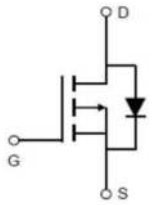
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM10P40D2V

P-Channel Enhancement Mosfet

Feature

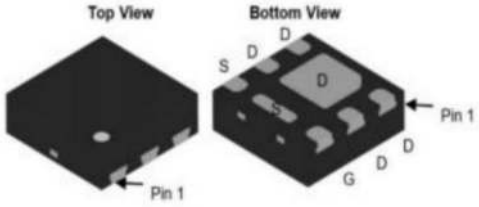
- -40V,-10A
  $R_{DS(ON)}$ (TYP:27mΩ)<34mΩ @V_{GS} = -10V
  $R_{DS(ON)}$ (TYP:34mΩ)<49mΩ @V_{GS} = -4.5V
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Tj max = 175℃
- P/N suffix V means AEC-Q101 qualified, e.g: RM10P40D2V



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management
- Halogen-free



DFN2X2

Package Marking and Ordering Information

Device Marking	Device	Device Package	Packaging Code	Reel Size	Quantity(PCS)
10P40	RM10P40D2V	DFN2x2	-T	7inch	3000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C =25℃)	I_D	-10	A
Continuous Drain Current (T_C =100℃)	I_D	-7.1	A
Pulsed Drain Current (1)	I_{DM}	-40	A
Single Pulsed Avalanche Energy (2)	E_{AS}	42	mJ
Power Dissipation	P_D	6.5	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	20	℃/W
Thermal Resistance from Junction to Ambient(3)	$R_{\theta JA}$	78	℃/W
Junction Temperature	T_J	175	℃
Storage Temperature	T_{STG}	-55~ +175	℃

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

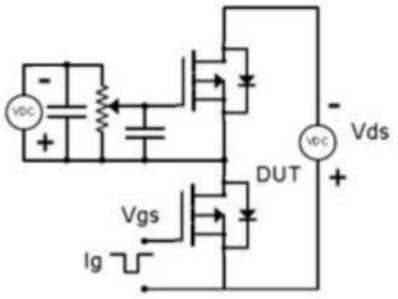
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-40V, V_{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-1	-1.5	-2.2	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =-10V, I_D =-10A	-	27	34	mΩ
		V_{GS} =-4.5V, I_D =-8A	-	34	49	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-20V, V_{GS} =0V, f =1MHz	-	1512	-	pF
Output Capacitance	C_{oss}		-	115	-	
Reverse Transfer Capacitance	C_{rss}		-	104	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-20V, I_D=-10A, V_{GS}=-10V, R_G=2.5Ω	-	4	-	ns
Turn-on rise time	t_r		-	27.5	-	
Turn-off delay time	$t_{d(off)}$		-	39.4	-	
Turn-off fall time	t_f		-	10.4	-	
Total Gate Charge	Qg	VDS=-20V, ID=-8A, VGS=-10V	-	27.6	-	nC
Gate-Source Charge	Qgs		-	4.4	-	
Gate-Drain Charge	Qgd		-	5.4	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=-10A	-	-	-1.2	V
Diode Forward current(4)	I_S		-	-	-10	A
Reverse Recovery Time	Trr	V_{GS} =0V, I_S=-10A,di/dt=100A/μS	-	10.9	-	ns
Reverse Recovery Char	Qrr		-	2.09	-	nC

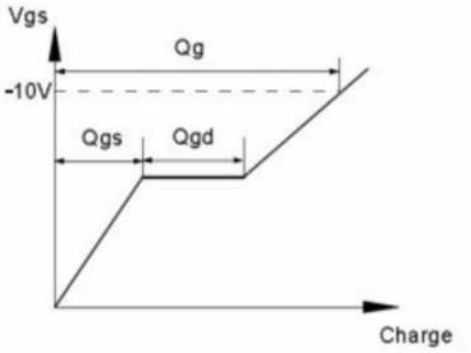
Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=-20V,R_G=25Ω,L=0.5mH,I_{AS}=-13A
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

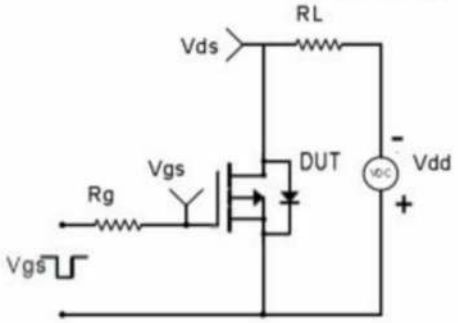
Test Circuit & Waveform

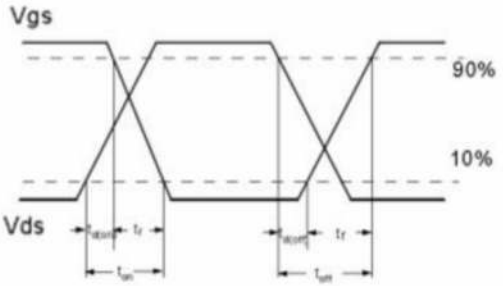
Gate Charge Test Circuit & Waveform



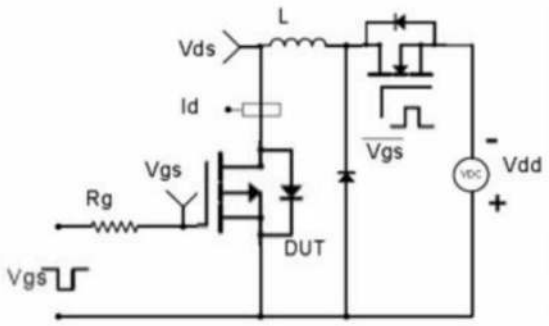


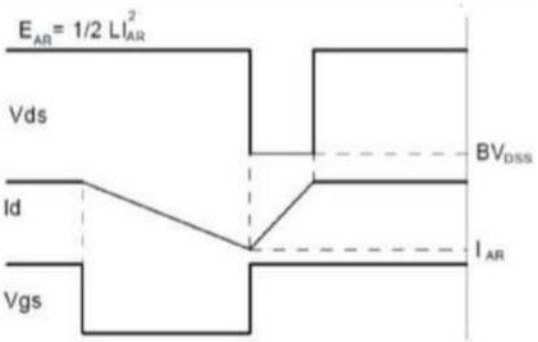
Resistive Switching Test Circuit & Waveforms



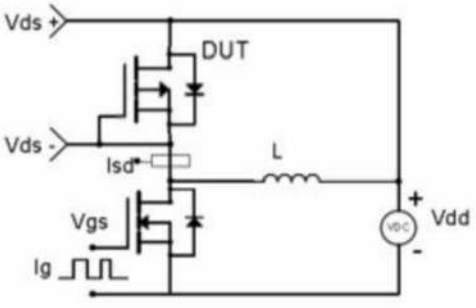


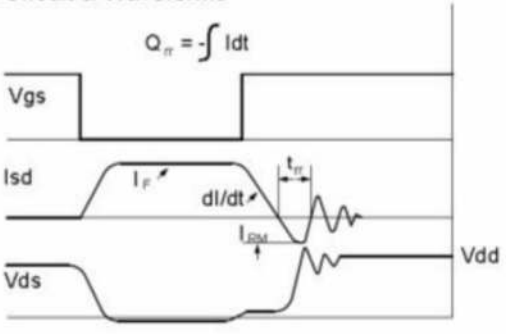
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





RATING AND CHARACTERISTICS CURVES (RM10P40D2V)

Fig1. Typical Output Characteristics@Tj= 125℃

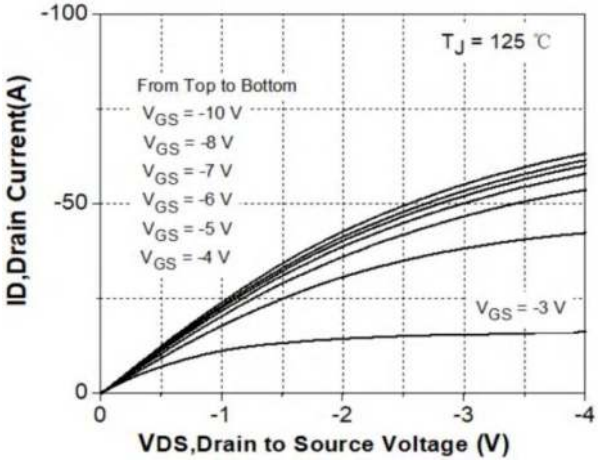


Fig2. Transconductance vs. Drain Current @Tj= -25/25/75/125℃

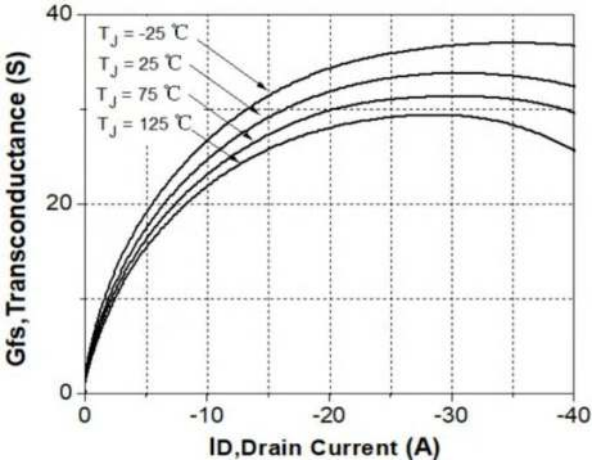


Fig3. Typical Transfer Characteristics @Tj= -25/25/75/125℃

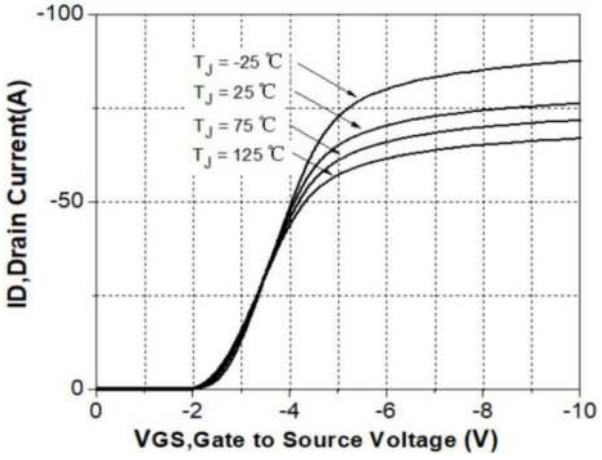


Fig4. Static Drain - Source On - State Resistance vs. Drain Current @Tj= -25℃

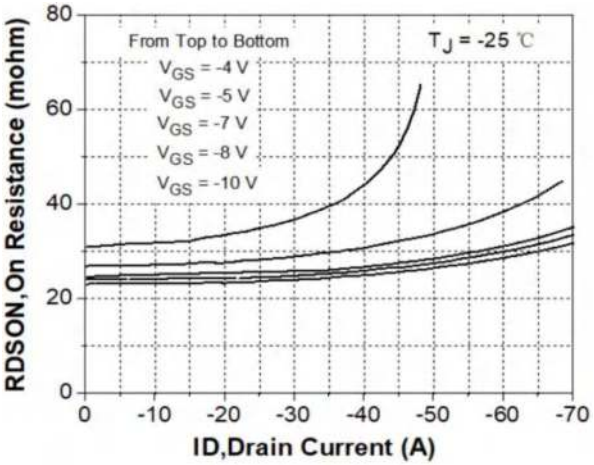


Fig5. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 25℃

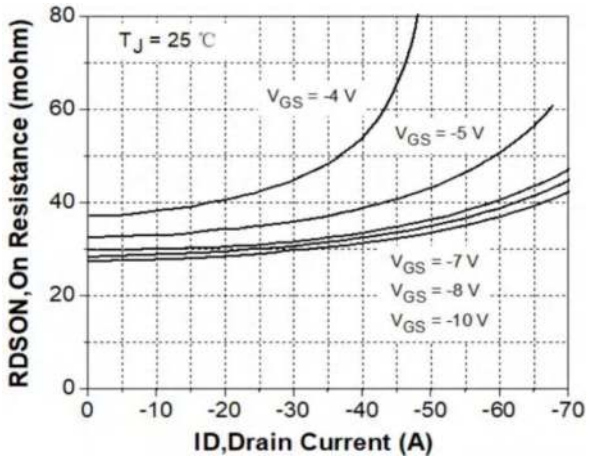
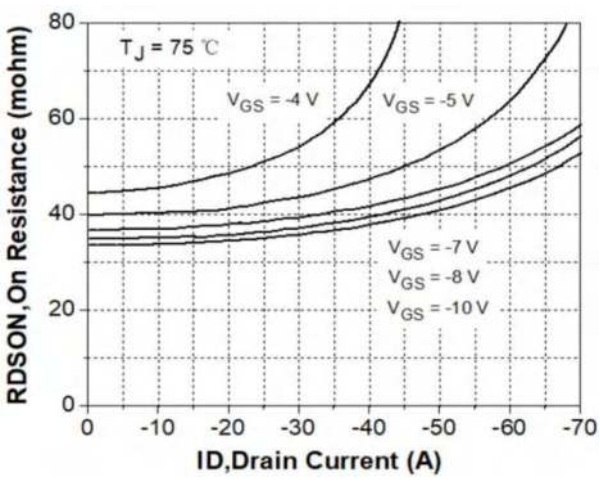


Fig6. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 75℃



RATING AND CHARACTERISTICS CURVES (RM10P40D2V)

Fig7. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 125℃

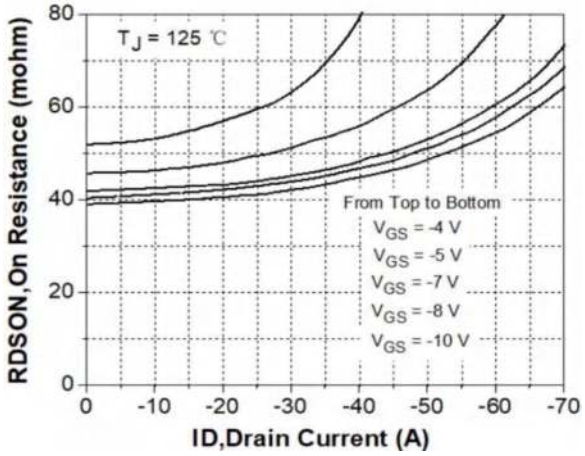


Fig8. Gate Charge Characteristics

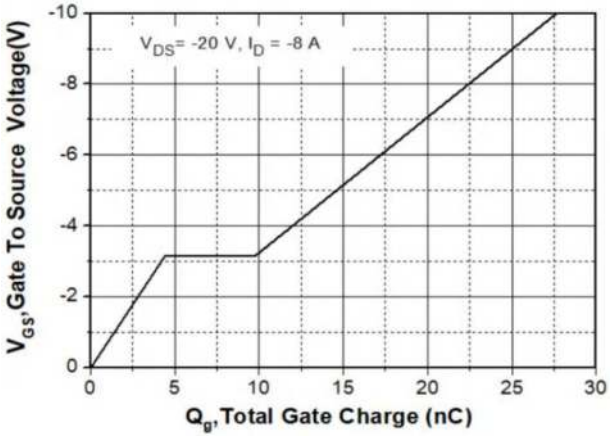


Fig9. Breakdown Voltage vs. Junction Temperature

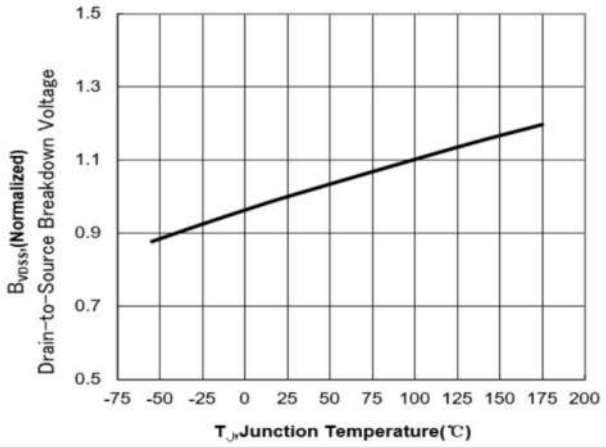


Fig10. Gate Threshold Voltage vs. Junction Temperature

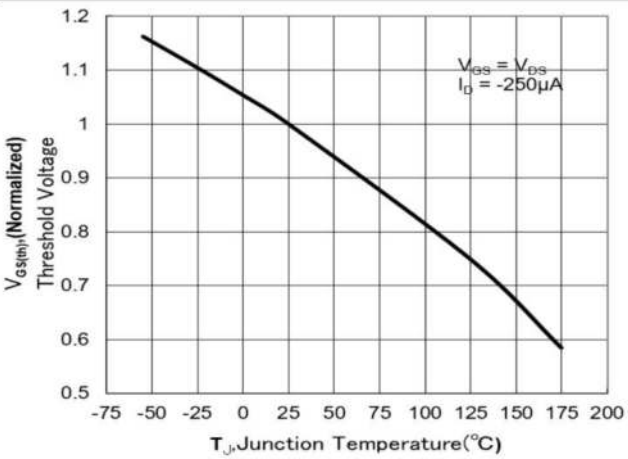


Fig11. On-Resistance Variation vs. Junction Temperature

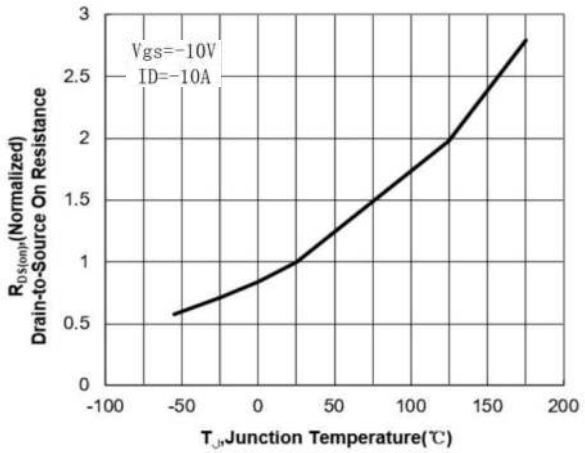
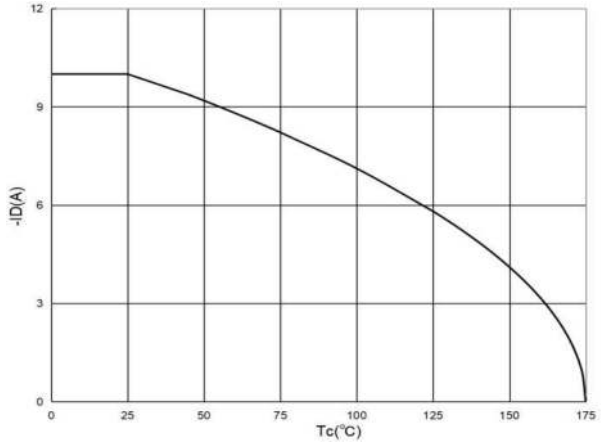


Fig12. Maximum Drain Current vs. Case Temperature



RATING AND CHARACTERISTICS CURVES (RM10P40D2V)

Fig13. Body Diode Forward Voltage vs. Reverse Drain Current

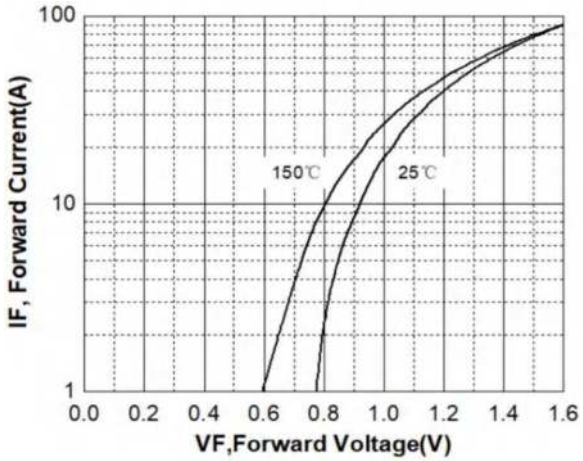


Fig14. Typical Output Characteristics@Tj= 25℃

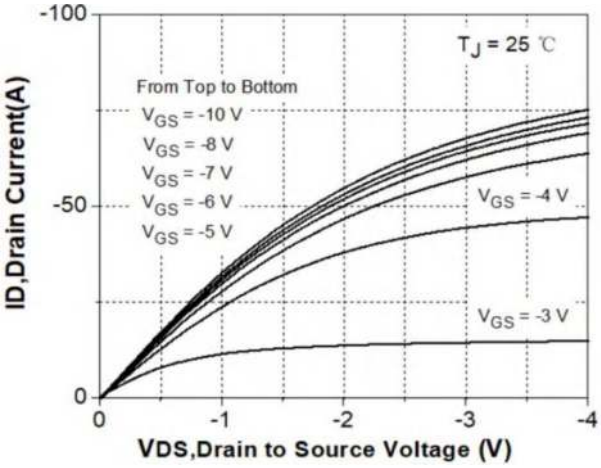
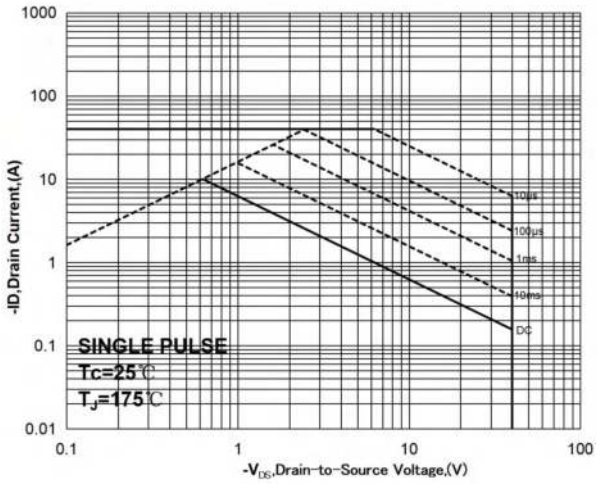
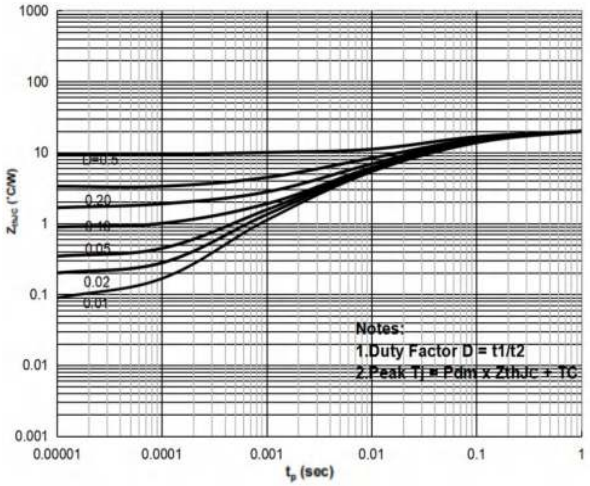


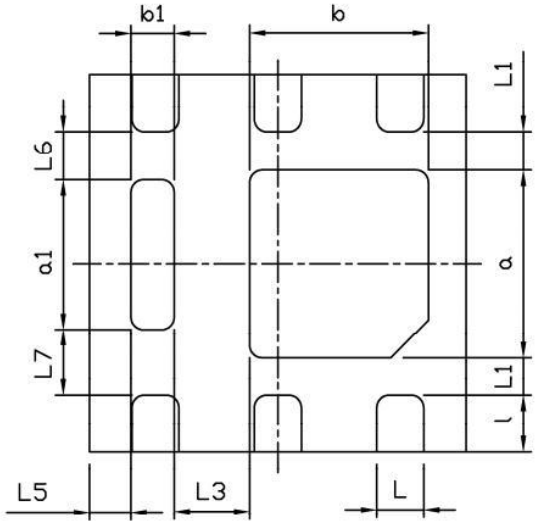
Fig15. Safe Operating AreaFig

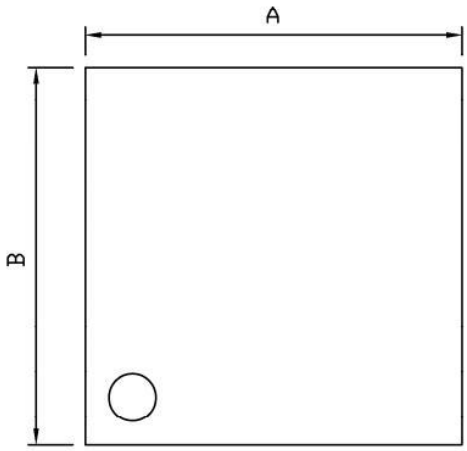


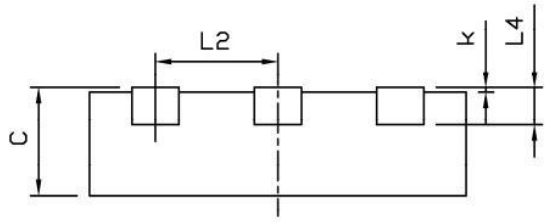
16. Transient Thermal Response Curve



DFN2X2 Package Information







Dimensions In Millimeters			
Symbol	MIN	TYP	MAX
A	1.95	2.00	2.05
B	1.95	2.00	2.05
C	0.45	0.50	0.55
L	0.25	0.30	0.35
L1	0.10	0.20	0.30
L2	–	0.65	–
L3	0.30	0.40	0.50
L4	–	0.152	–
L5	0.12	0.22	0.32
L6	0.15	0.25	0.35
L7	0.23	0.33	0.43
a	0.90	1.00	1.10
a1	0.72	0.82	0.92
b	0.85	0.95	1.05
b1	0.13	0.23	0.33
l	0.25	0.30	0.35
k	0.00	–	0.05

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