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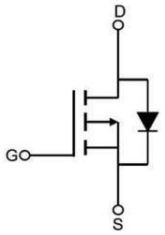
AP40P100K Data Sheet

V 1.1

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Features

- -100V,-34A
  $R_{DS(ON)}$ <37mΩ @V_{GS}=-10V TYP: 31mΩ
  $R_{DS(ON)}$ <48mΩ @V_{GS}=-4.5V TYP:37mΩ
- Advanced Trench Technology
- Low On-Resistance
- Low Gate Charge



Schematic Diagram



Marking and pin assignment

Applications

- Battery management
- Motor control and drive
- UPS (Uninterrupible Power Supplies)

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
40P100K	AP40P100K	TO-252	-	-	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃)(1)	I_D	-34	A
Continuous Drain Current (Tc=100℃)(1)	I_D	-21	A
Pulsed Drain Current (2,3)	I_{DM}	-135	A
Drain Power Dissipation(1)	P_D	94	W
Single Pulsed Avalanche Energy	E_{AS}	750	mJ
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.33	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	129	℃/W
Junction Temperature	T_J	-55~ +150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

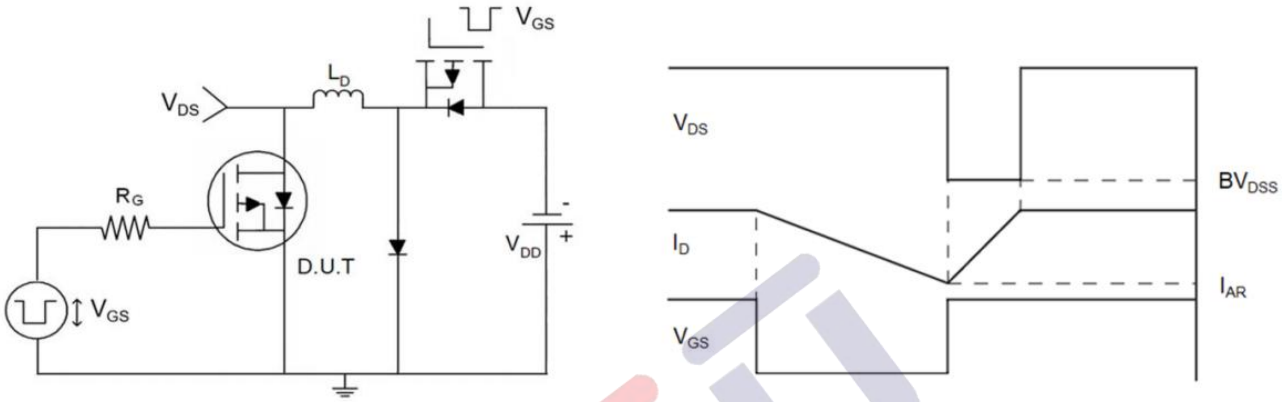
MOSFET ELECTRICAL CHARACTERISTICS(T_j=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-100	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-100V, V_{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(4)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-1.5	-2.0	-2.5	V
Drain-source on-resistance(4)	$R_{DS(on)}$	V_{GS} =-10V, I_D =-22A	-	31	37	mΩ
		V_{GS} =-4.5V, I_D =-10A	-	37	48	mΩ
Gate Input Resistance	R_G	f=1MHz	-	3.8	-	Ω
Dynamic characteristics(5)						
Input Capacitance	C_{iss}	V_{DS} =-50V, V_{GS}=0V, f=1MHz	-	5805	-	pF
Output Capacitance	C_{oss}		-	178	-	
Reverse Transfer Capacitance	C_{rss}		-	86	-	
Switching characteristics(5)						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-50V, I_D=-22A, R_G=2.7Ω, V_{GS}=-10V	-	15	-	nS
Turn-on rise time	t_r		-	44	-	
Turn-off delay time	$t_{d(off)}$		-	90	-	
Turn-off fall time	t_f		-	76	-	
Total Gate Charge	Qg	V_{DS}=-50V, I_D=-22A, V_{GS}=-10V	-	100	-	nC
Gate-Source Charge	Qgs		-	25	-	
Gate-Drain Charge	Qgd		-	16	-	
Source-Drain Diode characteristics						
Diode Forward voltage(4)	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=-22A	-	-0.87	-1.3	V
Diode Forward current	I_S	T_C=25℃	-	-	-34	A
Body Diode Reverse Recovery Time	trr	T_J=25℃, I_F=-22A,di/dt=100A/us	-	33	-	nS
Body Diode Reverse Recovery Charge	Qrr		-	54	-	nC

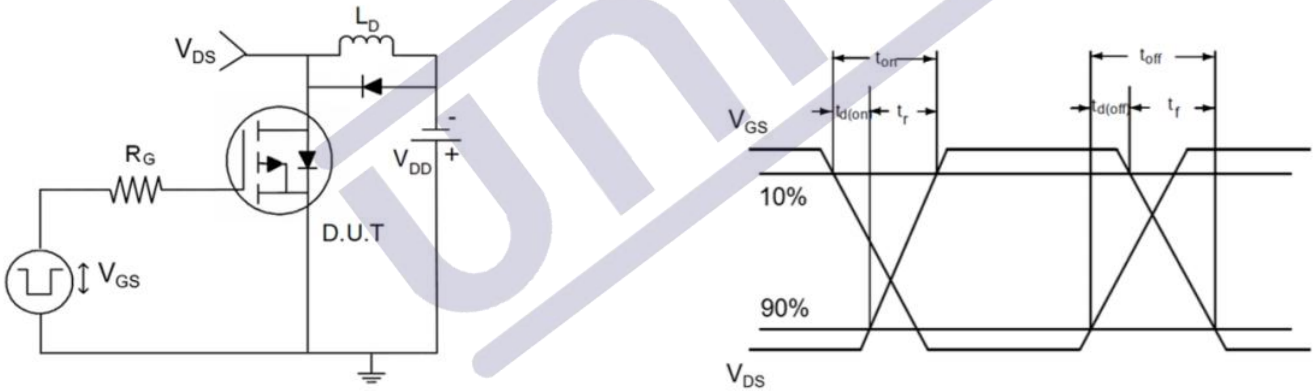
Notes:

1) Surface Mounted on 1 in² pad area, t ≤ 10 sec
2) Pulse width ≤ 10μs, duty cycle ≤ 1 %
3) Limited by bonding wire
4) Pulse width ≤ 300 μs, duty cycle ≤ 2%
5) Guaranteed by design, not subject to production testing

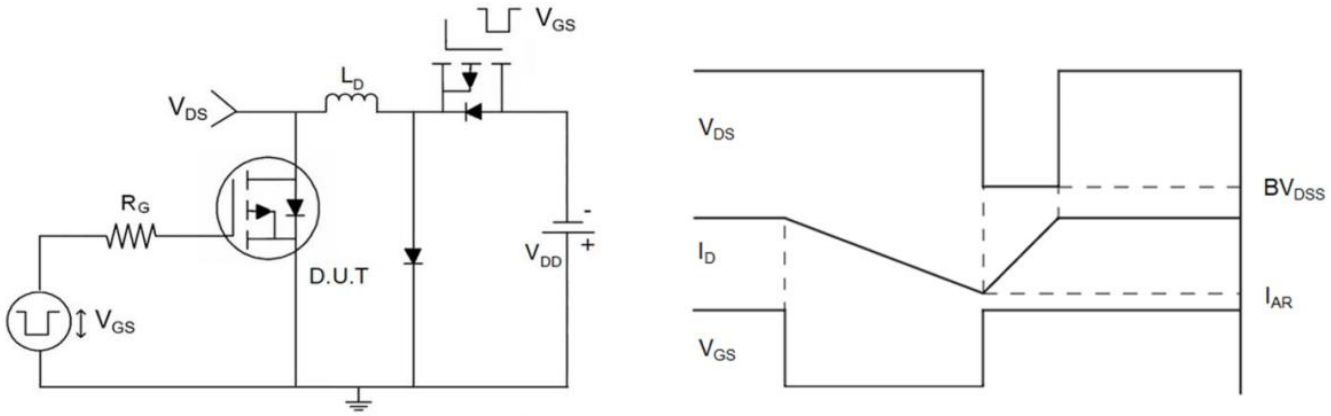
Test Circuit & Waveform



Gate Charge Test Circuit



Resistive Switching Test Circuit



Unclamped Inductive Switching Test Circuit

Typical Characteristics

Fig 1: Output Characteristics

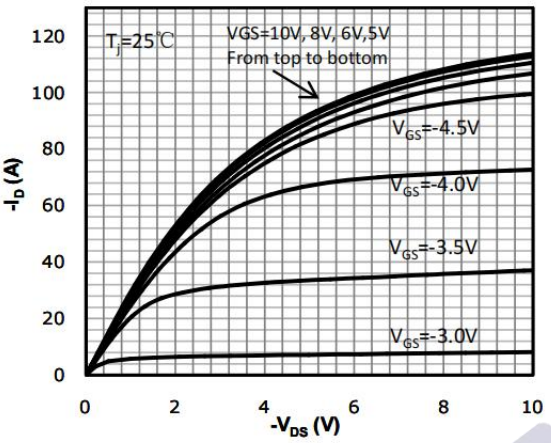


Fig 2: Transfer Characteristics

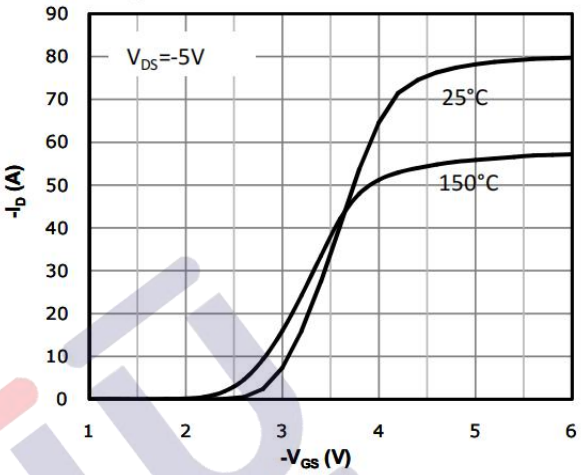


Fig 3: Rds(on) vs Drain Current and Gate Voltage

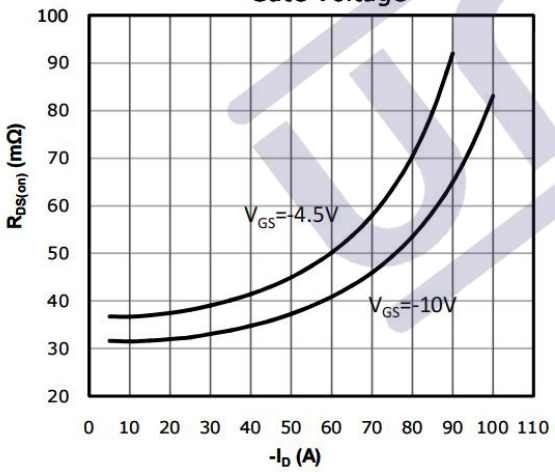


Fig 4: Rds(on) vs Gate Voltage

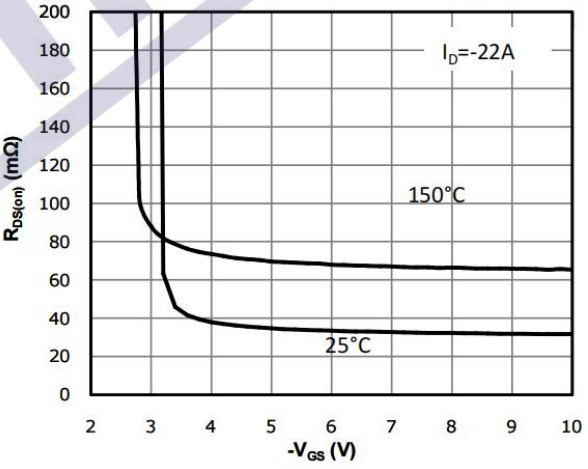


Fig 5: Rds(on) vs. Temperature

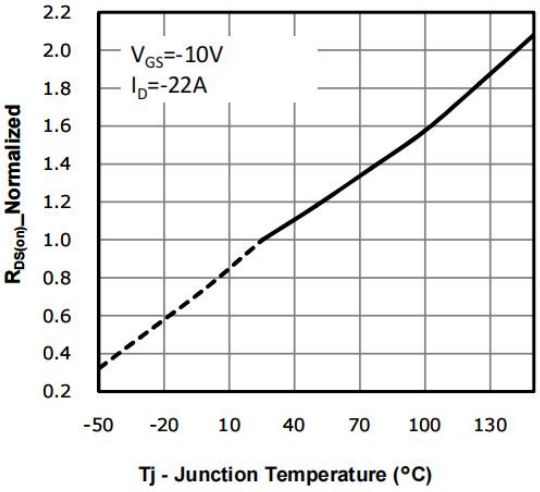
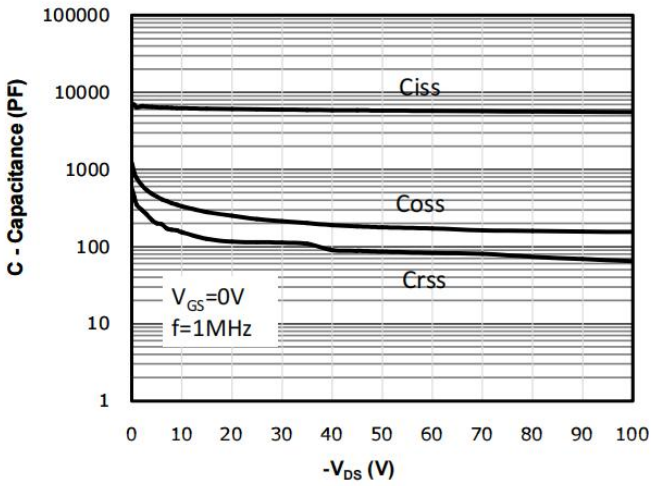


Fig 6: Capacitance Characteristics



Typical Characteristics (cont.)

Fig 7: BVDS vs. Temperature

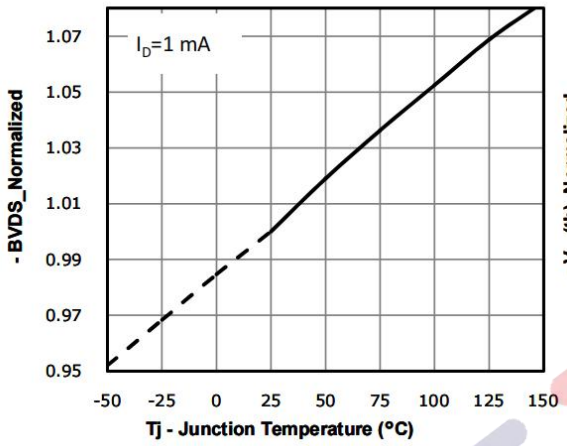


Fig 8: V_{GS}(th) vs. Temperature

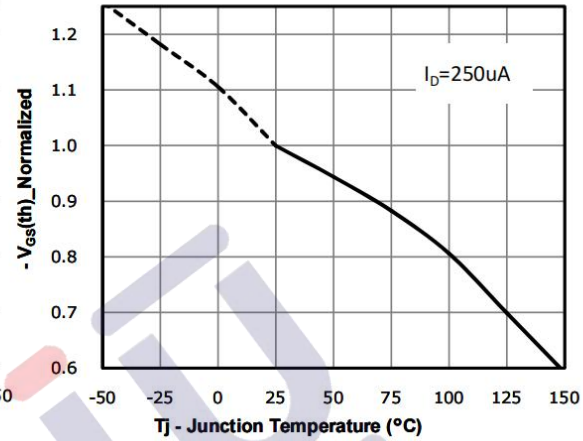


Fig 9: Gate Charge Characteristics

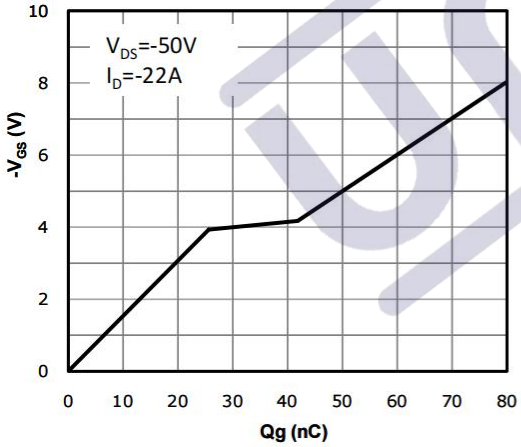


Fig 10: Body-diode Forward Characteristics

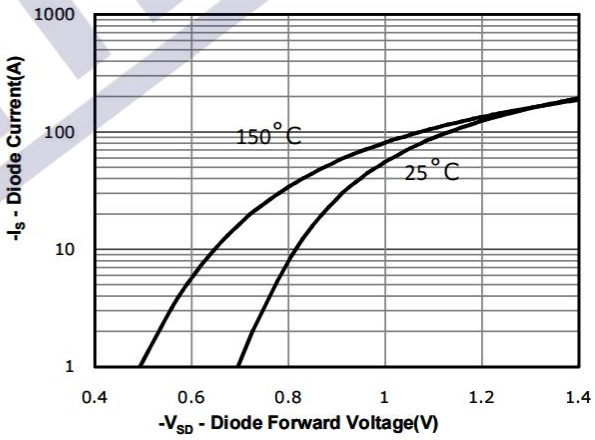


Fig 11: Power Dissipation

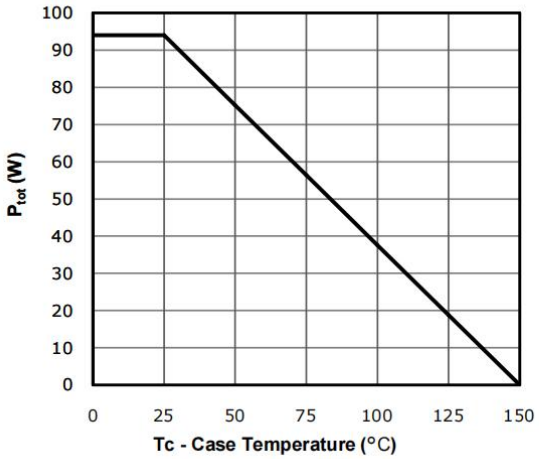
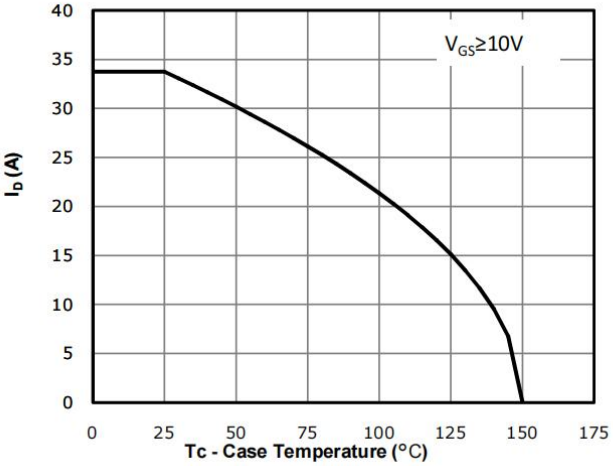


Fig 12: Drain Current Derating



Typical Characteristics (cont.)

Fig 13: Safe Operating Area

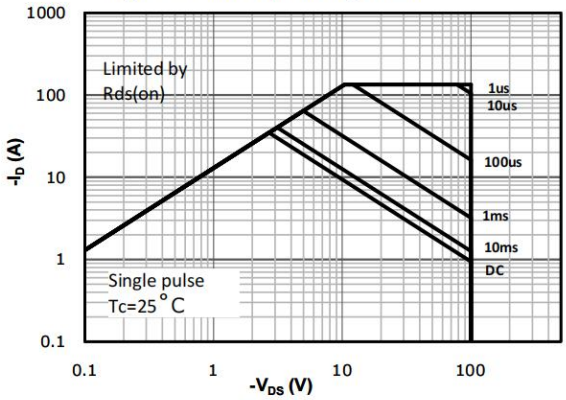
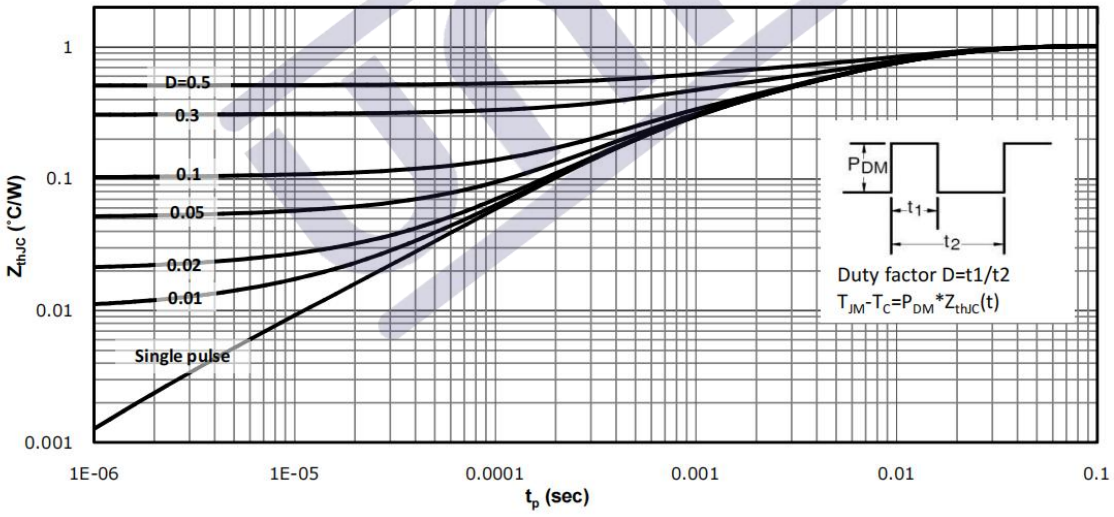
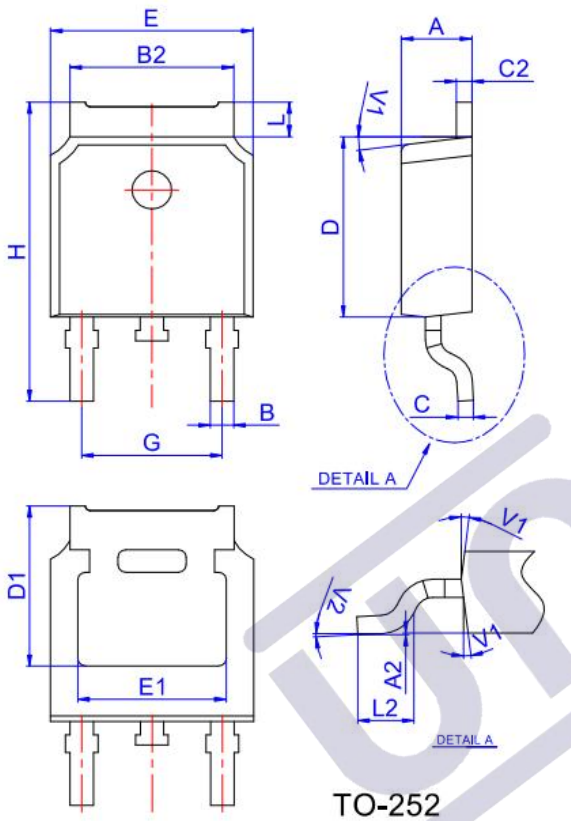


Fig 14: Max. Transient Thermal Impedance



TO-252 Package Information



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

1.版本记录

DATE	REV.	DESCRIPTION
2023/05/01	1.0	Initial Release
2023/11/01	1.1	Layout Adjustment

2.免责声明

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