

NP83P04PDG

-40V - -83A - P-channel Power MOS FET

R07DS1521EJ0100 Rev.1.00 Jun. 17, 2022

Application : Automotive

Description

This product is P-channel MOS Field Effect Transistor designed for high current switching applications.

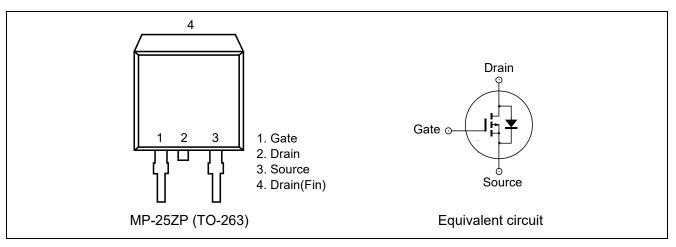
Features

• Super low on-state resistance : $R_{DS(on)}$ = 5.3 m Ω Max. (V_{GS} = -10 V, I_D = -41.5 A)

$$R_{DS(on)}$$
 = 8.0 m Ω Max. (V_{GS} = -4.5 V, I_D = -41.5 A)

- Low input capacitance : Ciss = 9820 pF Typ.
- Designed for automotive application and AEC-Q101 qualified.
- Pb-free (This product does not contain Pb in the external electrode)

Outline



Absolute Maximum Ratings

			(T _a =25°C)
ltem	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) (T _c = 25 °C)	I _{D(DC)}	∓83	A
Drain Current (pulse)	I _{D(pulse)} Notes1	∓249	A
Total Power Dissipation (T_c = 25 °C)	P _{T1}	150	W
Total Power Dissipation ($T_a = 25 \text{ °C}$)	P _{T2}	1.8	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-55 to 175	°C
Single Avalanche Current	I _{AS} Notes2	56	A
Single Avalanche Energy	E _{AS} ^{Notes2}	315	mJ

Notes 1. PW \leq 10 μ s , Duty Cycle \leq 1%

2. Starting T_ch=25 $^\circ\!\!{\rm C}$, V_DD = -20V , R_G = 25 Ω , V_Gs = -20 \rightarrow 0V , L = 100 μH



Thermal Resistance

Channel to Case Thermal Resistance	Rth(ch-c) Notes3	1.0	°C/W
Channel to Ambient Thermal Resistance	$R_{th(ch-a)}^{Notes3}$	83.3	°C/W

Electrical Characteristics

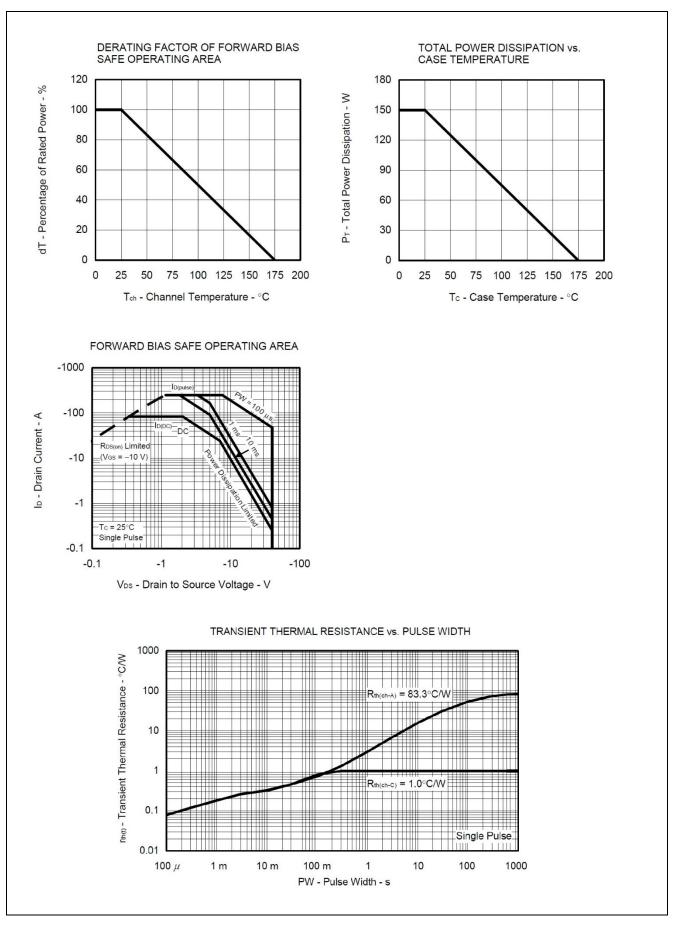
						(T _a =25°C)
Item	Symbol	Min	Тур	Max	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}		_	-10	μA	V _{DS} = -40 V, V _{GS} = 0 V
Gate Leakage Current	I _{GSS}		—	∓100	nA	$V_{GS} = \mp 20 \text{ V}, V_{DS} = 0 \text{ V}$
Gate to Source Threshold Voltage	$V_{GS(th)}$	-1.0	-1.6	-2.5	V	V _{DS} = -10 V, I _D = -1 mA
Forward Transfer Admittance	yfs ^{Notes4}	30	60	_	S	V _{DS} = -10 V, I _D = -41.5 A
Drain to Source On-state Resistance	R _{DS(on)1} Notes4		4.1	5.3	mΩ	Vgs = -10 V, Id = -41.5 A
	R _{DS(on)2} Notes4		5.1	8.0	mΩ	V _{GS} = -4.5 V, I _D = -41.5 A
Input Capacitance	C _{iss}		9820		pF	V _{DS} = -10 V
Output Capacitance	C _{oss}		1500		pF	V _{GS} = 0 V
Reverse Transfer Capacitance	C _{rss}		850		pF	f = 1 MHz
Turn-on Delay Time	t _{d(on)}		35		ns	V _{DD} = -20 V
Rise Time	t _r		21	_	ns	I⊳ = -41.5 A
Turn-off Delay Time	t _{d(off)}		245		ns	V _{GS} = -10 V
Fall Time	t _f		120		ns	R _G = 0 Ω
Total Gate Charge	Qg		200		nC	V _{DD} = -32 V
Gate to Source Charge	Q _{gs}		25		nC	V _{GS} = -10 V
Gate to Drain Charge	Q _{gd}		53		nC	I _D = -83A
Body Diode Forward Voltage	V _{F(S-D)} ^{Notes4}		0.93	1.5	V	IF = -83 A, VGS = 0 V
Reverse Recovery Time	t _{rr}		57		ns	IF = -83 A, VGS = 0 V
Reverse Recovery Charge	Q _{rr}		92		nC	di/dt = -100 A/ <i>µ</i> s

Notes 3. Designed target value on Renesas measurement condition. Not subject to production test.

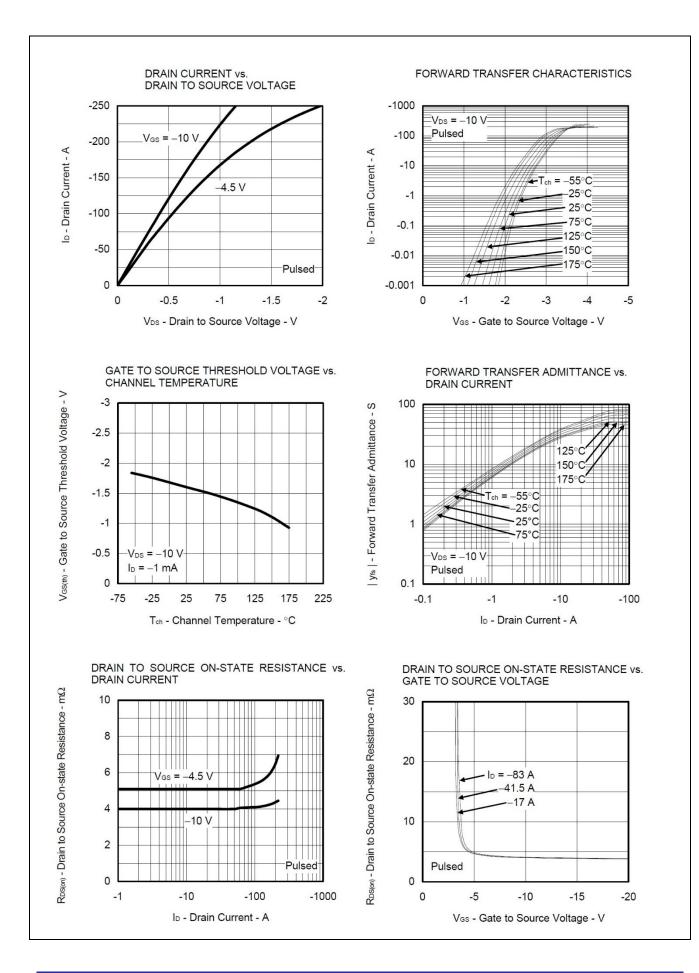
4. Pulse test.



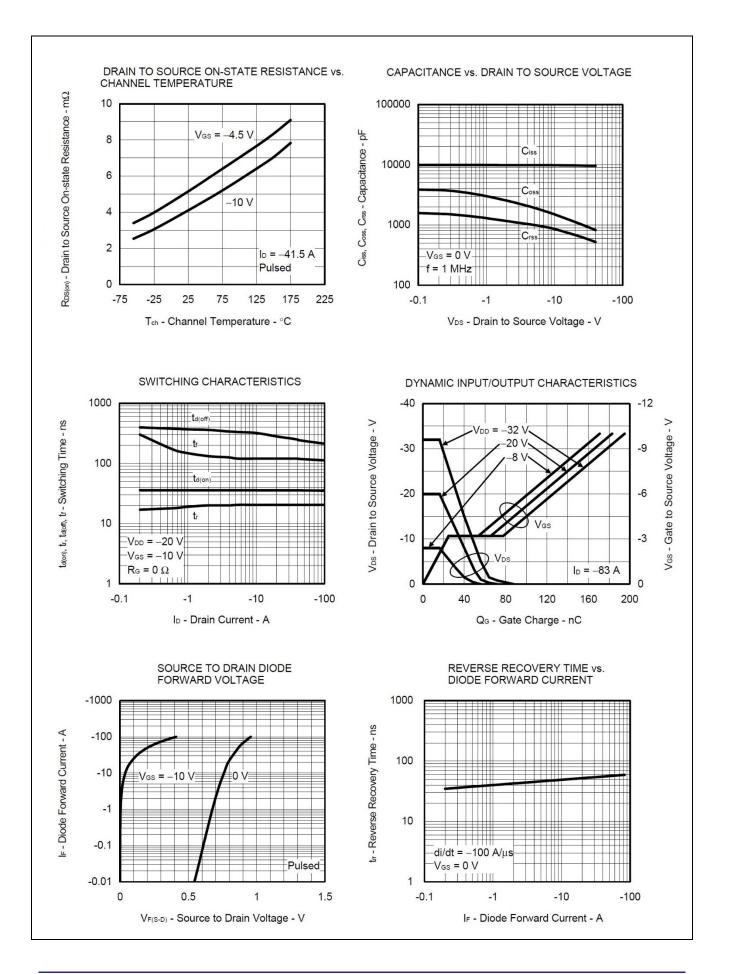
Typical Characteristics





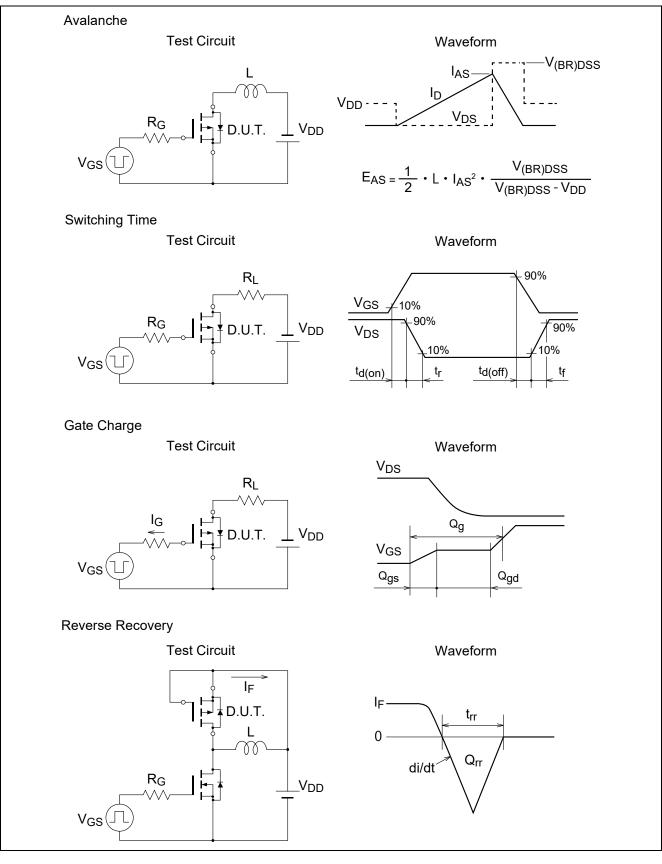




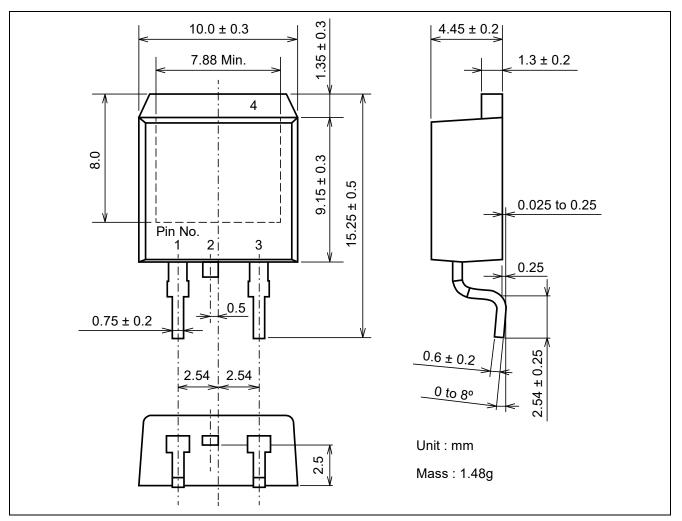


RENESAS

Test Circuit



Package Dimensions



Ordering Information

Part No.	Quantity	Shipping container
NP83P04PDG-E1-AY	800pcs/reel	Taping

Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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