

## SIPMOS® Power-Transistor

### Feature

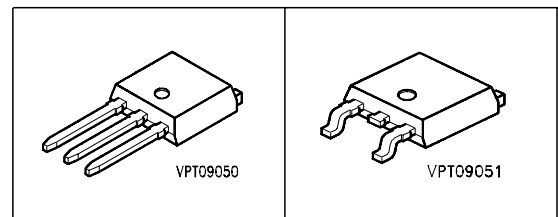
- N-Channel
- Enhancement mode
- 175°C operating temperature
- Avalanche rated
- dv/dt rated

### Product Summary

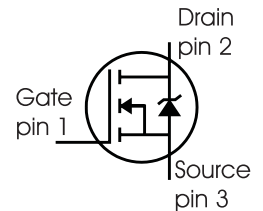
$V_{DS}$	100	V
$R_{DS(on)}$	179	mΩ
$I_D$	10.5	A

P-TO251

P-TO252



Type	Package	Ordering Code	Marking
SPD11N10	P-TO252	-	11N10
SPU11N10	P-TO251	-	11N10



### Maximum Ratings, at $T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current $T_C=25\text{ °C}$ $T_C=100\text{ °C}$	$I_D$	10.5 -	A
Pulsed drain current $T_C=25\text{ °C}$	$I_D \text{ puls}$	42	
Avalanche energy, single pulse $I_D=10.5\text{ A}$ , $V_{DD}=25\text{ V}$ , $R_{GS}=25\text{ }\Omega$	$E_{AS}$	60	mJ
Reverse diode dv/dt $I_S=10.5\text{ A}$ , $V_{DS}=80\text{ V}$ , $di/dt=200\text{ A}/\mu\text{s}$ , $T_{jmax}=175\text{ °C}$	dv/dt	6	kV/ $\mu\text{s}$
Gate source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation $T_C=25\text{ °C}$	$P_{tot}$	48	W
Operating and storage temperature	$T_j, T_{stg}$	-55... +175	°C
IEC climatic category; DIN IEC 68-1		55/175/56	

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$	-	-	3.1	K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$	-	-	100	
SMD version, device on PCB: @ min. footprint @ 6 cm <sup>2</sup> cooling area <sup>1)</sup>	$R_{thJA}$	-	-	75 50	

**Electrical Characteristics**, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Drain-source breakdown voltage $V_{GS}=0V, I_D=1mA$	$V_{(BR)DSS}$	100	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = 21\ \mu A$	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current $V_{DS}=100V, V_{GS}=0V, T_j=25^\circ C$ $V_{DS}=100V, V_{GS}=0V, T_j=125^\circ C$	$I_{DSS}$	-	0.01 1	1 100	$\mu A$
Gate-source leakage current $V_{GS}=20V, V_{DS}=0V$	$I_{GSS}$	-	1	100	
Drain-source on-state resistance $V_{GS}=10V, I_D=-A$	$R_{DS(on)}$	-	tbd	179	m $\Omega$

<sup>1</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu m$  thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic Characteristics**

Transconductance	$g_{fs}$	$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = -A$	tbd	tbd	-	S
Input capacitance	$C_{iss}$	$V_{GS} = 0V$ , $V_{DS} = 25V$ , $f = 1MHz$	-	tbd	tbd	pF
Output capacitance	$C_{oss}$		-	tbd	tbd	
Reverse transfer capacitance	$C_{rss}$		-	tbd	tbd	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50V$ , $V_{GS} = 10V$ , $I_D = 10.5A$ , $R_G = 27\Omega$	-	tbd	tbd	ns
Rise time	$t_r$		-	tbd	tbd	
Turn-off delay time	$t_{d(off)}$		-	tbd	tbd	
Fall time	$t_f$		-	tbd	tbd	

**Gate Charge Characteristics**

Gate to source charge	$Q_{gs}$	$V_{DD} = 80V$ , $I_D = 10.5A$	-	tbd	tbd	nC
Gate to drain charge	$Q_{gd}$		-	tbd	tbd	
Gate charge total	$Q_g$	$V_{DD} = 80V$ , $I_D = 10.5A$ , $V_{GS} = 0$ to $10V$	-	tbd	tbd	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 80V$ , $I_D = 10.5A$	-	tbd	-	V

**Reverse Diode**

Inverse diode continuous forward current	$I_S$	$T_C = 25^\circ\text{C}$	-	-	10.5	A
Inverse diode direct current, pulsed	$I_{SM}$		-	-	42	
Inverse diode forward voltage	$V_{SD}$	$V_{GS} = 0V$ , $I_F = 10.5A$	-	tbd	tbd	V
Reverse recovery time	$t_{rr}$	$V_R = 50V$ , $I_F = I_S$ , $di_F/dt = 100A/\mu s$	-	tbd	tbd	ns
Reverse recovery charge	$Q_{rr}$		-	tbd	tbd	nC

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