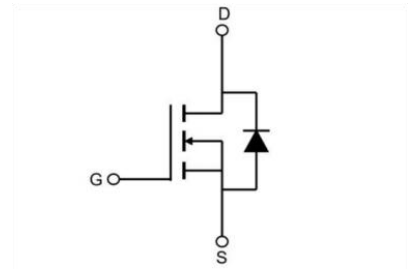


Features

- 650V,37A
 $R_{DS(on)} < 90m\ \Omega @V_{GS}=10V$ TYP: 72m Ω
- Super Junction Technology
- Fast Switching
- Low Gate Charge



Schematic Diagram

Applications

- Switched mode power supplies (SMPS)
- LED/LCD/PDP TV and monitor Lighting
- Charger
- Power Supply



TO-247

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
C65R090WMF	APC65R090WMF	TO-247	-	-	1000

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage	V _{GS}	±30	V
Continuous Drain Current (T _c =25°C)	I _D	37	A
Continuous Drain Current (T _c =100°C)	I _D	25	A
Pulsed Drain Current ⁽¹⁾	I _{DM}	118	A
Single Pulsed Avalanche Energy (L=30mH) ⁽²⁾	E _{AS}	540	mJ
Drain Power Dissipation	P _D	297	W
Thermal Resistance from Junction to Case	R _{θJC}	0.42	°C/W
Thermal Resistance- Junction to Ambient	R _{θJA}	45	°C/W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55~ +150	°C

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

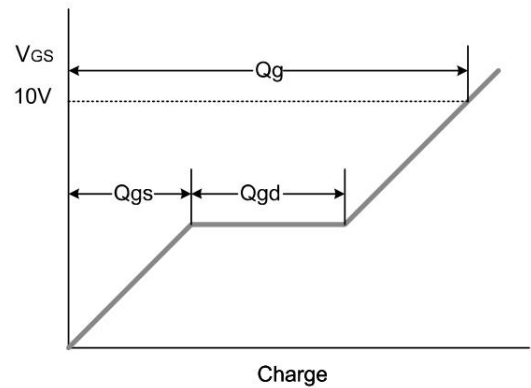
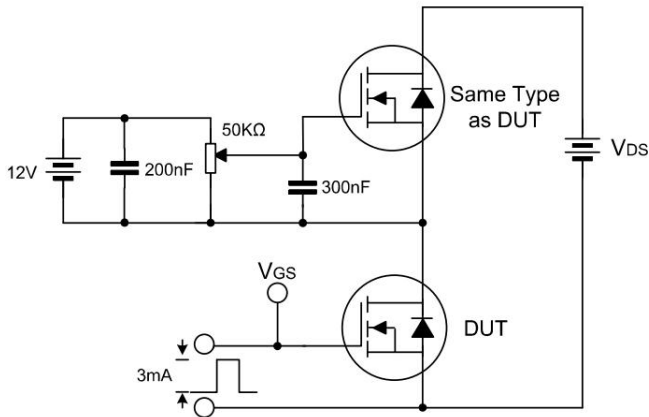
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	650	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =650V, V _{GS} = 0V	-	-	10	μA
		V _{DS} =650V, V _{GS} = 0V T _J =150°C	-	1200	-	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	3.2	-	4.6	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =21.5A	-	72	90	mΩ
Transconductance	g _{fs}	V _{DS} =10V, I _D =21.5A	-	30	-	S
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =100V, V _{GS} =0V, f =100KHz	-	2370	-	pF
Output Capacitance	C _{oss}		-	123	-	
Reverse Transfer Capacitance	C _{rss}		-	1.1	-	
Gate Resistance	R _g	f =1.0MHz	-	8	-	Ω
Switching characteristics ^(3,4)						
Turn-on delay time	t _{d(on)}	V _{DD} =400V, I _D =21.5A, R _G =27Ω, V _G =10V	-	83	-	ns
Turn-on rise time	t _r		-	105	-	
Turn-off delay time	t _{d(off)}		-	243	-	
Turn-off fall time	t _f		-	98	-	
Total Gate Charge	Q _g	V _{DS} =480V, I _D =21.5A, V _{GS} =10V	-	76	-	nC
Gate-Source Charge	Q _{gs}		-	21	-	
Gate-Drain Charge	Q _{gd}		-	43	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	T _c =25°C, V _{GS} =0V, I _S =21.5A	-	-	1.2	V
Diode Forward current	I _S	T _c =25°C	-	-	37	A
Body Diode Reverse Recovery Time ⁽³⁾	t _{rr}	T _c =25°C, I _F =21.5A, di/dt=100A/us	-	160	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}	T _c =25°C, I _F =21.5A, di/dt=100A/us	-	0.66	-	uc

Notes:

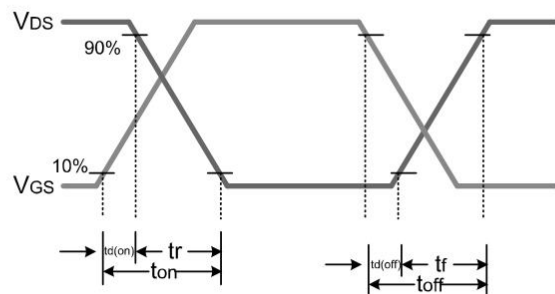
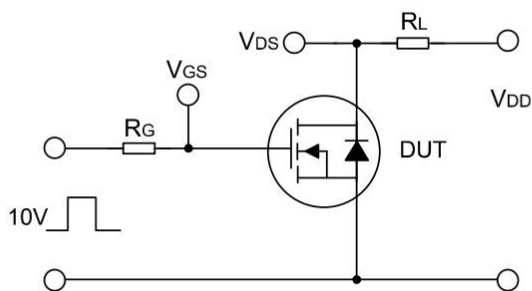
1. Pluse width limited by maximum junction temperature
2. L=30mH, IAS=6A, VDD=50V, VG=10V, RG=25Ω, starting TJ=25°C
3. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%
4. Essentially independent of operating temperature

Test Circuit

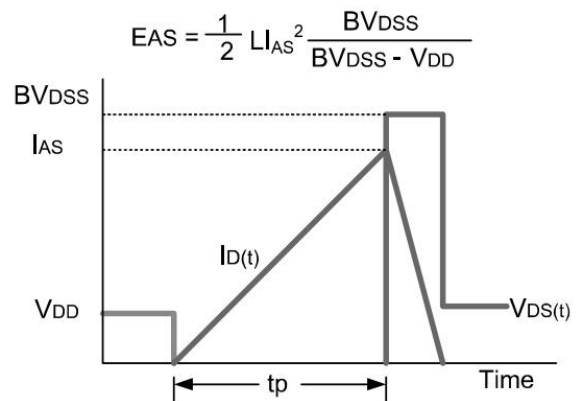
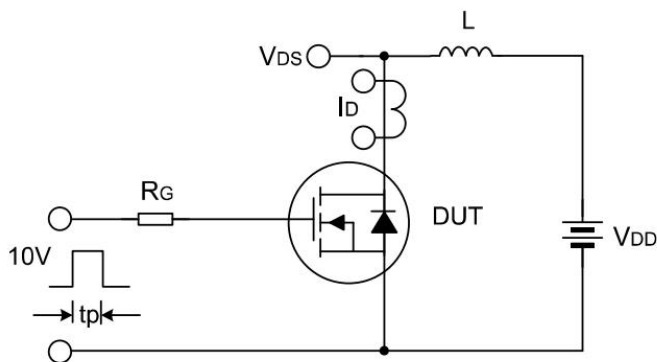
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Typical Characteristics

Fig 1. Output Characteristics ($T_j=25^\circ\text{C}$)

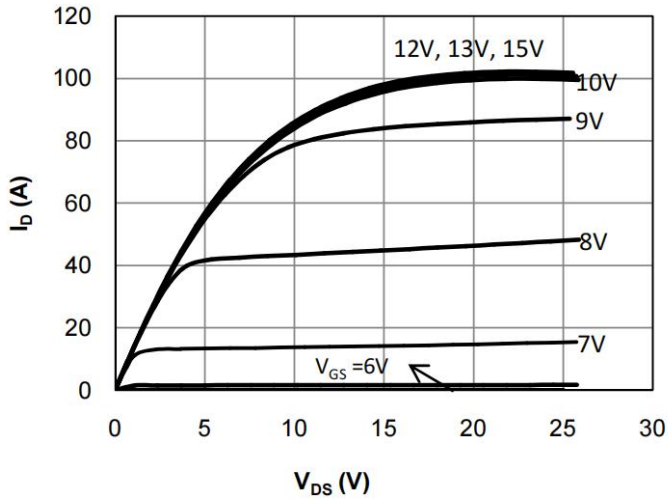


Fig 2. Output Characteristics ($T_j=150^\circ\text{C}$)

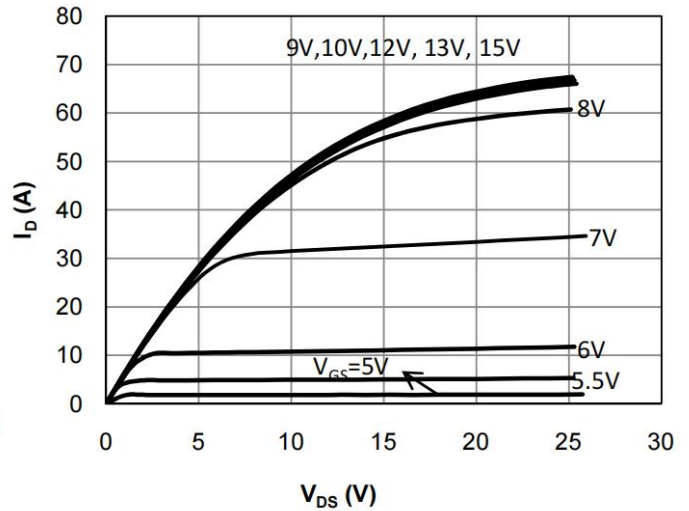


Fig 3: Transfer Characteristics

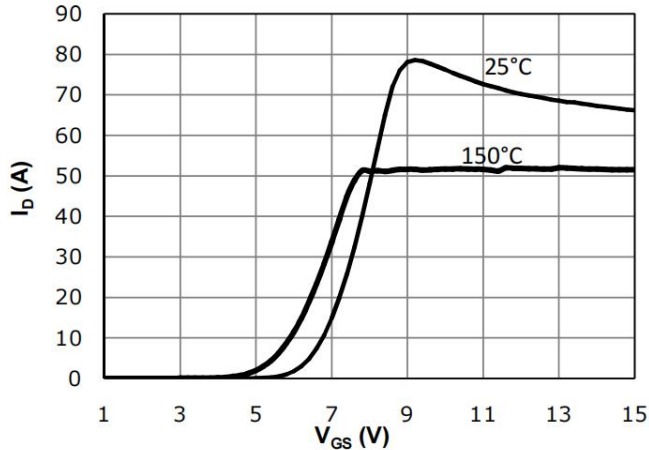


Fig 4: V_{TH} vs. T_j Temperature Characteristics

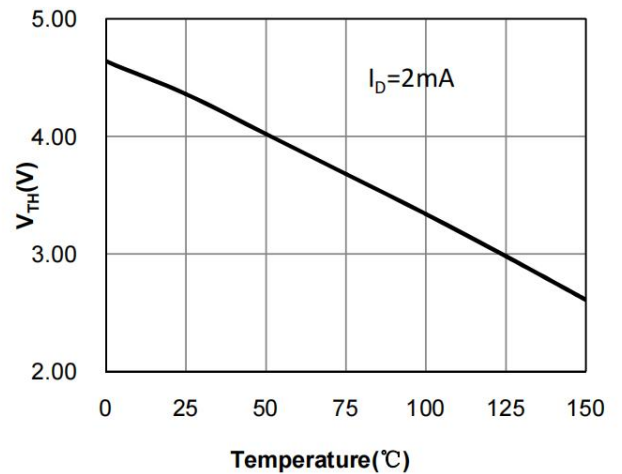


Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics ($T_j=25^\circ\text{C}$)

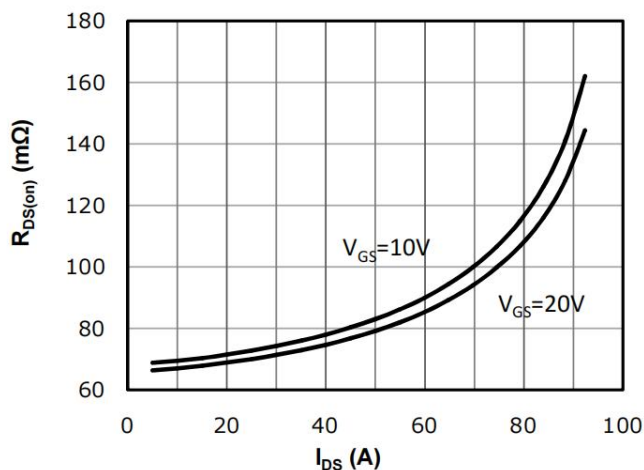
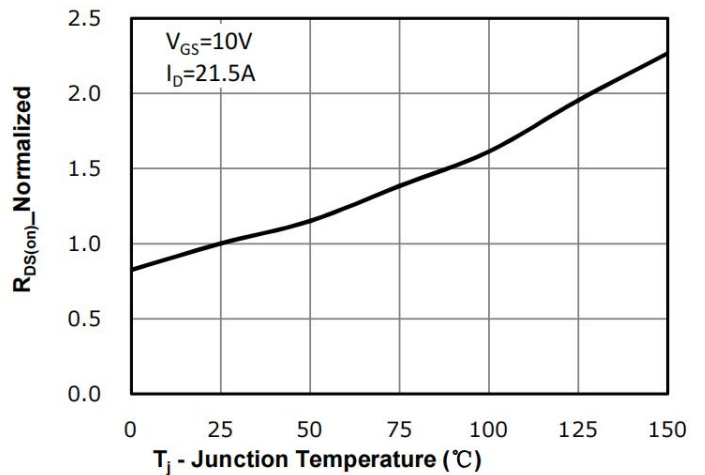


Fig 6: $R_{DS(on)}$ vs. Temperature



Typical Characteristics

Fig 7: BV_{DSS} vs. Temperature

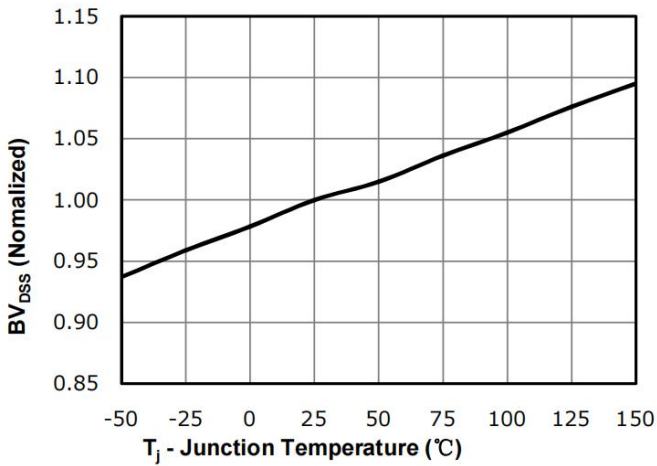


Fig 8: $R_{DS(on)}$ vs. Gate Voltage

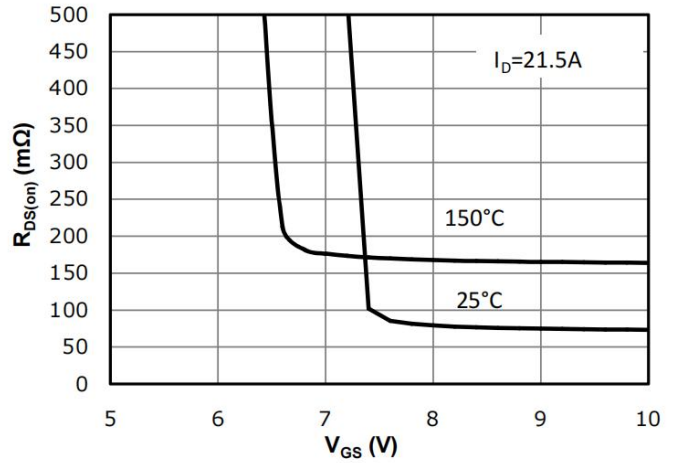


Fig 9: Body-diode Forward Characteristics

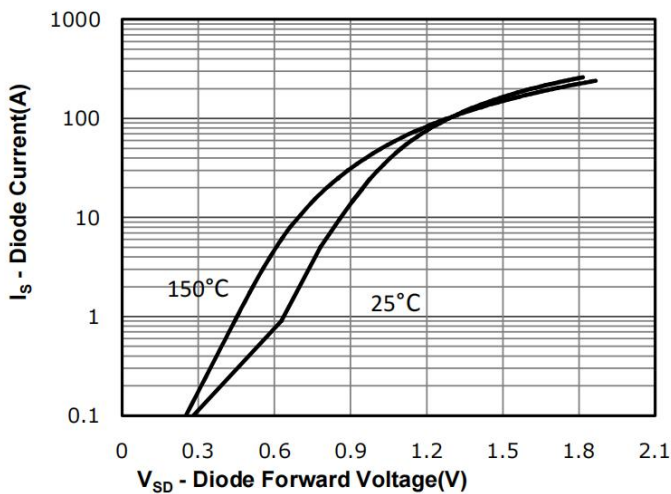


Fig 10: Gate Charge Characteristics

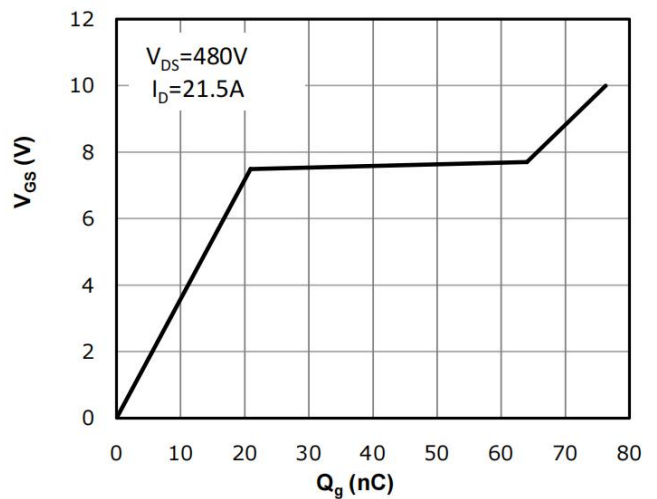


Fig 11: Capacitance Characteristics

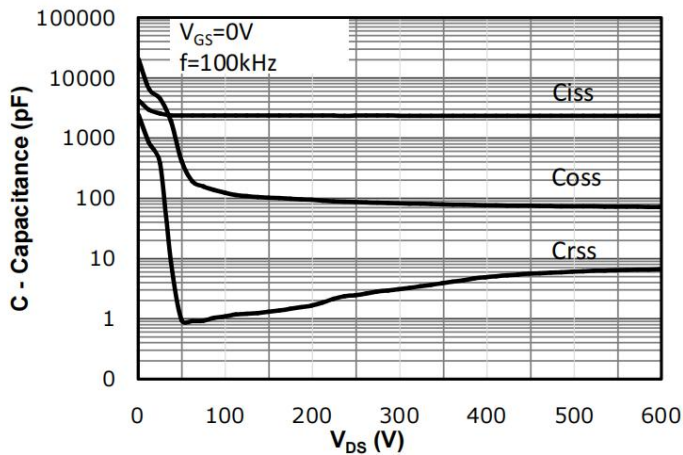
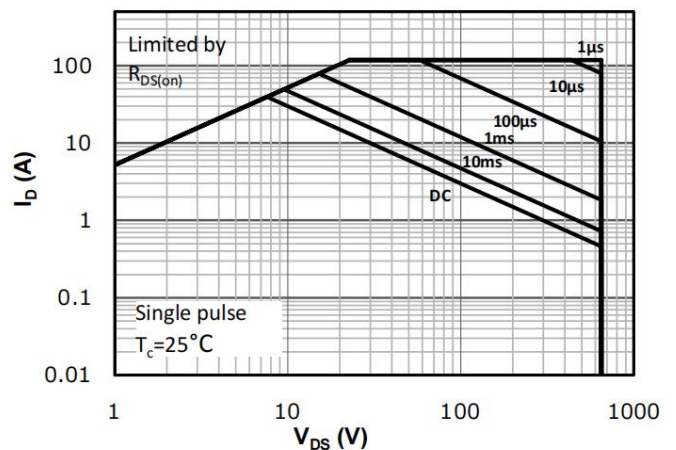
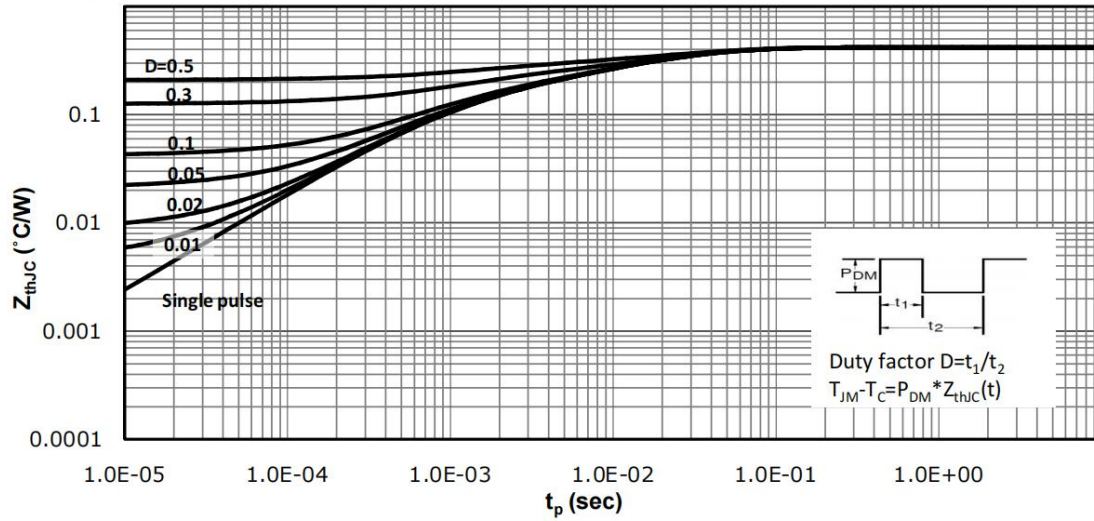


Fig 12: Safe Operating Area

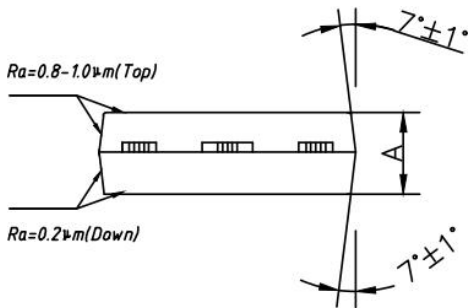
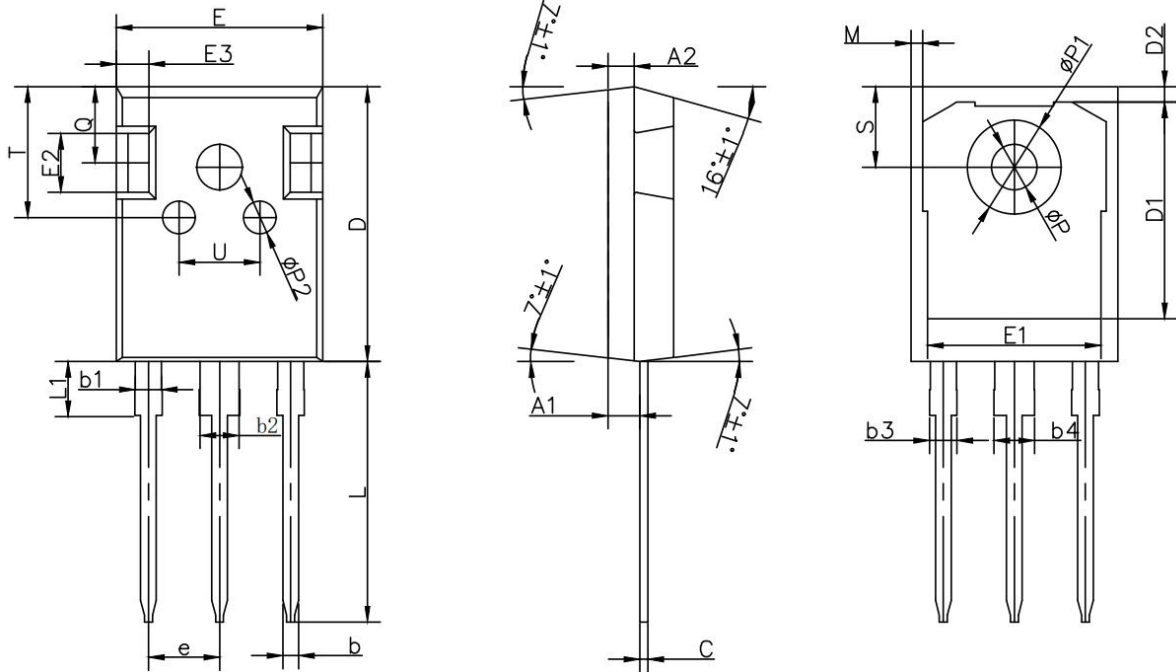


Typical Characteristics

Fig 13: Max. Transient Thermal Impedance



TO-247 Package Information



TO247-3L			
DIM.	MIN.	NOM.	MAX.
A	4.90	5.00	5.10
A1	2.31	2.432	2.51
A2	1.90	2.00	2.10
b	1.16	1.20	1.26
b1	1.96	2.00	2.06
b2	2.96	3.00	3.06
b3	-	-	2.25
b4	-	-	3.25
c	0.59	0.60	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.26	13.50
E2	4.40	4.50	4.60
E3	2.40	2.50	2.60
e	5.436BSC		
L	19.80	19.90	20.10
L1	-	-	4.30
M	0.35	0.89	0.95
P	3.40	3.50	3.60
P1	7.00	7.20	7.40
P2	2.40	2.50	2.60
Q	5.60	5.80	6.00
S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40
All dimensions in millimeters			

Revision History

Revision	Release	Remark
V1.0	2025/02/07	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.