

PRODUCT CHARACTERISTICS

VDSS	700V
$R_{DS(on)max}(V_{GS}=10V)$	2.8Ω
Qg@type	20nC
ID	4A

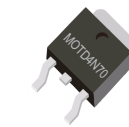
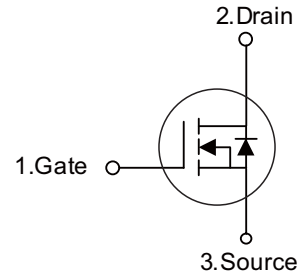
APPLICATIONS

- * High frequency switching mode power supply
- * Electronic ballast
- * LED power supplies

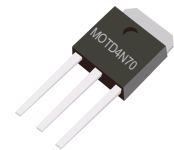
FEATURES

- * $R_{DS(ON)} < 2.8\Omega @ V_{GS} = 10V$
- * Ultra Low Gate Charge (Typical 15nC)
- * Low Reverse Transfer Capacitance (C_{RSS} = Typical 8.0 pF)
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

Symbol



TO-252



TO-251

ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT4N70C	TO-251	70 pieces/Tube
N/A	MOT4N70D	TO-252	2500 pieces/Reel

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	700	V
Gate-Source Voltage	V_{GS}	±30	V
Avalanche Current (Note 2)	I_{AR}	4	A
Drain Current	Continuous	I_D	4
	Pulsed (Note 2)	I_{DM}	16
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	260
	Repetitive (Note 2)	E_{AR}	10.6
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.5	V/ns
Power Dissipation	TO-251/ TO-252	P_D	49
Junction Temperature	T_J	+150	°C
Operating Temperature	T_{OPR}	-55 ~ +150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by maximum junction temperature

3. $L = 26.9\text{mH}$, $I_{AS} = 4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SP} \leq 4\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-251/ TO-252	θ_{JA}	110
Junction to Case	TO-251/ TO-252	θ_{JC}	2.55



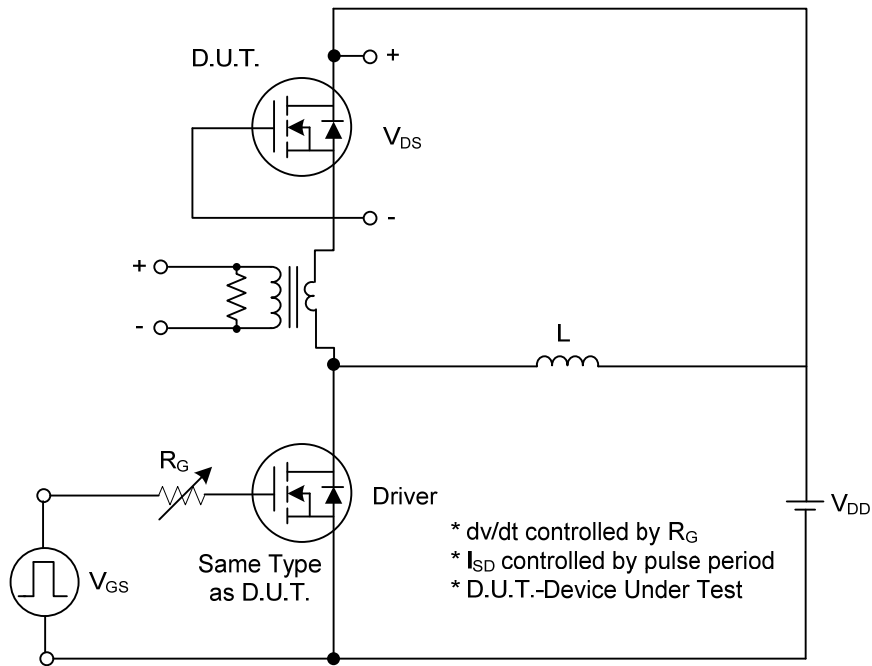
■ ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	700			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS} = 700\text{ V}, V_{GS} = 0\text{ V}$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$			100	nA
	Reverse		$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$		-100		
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	$I_D = 250\mu\text{A}$, Referenced to 25°C		0.6		V/°C
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 2\text{ A}$		2.6	2.8	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$		520	670	pF
Output Capacitance		C_{OSS}			70	90	pF
Reverse Transfer Capacitance		C_{RSS}			8	11	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{D(ON)}$	$V_{DD} = 350\text{V}, I_D = 4\text{A},$ $R_G = 25\Omega$ (Note 1, 2)		13	35	ns
Turn-On Rise Time		t_R			45	100	ns
Turn-Off Delay Time		$t_{D(OFF)}$			25	60	ns
Turn-Off Fall Time		t_F			35	80	ns
Total Gate Charge		Q_G	$V_{DS} = 560\text{V}, I_D = 4\text{A},$ $V_{GS} = 10\text{ V}$ (Note 1, 2)		15	20	nC
Gate-Source Charge		Q_{GS}			3.4		nC
Gate-Drain Charge		Q_{GD}			7.1		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V_{SD}	$V_{GS} = 0\text{ V}, I_S = 4\text{ A}$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I_S				4	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				16	A
Reverse Recovery Time		t_{rr}	$V_{GS} = 0\text{ V}, I_S = 4\text{ A},$		250		ns
Reverse Recovery Charge		Q_{RR}	$dI/dt = 100\text{ A}/\mu\text{s}$ (Note 1)		1.5		μC

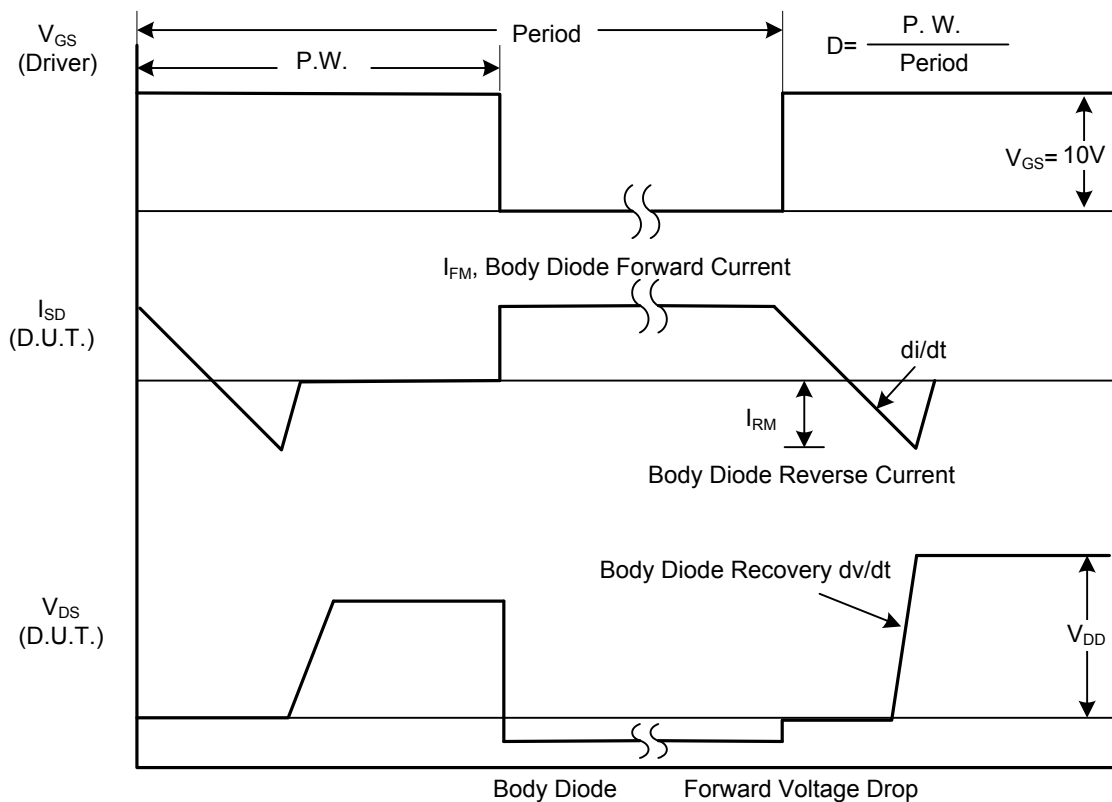
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

TEST CIRCUITS AND WAVEFORMS

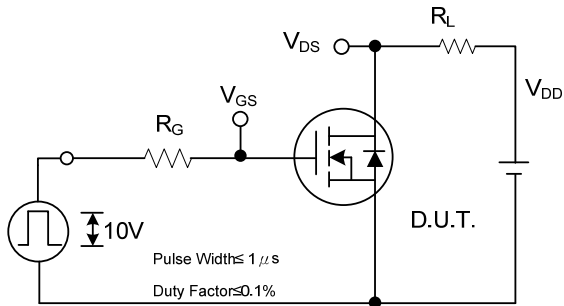


Peak Diode Recovery dv/dt Test Circuit

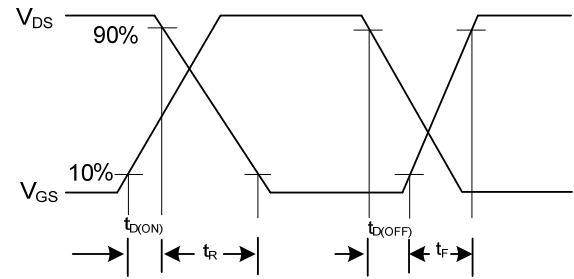


Peak Diode Recovery dv/dt Waveforms

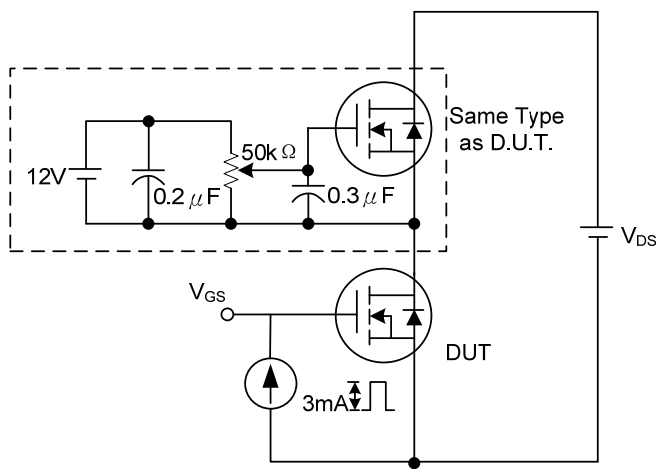
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



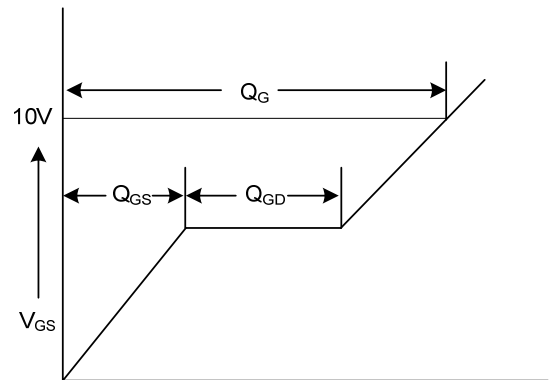
Switching Test Circuit



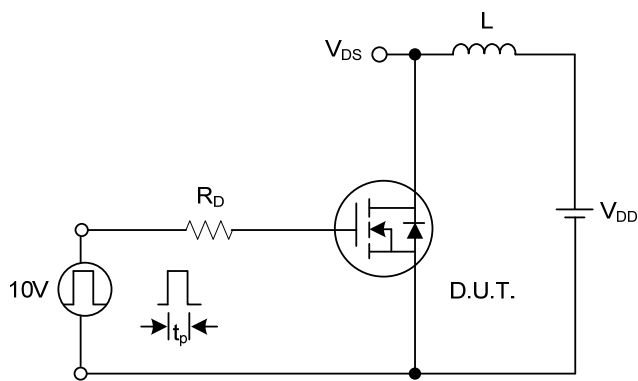
Switching Waveforms



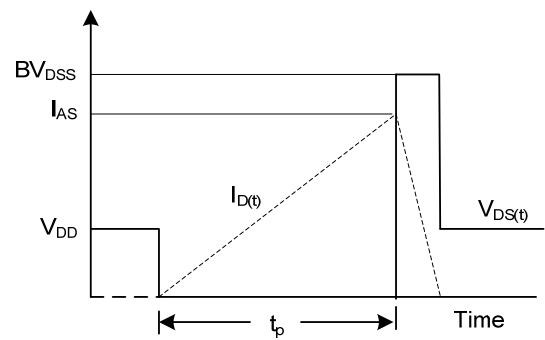
Gate Charge Test Circuit



Gate Charge Waveform

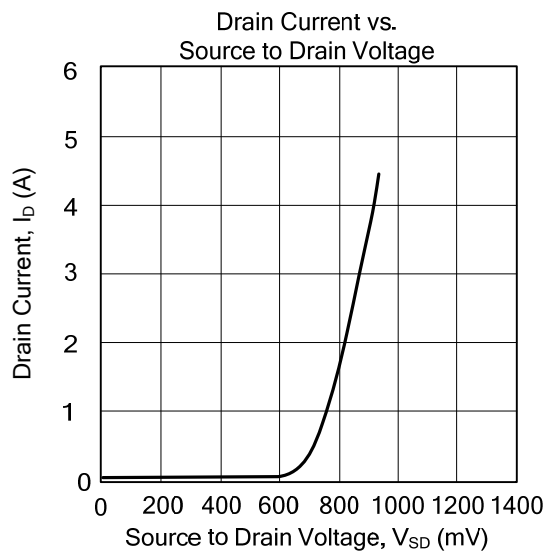
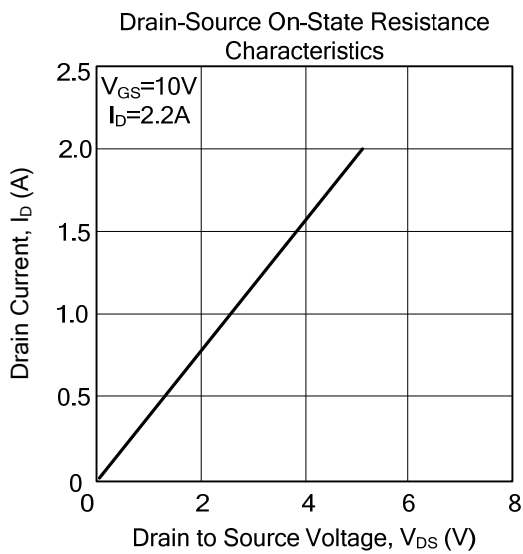
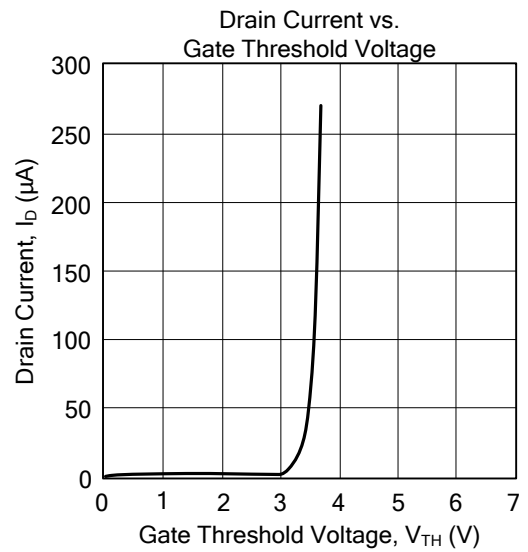
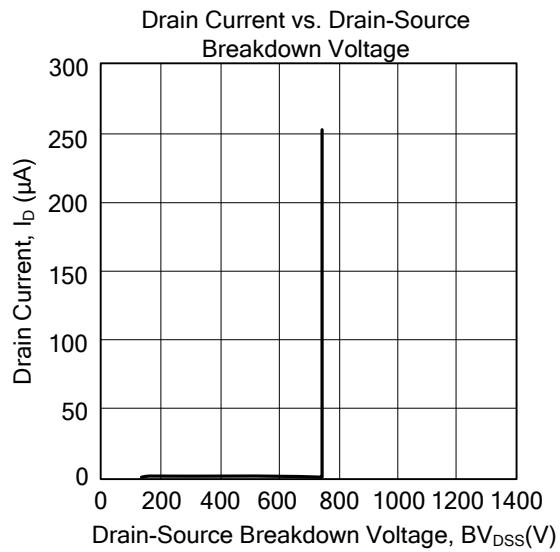


Unclamped Inductive Switching Test Circuit

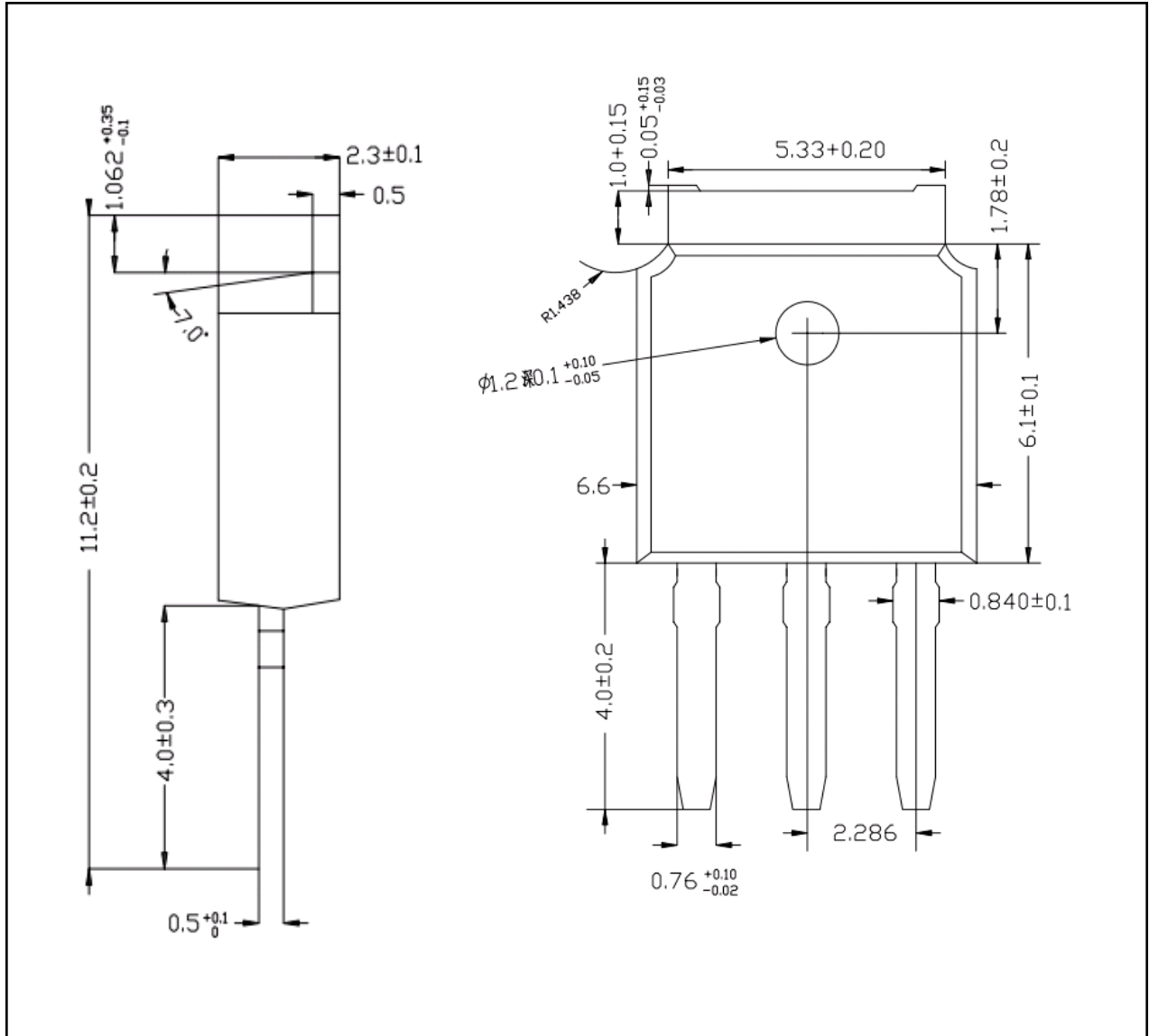


Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



■ TO-251F-3L PACKAGE OUTLINE DIMENSIONS



Technical drawing of a mechanical part, showing front and side views with dimensions.

Front View Dimensions:

- Top edge: $1.0^{+0.15}_{-0.05}$
- Top edge: $5.33^{+0.20}$
- Right edge: $1.78^{+0.2}$
- Right edge: $6.1^{+0.1}$
- Bottom edge: $0.840^{+0.1}$
- Bottom edge: 2.286
- Left edge: $0.76^{+0.10}_{-0.02}$
- Left edge: $0.8^{+0.2}$
- Left edge: 6.6
- Left edge: $1.2^{+0.10}_{-0.05}$
- Top-left corner: $R1.438$

Side View Dimensions:

- Top edge: $2.3^{+0.15}$
- Top edge: 0.5
- Top edge: $1.062^{+0.35}_{-0.1}$
- Top edge: 7.0°
- Top edge: $10.2^{+0.3}$
- Top edge: $3.1^{+0.3}$
- Top edge: $0.5^{+0.1}_0$
- Top edge: $0 \sim 0.15$
- Top edge: $0 \sim 5^\circ$
- Top edge: 1.65