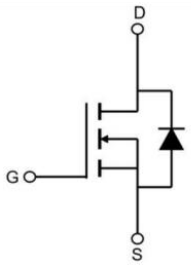
APG050N06K

N-Channel Enhancement Mosfet

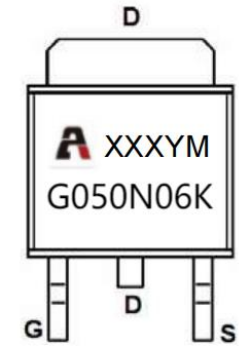
DATA SHEET

Features

- 60V,105A
  $R_{DS(ON)}$ <5.0mΩ @V_{GS}=10V TYP:3.6mΩ
  $R_{DS(ON)}$ <5.8mΩ @V_{GS}=4.5V TYP:4.7mΩ
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram



Marking and pin assignment

Applications

- Load Switch
- DC/DC Converter
- Power Management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G050N06K	APG050N06K	TO-252	-	-	2500

ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃) (1)	I_D	105	A
Continuous Drain Current (Tc=100℃)	I_D	60	A
Pulsed Drain Current (1)	I_{DM}	420	A
Drain Power Dissipation	P_D	78	W
Single Pulsed Avalanche Energy (2)	E_{AS}	240	mJ
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.6	℃/W
Thermal Resistance from Junction to Ambient (3)	$R_{\theta JA}$	44	℃/W
Junction Temperature	T_J	-55~ +150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

Notes:

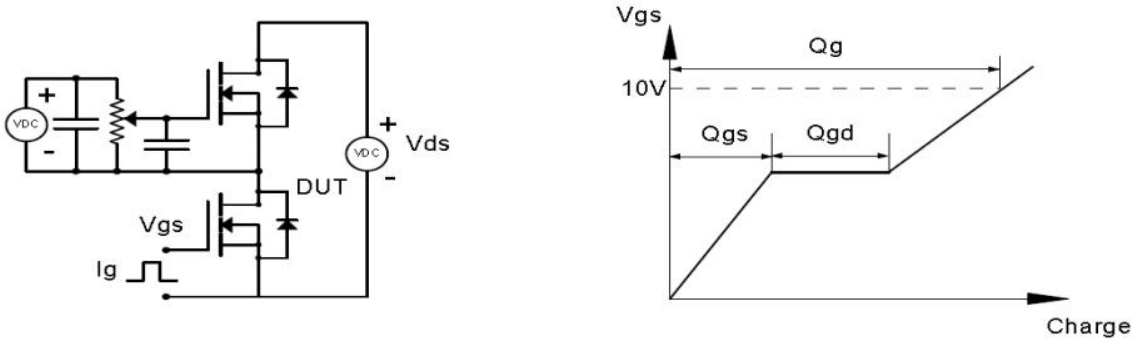
1) Repetitive Rating: pulse width limited by maximum junction temperature
2) EAS condition : T_J=25℃, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25Ω, I_{AS}=31A

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25℃ unless otherwise noted)

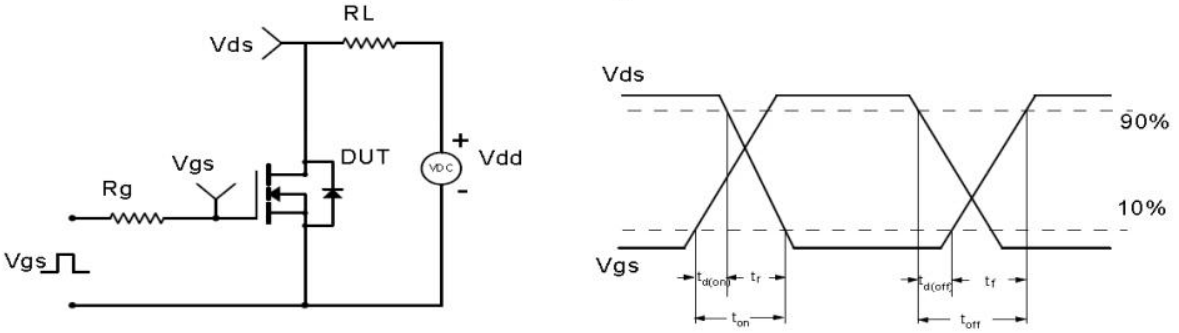
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	60	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =60V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.0	1.6	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =20A	-	3.6	5.0	mΩ
		V_{GS} =4.5V, I_D =15A	-	4.7	5.8	mΩ
Forward transconductance	R_g	f=1.0MHz	-	1.7	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =30V, VGS=0V, f=1MHz	-	1693	-	pF
Output Capacitance	C_{oss}		-	900	-	
Reverse Transfer Capacitance	C_{rss}		-	31	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, I_D=20A, R_G=3Ω, V_{GS}=10V	-	5.5	-	ns
Turn-on rise time	t_r		-	9.5	-	
Turn-off delay time	$t_{d(off)}$		-	26	-	
Turn-off fall time	t_f		-	16	-	
Total Gate Charge	Qg	V_{DS}=30V, I_D=20A, V_{GS}=10V	-	33	-	nC
Gate-Source Charge	Qgs		-	5.5	-	
Gate-Drain Charge	Qgd		-	7.3	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=20A	-	0.7	1.2	V
Diode Forward current	I_S	T_C=25℃	-	-	105	A
Body Diode Reverse Recovery Time	Trr	di/dt=100A/us,IF=20A	-	40	-	ns
Body Diode Reverse Recovery Charge	Qrr	di/dt=100A/us,IF=20A	-	48	-	nC

Test Circuit & Waveform

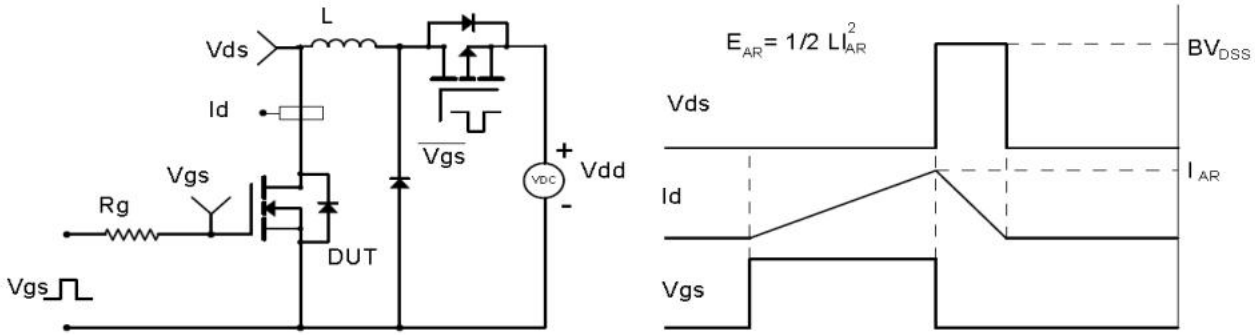
Gate Charge Test Circuit & Waveform



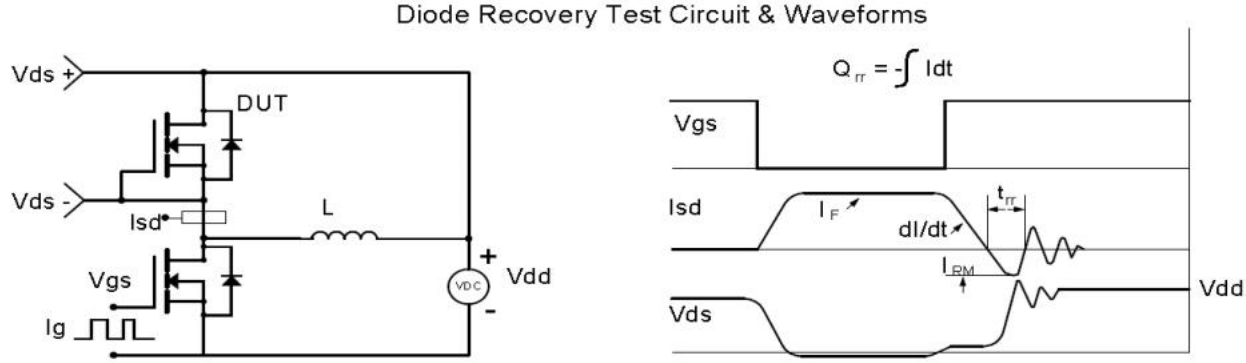
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

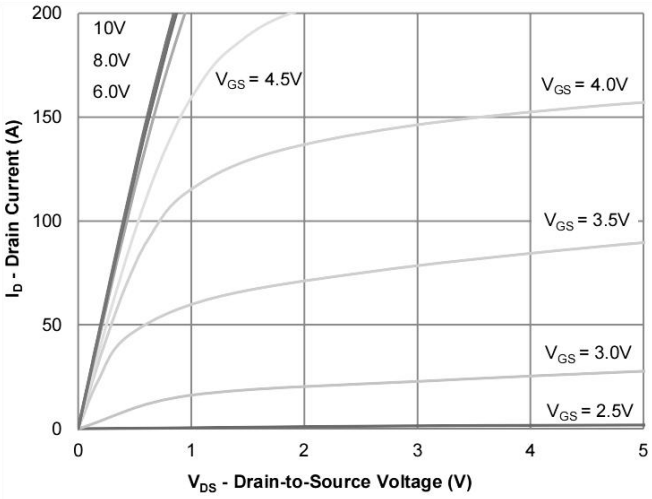


Figure 1: Output Characteristics

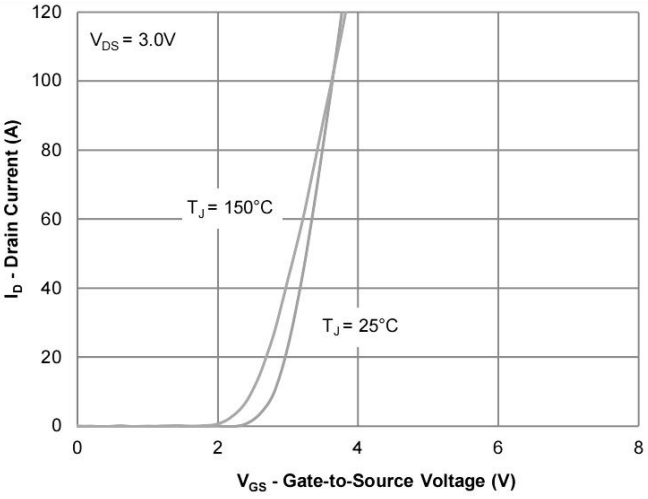


Figure 2: Transfer Characteristics

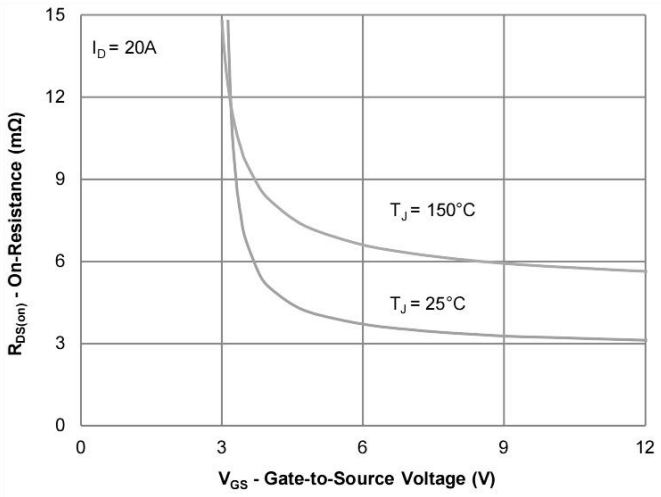


Figure 3: On-Resistance vs. Gate-Source Voltage

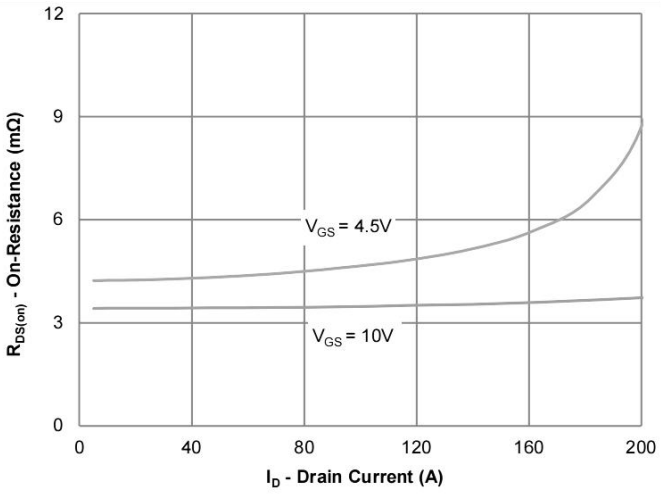


Figure 4: On-Resistance vs. Gate-Source Voltage

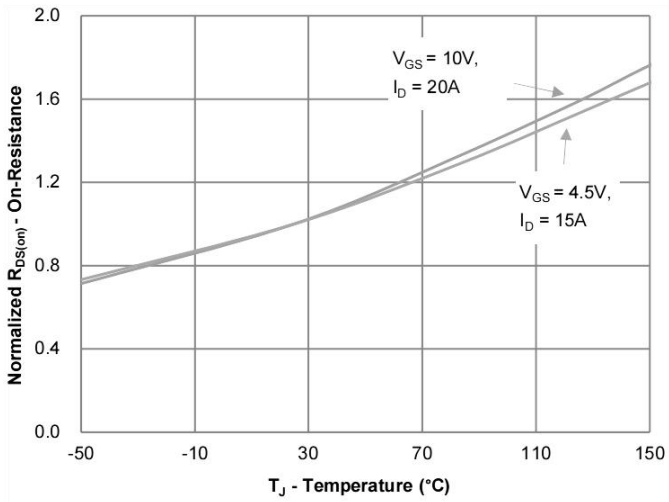


Figure 5: On-Resistance vs. Junction Temperature

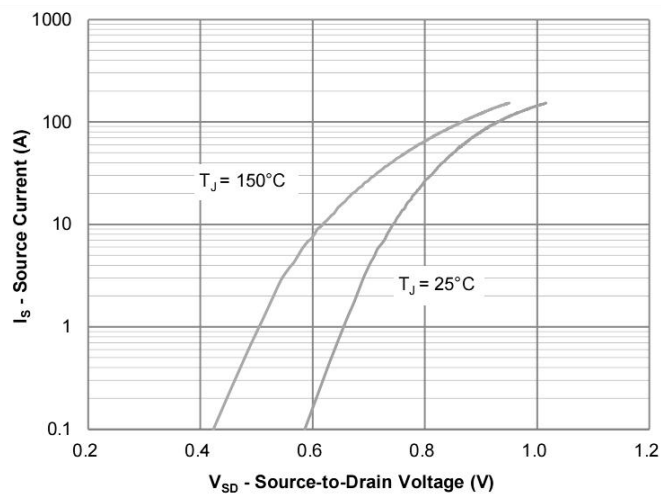


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics

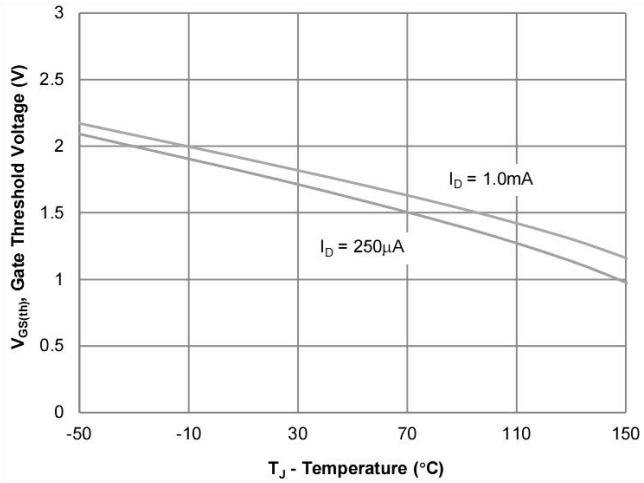


Figure 7: Gate Threshold Variation vs. Junction Temperature

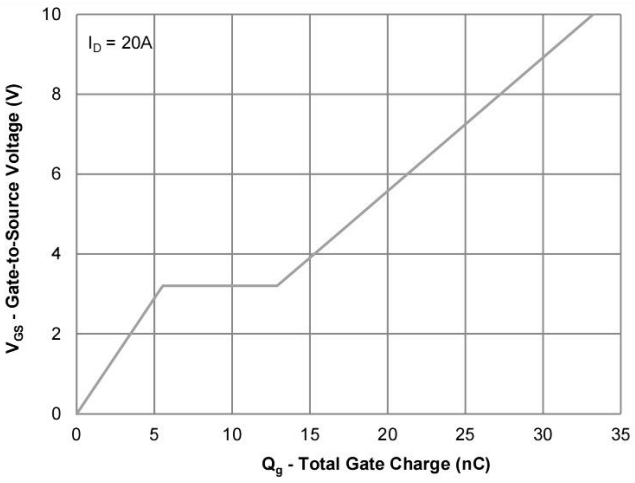


Figure 8: Gate Charge Characteristics

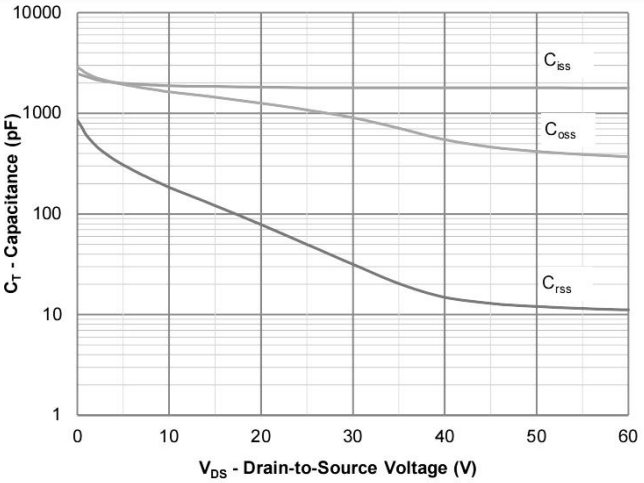


Figure 9: Capacitance Characteristics

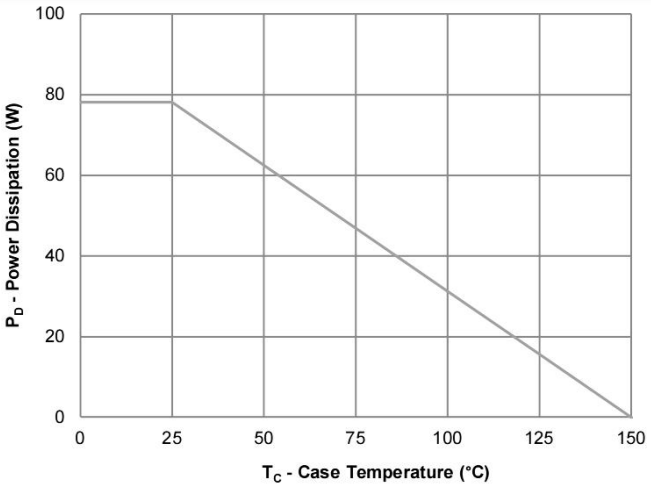


Figure 10: Power Derating

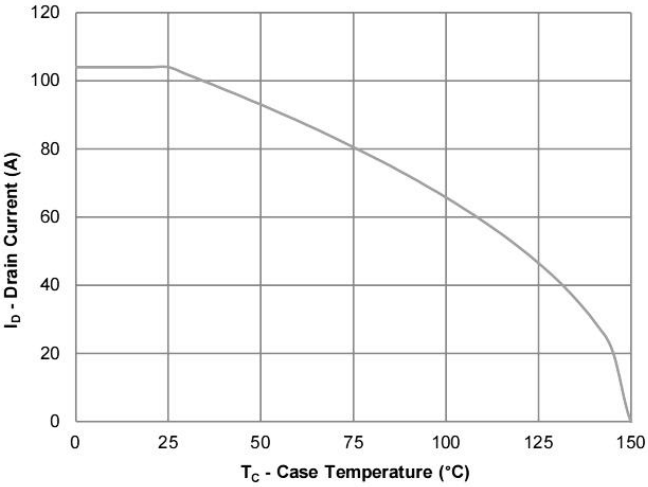


Figure 11: Current Derating

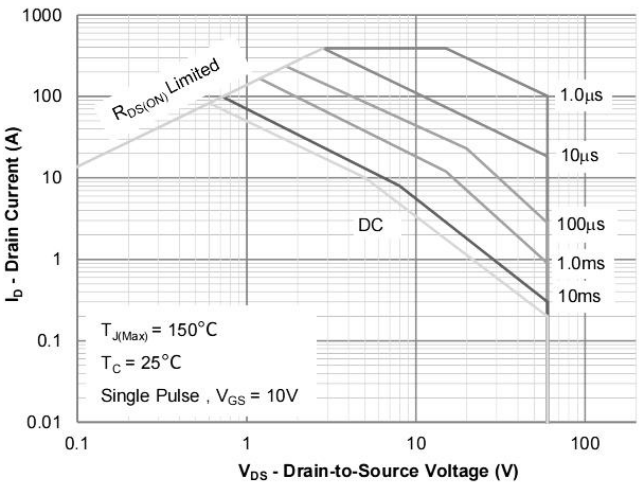


Figure 12: Safe Operating Area

Typical Characteristics

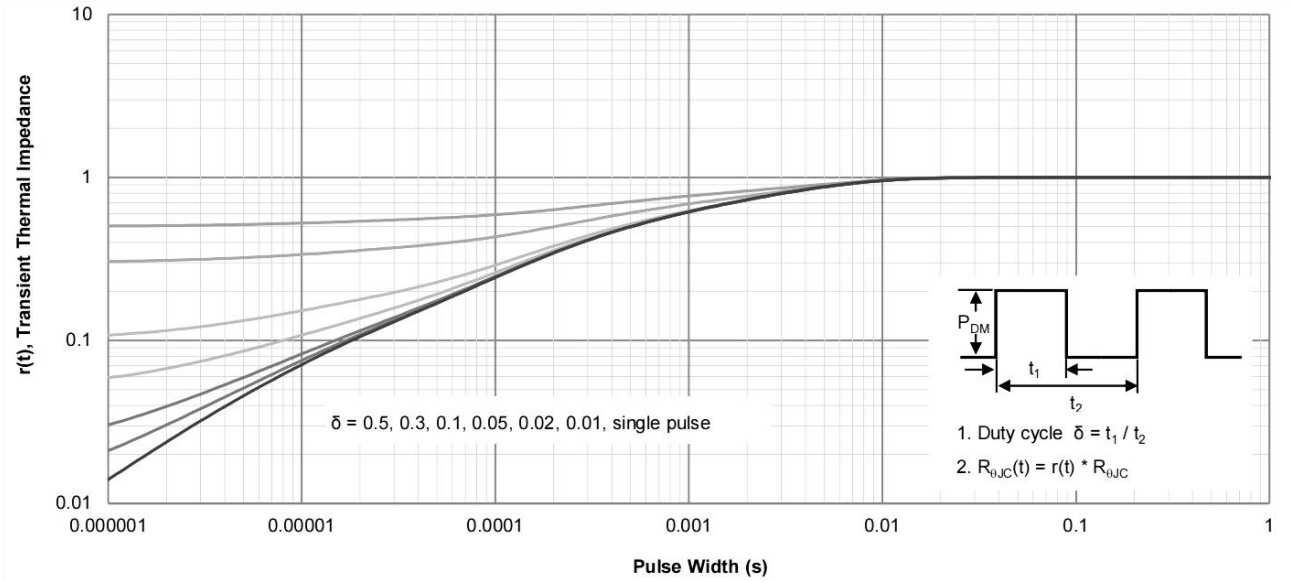
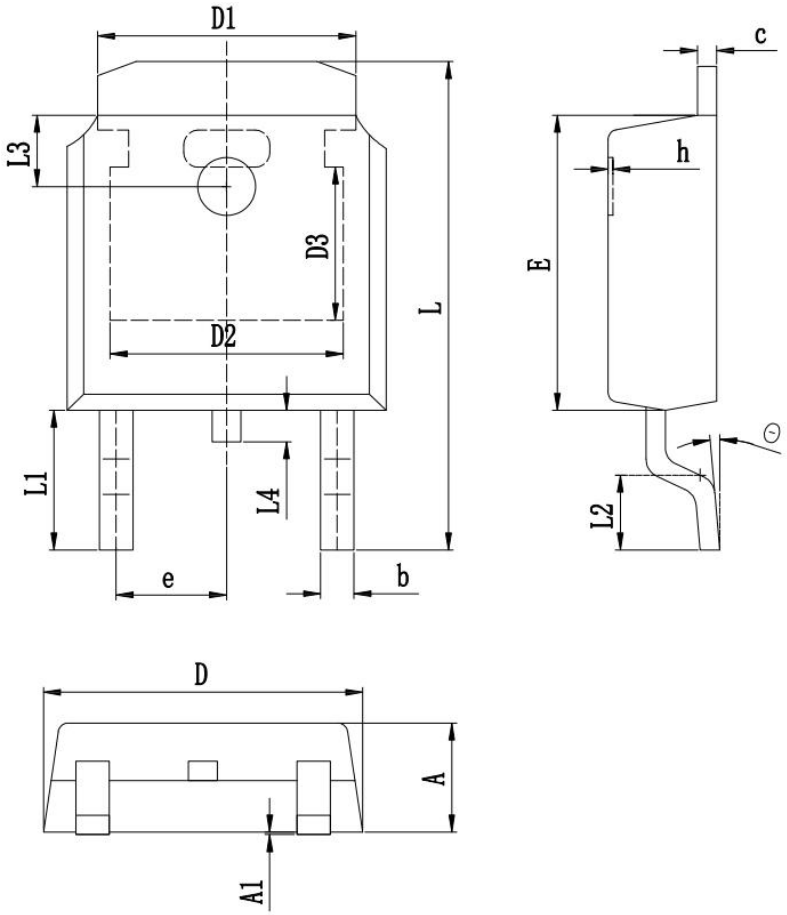


Figure 13: Normalized Maximum Transient Thermal Impedance

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	2024/12/26	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.