

RBA200N15YAPF-6UA03

REXFET-1 N-Channel [Power MOSFET](#)

150 V - 200 A - 3.4 mΩ - TOLT for Automotive

Description

The RBA200N15YAPF-6UA03 N-channel power MOSFET features REXFET-1 split-gate technology and is offered in a TOLT package. The TOLT package features top-side cooling for ultra-compact and optimal thermal performance. Renesas' REXFET-1 split gate technology is suitable for applications requiring low $R_{DS(on)}$ and switching capability for high-power and high-frequency applications.

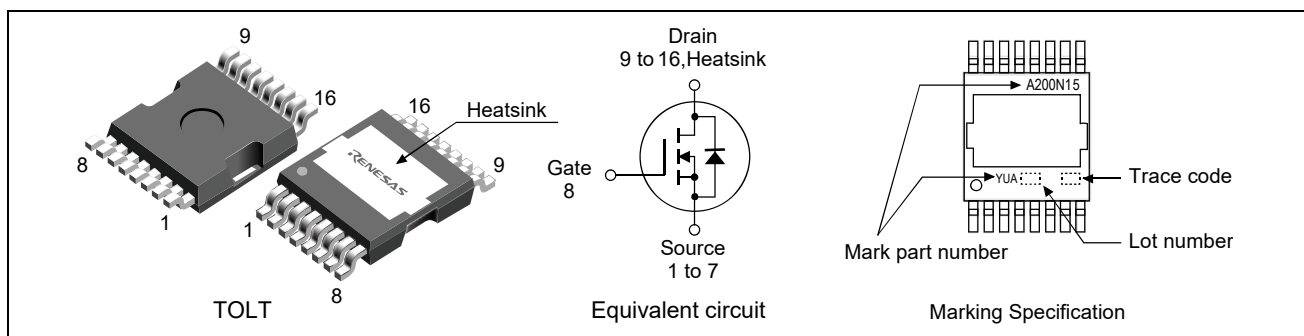
Features

- Standard level gate drive voltage: $V_{GS(th)} = 2.2$ to 3.7 V
- Super low on-state resistance: $R_{DS(on)} = 3.4$ mΩ MAX.
- Low input capacitance
- Low thermal resistance
- 100% Avalanche tested
- AEC-Q101 qualified
- PPAP capable
- Pb-free lead plating: RoHS compliant
- MSL1 classified according to IPC/JEDEC J-STD-020

Application

Small Traction (2-wheel, 3-wheel vehicle), 72 to 96 V load, Onboard charger, Charging station, Low voltage DC/DC,

Outline



Absolute Maximum Ratings

($T_j = 25$ °C unless otherwise notice)

Item	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DSS}	150	V
Gate to Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	$I_D(T_c=25^\circ\text{C})$ Note 2,6	±200	A
	$I_D(T_c=100^\circ\text{C})$ Note 2,6	±148	A
Pulsed Drain Current	$I_D(\text{pulse})$ Note 1,2,3,6	±800	A
Power Dissipation	P_D Note 1,6	366	W
Operating and Storage Temperature	T_j, T_{stg}	-55 to 175	°C
Single Avalanche Current	I_{AS} Note 4	75	A
Single Avalanche Energy	E_{AS} Note 4	421	mJ

Thermal Resistance

Item	Symbol	Min	Typ	Max	Unit
Junction to Case Thermal Resistance	$R_{th(j-c)}$ ^{Note 6}	—	—	0.41	°C/W
Junction to Ambient Thermal Resistance	$R_{th(j-a)}$ ^{Note 5,6}	—	—	40	°C/W

Electrical Characteristics

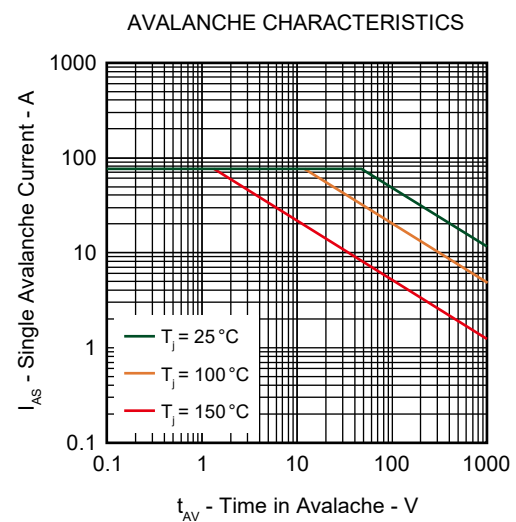
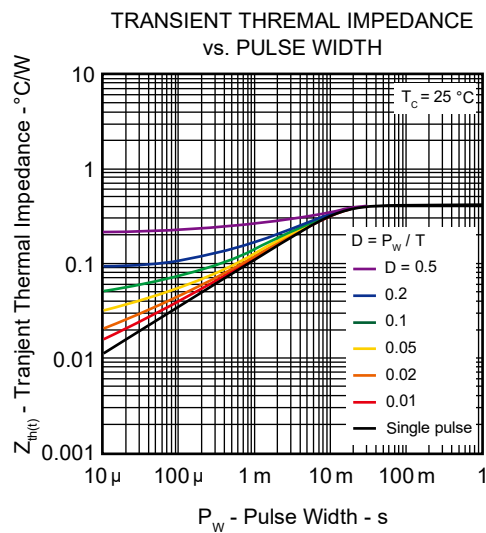
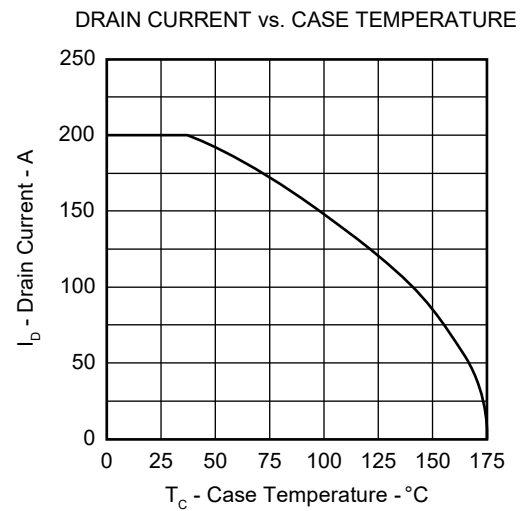
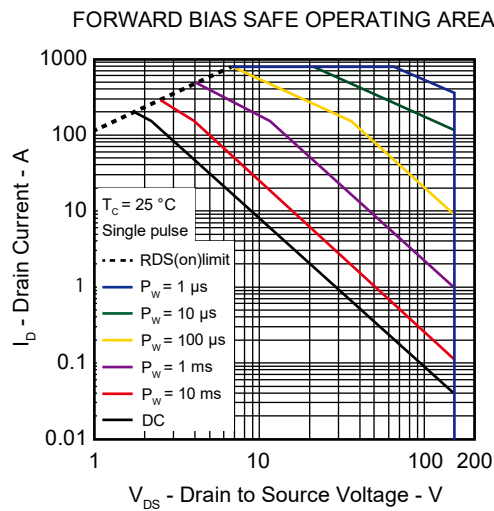
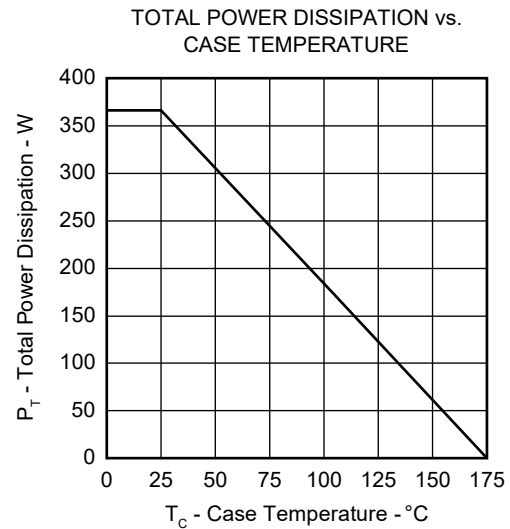
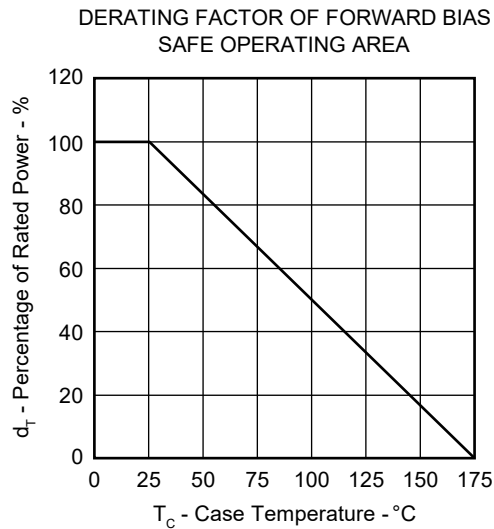
(T_j = 25 °C unless otherwise notice)

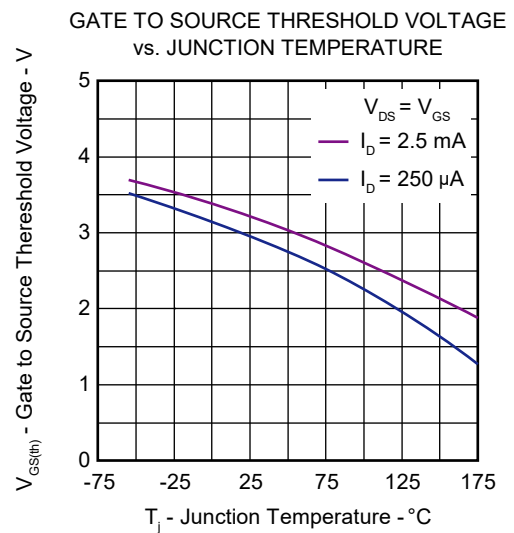
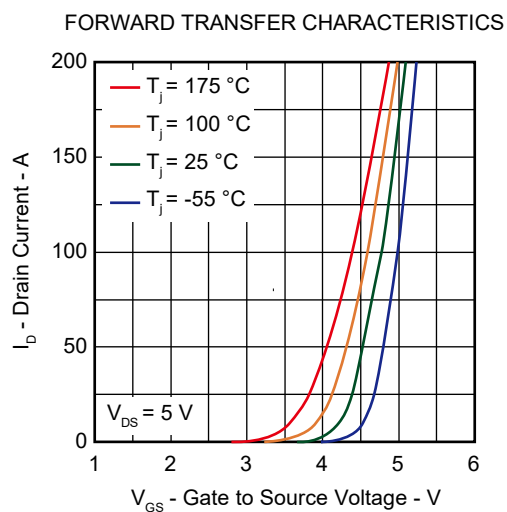
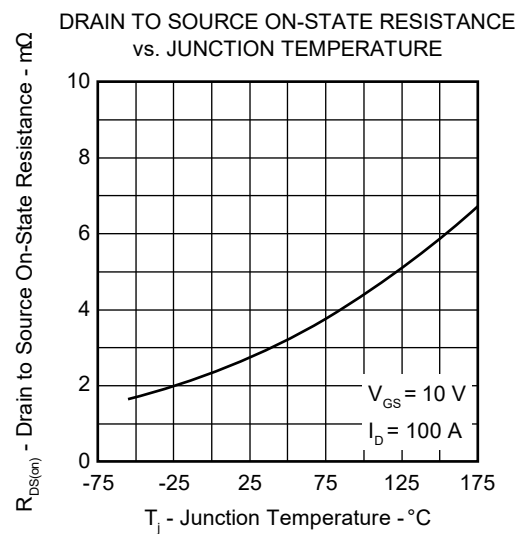
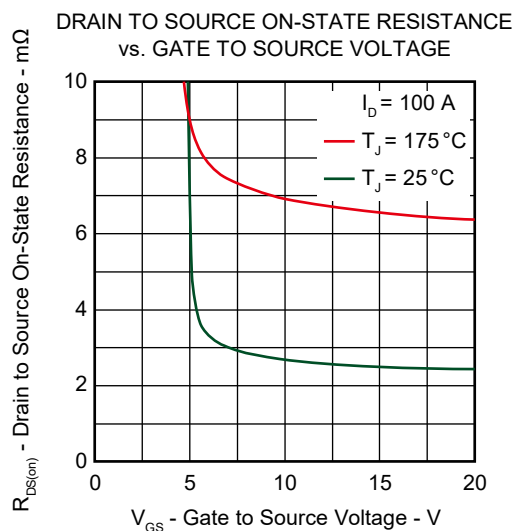
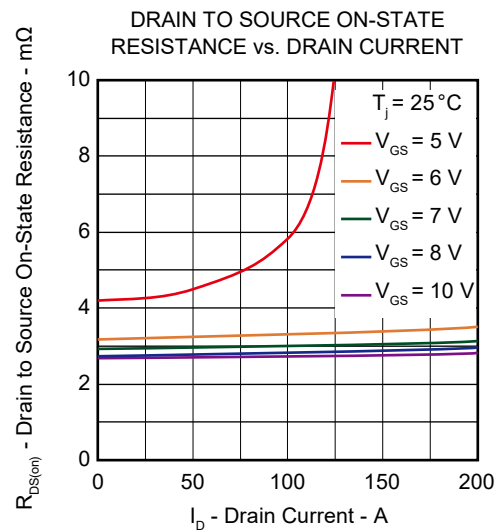
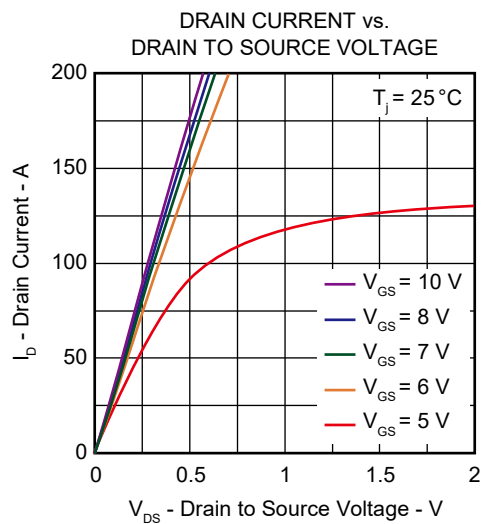
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 150 V, V _{GS} = 0 V
Gate Leakage Current	I _{GSS}	—	—	±100	nA	V _{GS} = ±20 V, V _{DS} = 0 V
Gate to Source Threshold Voltage	V _{GS(th)}	2.2	—	3.7	V	V _{DS} = V _{GS} , I _D = 250 μA
Drain to Source On-state Resistance	R _{DS(on)}	—	2.8	3.4	mΩ	V _{GS} = 10 V, I _D = 100 A
Input Capacitance	C _{iss}	—	6200	—	pF	V _{DS} = 75 V, V _{GS} = 0 V f = 100 kHz
Output Capacitance	C _{oss}	—	2100	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	37	—	pF	
Gate resistance	R _g	—	4.4	—	Ω	—
Turn-on Delay Time	t _{d(on)}	—	30	—	ns	V _{DD} = 75 V, I _D = 50 A V _{GS} = 10 V R _G = 5 Ω
Rise Time	t _r	—	20	—	ns	
Turn-off Delay Time	t _{d(off)}	—	95	—	ns	
Fall Time	t _f	—	20	—	ns	
Total Gate Charge	Q _g	—	86	—	nC	V _{DD} = 75 V, I _D = 50 A V _{GS} = 10 V
Gate to Source Charge	Q _{gs}	—	30	—	nC	
Gate to Drain Charge	Q _{gd}	—	15	—	nC	
Gate plateau voltage	V _{plateau}	—	5.0	—	V	
Output Charge	Q _{oss}	—	255	—	nC	V _{DS} = 75 V, V _{GS} = 0 V
Body Diode Forward Voltage	V _{F(S-D)}	—	0.87	1.5	V	I _F = 100 A, V _{GS} = 0 V
Reverse Recovery Time	t _{rr}	—	120	—	ns	I _F = 50 A, V _{GS} = 0 V
Reverse Recovery Charge	Q _{rr}	—	400	—	nC	dI/dt = 100 A/μs

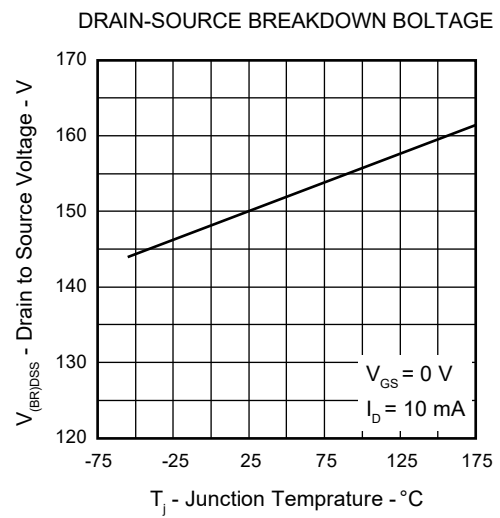
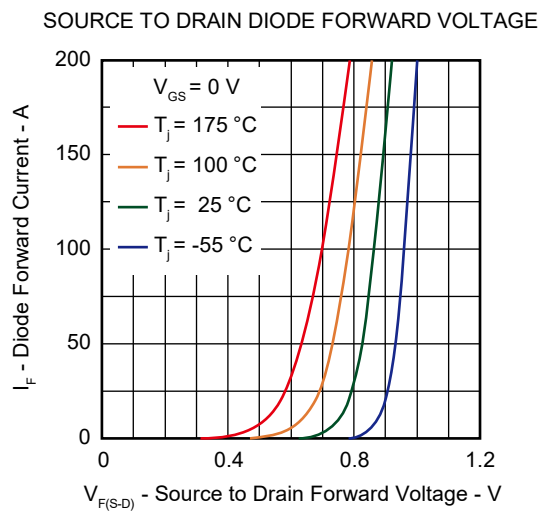
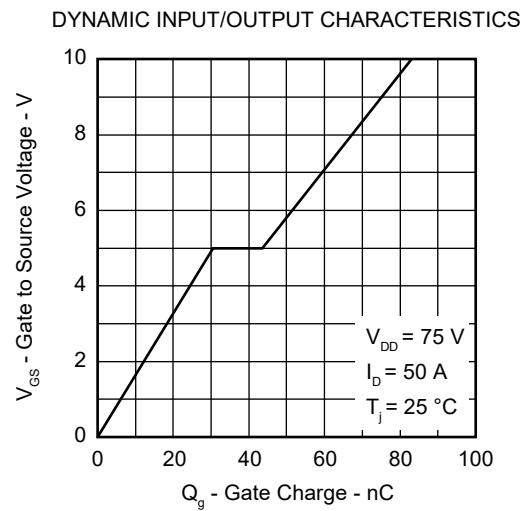
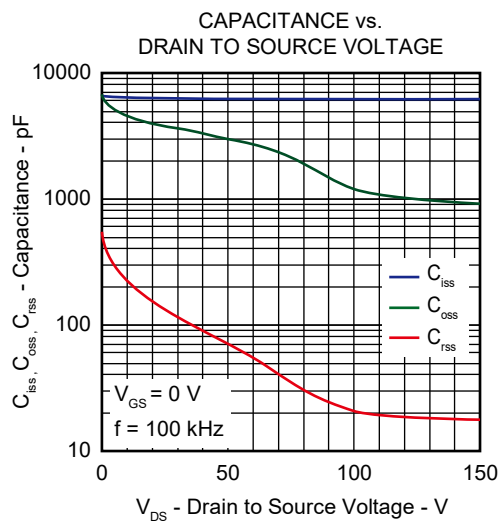
Note 1. T_c = 25 °C

- Value is limited by overall system design including PCB.
- PW ≤ 10 μs
- L = 100 μH, V_{DD} = 50 V, R_G = 25 Ω
- Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4. (2 oz Cu pad.)
- Defined by design. Not subject to production test.

Typical Characteristics



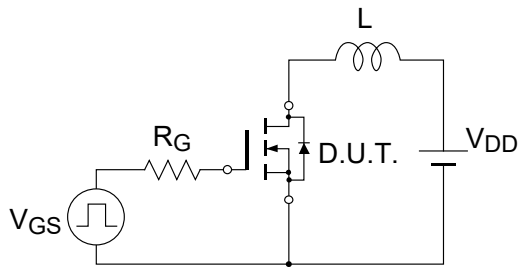




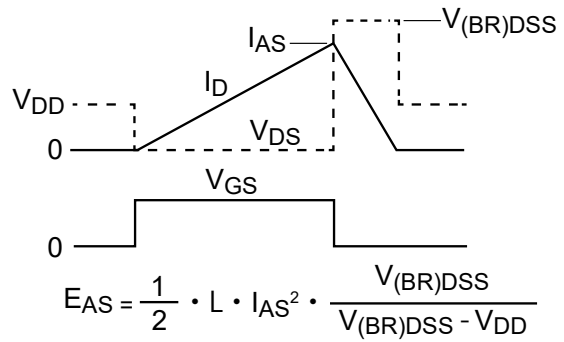
Test Circuit

Avalanche

Test Circuit

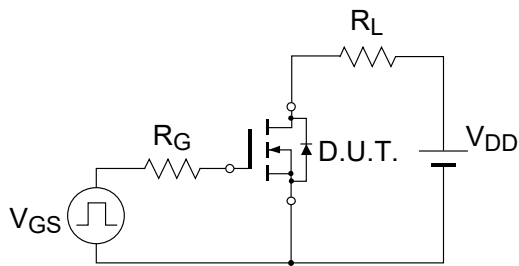


Waveform

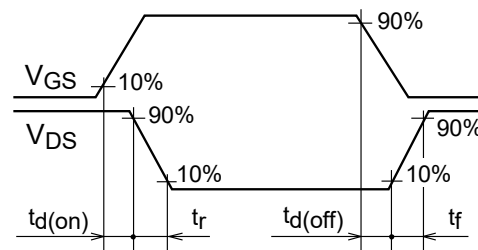


Switching Time

Test Circuit

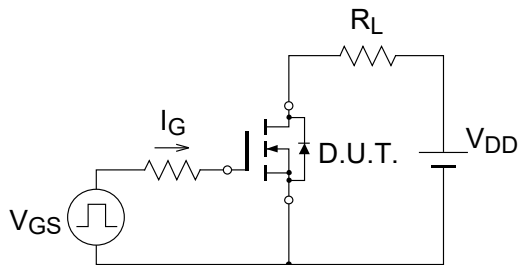


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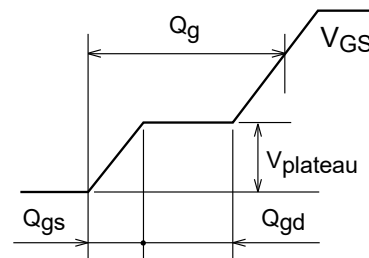


Gate Charge

Test Circuit

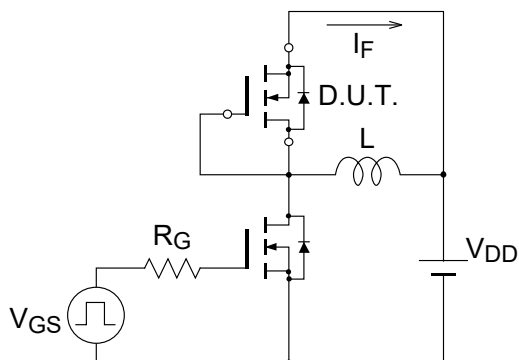


Waveform

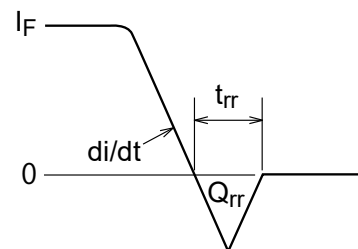


Reverse Recovery

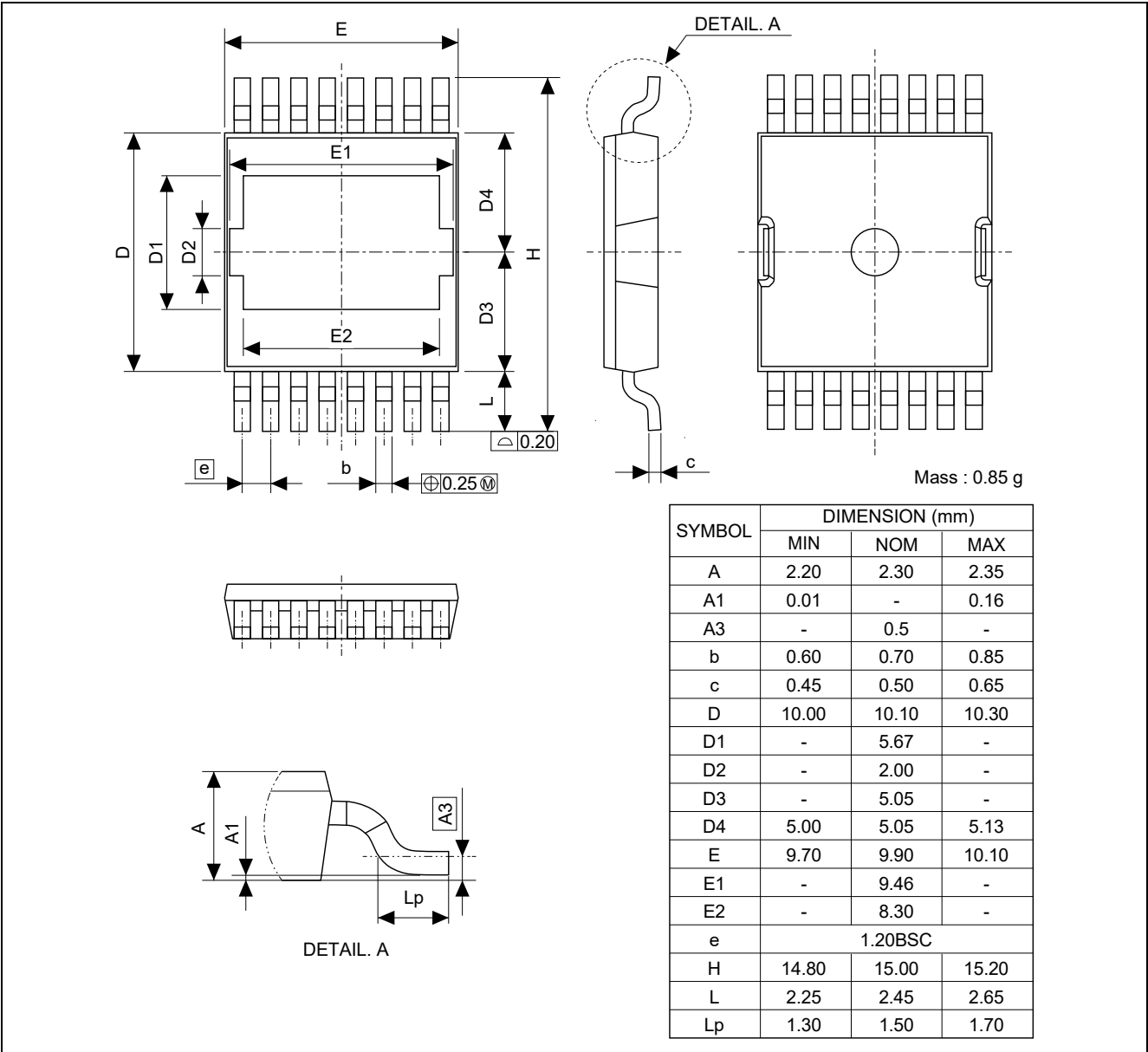
Test Circuit



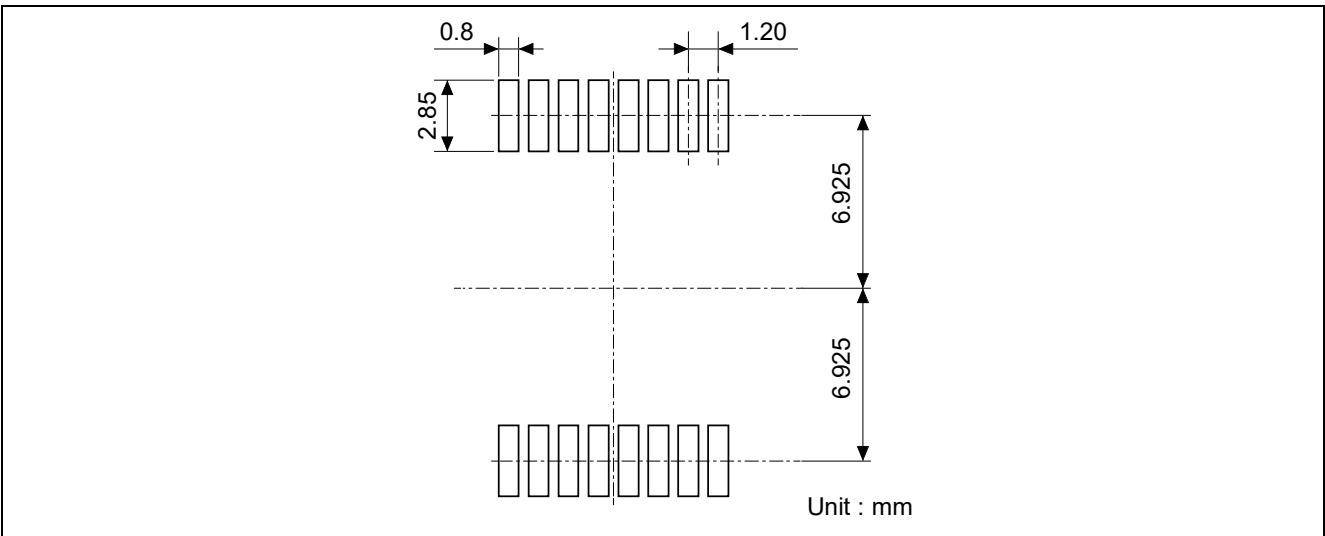
Waveform



Package Dimensions



Mount pad



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