

JMSH04060G3L

Features

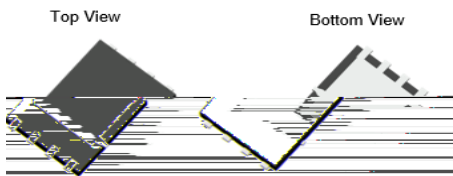
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% Vds Tested
- Halogen-free; RoHS-compliant

Applications

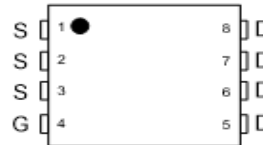
- Load Switch
- PWM Application
- Power Management

Product Summary

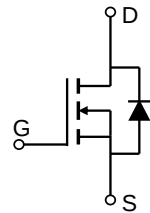
Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th_Typ)}$	2.8	V
$I_D(@V_{GS}=10V)$	87	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	4.8	mΩ



PDFN5X6-8L



Pin Assignment



Schematic Diagram

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSH04060G3L-13	SH040603L	1	Tape&Reel	PDFN5x6-8L	5000	50000

Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$: 87 $T_C = 100^\circ\text{C}$: 62	A
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	106	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$: 83 $T_C = 100^\circ\text{C}$: 42	W
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Max	Unit
R	Thermal Resistance, Junction to Ambient ⁽³⁾	45	$^\circ\text{C/W}$
R	Thermal Resistance, Junction to Case	1.8	

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 32V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.8	4.0	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	-	4.8	6.0	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	1.6	-	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz	-	1068	1450	pF
C _{oss}	Output Capacitance		-	355	480	pF
C _{rss}	Reverse Transfer Capacitance		-	10	20	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 20V, I _D = 20A	-	15	-	nC
Q _{gs}	Gate Source Charge		-	6	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 20V I _D = 20A, R _{GEN} = 3Ω	-	10	-	ns
t _r	Turn-On Rise Time		-	28	-	ns
t _{d(off)}	Turn-Off DelayTime		-	15	-	ns
t _f	Turn-Off Fall Time		-	3	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	87	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	350	A
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _S = 20A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	11	22	32	ns
Qrr	Body Diode Reverse Recovery Charge		-	12	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 20\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 8.4\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.
 3. R is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width $\leq$ $\leq 0.5\%$.

Typical Performance Characteristics

Figure 1: Power De-rating

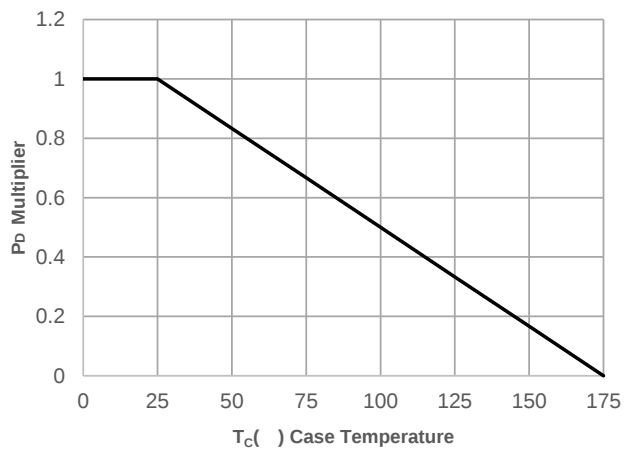
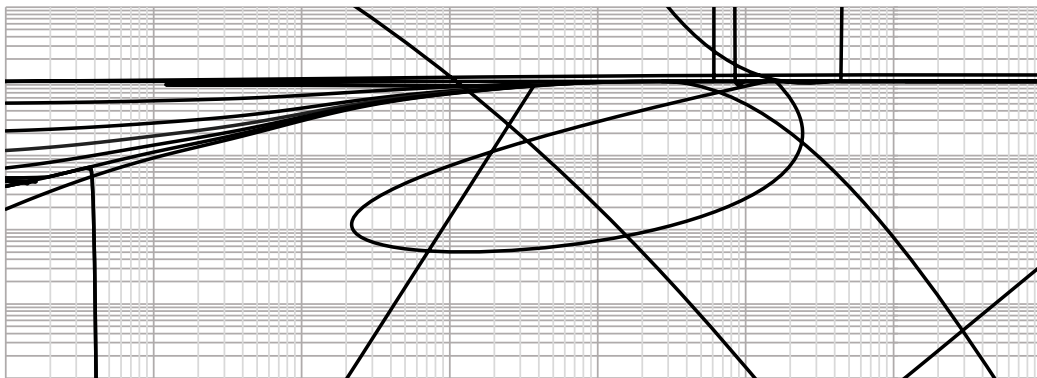
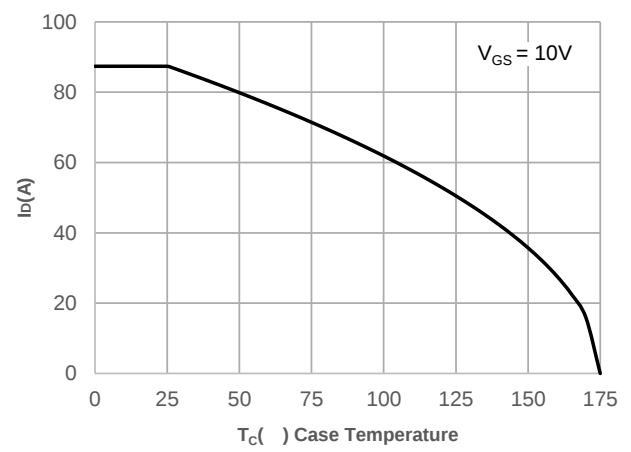
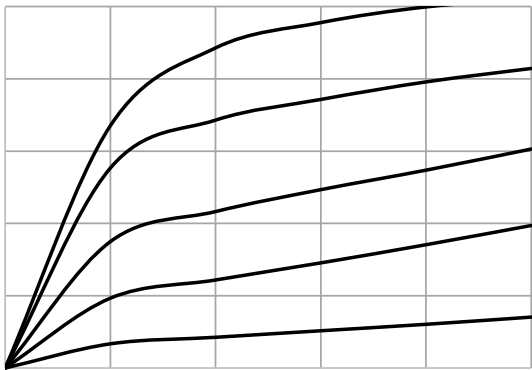


Figure 2: Current De-rating



Typical Performance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown Voltage vs. Junction Temperature

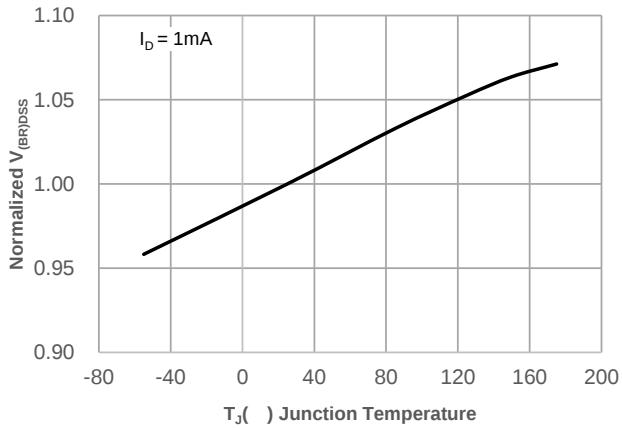


Figure 12: Normalized on Resistance vs. Junction Temperature

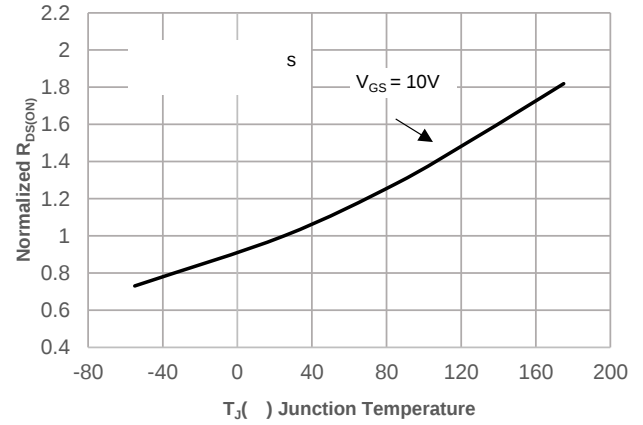


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

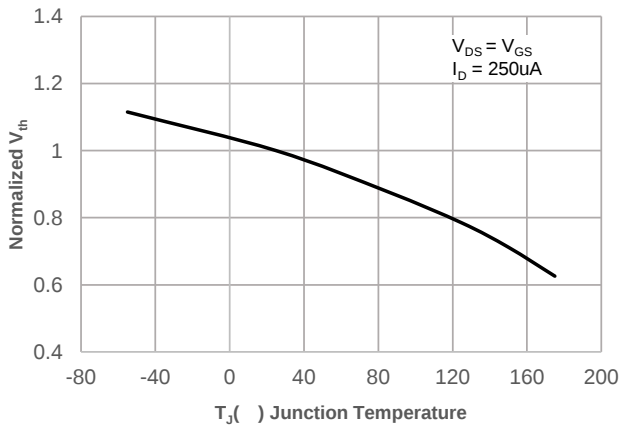


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

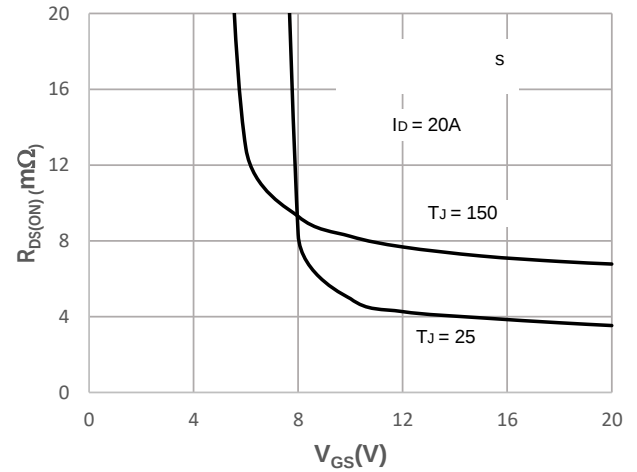
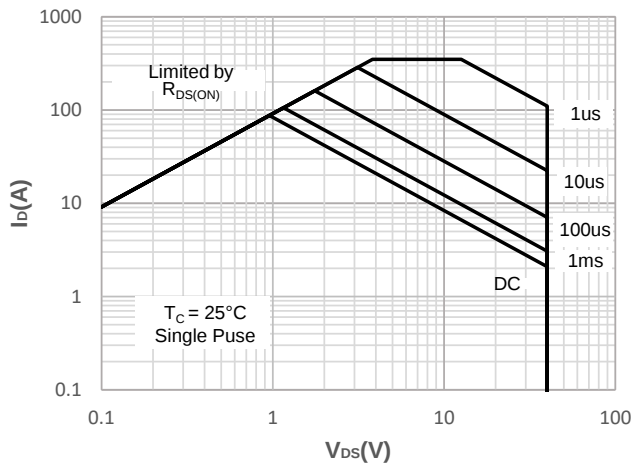


Figure 15: Maximum Safe Operating Area



Test Circuit



Figure 1: Gate Charge Test Circuit & Waveform

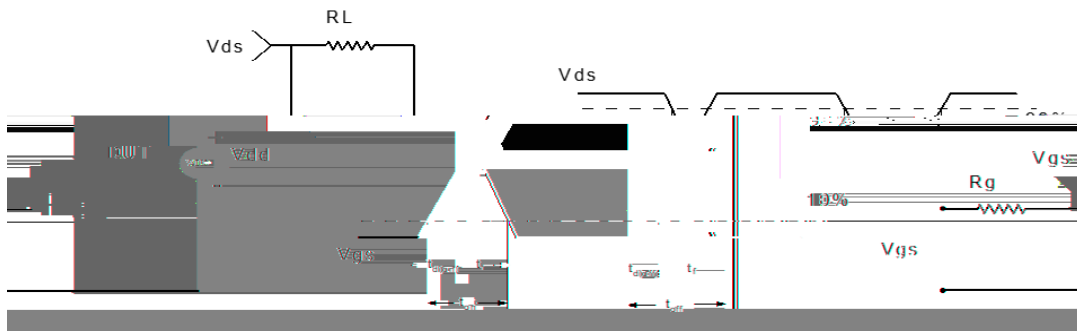


Figure 2: Resistive Switching Test Circuit & Waveform

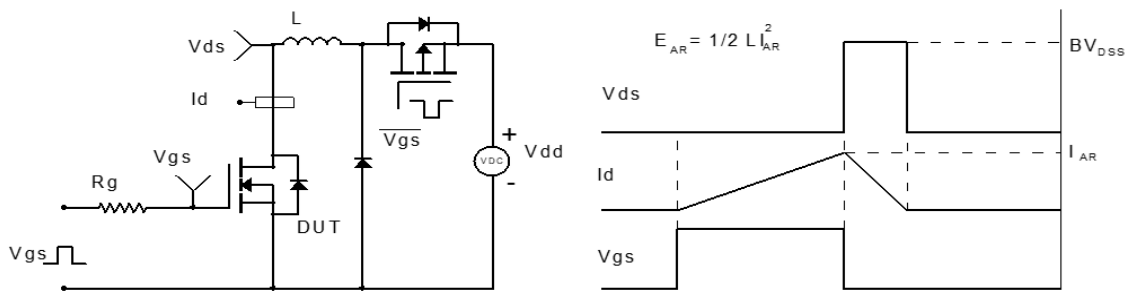


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

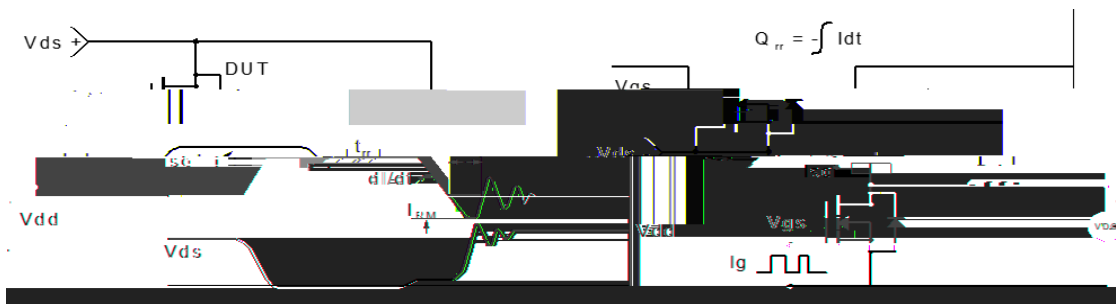


Figure 4: Diode Recovery Test Circuit & Waveform

SYMBOLS			UNITS			UNITS		
	MIN	NOM	MAX	MIN	NOM	MAX		
*A	0.000	1.600	1.150	0.035	0.099	0.085		
A3	0.000		0.050	0.000		0.002		
B	0.246	0.254	0.350	0.010	0.010	0.014		
C	0.000	0.0010	0.000	0.010	0.000	0.000		
D		1.27REF			0.850REF			
E	0.000	5.050	0.000	0.005	0.009	0.000		
F	0.000	4.100	0.000	0.007	0.000	0.000		
G		0.125REF			0.000REF			
H		0.000			0.000			
I	0.000	5.600	5.700	0.217	8.200	0.000		
J		0.000			0.000			
K		0.000			0.000			
L	0.000	0.000	0.000	0.000	0.000	0.000		
M	0.000	0.000	0.000	0.000	0.000	0.000		
N	0.000	0.000	0.000	0.000	0.000	0.000		
O	0.000	0.000	0.000	0.000	0.000	0.000		
P	0.000	0.000	0.000	0.000	0.000	0.000		
Q	0.000	0.000	0.000	0.000	0.000	0.000		
R	0.000	0.000	0.000	0.000	0.000	0.000		
S	0.000	0.000	0.000	0.000	0.000	0.000		
T	0.000	0.000	0.000	0.000	0.000	0.000		
U	0.000	0.000	0.000	0.000	0.000	0.000		
V	0.000	0.000	0.000	0.000	0.000	0.000		
W	0.000	0.000	0.000	0.000	0.000	0.000		
X	0.000	0.000	0.000	0.000	0.000	0.000		
Y	0.000	0.000	0.000	0.000	0.000	0.000		
Z	0.000	0.000	0.000	0.000	0.000	0.000		
AA	0.000	0.000	0.000	0.000	0.000	0.000		
AB	0.000	0.000	0.000	0.000	0.000	0.000		
AC	0.000	0.000	0.000	0.000	0.000	0.000		
AD	0.000	0.000	0.000	0.000	0.000	0.000		
AE	0.000	0.000	0.000	0.000	0.000	0.000		
AF	0.000	0.000	0.000	0.000	0.000	0.000		
AG	0.000	0.000	0.000	0.000	0.000	0.000		
AH	0.000	0.000	0.000	0.000	0.000	0.000		
AI	0.000	0.000	0.000	0.000	0.000	0.000		
AJ	0.000	0.000	0.000	0.000	0.000	0.000		
AK	0.000	0.000	0.000	0.000	0.000	0.000		
AL	0.000	0.000	0.000	0.000	0.000	0.000		
AM	0.000	0.000	0.000	0.000	0.000	0.000		
AN	0.000	0.000	0.000	0.000	0.000	0.000		
AO	0.000	0.000	0.000	0.000	0.000	0.000		
AP	0.000	0.000	0.000	0.000	0.000	0.000		
AQ	0.000	0.000	0.000	0.000	0.000	0.000		
AR	0.000	0.000	0.000	0.000	0.000	0.000		
AS	0.000	0.000	0.000	0.000	0.000	0.000		
AT	0.000	0.000	0.000	0.000	0.000	0.000		
AU	0.000	0.000	0.000	0.000	0.000	0.000		
AV	0.000	0.000	0.000	0.000	0.000	0.000		
AW	0.000	0.000	0.000	0.000	0.000	0.000		
AX	0.000	0.000	0.000	0.000	0.000	0.000		
AY	0.000	0.000	0.000	0.000	0.000	0.000		
AZ	0.000	0.000	0.000	0.000	0.000	0.000		
BA	0.000	0.000	0.000	0.000	0.000	0.000		
BB	0.000	0.000	0.000	0.000	0.000	0.000		
BC	0.000	0.000	0.000	0.000	0.000	0.000		
BD	0.000	0.000	0.000	0.000	0.000	0.000		
BE	0.000	0.000	0.000	0.000	0.000	0.000		
BF	0.000	0.000	0.000	0.000	0.000	0.000		
BG	0.000	0.000	0.000	0.000	0.000	0.000		
BH	0.000	0.000	0.000	0.000	0.000	0.000		
BI	0.000	0.000	0.000	0.000	0.000	0.000		
BJ	0.000	0.000	0.000	0.000	0.000	0.000		
BK	0.000	0.000	0.000	0.000	0.000	0.000		
BL	0.000	0.000	0.000	0.000	0.000	0.000		
BM	0.000	0.000	0.000	0.000	0.000	0.000		
BN	0.000	0.000	0.000	0.000	0.000	0.000		
BO	0.000	0.000	0.000	0.000	0.000	0.000		
BP	0.000	0.000	0.000	0.000	0.000	0.000		
BQ	0.000	0.000	0.000	0.000	0.000	0.000		
BR	0.000	0.000	0.000	0.000	0.000	0.000		
BS	0.000	0.000	0.000	0.000	0.000	0.000		
BT	0.000	0.000	0.000	0.000	0.000	0.000		
BU	0.000	0.000	0.000	0.000	0.000	0.000		
BV	0.000	0.000	0.000	0.000	0.000	0.000		
BW	0.000	0.000	0.000	0.000	0.000	0.000		
BX	0.000	0.000	0.000	0.000	0.000	0.000		
BY	0.000	0.000	0.000	0.000	0.000	0.000		
BZ	0.000	0.000	0.000	0.000	0.000	0.000		
CA	0.000	0.000	0.000	0.000	0.000	0.000		
CB	0.000	0.000	0.000	0.000	0.000	0.000		
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CK	0.000	0.000	0.000	0.000	0.000	0.000		
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CO	0.000	0.000	0.000	0.000	0.000	0.000		
CP	0.000	0.000	0.000	0.000	0.000	0.000		
CQ	0.000	0.000	0.000	0.000	0.000	0.000		
CR	0.000	0.000	0.000	0.000	0.000	0.000		
CS	0.000	0.000	0.000	0.000	0.000	0.000		
CT	0.000	0.000	0.000	0.000	0.000	0.000		
CU	0.000	0.000	0.000	0.000	0.000	0.000		
CV	0.000	0.000	0.000	0.000	0.000	0.000		
CW	0.000	0.000	0.000	0.000	0.000	0.000		
CX	0.000	0.000	0.000	0.000	0.000	0.000		
CY	0.000	0.000	0.000	0.000	0.000	0.000		
CZ	0.000	0.000	0.000	0.000	0.000	0.000		
DA	0.000	0.000	0.000	0.000	0.000	0.000		
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DL	0.000	0.000	0.000	0.000	0.000	0.000		
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DU	0.000	0.000	0.000	0.000	0.000	0.000		
DV	0.000	0.000	0.000	0.000	0.000	0.000		
DW	0.000	0.000	0.000	0.000	0.000	0.000		
DX	0.000	0.000	0.000	0.000	0.000	0.000		
DY	0.000	0.000	0.000	0.000	0.000	0.000		
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EC	0.000	0.000	0.000	0.000	0.000	0.000		
ED	0.000	0.000	0.000	0.000	0.000	0.000		
EE	0.000	0.000	0.000	0.000	0.000	0.000		
EF	0.000	0.000	0.000	0.000	0.000	0.000		
EG	0.000	0.000	0.000	0.000	0.000	0.000		
EH	0.000	0.000	0.000	0.000	0.000	0.000		
EI	0.000	0.000	0.000	0.000	0.000	0.000		
EJ	0.000	0.000	0.000	0.000	0.000	0.000		
EK	0.000	0.000	0.000	0.000	0.000	0.000		
EL	0.000	0.000	0.000	0.000	0.000	0.000		
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EP	0.000	0.000	0.000	0.000	0.000	0.000		
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ER	0.000	0.000	0.000	0.000	0.000	0.000		
ES	0.000	0.000	0.000	0.000	0.000	0.000		
ET	0.000	0.000	0.000	0.000	0.000	0.000		
EU	0.000	0.000	0.000	0.000	0.000	0.000		
EV	0.000	0.000	0.000	0.000	0.000	0.000		
EW	0.000	0.000	0.000	0.000	0.000	0.000		
EX	0.000	0.000	0.000	0.000	0.000	0.000		
EY	0.000	0.000	0.000	0.000	0.000	0.000		
EZ	0.000	0.000	0.000	0.000	0.000	0.000		
FA	0.000	0.000	0.000	0.000	0.000	0.000		
FB	0.000	0.000	0.000	0.000	0.000	0.000		
FC	0.000	0.000	0.000	0.000	0.000	0.000		
FD	0.000	0.000	0.000	0.000	0.000	0.000		
FE	0.000	0.000	0.000	0.000	0.000	0.000		
FF	0.000	0.000	0.000	0.000	0.000	0.000		
FG	0.000	0.000	0.000	0.000	0.000	0.000		
FH	0.000	0.000	0.000	0.000	0.000	0.000		
FI	0.000	0.000	0.000	0.000	0.000	0.000		
FJ	0.000	0.000	0.000	0.000	0.000	0.000		
FK	0.000	0.000	0.000	0.000	0.000	0.000		
FL	0.000	0.000	0.000	0.000	0.000	0.000		
FM	0.000	0.000	0.000	0.000	0.000	0.000		
FN	0.000	0.000	0.000	0.000	0.000	0.000		
FO	0.000	0.000	0.000	0.000	0.000	0.000		
FP	0.000	0.000	0.000	0.000	0.000	0.000		
FQ	0.000	0.000	0.000	0.000	0.000	0.000		
FR	0.000	0.000	0.000	0.000	0.000	0.000		
FS	0.000	0.000	0.000	0.000	0.000	0.000		
FT	0.000	0.000	0.000	0.000	0.000	0.000		
FU	0.000	0.000	0.000	0.000	0.000	0.		

Technical drawing of a rectangular structure with dimensions in millimeters. The overall width is 4,300 mm and the overall height is 6,610 mm. The inner width is 4,300 mm and the inner height is 4,504 mm. The top section has a height of 3,574 mm. The bottom section has a height of 1,270 mm. The bottom section is divided into three vertical sections with widths of 0,610 mm, 1,270 mm, and 1,270 mm.

DIMENSIONS: MILLIMETERS

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