d(on)}$		21			
Rise time	t_r		69		ns	V_{DS} = 50 V, I_D =40 A, V_{GS} = 10 V, R_{GEN} = 3 Ω
Turn-off delay time	$t_{d(off)}$		57			
Fall time	t_f		70			
Input capacitance	C_{iss}		5440			
Output capacitance	C_{oss}		1035		pF	V_{DS} =50 V, V_{GS} = 0 V, f = 1MHz
Reverse transfer capacitance	C_{rss}		35			
Body Diode						
Diode forward voltage	V_{SD}		0.8	1.2	V	V_{GS} = 0 V, I_F = 40 A
Reverse recovery time	t_{rr}		59		ns	V_{GS}= 0 V, I_S =40 A, di/dt = 100 A/μs
Reverse recovery charge	Q_{rr}		71		nC	

Electrical Characteristics Diagrams
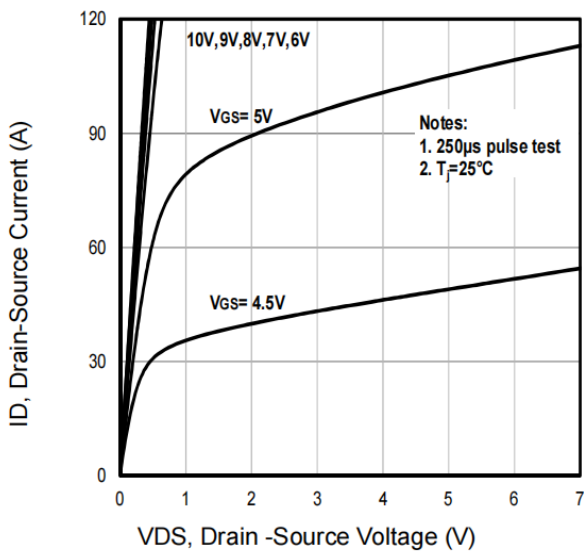
Fig1. Typical Output Characteristics
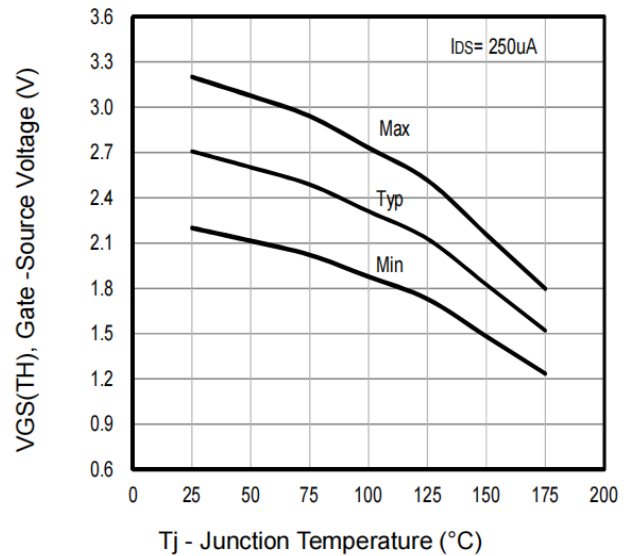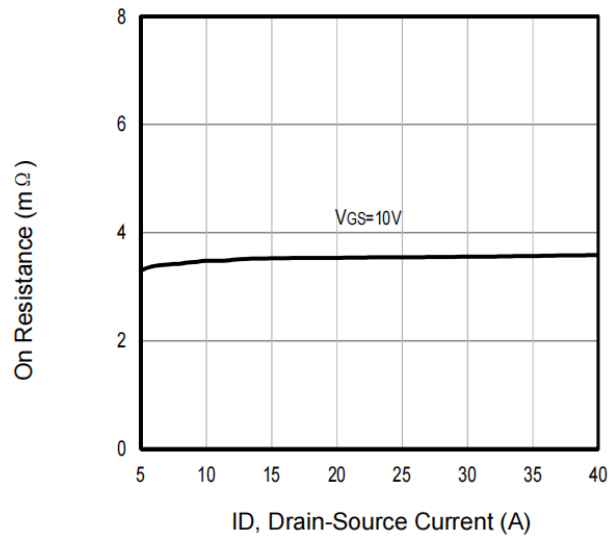

Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

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 and Gate

Fig7. Typical Source-Drain Diode Forward Voltage
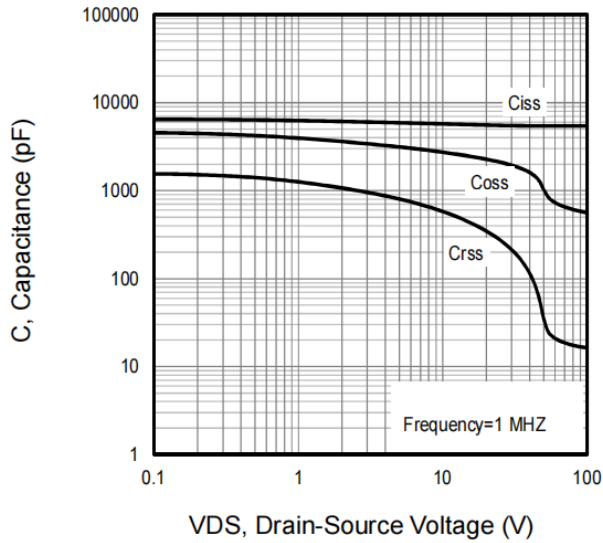

Fig8. Maximum Safe Operating Area
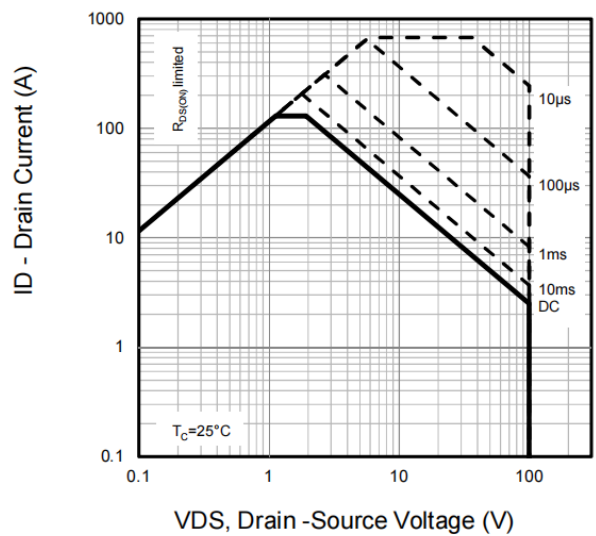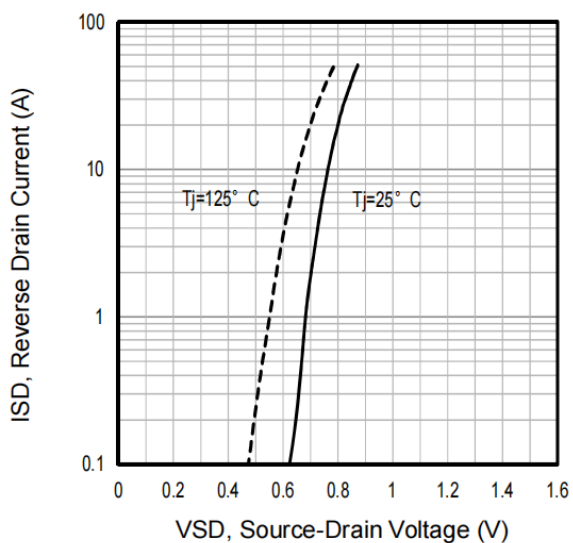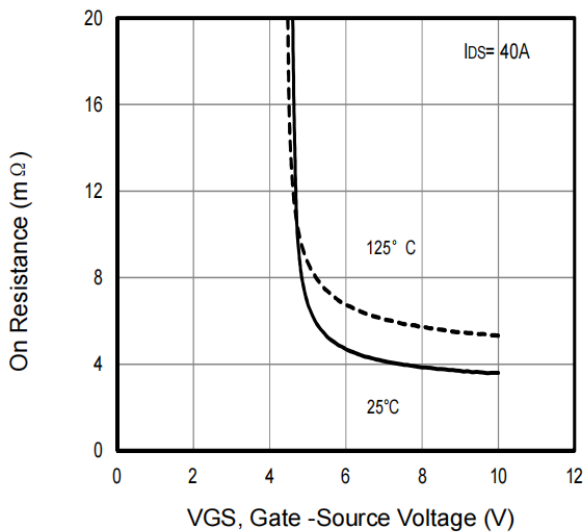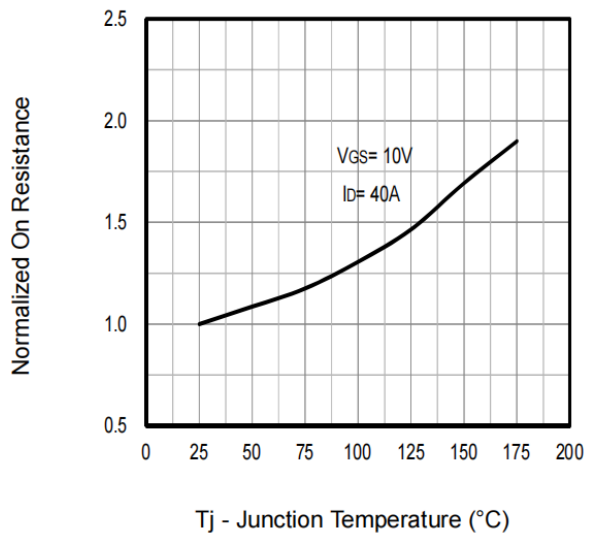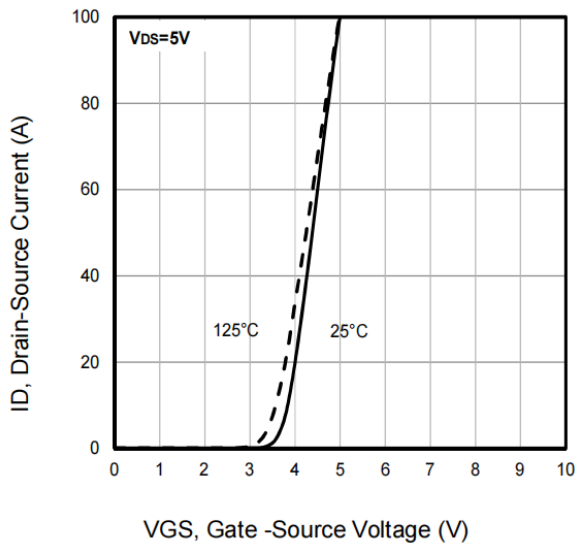
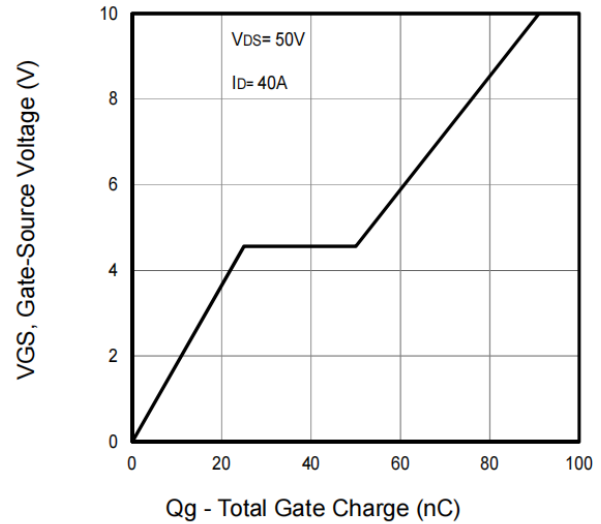Fig9. Typical Capacitance Vs. Drain-Source Voltage

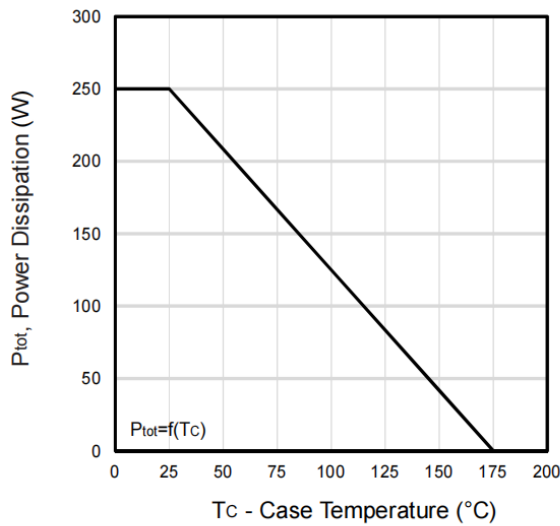Fig10. Typical Gate Charge Vs. Gate-Source Voltage
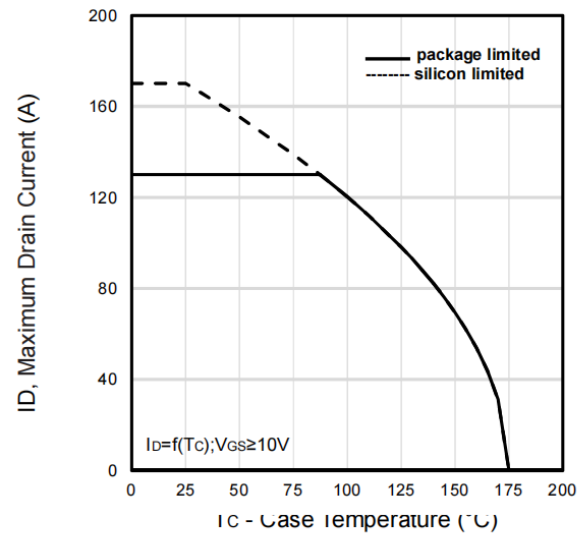

Fig11. Power Dissipation Vs. Case Temperature
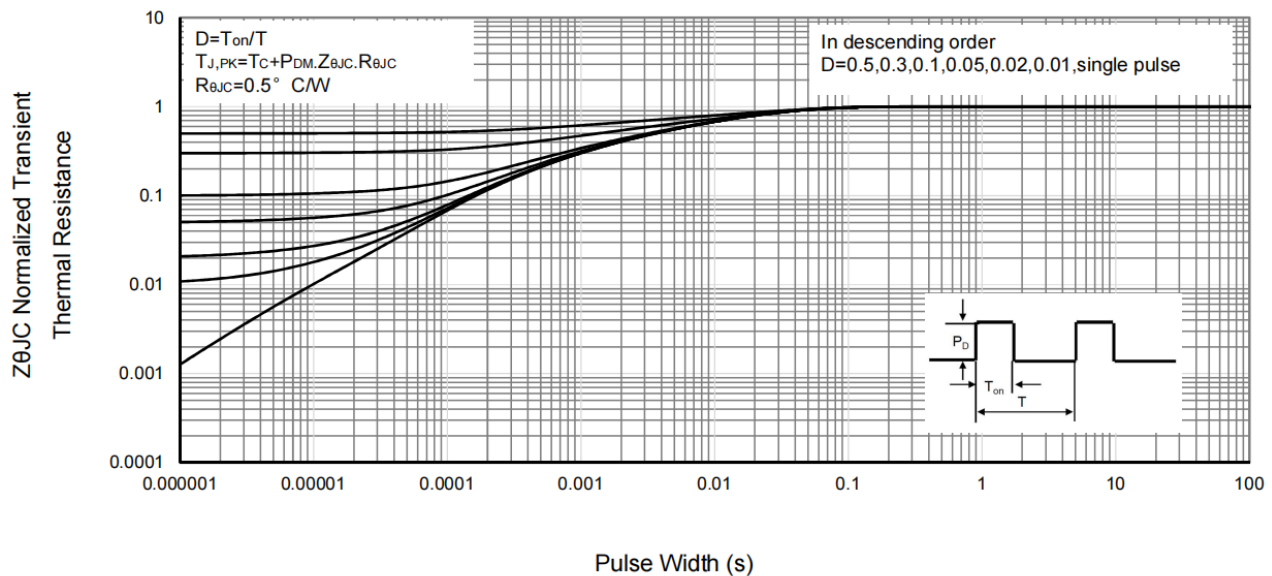

Fig12. Maximum Drain Current Vs. Case Temperature

Fig13 . Normalized Maximum Transient Thermal Impedance
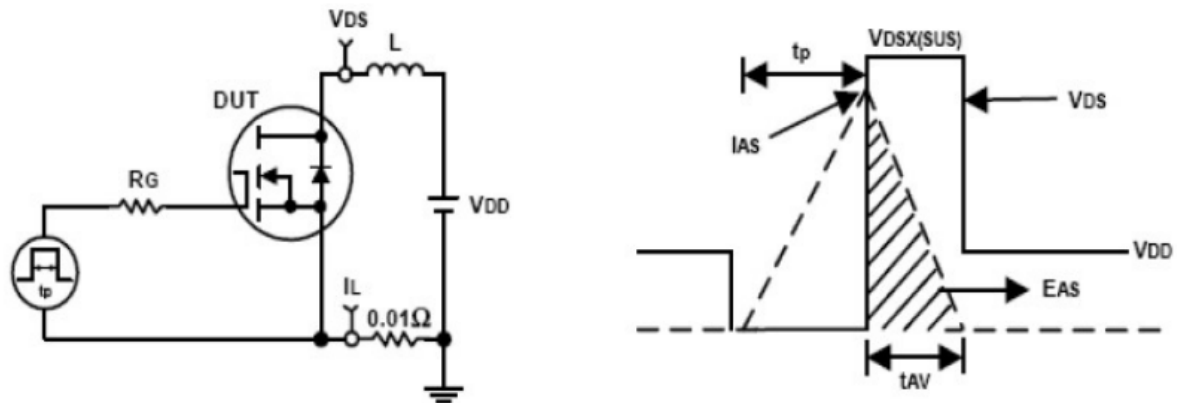
Test circuits and waveforms

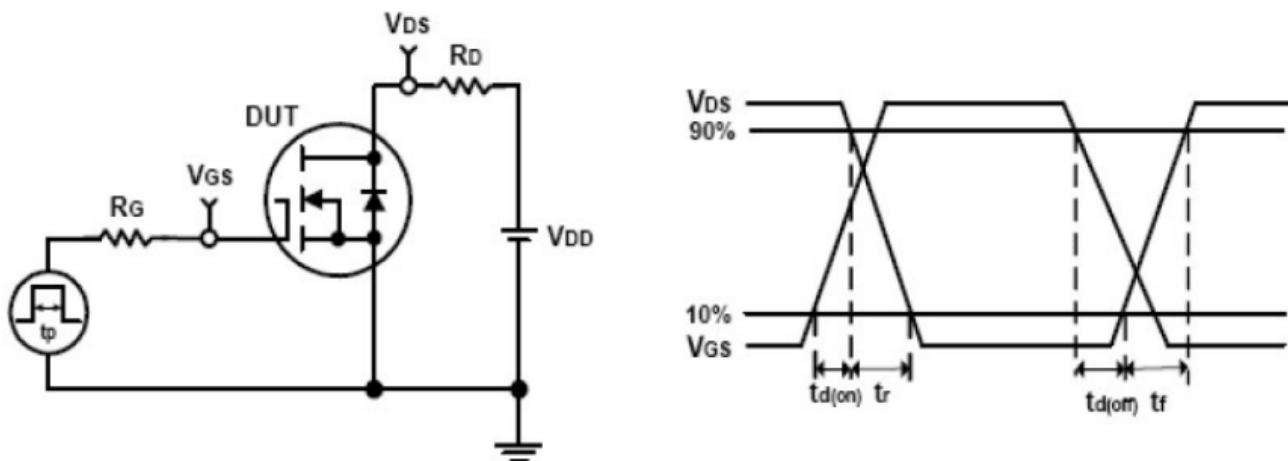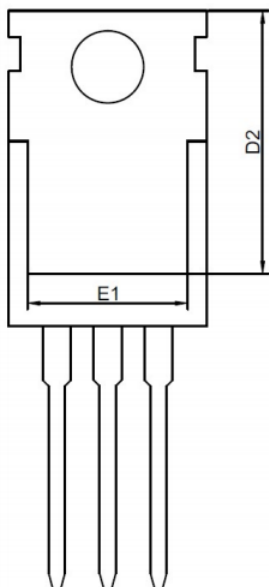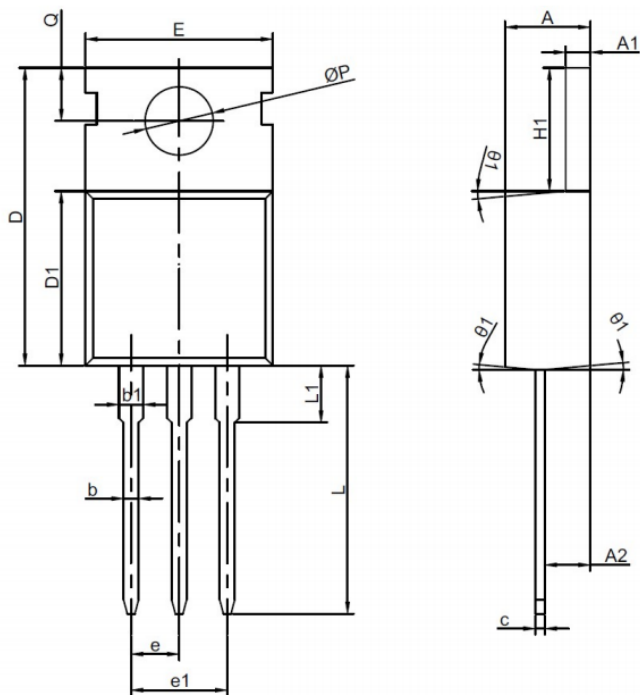**Fig14.** Unclamped Inductive Test Circuit and waveforms

Fig15. Switching Time Test Circuit and waveforms

Package Outline Dimensions

Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.30	4.52	4.70
A1	1.15	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	1.00
b1	1.15	1.32	1.50
c	0.45	0.50	0.65
D	15.10	15.70	16.10
D1	8.80	9.20	9.40
D2	12.80	-	13.70
E	9.65	9.90	10.30
E1	7.00	-	8.2
e	2.54 BSC		
e1	5.08 BSC		
H1	6.20	6.50	6.90
L	12.70	-	13.90
L1	-	-	3.50
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00
θ1	1 °	3 °	7 °

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