

Data Sheet

RBA160N04AHPF-4UA01

40V - 160A - N-channel Power MOS FET

R07DS1344EJ0200 Rev.2.00 Jul. 8, 2020

Application: Automotive

Description

The RBA160N04AHPF-4UA01 is N-channel MOS Field Effect Transistor designed for high current switching applications.

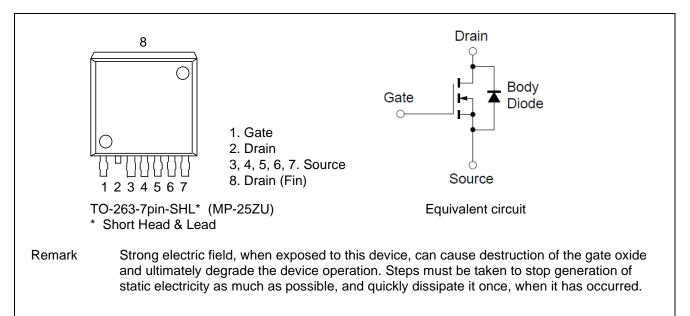
Features

- Super low on-state resistance $R_{DS(on)} = 1.25 \ m\Omega \ MAX. \ (\ V_{GS} = 10 \ V, \ I_D = 80A \)$
- Low input capacitance
 Ciss = 8800pF TYP. (V_{DS} = 25 V)
- Designed for automotive application and AEC-Q101 qualified
- Pb-free (This product does not contain Pb in the external electrode)

Ordering Information

Part No.	Quantity	Shipping container		
RBA160N04AHPF-4UA01#GB0	800pcs/reel	Taping		

Outline



Absolute Maximum Ratings

(T_A=25°C)

Item	Symbol	Ratings	Unit
Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	40	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±20	V
Drain Current (DC) (Tc = 25 °C)	I _{D(DC)}	±160	A
Drain Current (pulse) Note1	I _{D(pulse)}	±640	A
Total Power Dissipation (T _C = 25 °C)	P _{T1}	250	W
Total Power Dissipation (T _A = 25 °C)	P _{T2}	1.8	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-55 to 175	°C
Repetitive Avalanche Current Note2	I _{AR}	55	А
Repetitive Avalanche Energy Note3	Ear	303	mJ

Note 1. $P_W \le 10 \mu s$, Duty Cycle $\le 1\%$

Thermal Resistance

Channel to Case Thermal Resistance	R _{th(ch-C)}	0.60	°C/W
Channel to Ambient Thermal Resistance	R _{th(ch-A)}	83.3	°C/W

Electrical Characteristics

 $(T_A=25^{\circ}C)$

Item	Symbol	Min	Тур	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}			1	μΑ	V _{DS} = 40 V, V _{GS} = 0 V
Gate Leakage Current	I _{GSS}			±100	nA	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$
Gate to Source Threshold Voltage	V _{GS(th)}	2.0	3.0	4.0	V	V _{DS} = V _{GS} , I _D = 250 μA
Drain to Source On-state Resistance	R _{DS(on)} Note4		1.05	1.25	mΩ	Vgs = 10 V, ID = 80 A
Input Capacitance	C _{iss} Note5		8800	13200	pF	V _{DS} = 25 V
Output Capacitance	Coss Note5		980	1470	pF	Vgs = 0 V
Reverse Transfer Capacitance	C _{rss} Note5		530	960	pF	f = 1 MHz
Turn-on Delay Time	t _{d(on)} Note5		32	64	ns	V _{DD} = 20 V, I _D = 80 A
Rise Time	t _r Note5		22	53	ns	V _G S = 10 V
Turn-off Delay Time	t _{d(off)} Note5		97	194	ns	$R_G = 0 \Omega$
Fall Time	t _f Note5		22	53	ns	
Total Gate Charge	Q _G Note5		157	236	nC	V _{DD} = 32 V
Gate to Source Charge	Q _{GS} Note5		37		nC	V _G S = 10 V
Gate to Drain Charge	Q _{GD} Note5		40		nC	ID = 160 A
Body Diode Forward Voltage	V _{F(S-D)} Note4		0.9	1.5	V	IF = 160 A, VGS = 0 V
Reverse Recovery Time	t _{rr} Note5		71		ns	IF = 160 A, VGS = 0 V
Reverse Recovery Charge	Q _{rr} Note5		92		nC	di/dt = 100 A/μs

Note 4. Pulse test

Note 5. Refer value



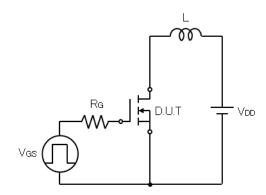
^{2.} $V_{GS} = 20 \rightarrow 0V$, $R_G = 25 \Omega$

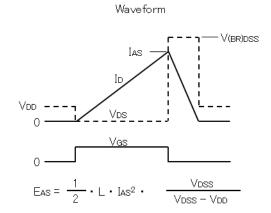
^{3.} L = 100 μH , V_{DD} = 20V , V_{GS} = 20 \rightarrow 0V, R_G = 25 Ω

Test Circuit

Avalanche

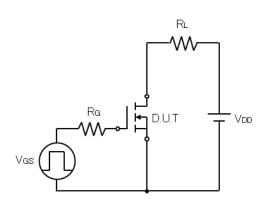
Test Circuit

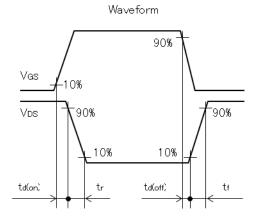




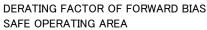
Switching Time

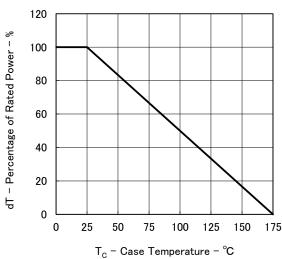
Test Circuit



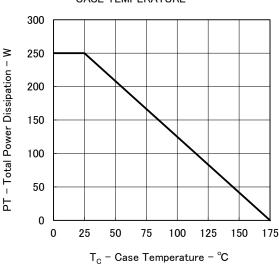


Typical Characteristics (TA = 25°C)

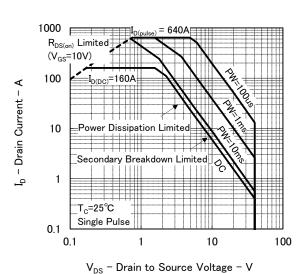




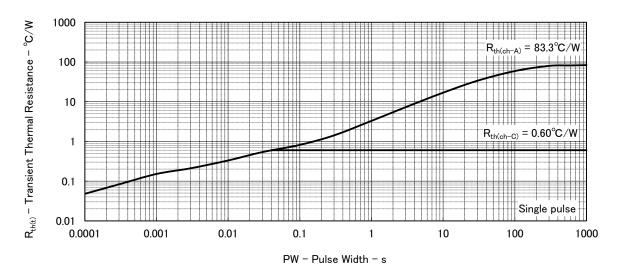
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



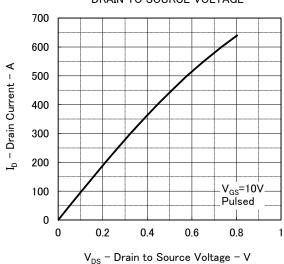
FORWARD BIAS SAFE OPERATING AREA



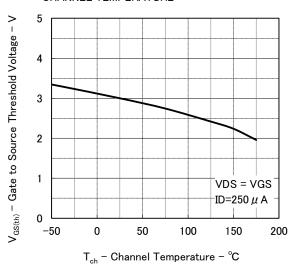
TRANSIENT THREMAL RESISTANCE vs. PULSE WIDTH



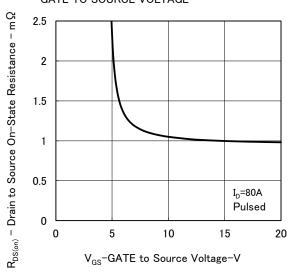
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



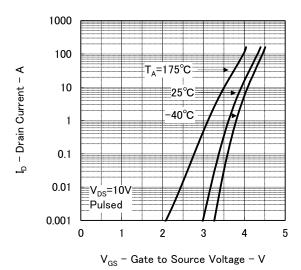
GATE TO SOURCE THRESHOLD VOLTAGE vs. CHANNEL TEMPERATURE



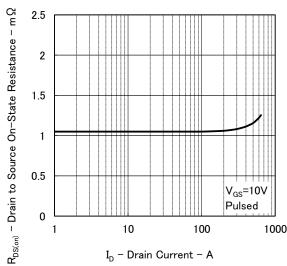
DRAIN TO SOURCE ON-STATERESISTANCE vs. GATE TO SOURCE VOLTAGE



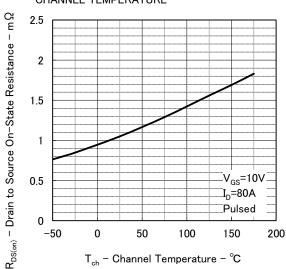
FORWARD TRANSFER CHARACTERISTICS



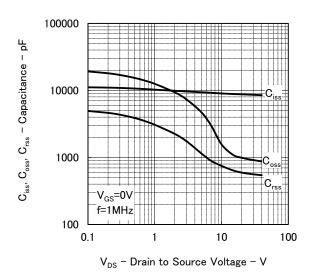
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



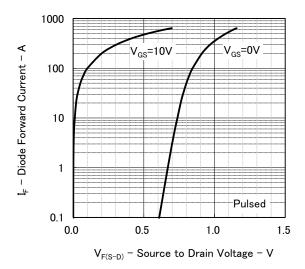
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



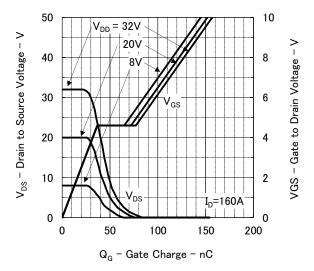
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



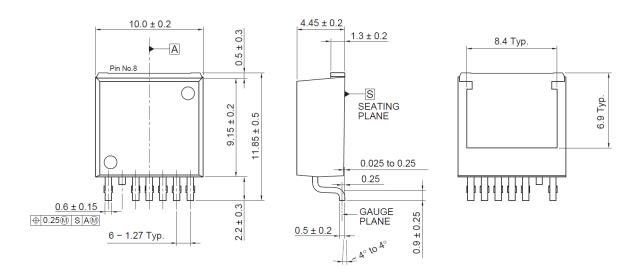
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

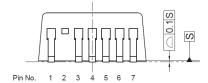


Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]	Package Name
_	PRSS0008DC-A	_	1.39	MP-25ZU

Unit: mm





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