

Data Sheet

RBA250N10CHPF-4UA02

100V - 250A - N-channel Power MOS FET

Application : Automotive

R07DS1488EJ0100 Rev.1.00 Jul. 08, 2020

Description

The RBA250N10CHPF-4UA02 is N-channel MOS Field Effect Transistor designed for high current switching applications.

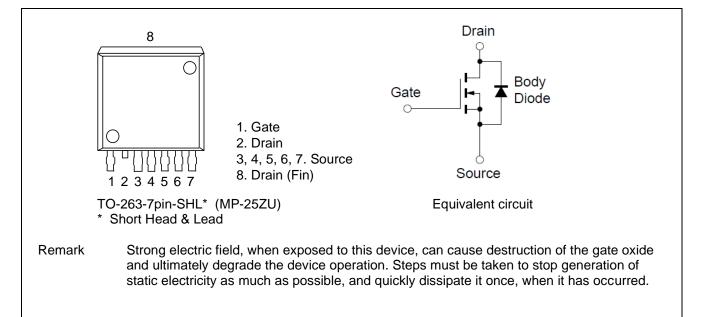
Features

- Super low on-state resistance $R_{DS(on)} = 2.4 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 10 \text{ V}$, $I_D = 125 \text{A}$)
- Low input capacitance
 Ciss = 9500pF TYP. (V_{DS} = 50 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		
RBA250N10CHPF-4UA02#GB0	800pcs/reel	Taping		

Outline



Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	100	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±20	V
Drain Current (DC) (T _C = 25 °C)	I _{D(DC)}	±250	А
Drain Current (pulse) Note1	I _{D(pulse)}	±500	А
Total Power Dissipation (T _C = 25 °C)	P _{T1}	348	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
Avalanche Current Note2	las	64	А
Avalanche Energy Note3	Eas	409	mJ

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

- 2. $V_{GS} = 20 \rightarrow 0V$, $R_G = 25 \Omega$
- 3. L = 100 μ H , V_{DD} = 20V , V_{GS} = 20 \rightarrow 0V, R_G = 25 Ω

Thermal Resistance

Electrical Characteristics

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

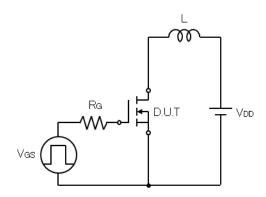
Item	Symbol	Min	Тур	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}			10	μА	V _{DS} = 100 V, V _{GS} = 0 V
Gate Leakage Current	I _{GSS}			±100	nA	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$
Gate to Source Threshold Voltage	$V_{GS(th)}$	1.8	2.8	3.8	V	V _{DS} = V _{GS} , I _D = 250 μA
Drain to Source On-state Resistance	R _{DS(on)} Note4		1.9	2.4	mΩ	Vgs = 10 V, ID = 125 A
Input Capacitance	C _{iss}		9500		pF	V _{DS} = 50 V
Output Capacitance	C _{oss}		460		pF	Vgs = 0 V
Reverse Transfer Capacitance	C _{rss}		190		pF	f = 1 MHz
Turn-on Delay Time	t _{d(on)}		30		ns	V _{DD} = 50 V, I _D = 125 A
Rise Time	t _r		30		ns	Vgs = 10 V
Turn-off Delay Time	t _{d(off)}		130		ns	$R_G = 0 \Omega$
Fall Time	t _f		15		ns	
Total Gate Charge	Q_{G}		190		nC	V _{DD} = 80 V
Gate to Source Charge	Q_{GS}		55		nC	Vgs = 10 V
Gate to Drain Charge	Q_{GD}		50		nC	ID = 250A
Body Diode Forward Voltage	V _{F(S-D)} Note4		0.9	1.5	V	IF = 250 A, VGS = 0 V
Reverse Recovery Time	t _{rr}		50		ns	IF = 250 A, VGS = 0 V
Reverse Recovery Charge	Q _{rr}		85		nC	di/dt = 100 A/μs

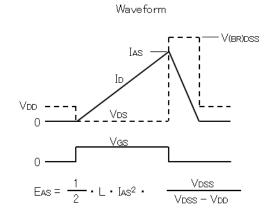
Note 4. Pulse test

Test Circuit

Avalanche

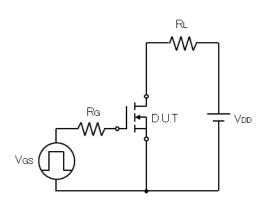
Test Circuit

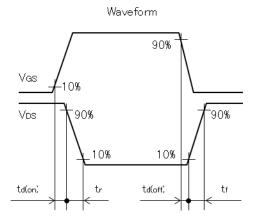




Switching Time

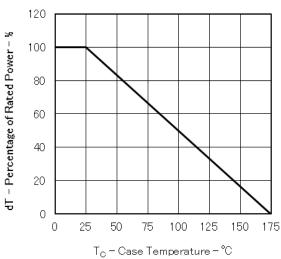
Test Circuit

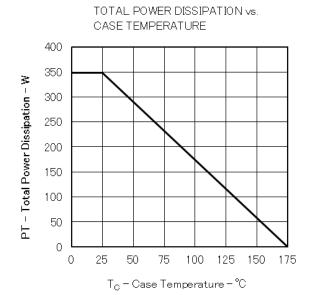




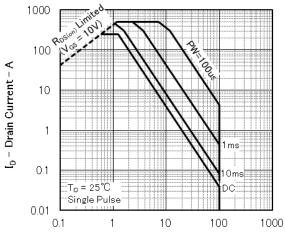
Typical Characteristics

DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



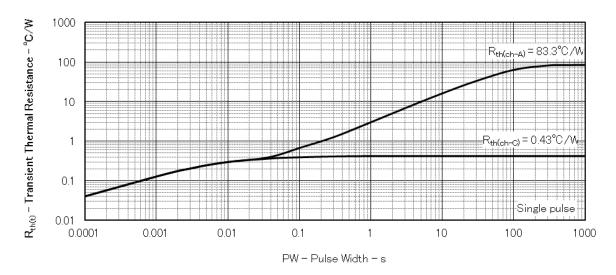


FORWARD BIAS SAFE OPERATING AREA

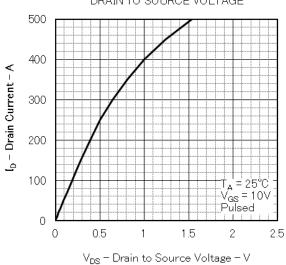


V_{DS} - Drain to Source Voltage - V

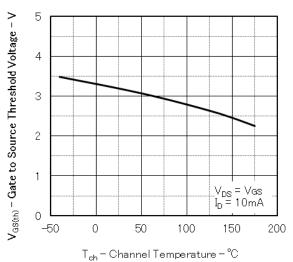
TRANSIENT THREMAL RESISTANCE vs. PULSE WIDTH



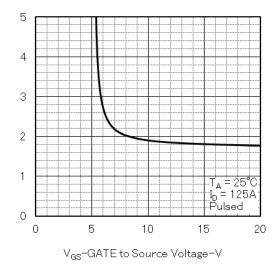




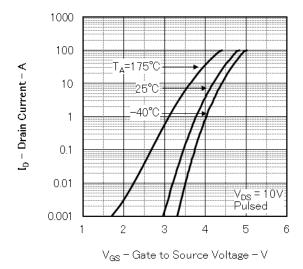
GATE TO SOURCE THRESHOLD VOLTAGE vs. CHANNEL TEMPERATURE



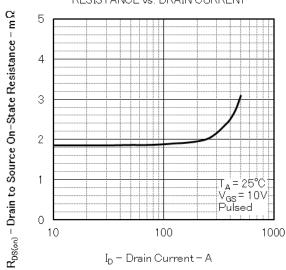
DRAIN TO SOURCE ON-STATERESISTANCE vs GATE TO SOURCE VOLTAGE



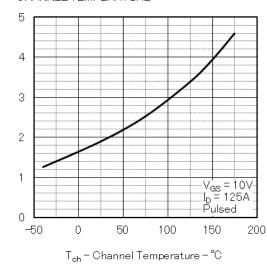
FORWARD TRANSFER CHARACTERISTICS



DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE

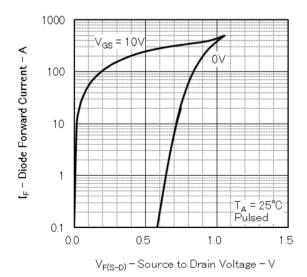


 $R_{DS(on)}$ – Drain to Source On–State Resistance – m Ω

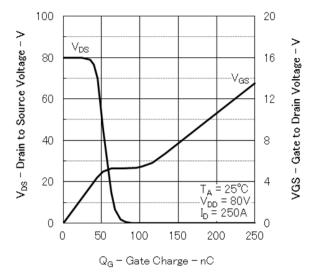
 $R_{DS(on)}$ – Drain to Source On–State Resistance – m Ω

CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

SOURCE TO DRAIN DIODE FORWARD VOLTAGE



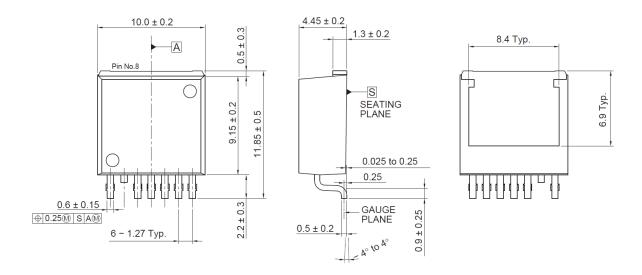
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



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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