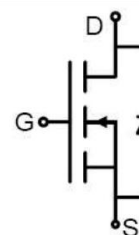


Features

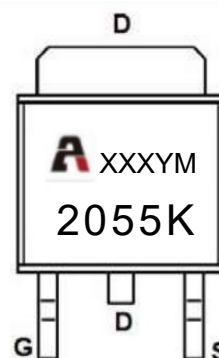
- 20V,60A
 $R_{DS(on)}$ (TYP: $3.8m\Omega$) $<5.5m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(on)}$ (TYP: $4.8m\Omega$) $<7.0m\Omega$ @ $V_{GS}=2.5V$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge



Schematic Diagram

Applications

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
2055K	AP2055K	TO-252	-	-	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ($T_c=25^{\circ}C$) ⁽¹⁾	I_D	60	A
Continuous Drain Current ($T_c=100^{\circ}C$)	I_D	40	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	240	A
Drain Power Dissipation	P_D	36	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	121	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}C/W$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.5	$^{\circ}C/W$
Junction Temperature	T_J	-55~ +150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

Notes:

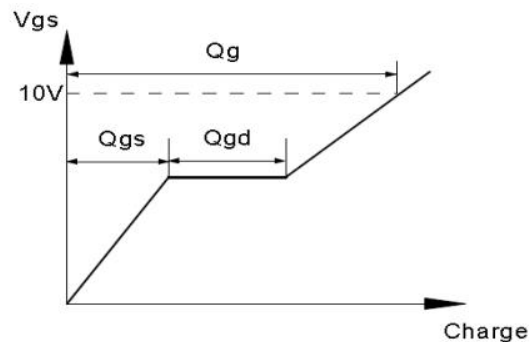
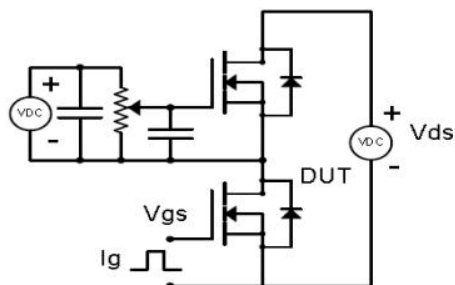
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : $T_J=25^{\circ}C$, $V_{DD}=20V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=22A$

MOSFET ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$ unless otherwise noted)

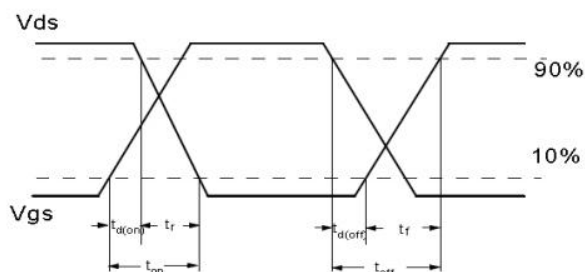
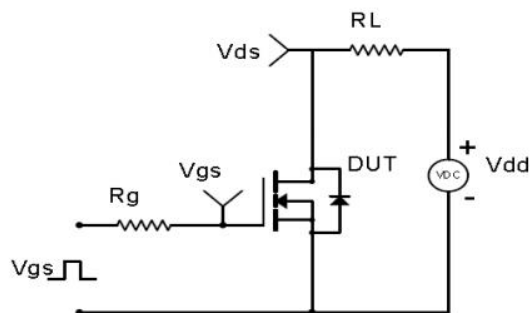
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	20	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =20V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ± 12V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.5	0.7	0.9	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =30A	-	3.8	5.5	mΩ
		V _{GS} =2.5V, I _D =20A	-	4.8	7.0	mΩ
Gate Resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f=1.0MHz	-	2.2	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	-	2200	-	pF
Output Capacitance	C _{oss}		-	500	-	
Reverse Transfer Capacitance	C _{rss}		-	200	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =10V, I _D =20A,R _G =3Ω, V _{GS} =4.5V	-	10	-	ns
Turn-on rise time	t _r		-	18	-	
Turn-off delay time	t _{d(off)}		-	30	-	
Turn-off fall time	t _f		-	18	-	
Total Gate Charge	Q _g	V _{DS} =10V, I _D =20A, V _{GS} =10V	-	27	-	nC
Gate-Source Charge	Q _{gs}		-	6	-	
Gate-Drain Charge	Q _{gd}		-	6.5	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	T _J =25℃, V _{GS} =0V, I _S =30A	-	-	1.2	V
Diode Forward current	I _S	T _C =25℃	-	-	60	A
Body Diode Reverse Recovery Time	t _{rr}	T _J =25℃, I _F =30A,di/dt=100A/us	-	30	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	26	-	nC

Test Circuit & Waveform

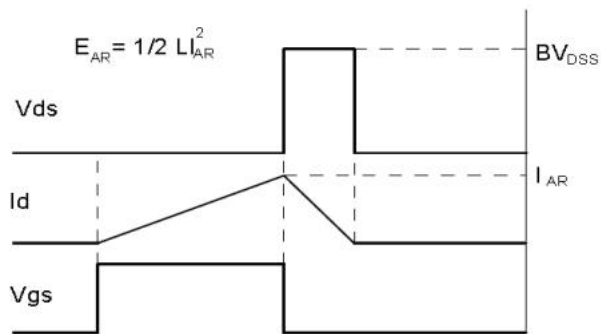
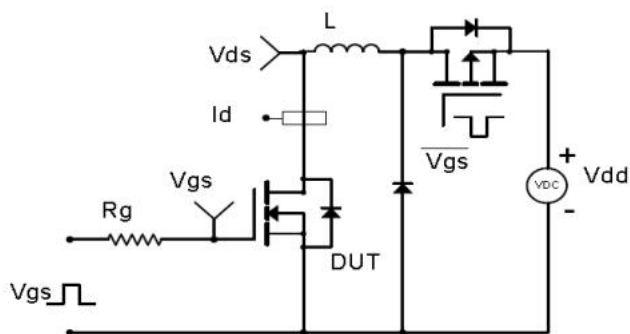
Gate Charge Test Circuit & Waveform



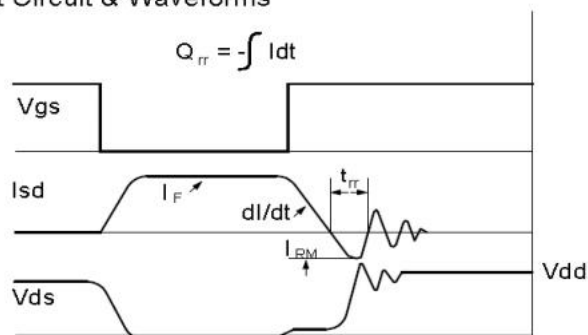
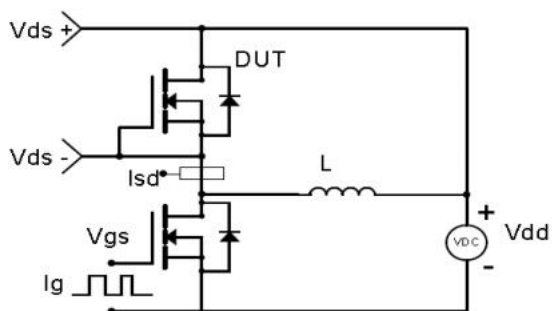
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

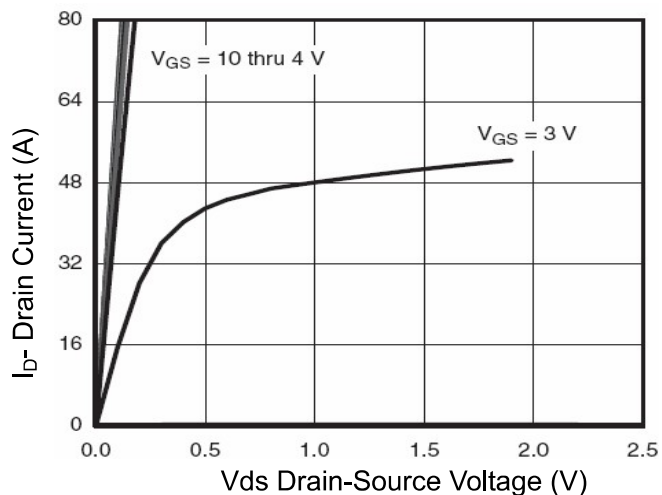


Figure 1 Output Characteristics

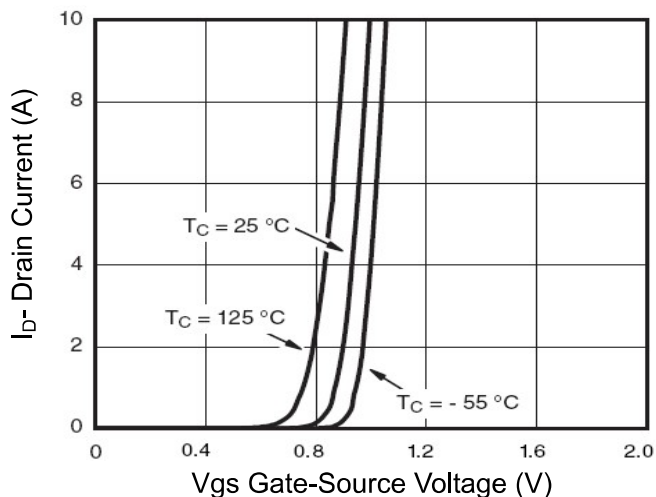


Figure 2 Transfer Characteristics

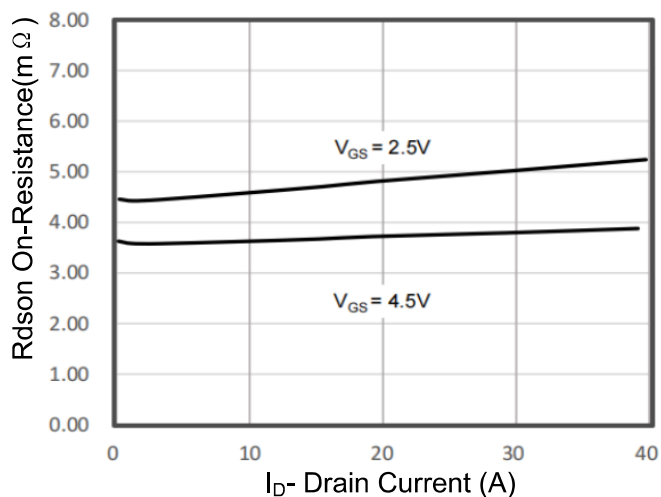


Figure 3 Rdson- Drain Current

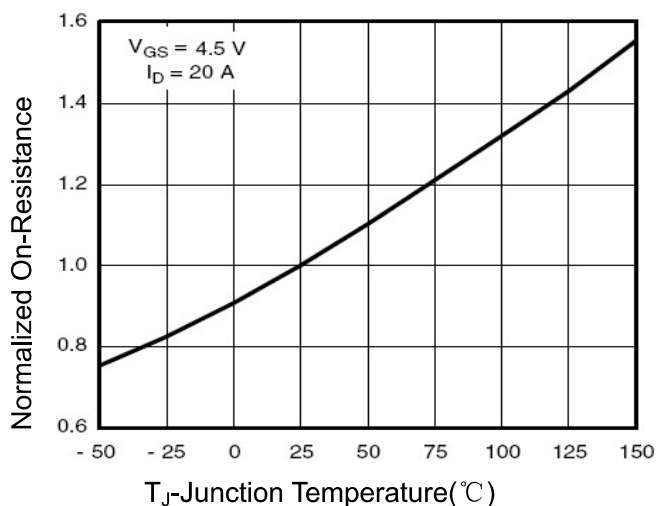


Figure 4 Rdson-Junction Temperature

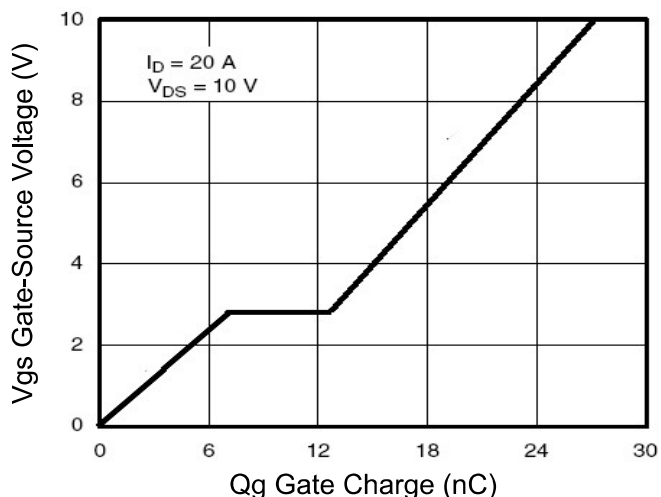


Figure 5 Gate Charge

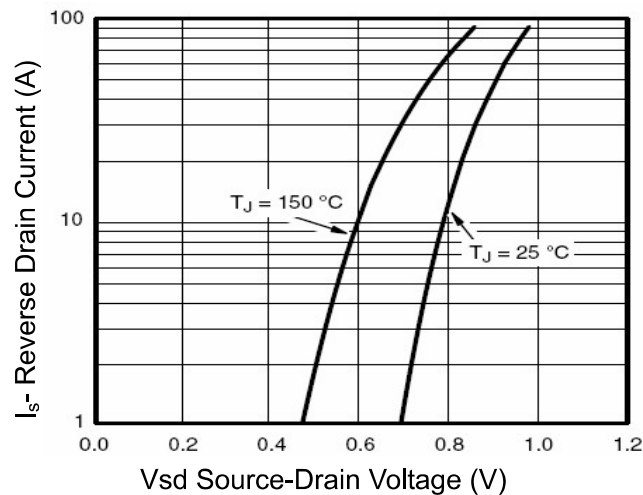


Figure 6 Source- Drain Diode Forward

Typical Characteristics

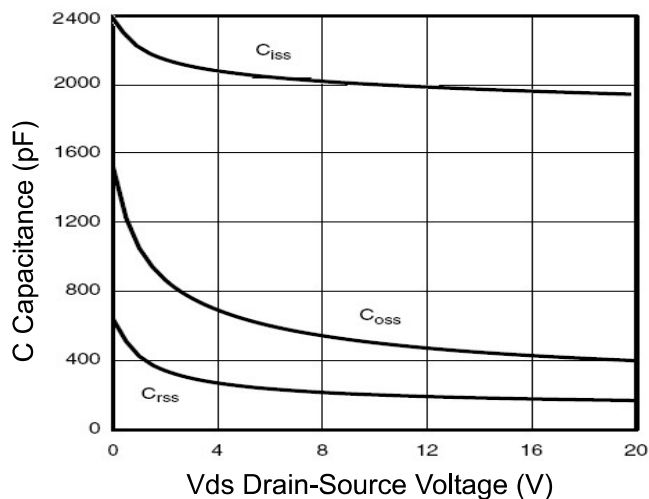


Figure 7 Capacitance vs Vds

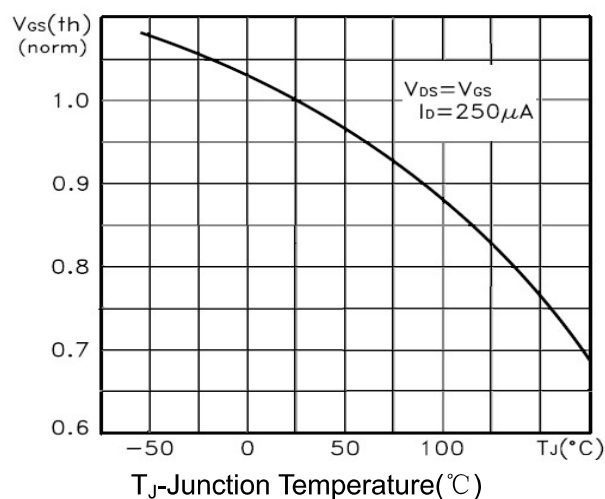


Figure 8 VGS(th) vs Junction Temperature

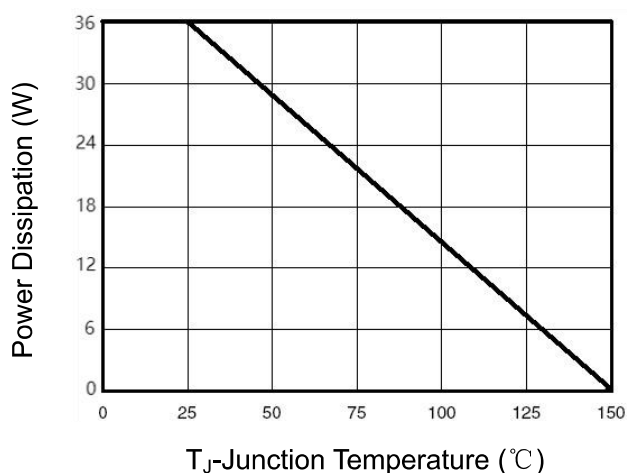


Figure 9 Power De-rating

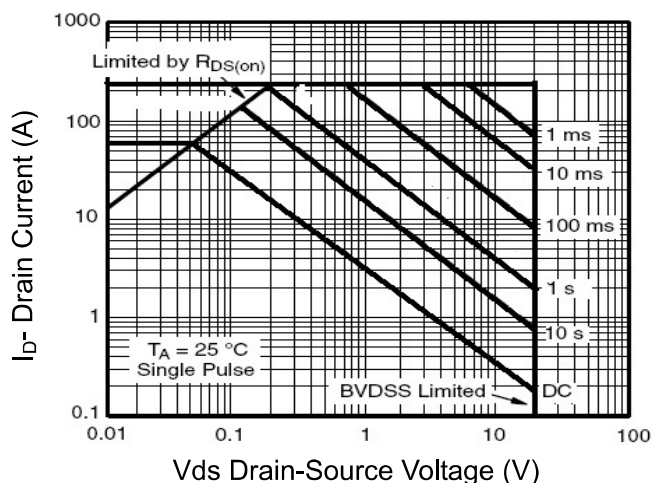


Figure 10 Safe Operation Area

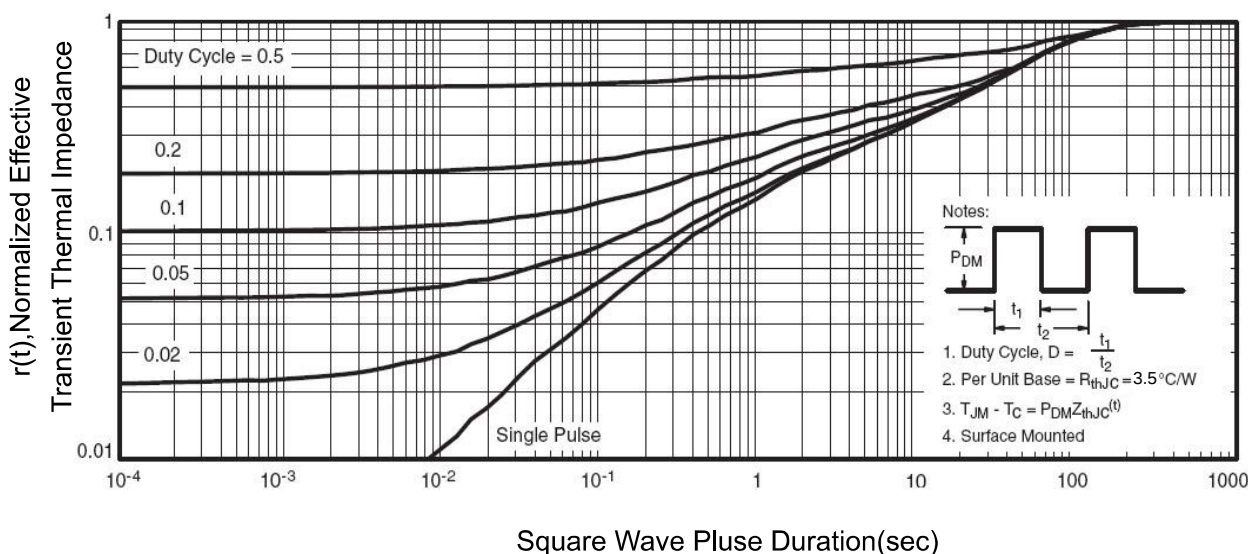
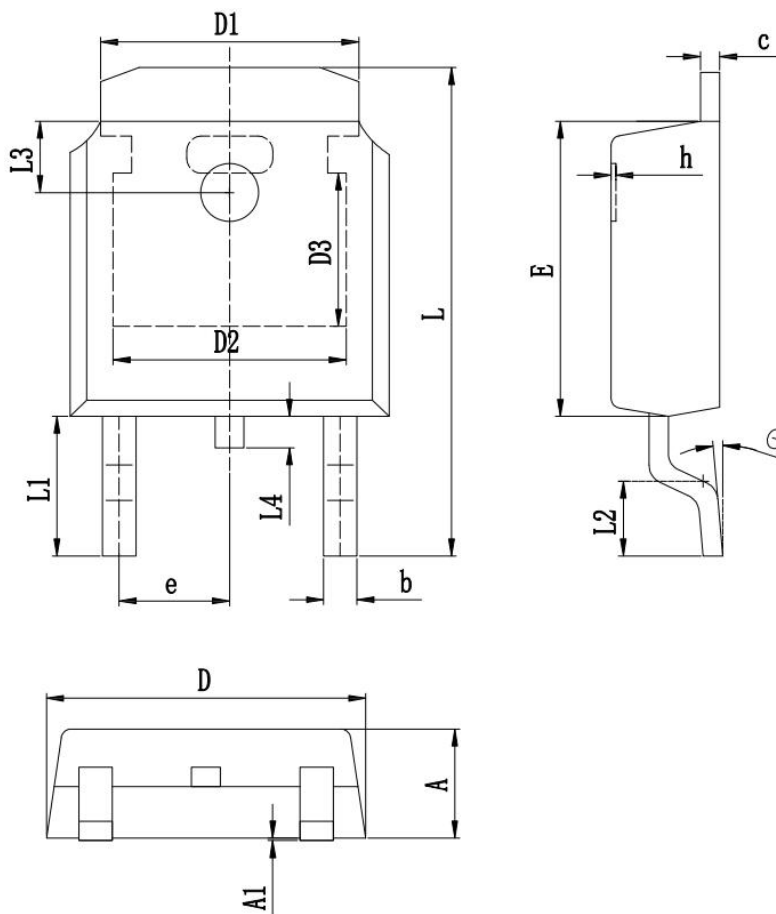


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.500	0.690	0.900
c	0.450	0.520	0.580
D	6.450	6.600	6.750
D1	5.100	5.334	5.500
D2	4.700	4.826	5.000
D3	3.000	3.166	3.250
E	5.950	6.100	6.250
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.450	10.100	10.200
L1	2.888 REF		
L2	1.250	1.550	1.750
L3	1.600 REF		
L4	0.600	0.800	1.000
θ	0°		8°

Revision History

Revision	Release	Remark
V1.0	2025/03/15	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.