WGA65R099G

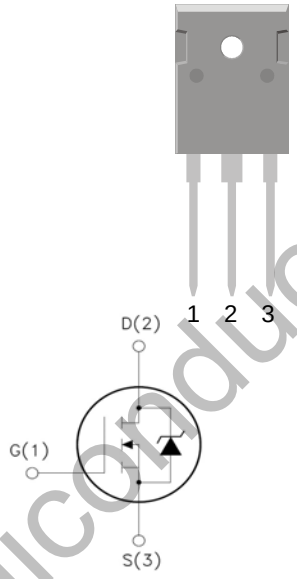
650V N-Channel MOSFET

Features:

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

TO-247

RoHS COMPLIANT



1.Gate (G)
2.Drain (D)
3.Sourse (S)

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Absolute Maximum Rating (T_c=25℃ unless otherwise specified)

Parameter	Symbol	Rating	Unit	Note
Drain – Source voltage	V_{DSS}	600	V	
Gate – Source voltage	V_{GSS}	±30	V	
Continuous drain current	I_D	33	A	T_C=25℃
		20.9	A	T_C=100℃
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	℃	
Maximum operating junction temperature	T_j	150	℃	

1) Pulse width t_P limited by $T_{j,max}$
2) I_{SD} ≤ I_D, $V_{DS\ peak}$ ≤ $V_{(BR)DSS}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case max	R_{thjc}	0.49	℃/W
Thermal resistance, junction-ambient max	R_{thja}	62.5	℃/W

Static Characteristics (T_c=25℃ unless otherwise specified)

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

Reverse Diode Characteristics (T_c=25℃ 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} = 33.0A, VGS = 0 V
Reverse Recovery Time	t_{rr}	-	587	-	ns	I_{SD} = 33.0A di/dt = 100 A/μs V_{DD} = 100 V
Reverse Recovery Charge	Q_{rr}	-	10.8	-	μC	
Reverse Recovery Current	I_{rrm}	-	36.6	-	A	

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Dynamic Characteristics (T_c=25℃ unless otherwise specified)

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

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% $V_{(BR)DSS}$

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■ Characteristic Graph

Fig.1 On-Region Characteristics.

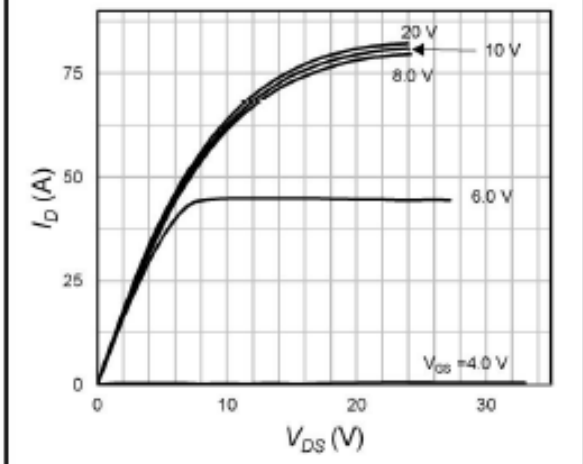

Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

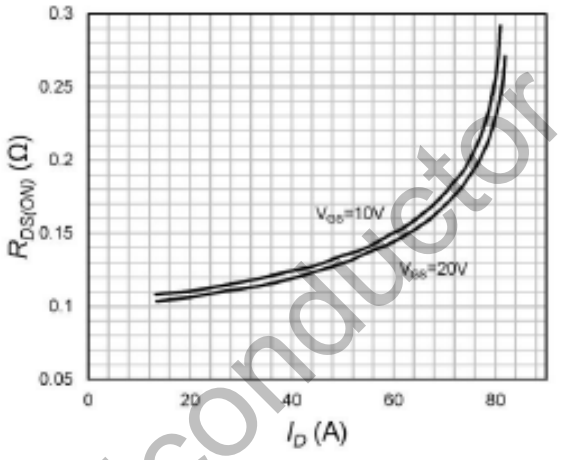

Fig.3 On-Resistance Variation with Temprature (Normalized)

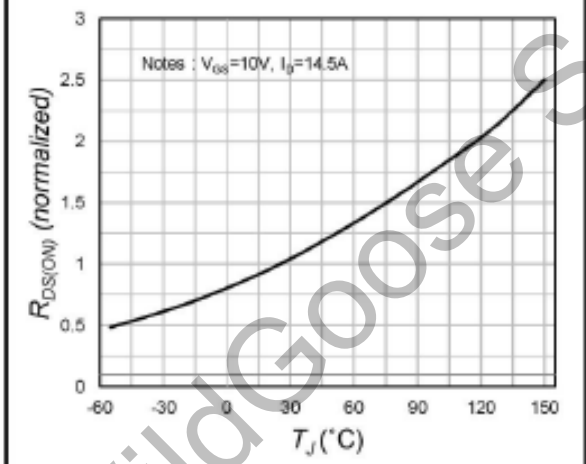

Fig.4 Breakdown Voltage Variation vs. Temperature (Normalized)

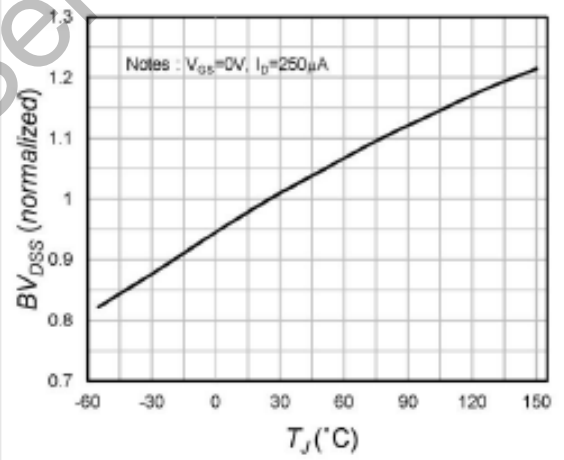

Fig.5 Transfer Characteristics

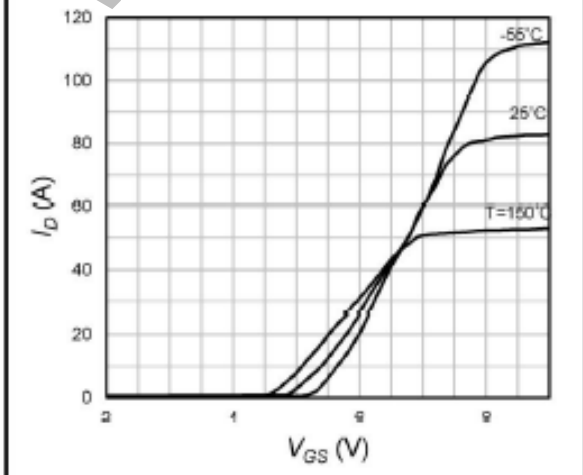

Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

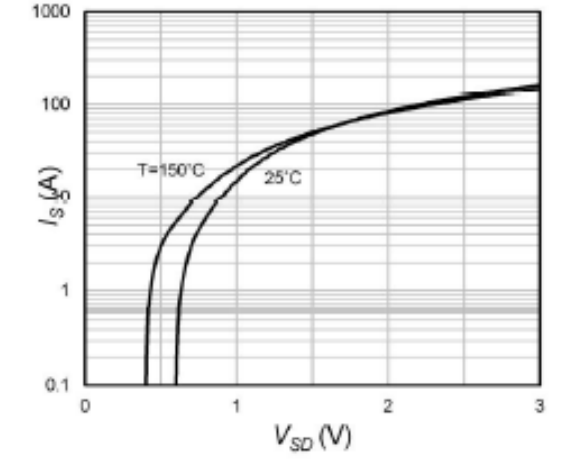

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Fig.7 Gate Charge Characteristics

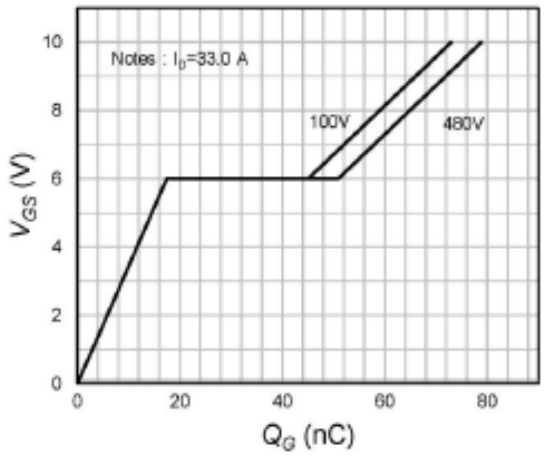

Fig.8 Capacitance Characteristics

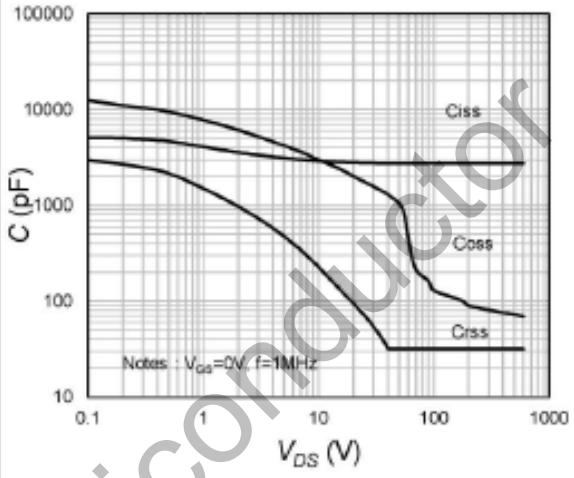

Fig.9 $V_{GS(th)}$ Variation with Temprature (Nomalized)

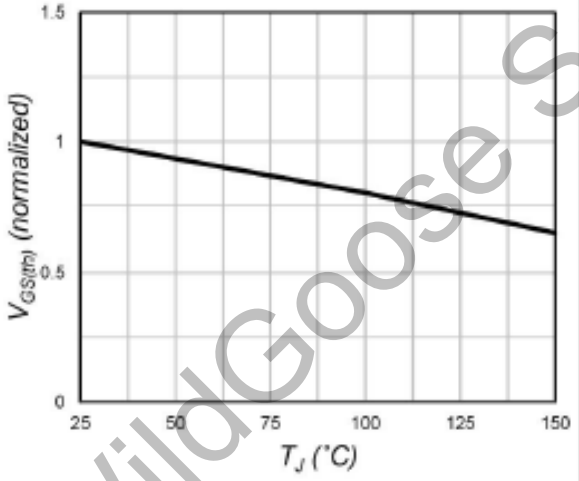

Fig.10 Maximum Drain Current vs. Case Temperature

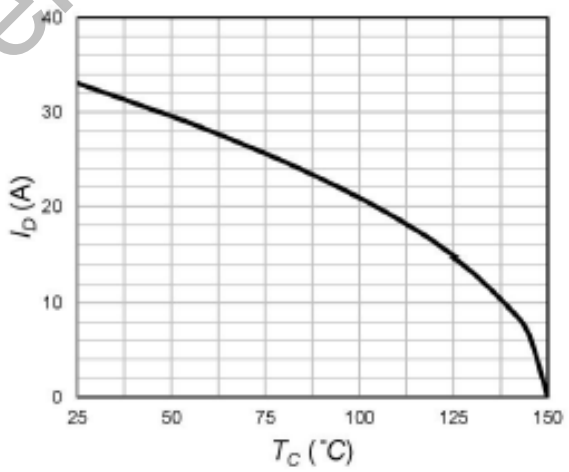

Fig.11 Single Pulse Maximum Power Dissipation

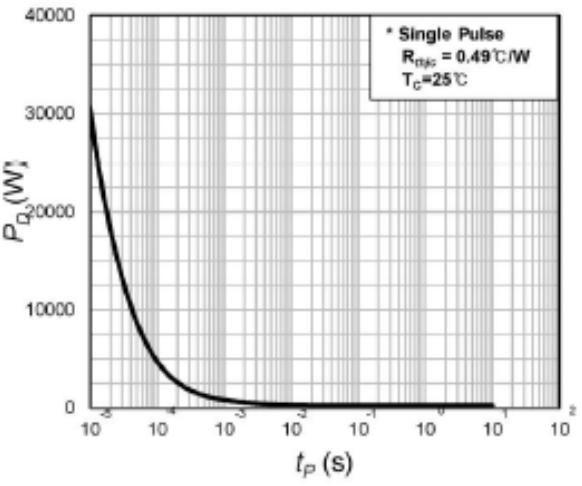

Fig.12 Output Capacitance Stored Energy

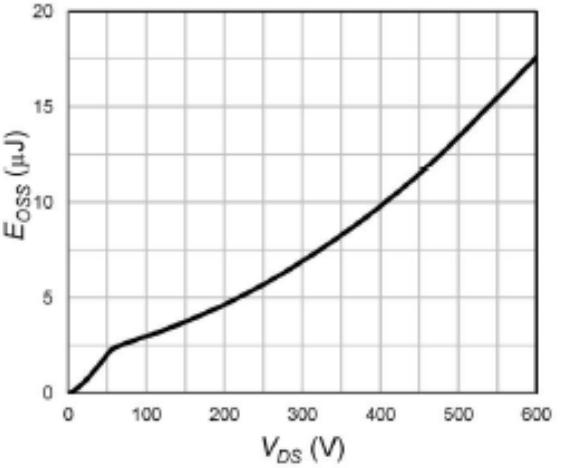

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Fig.13 Transient Thermal Response Curve

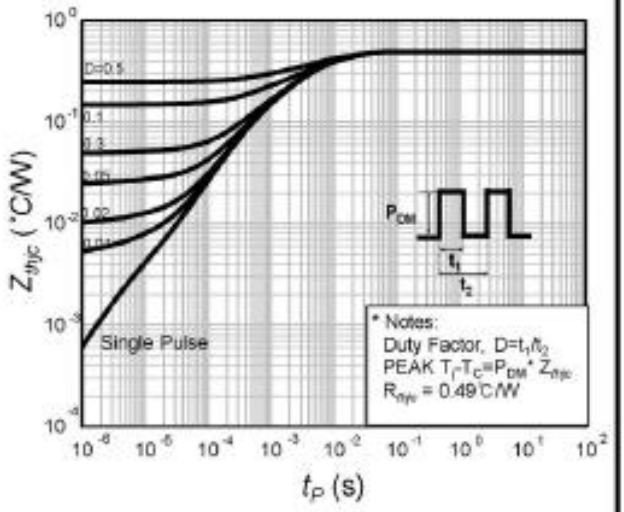
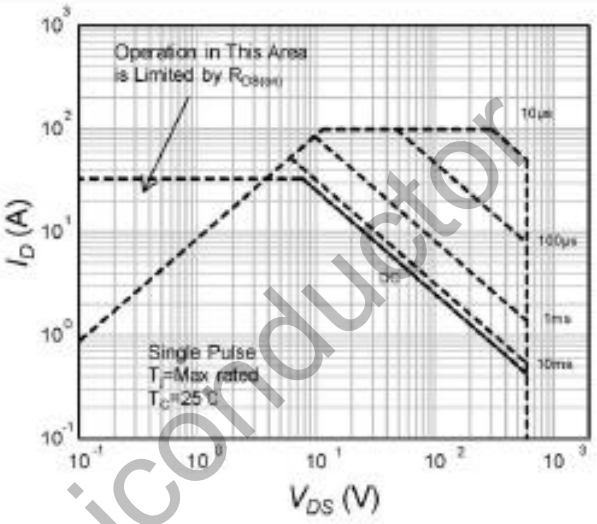


Fig.14 Maximum Safe Operating Area



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Test Circuit & Waveform

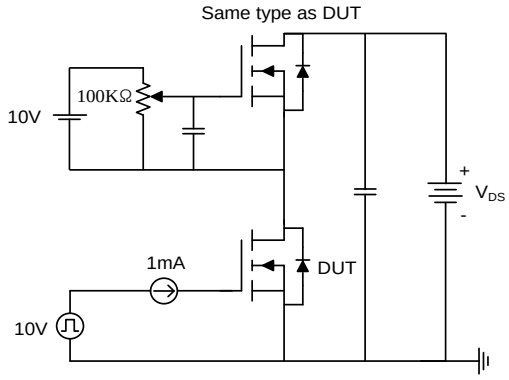

Fig15-1. Gate charge measurement circuit

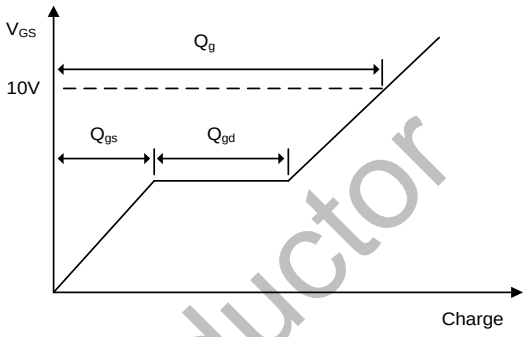

Fig15-2. Gate charge waveform

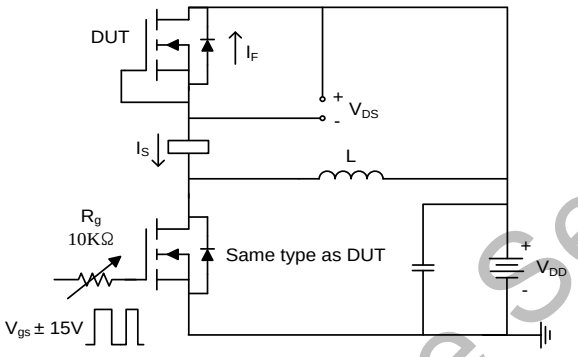

Fig16-1. Diode reverse recovery test circuit

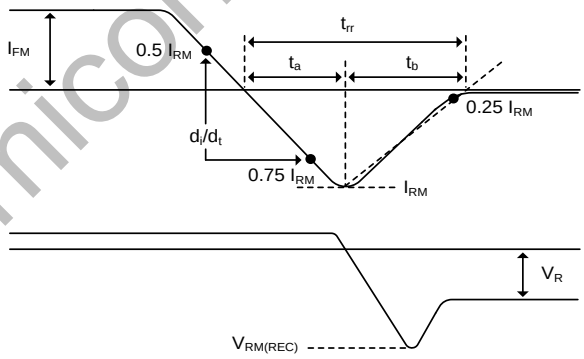

Fig16-1. Diode reverse recovery test waveform

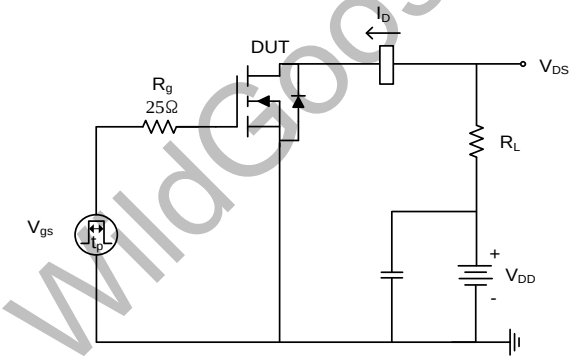

Fig17-1. Switching time test circuit for resistive load

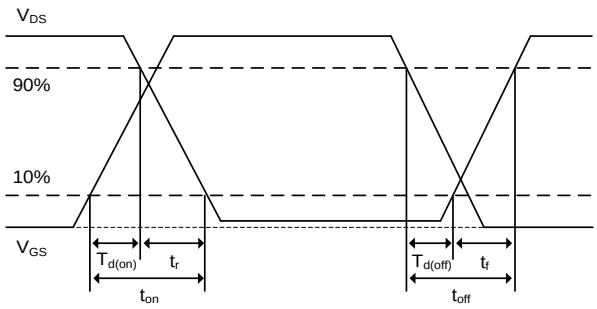

Fig17-2. Switching time waveform

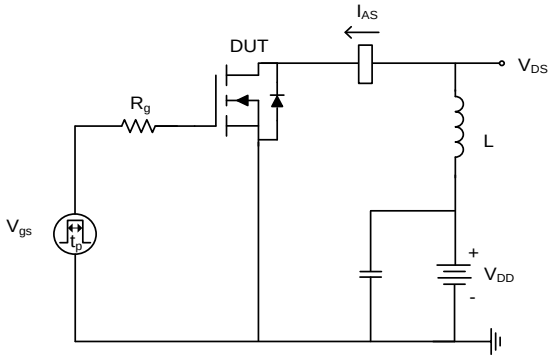

Fig18-1. Unclamped inductive load test circuit

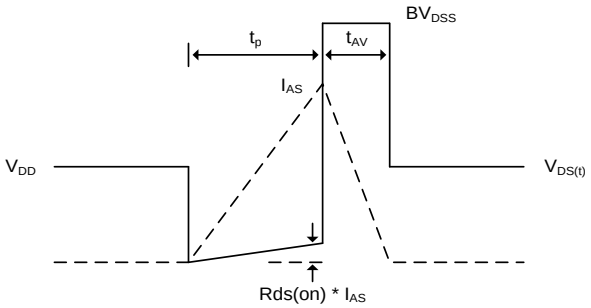

Fig18-2. Unclamped inductive waveform

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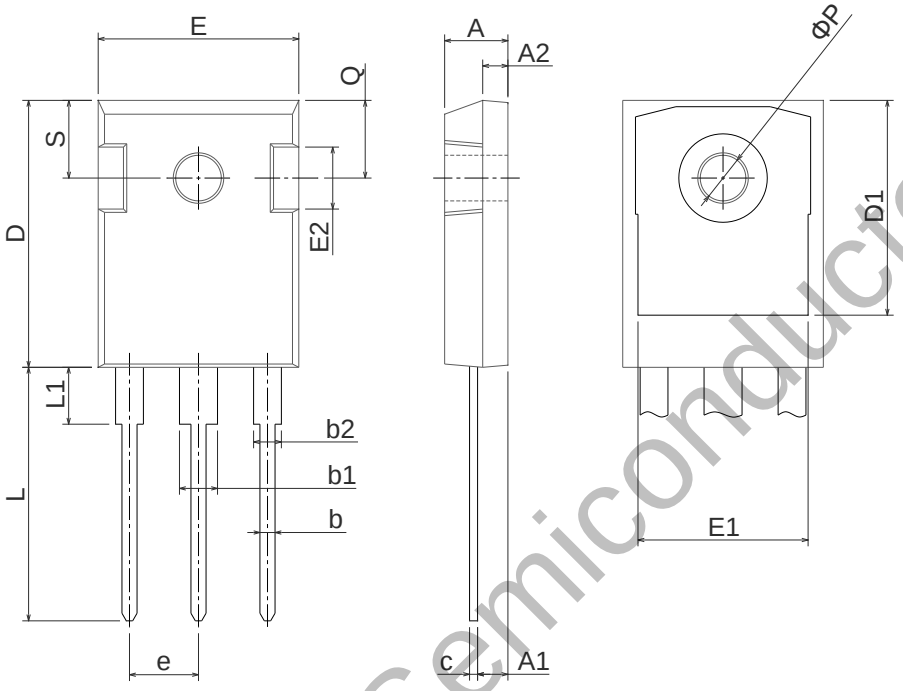
Package Dimension

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	

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