



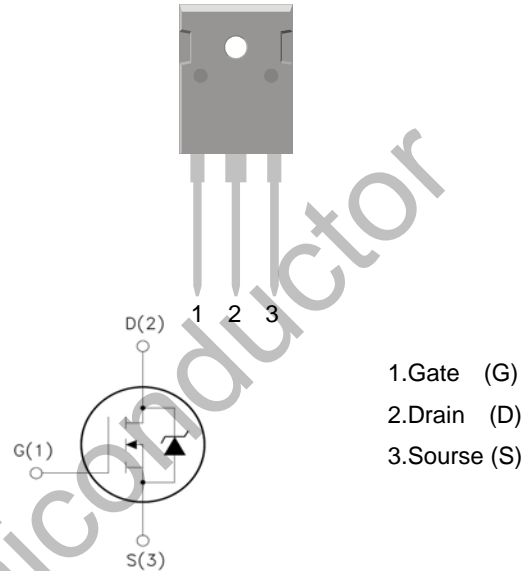
WGA65R099G

650V N-Channel MOSFET

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g=77$ nC (Typ.).
- $V_{DS}=650V, I_D=33$ A
- $R_{DS(on)}:0.115\Omega$ (Max) @ $V_G=10V$
- 100% Avalanche Tested

TO-247



Absolute Maximum Rating ($T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit	Note
Drain – Source voltage	V_{DS}	600	V	
Gate – Source voltage	V_{GS}	± 30	V	
Continuous drain current	I_D	33	A	$T_c=25^\circ\text{C}$
		20.9	A	$T_c=100^\circ\text{C}$
Pulsed drain current ⁽¹⁾	I_{DM}	99	A	
Power dissipation	P_D	255	W	
Single - pulse avalanche energy	E_{AS}	700	mJ	
MOSFET dv/dt ruggedness	dv/dt	50	V/ns	
Diode dv/dt ruggedness	dv/dt	15	V/ns	
Storage temperature	T_{stg}	-55 ~150	$^\circ\text{C}$	
Maximum operating junction temperature	T_j	150	$^\circ\text{C}$	

1) Pulse width t_p limited by $T_{j,max}$

2) $I_{SD} \leq I_D, V_{DS,peak} \leq V_{(BR)DSS}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case max	R_{thjc}	0.49	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction-ambient max	R_{thja}	62.5	$^{\circ}\text{C}/\text{W}$

Static Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain – Source Breakdown voltage	$V_{(BR)DSS}$	600	-	-	V	$V_{GS} = 0\text{V}, I_D=0.25\text{mA}$
Gate Threshold Voltage	$V_{GS(th)}$	2	3	4	V	$V_{DS} = V_{GS}, I_D=0.25\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS} = 600\text{V}, V_{GS} = 0\text{V}$
Gate Leakage Current	I_{GSS}	-	-	100	nA	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$
Drain-Source On State Resistance	$R_{DS(ON)}$	-	0.104	0.115	Ω	$V_{GS} = 10\text{V}, I_D = 14.5\text{A}$

Reverse Diode Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

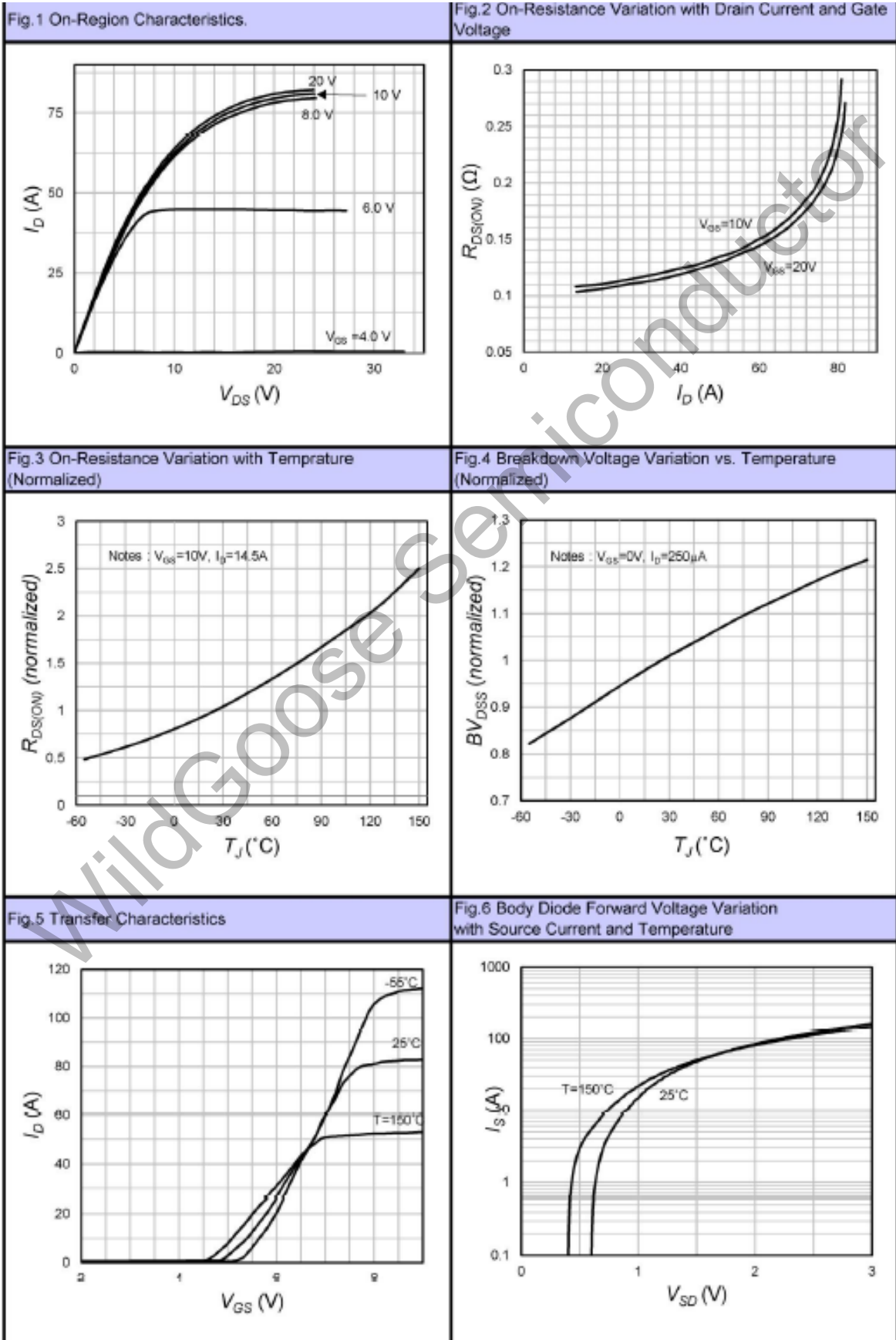
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Continuous Diode Forward Current	I_{SD}	-	-	33	A	
Diode Forward Voltage	V_{SD}	-	-	1.4	V	$I_{SD} = 33.0\text{A}, V_{GS} = 0\text{V}$
Reverse Recovery Time	t_{rr}	-	587	-	ns	$I_{SD} = 33.0\text{A}$ $di/dt = 100\text{A}/\mu\text{s}$ $V_{DD} = 100\text{V}$
Reverse Recovery Charge	Q_{rr}	-	10.8	-	μC	
Reverse Recovery Current	I_{rrm}	-	36.6	-	A	

Dynamic Characteristics ($T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input Capacitance	C_{iss}	-	2720	-	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	-	1770	-		
Reverse Transfer Capacitance	C_{rss}	-	88	-		
Effective Output Capacitance Energy Related ⁽³⁾	$C_{o(er)}$	-	74	-		
Turn On Delay Time	$t_{d(on)}$	-	46	-	ns	$V_{GS} = 10\text{V}, R_G = 25\Omega,$ $V_{DS} = 300\text{V}, I_D = 33\text{A}$
Rise Time	t_r	-	114	-		
Turn Off Delay Time	$t_{d(off)}$	-	247	-		
Fall Time	t_f	-	92	-		
Total Gate Charge	Q_g	-	77	-	nC	$V_{GS} = 10\text{V}, V_{DS} = 480\text{V},$ $I_D = 33\text{A}$
Gate – Source Charge	Q_{gs}	-	17	-		
Gate – Drain Charge	Q_{gd}	-	33	-		
Gate Resistance	R_G	-	3.2	-	Ω	$V_{GS} = 0\text{V}, f = 1.0\text{MHz}$

3) $C_{o(er)}$ is a capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0V to 80% $V_{(BR)DSS}$

■ Characteristic Graph



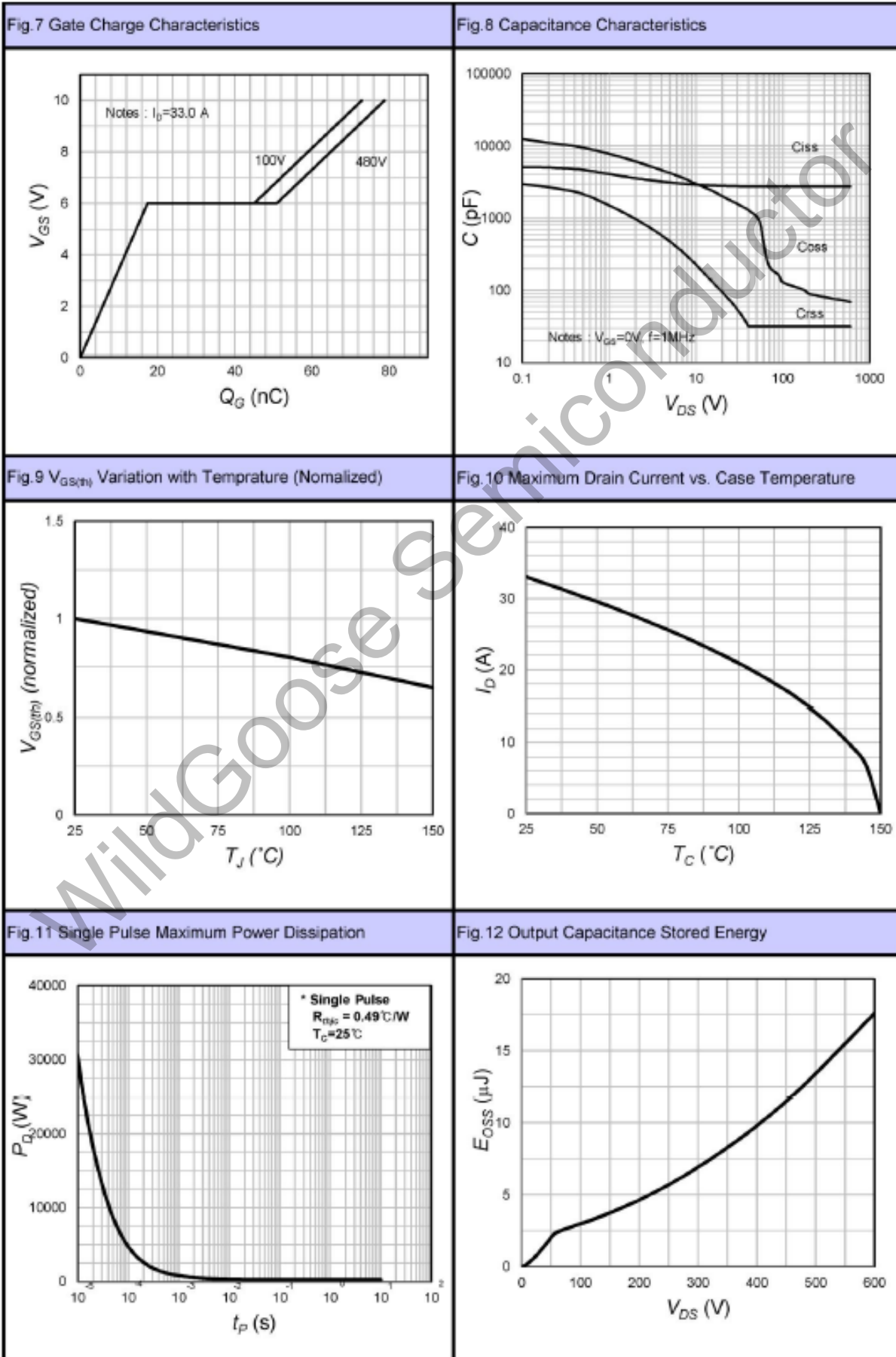


Fig.13 Transient Thermal Response Curve

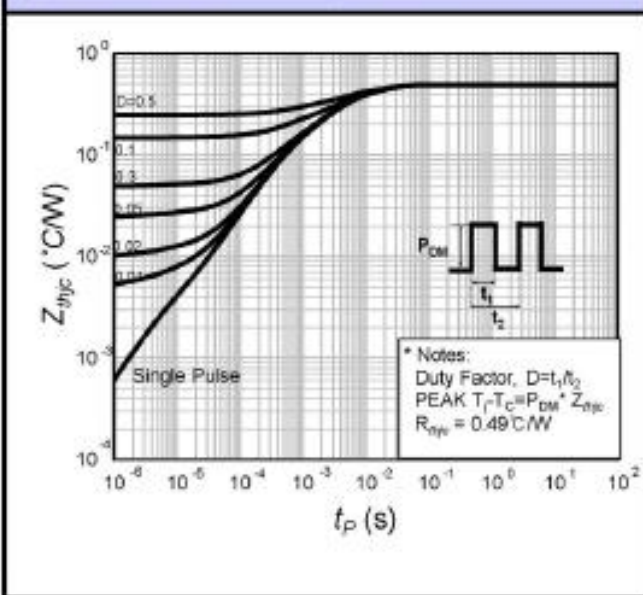
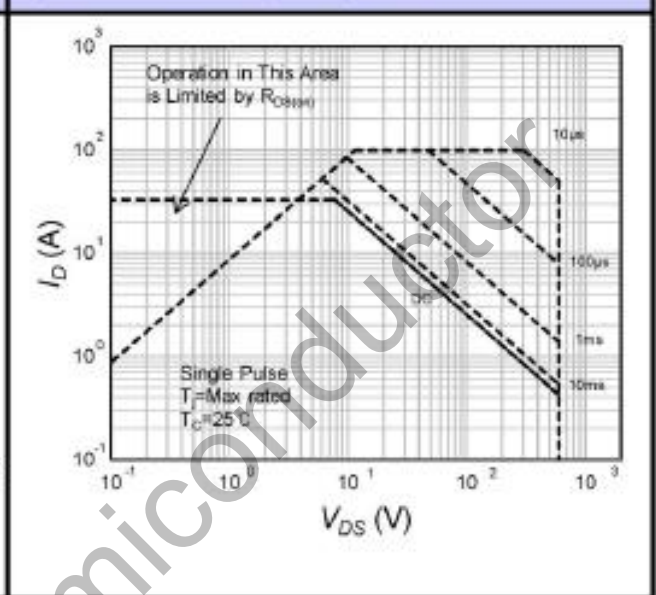


Fig.14 Maximum Safe Operating Area



WildGoose Semiconductor

Test Circuit & Waveform

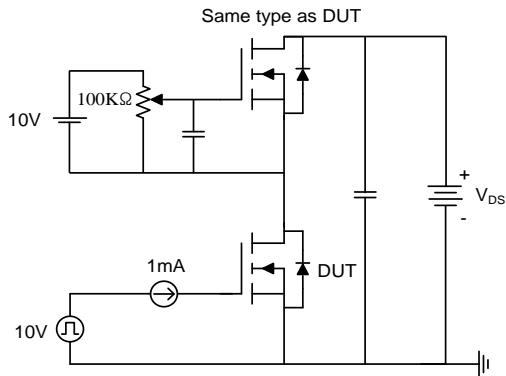


Fig15-1. Gate charge measurement circuit

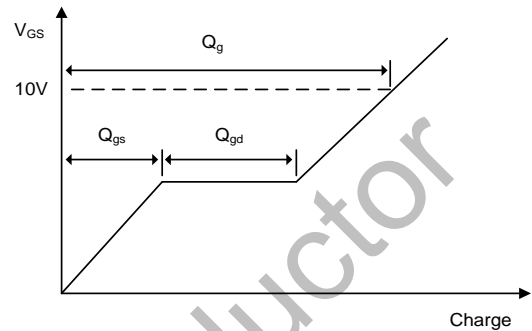


Fig15-2. Gate charge waveform

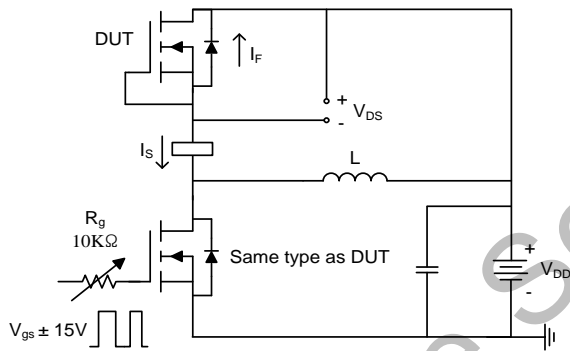


Fig16-1. Diode reverse recovery test circuit

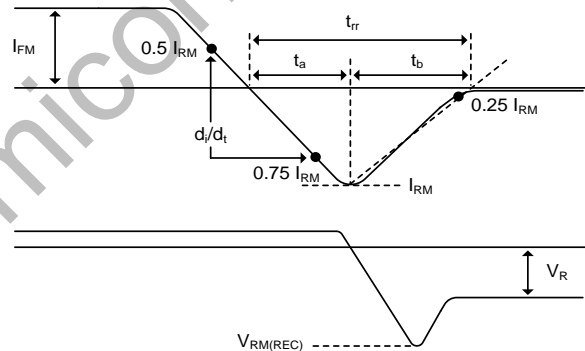


Fig16-1. Diode reverse recovery test waveform

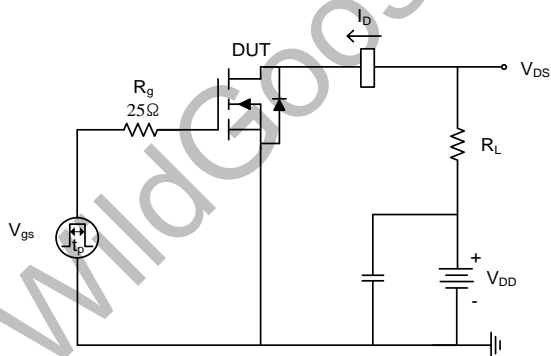


Fig17-1. Switching time test circuit for resistive load

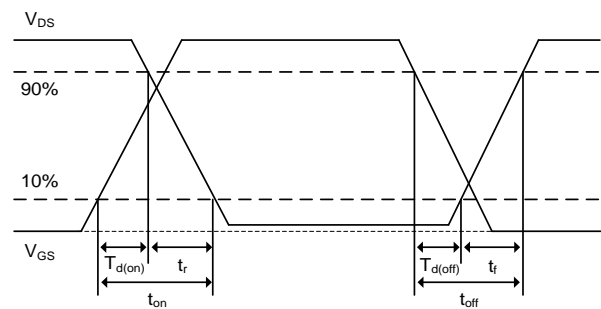


Fig17-2. Switching time waveform

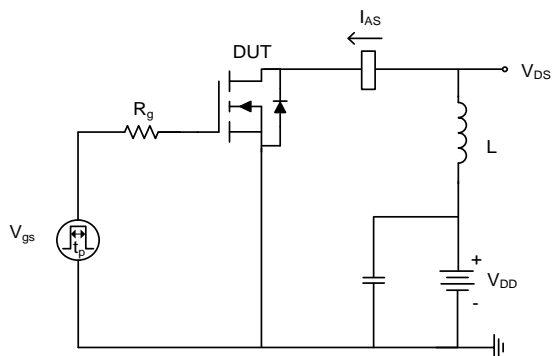


Fig18-1. Unclamped inductive load test circuit

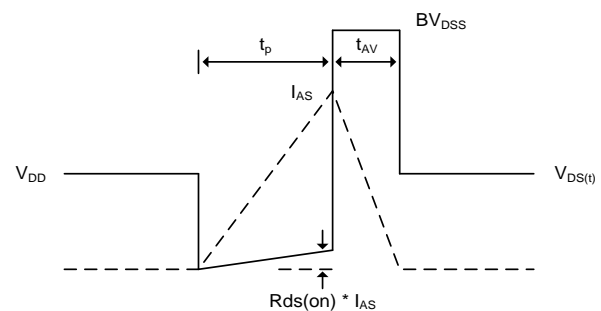
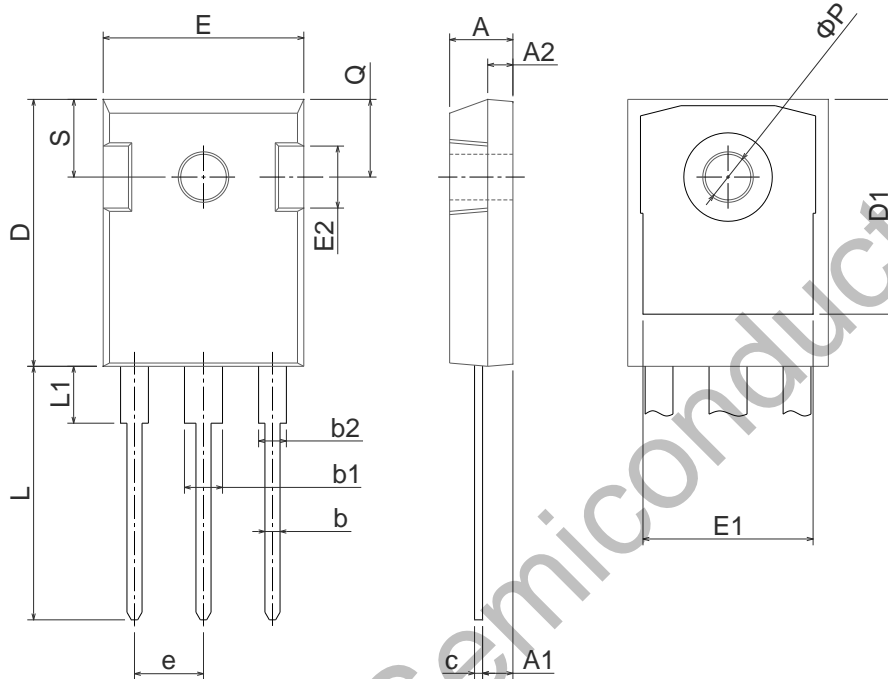


Fig18-2. Unclamped inductive waveform

Package Dimension

TO-247

Unit:mm



Dimension	Min(mm)	Max(mm)
A	4.70	5.31
A1	2.20	2.60
A2	1.50	2.49
b	0.99	1.40
b1	2.59	3.43
b2	1.65	2.39
c	0.38	0.89
D	20.30	21.46
D1	13.08	-
E	15.45	16.26
E1	13.06	14.02
E2	4.32	5.49
e	5.45BSC	
L	19.81	20.57
L1	-	4.50
ΦP	3.50	3.70
Q	5.38	6.20
S	6.15BSC	