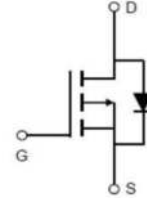


P-Channel Enhancement Mosfet

Feature

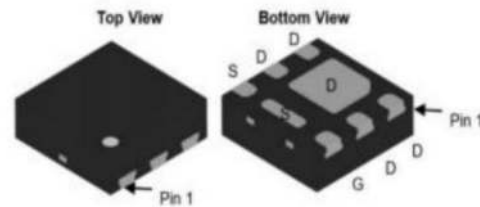
- -40V,-10A
- $R_{DS(on)}$ (TYP:27m Ω) < 34m Ω @ $V_{GS} = -10V$
- $R_{DS(on)}$ (TYP:34m Ω) < 49m Ω @ $V_{GS} = -4.5V$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge
- $T_j \text{ max} = 175^\circ\text{C}$
- P/N suffix V means AEC-Q101 qualified, 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)
14P04P-AU	RM10P40D2V	DFN2x2	-T	7inch	3000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c = 25^\circ\text{C}$)	I_D	-10	A
Continuous Drain Current ($T_c = 100^\circ\text{C}$)	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	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Ambient ⁽³⁾	$R_{\theta JA}$	78	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +175	$^\circ\text{C}$

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

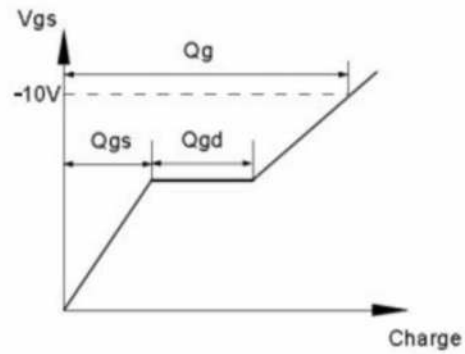
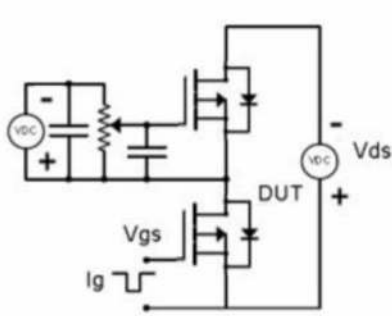
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -40V, V_{GS} = 0V$	-	-	-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.5	-2.2	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -10A$	-	27	34	m Ω
		$V_{GS} = -4.5V, I_D = -8A$	-	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	$t_{d(on)}$	$V_{DD} = -20V, I_D = -10A,$ $V_{GS} = -10V, R_G = 2.5\Omega$	-	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	Q_g	$V_{DS} = -20V, I_D = -8A,$ $V_{GS} = -10V$	-	27.6	-	nC
Gate-Source Charge	Q_{gs}		-	4.4	-	
Gate-Drain Charge	Q_{gd}		-	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	T_{rr}	$V_{GS} = 0V, I_S = -10A, di/dt = 100A/\mu S$	-	10.9	-	ns
Reverse Recovery Char	Q_{rr}		-	2.09	-	nC

Notes:

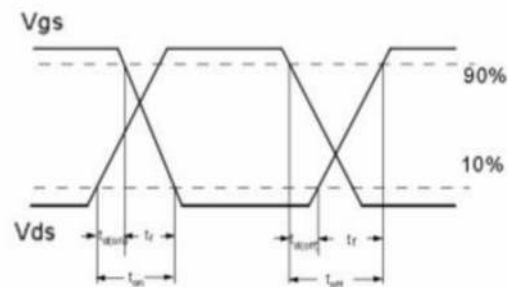
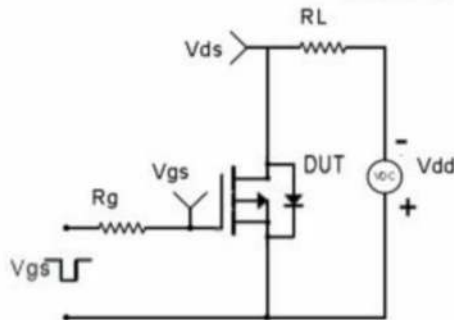
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = -20V, R_G = 25\Omega, L = 0.5mH, I_{AS} = -13A$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit & Waveform

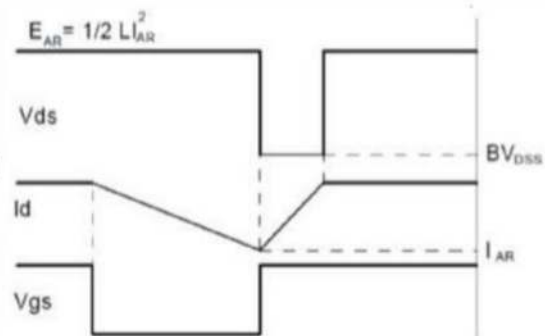
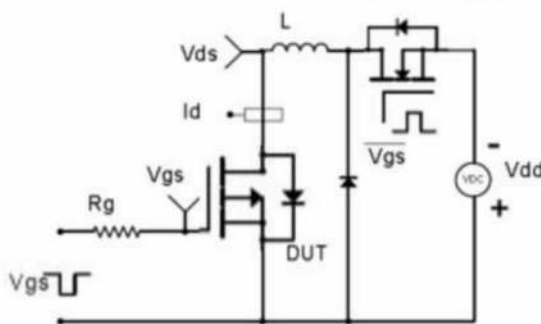
Gate Charge Test Circuit & Waveform



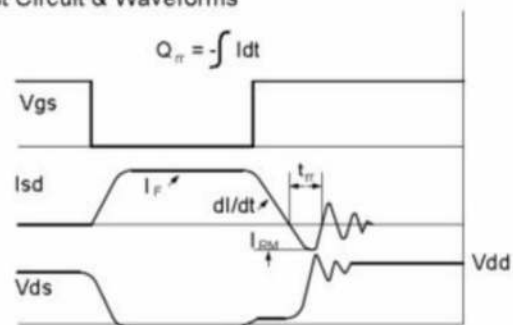
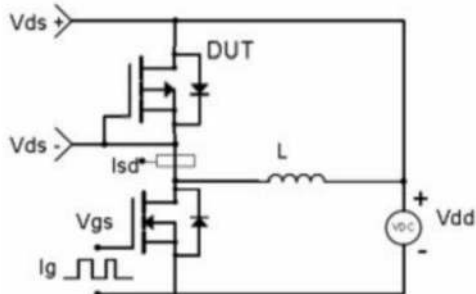
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



RATING AND CHARACTERISTICS CURVES (RM10P40D2V)

Fig1. Typical Output Characteristics @T_J= 125°C

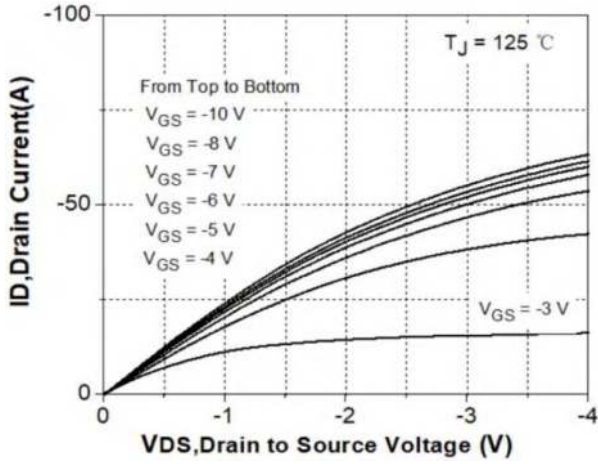


Fig2. Transconductance vs. Drain Current @T_J= -25/25/75/125°C

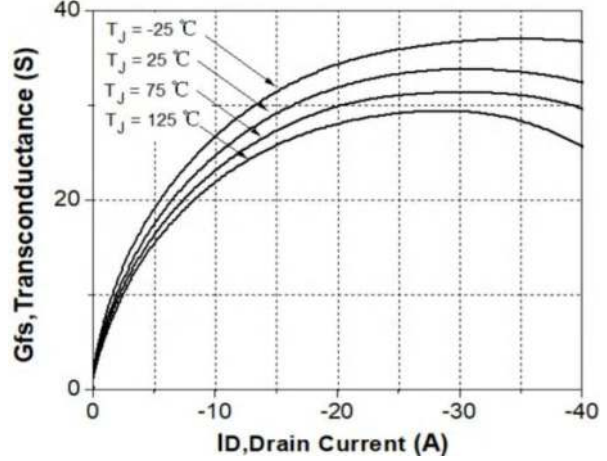


Fig3. Typical Transfer Characteristics @T_J= -25/25/75/125°C

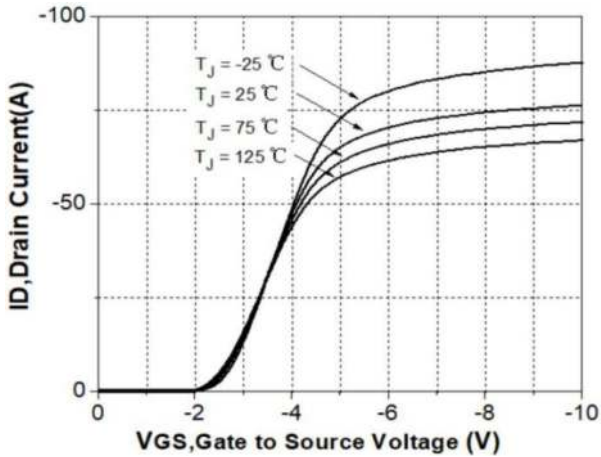


Fig4. Static Drain - Source On - State Resistance vs. Drain Current @T_J= -25°C

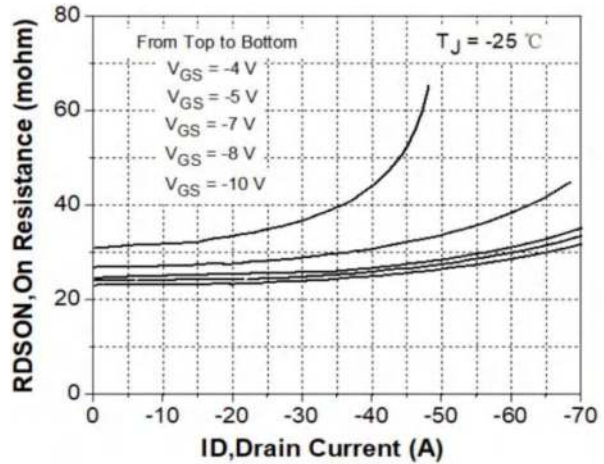


Fig5. Static Drain - Source On - State Resistance vs. Drain Current @T_J= 25°C

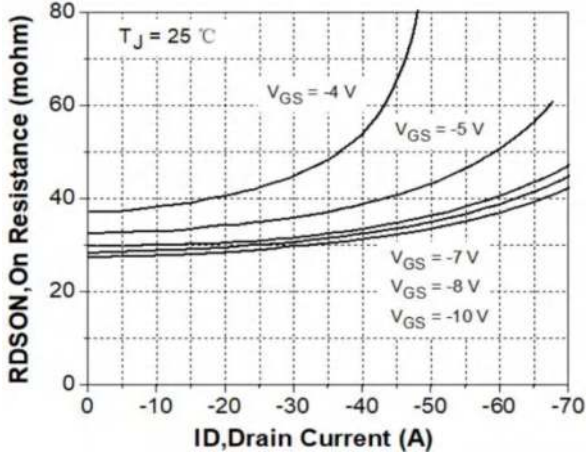
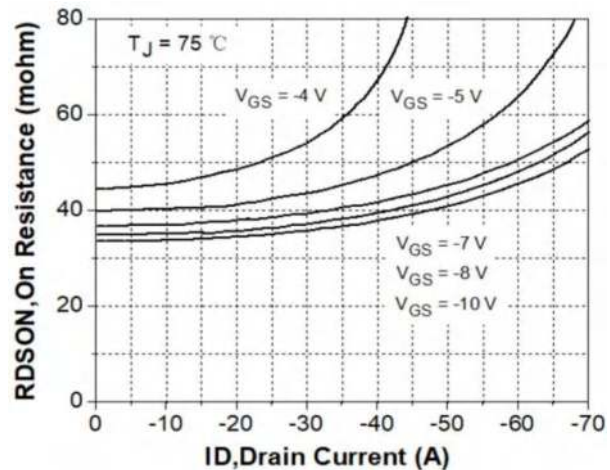


Fig6. Static Drain - Source On - State Resistance vs. Drain Current @T_J= 75°C



RATING AND CHARACTERISTICS CURVES (RM10P40D2V)

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

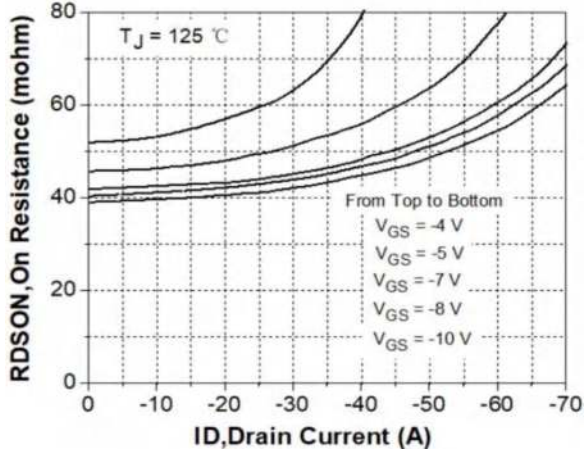


Fig8. Gate Charge Characteristics

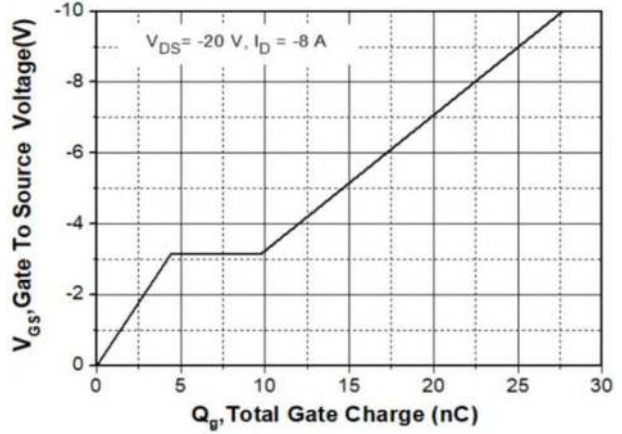


Fig9. Breakdown Voltage vs. Junction Temperature

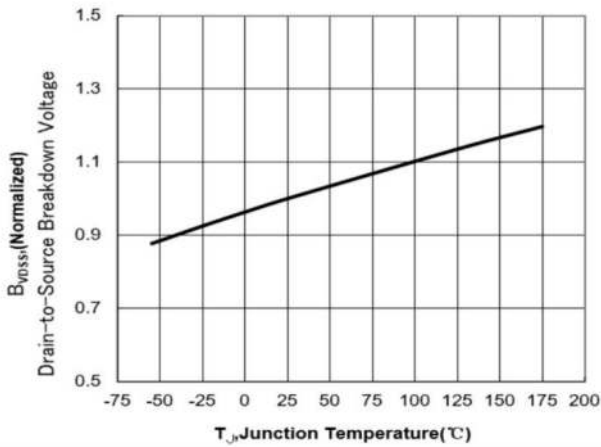


Fig10. Gate Threshold Voltage vs. Junction Temperature

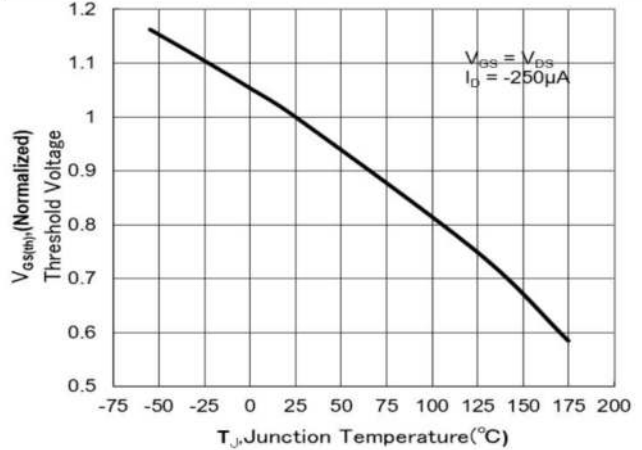


Fig11. On-Resistance Variation vs. Junction Temperature

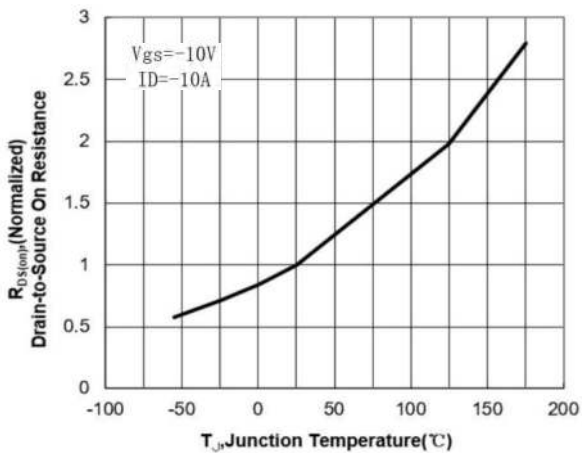
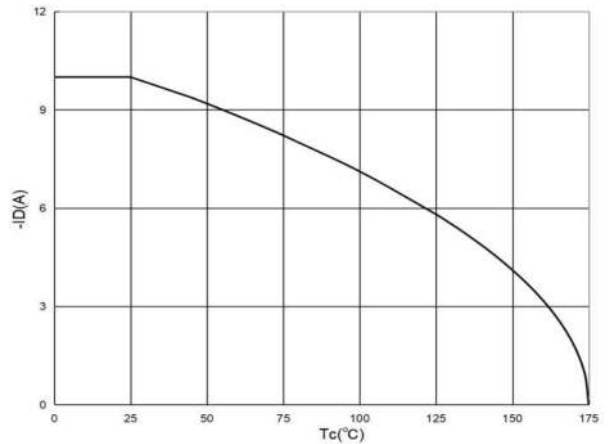


Fig12. Maximum Drain Current vs. Case Temperature



RATING AND CHARACTERISTICS CURVES (RM10P40D2V)

Fig13. Body Diode Forward Voltage vs. Reverse Drain Current

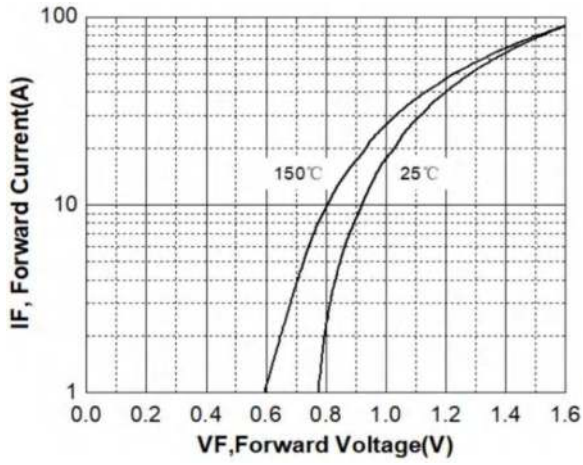


Fig14. Typical Output Characteristics @ $T_J = 25^\circ\text{C}$

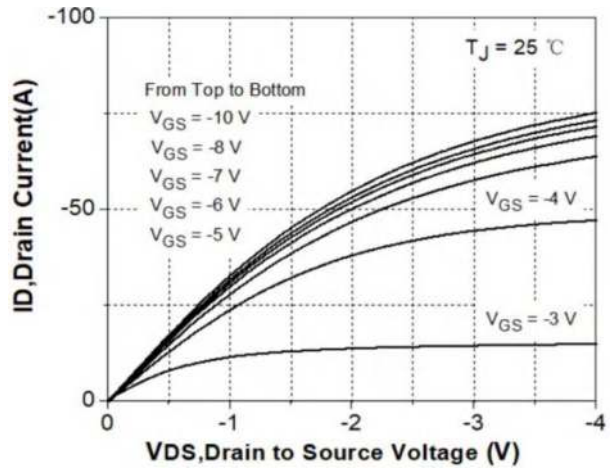
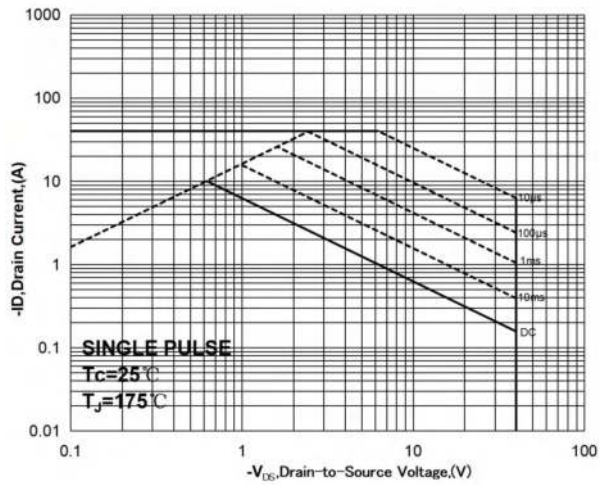
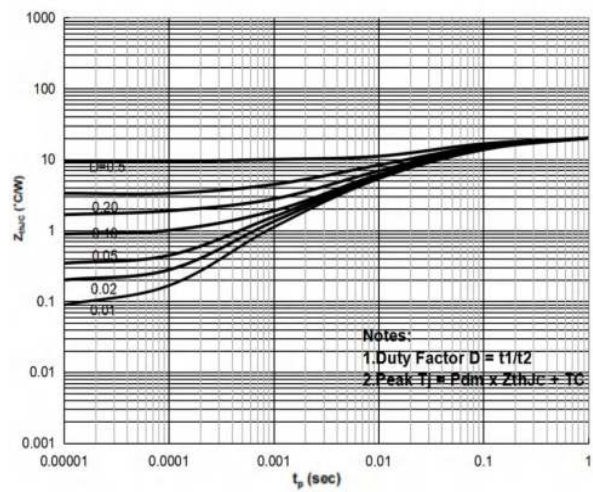


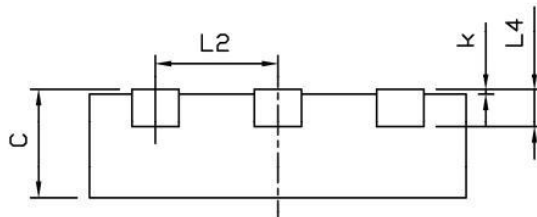
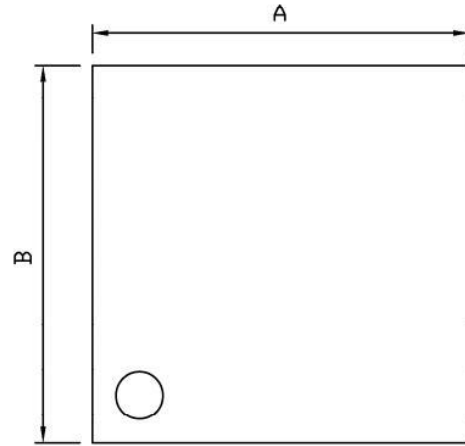
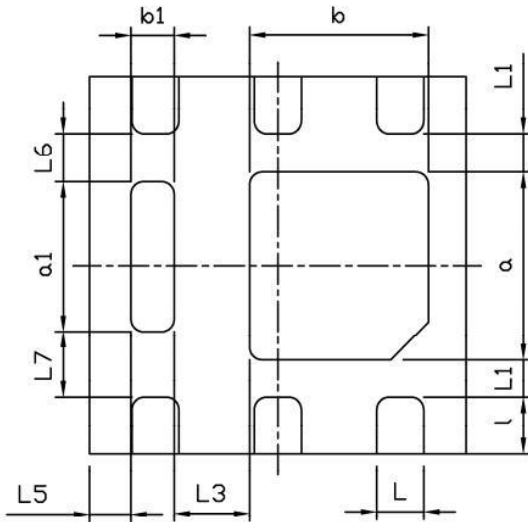
Fig15. Safe Operating Area Fig



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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