

APG042N15D

N-Channel Enhancement Mosfet

AIPOWER

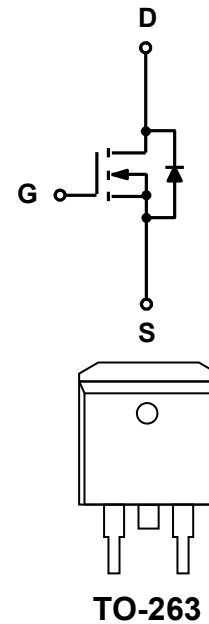
DATA SHEET

Features

- 150V,206A
 $R_{DS(on)} < 4.2m\Omega @ V_{GS}=10V$ TYP:3.6m Ω
- High Speed Power Smooth Switching
- Enhanced Body diode dv/dt capability
- Enhanced Avalanche Ruggedness
- 100% UIS Tested, 100% Rg Tested
- Lead Free

Applications

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- Motor Control



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G042N15D	APG042N15D	TO-263	-	-	800

ABSOLUTE MAXIMUM RATINGS ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	150	V	
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current (Silicon Limited)	I_D	$T_c=25^\circ\text{C}$	206	A
		$T_c=100^\circ\text{C}$	146	A
Continuous Drain Current (Package Limited) $T_c=25^\circ\text{C}$		180	A	
Pulsed Drain Current	I_{DM}	750	A	
Single Pulsed Avalanche Energy ($T_c=25^\circ\text{C}, L=0.4\text{mH}$) ⁽²⁾	E_{AS}	720	mJ	
Drain Power Dissipation	P_D	429	W	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.35	$^\circ\text{C}/\text{W}$	
Thermal Resistance- Junction to Ambient	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$	
Junction Temperature	T_J	150	$^\circ\text{C}$	
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$	

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	150	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =150V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	2.9	4.0	V
Drain-source on-resistance ^(a)	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	3.6	4.2	mΩ
Gate Resistance	R _g	V _{GS} =0V, V _{DS} Open, f=1MHz		1.9		Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =75V, V _{GS} =0V, f =1.0MHz	-	10640	-	pF
Output Capacitance	C _{oss}		-	729	-	
Reverse Transfer Capacitance	C _{rss}		-	182	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =75V, I _D =20A, R _G =10Ω, V _G =10V	-	34	-	ns
Turn-on rise time	t _r		-	30	-	
Turn-off delay time	t _{d(off)}		-	44	-	
Turn-off fall time	t _f		-	19	-	
Total Gate Charge	Q _g	V _{DS} =75V, I _D =20A, V _{GS} =10V	-	206	-	nC
Gate-Source Charge	Q _{gs}		-	44	-	
Gate-Drain Charge	Q _{gd}		-	70	-	
Source-Drain Diode characteristics						
Diode Forward voltage ^(a)	V _{SD}	T _J =25°C, V _{GS} =0V, I _S =20A	-	-	0.9	V
Diode Forward current	I _S	T _C =25°C	-	-	206	A
Body Diode Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =20A, di/dt=100A/us		101		ns
Body Diode Reverse Recovery Charge	Q _{rr}	T _J =25°C, I _F =20A, di/dt=100A/us		253		uc

Notes:

- a) Pulse width ≤ 300 μs, duty cycle ≤ 2%
- b) Guaranteed by design, not subject to production testing

Typical Characteristics

Fig 1. Typical Output Characteristics

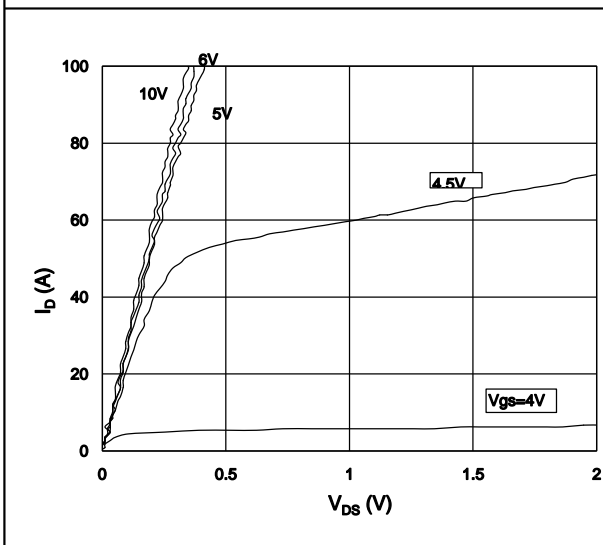


Figure 2. On-Resistance vs. Gate-Source Voltage

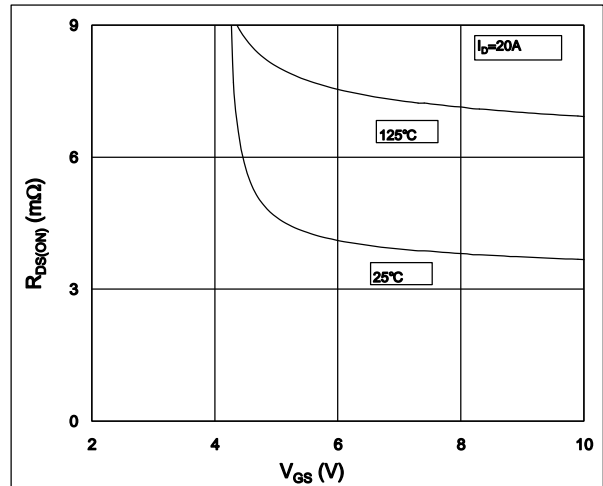


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

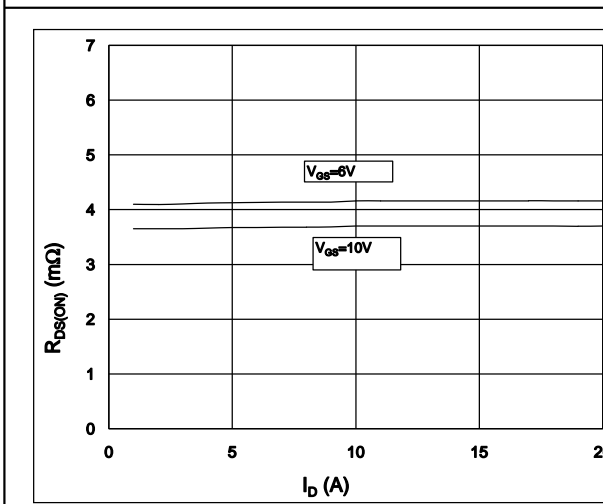


Figure 4. Normalized On-Resistance vs. Junction Temperature

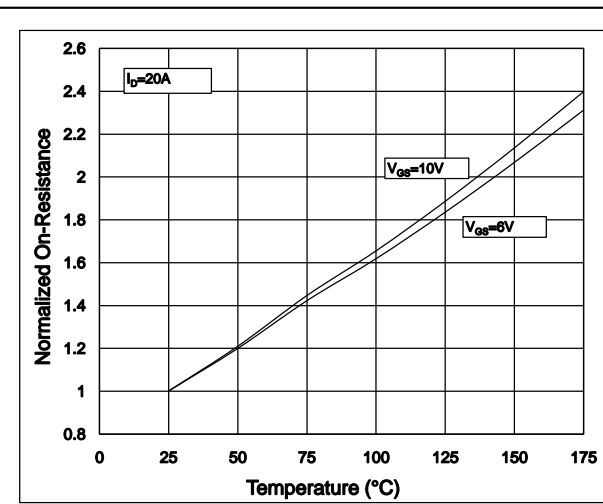


Figure 5. Typical Transfer Characteristics

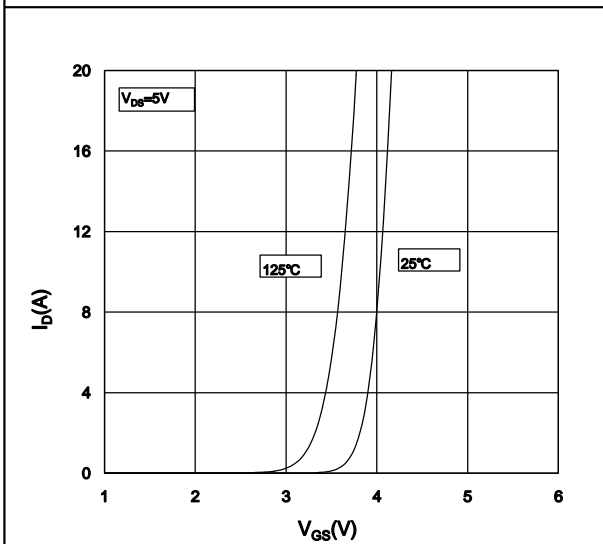
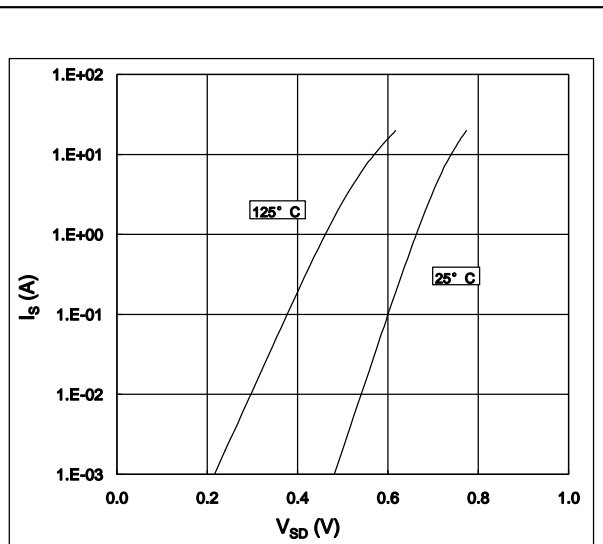


Figure 6. Typical Source-Drain Diode Forward Voltage



Typical Characteristics

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

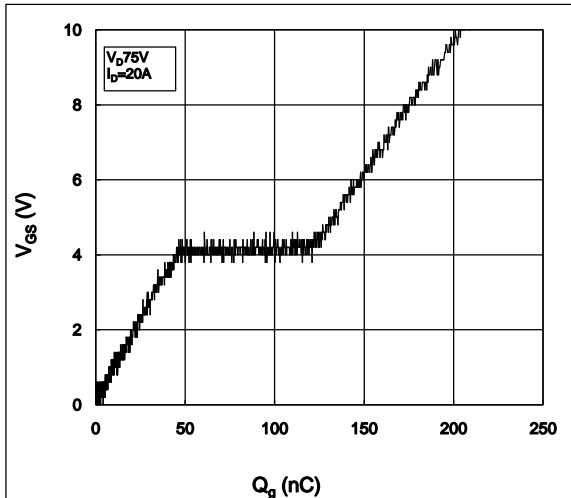


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

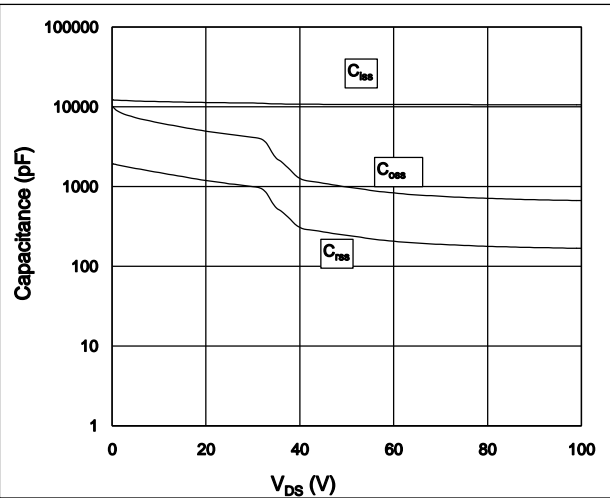


Figure 9. Maximum Safe Operating Area

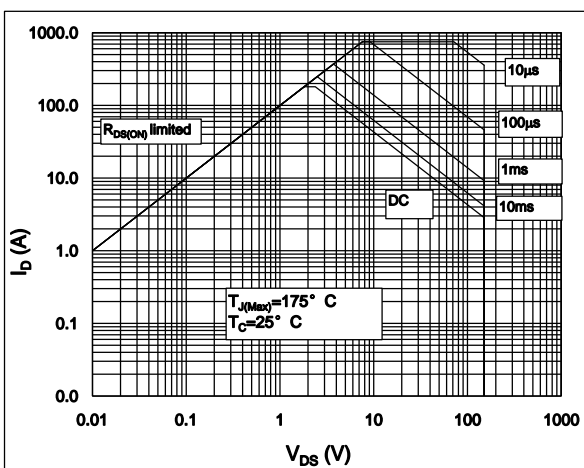


Figure 10. Maximum Drain Current vs. Case Temperature

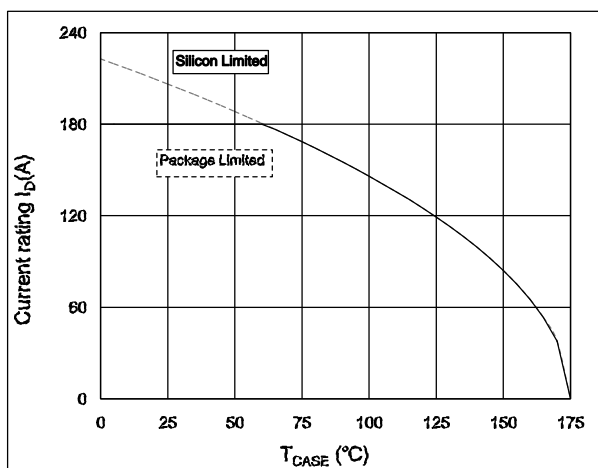
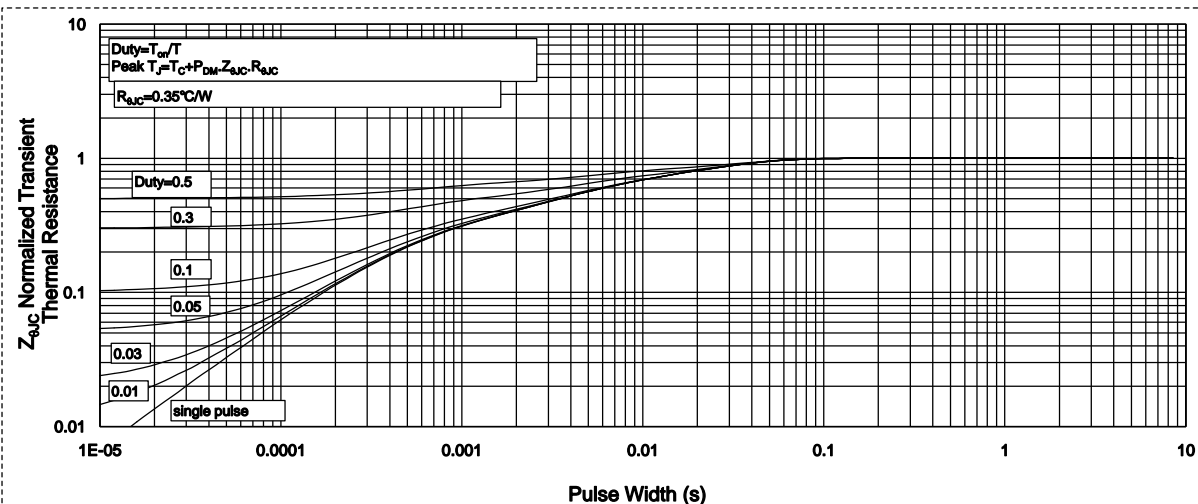
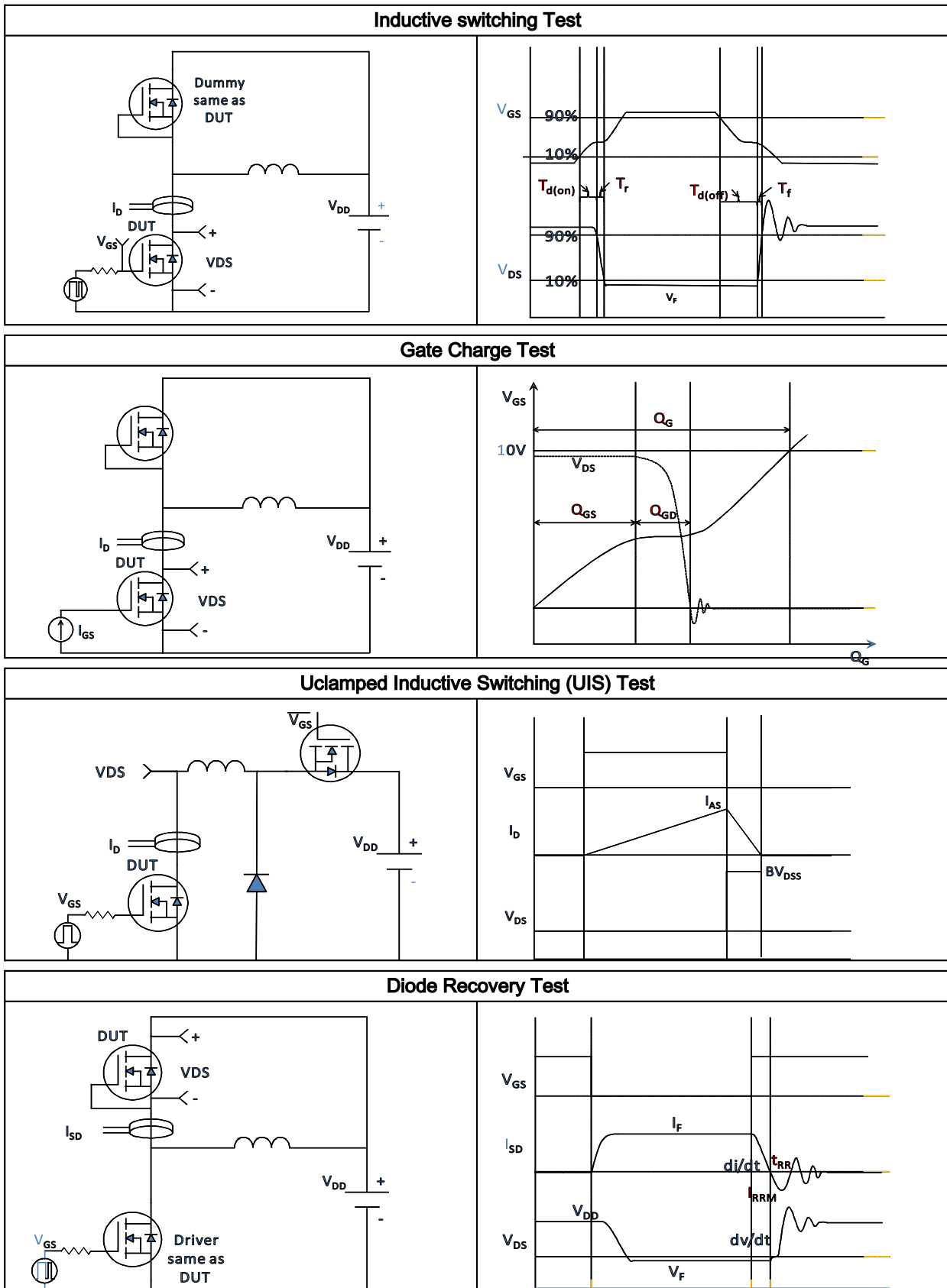


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

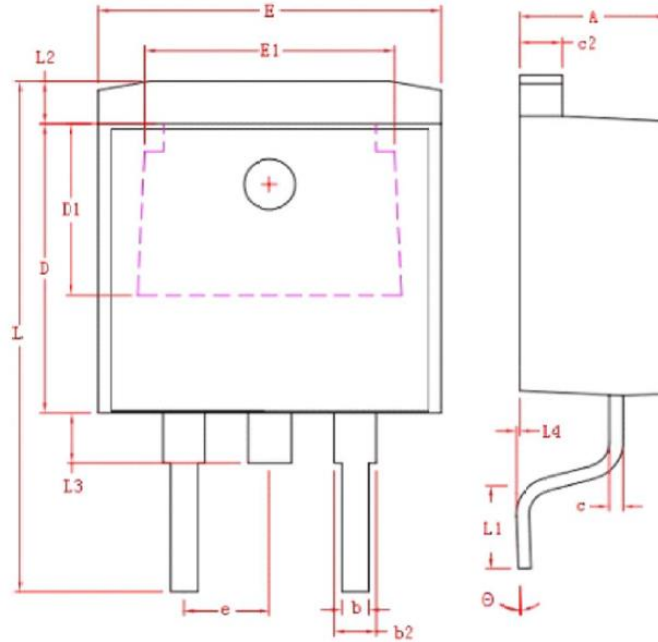


Test Circuit



Package Dimensions

TO-263



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.40	4.80
b	0.76	1.00
L4	0.00	0.25
C	0.36	0.50
L3	1.50 REF	
L1	2.29	2.79
E	9.80	10.40
E1	7.40 REF	
c2	1.25	1.45
b2	1.17	1.47
D	8.60	9.00
D1	5.10 REF	
e	2.54 REF	
L	14.6	15.8
θ	0° ± 3°	
L2	1.27 REF	

Revision History

Revision	Release	Remark
V1.0	2023/06/06	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.