

SIPMOS® Power-Transistor

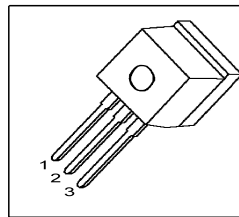
Feature

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

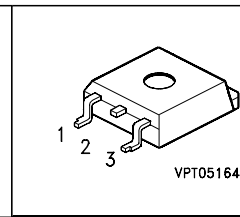
Product Summary

V_{DS}	100	V
$R_{DS(on)}$	85	mΩ
I_D	21	A

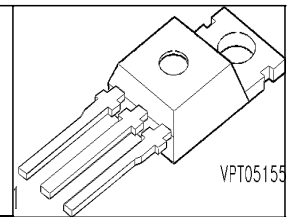
P-TO262-3-1



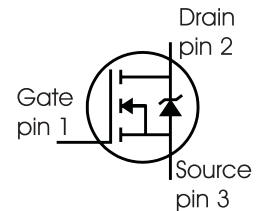
P-TO263-3-2



P-TO220-3-1



Type	Package	Ordering Code	Marking
SPP21N10	P-TO220-3-1	-	21N10
SPB21N10	P-TO263-3-2	-	21N10
SPI21N10	P-TO262-3-1	-	21N10



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

Parameter	Symbol	Value	Unit
Continuous drain current	I_D	21	A
$T_C=25\text{ °C}$			
$T_C=100\text{ °C}$		-	
Pulsed drain current	$I_D \text{ puls}$	84	
$T_C=25\text{ °C}$			
Avalanche energy, single pulse	E_{AS}	130	mJ
$I_D=21\text{ A}$, $V_{DD}=25\text{ V}$, $R_{GS}=25\text{ Ω}$			
Reverse diode dv/dt	dv/dt	6	kV/μs
$I_S=21\text{ A}$, $V_{DS}=80\text{ V}$, $di/dt=200\text{ A/μs}$, $T_{jmax}=175\text{ °C}$			
Gate source voltage	V_{GS}	±20	V
Power dissipation	P_{tot}	104	W
$T_C=25\text{ °C}$			
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.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.5	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	100	
SMD version, device on PCB: @ min. footprint @ 6 cm ² cooling area ¹⁾	R_{thJA}	-	-	75 50	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage $V_{GS}=0V, I_D=1mA$	$V_{(BR)DSS}$	100	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = 44\ \mu A$	$V_{GS(th)}$	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	μA
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	85	$m\Omega$

¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, 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	$t_{d(on)}$	$V_{DD} = 50V$, $V_{GS} = 10V$, $I_D = 21A$, $R_G = 13\Omega$	-	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}	$V_{DD} = 17V$, $I_D = 21A$	-	tbd	tbd	nC
Gate to drain charge	Q_{gd}		-	tbd	tbd	
Gate charge total	Q_g	$V_{DD} = 17V$, $I_D = 21A$, $V_{GS} = 0$ to $10V$	-	tbd	tbd	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 17V$, $I_D = 21A$	-	tbd	-	V

Reverse Diode

Inverse diode continuous forward current	I_S	$T_C = 25^\circ\text{C}$	-	-	21	A
Inverse diode direct current, pulsed	I_{SM}		-	-	84	
Inverse diode forward voltage	V_{SD}	$V_{GS} = 0V$, $I_F = 21A$	-	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

Published by
Infineon Technologies AG,
Bereichs Kommunikation
St.-Martin-Strasse 53,
D-81541 München
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