OptiMOS® Power-Transistor

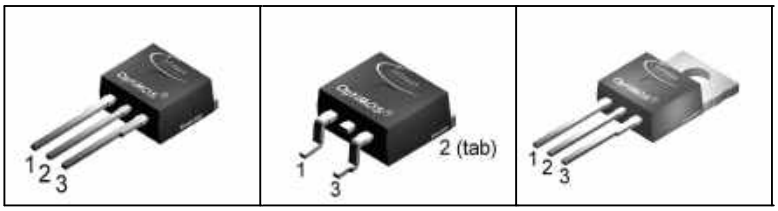
Feature

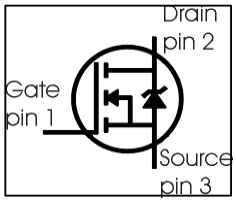
- N-Channel
- Enhancement mode
- Excellent Gate Charge x $R_{DS(on)}$ product (FOM)
- Superior thermal resistance
- 175°C operating temperature
- Avalanche rated
- d*v*/d*t* rated

Product Summary

V_{DS}	30	V
$R_{DS(on)}$ max. SMD version	3.1	mΩ
I_D	80	A

P- TO262 -3-1 | P- TO263 -3-2 | P- TO220 -3-1





Type	Package	Ordering Code	Marking
SPP80N03S2-03	P- TO220 -3-1	Q67040-S4247	2N0303
SPB80N03S2-03	P- TO263 -3-2	Q67040-S4258	2N0303
SPI80N03S2-03	P- TO262 -3-1	Q67042-S4079	2N0303

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current 1) T_C=25°C	I_D	 80 80	A
Pulsed drain current T_C=25°C	$I_{D\ puls}$	320	
Avalanche energy, single pulse I_D=80 A , V_{DD}=25V, R_{GS}=25Ω	E_{AS}	810	mJ
Repetitive avalanche energy, limited by T_{jmax} 2)	E_{AR}	30	
Reverse diode d*v*/d*t* I_S=80A, V_{DS}=24V, d*i*/d*t*=200A/µs, T_{jmax}=175°C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	±20	V
Power dissipation T_C=25°C	P_{tot}	300	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.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	0.3	0.5	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	62	
@ 6 cm^2 cooling area [3]		-	-	40	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS}=0V, I_D=1mA	$V_{(BR)DSS}$	30	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D=250µA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=30V, V_{GS}=0V, T_j=25°C		-	0.01	1	
V_{DS}=30V, V_{GS}=0V, T_j=125°C		-	1	100	
Gate-source leakage current V_{GS}=20V, V_{DS}=0V	I_{GSS}	-	1	100	nA
Drain-source on-state resistance [4]	$R_{DS(on)}$				mΩ
V_{GS}=10V, I_D=80A		-	2.6	3.4	
V_{GS}=10V, I_D=80A, SMD version		-	2.3	3.1	

[1]Current limited by bondwire ; with an R_{thJC} = 0.5K/W the chip is able to carry I_D= 307A at 25°C, for detailed information see app.-note ANPS071E available at *www.infineon.com/optimos*

[2]Defined by design. Not subject to production test.

[3]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

[4]Diagrams are related to straight lead versions

Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Transconductance	g_{fs}	$V_{DS}\geq 2*I_D*R_{DS(on)max}$, I_D=80A	66	132	-	S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	5280	7020	pF
Output capacitance	C_{oss}		-	2420	3220	
Reverse transfer capacitance	C_{rss}		-	470	700	
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V, V_{GS}=10V, I_D=80A, R_G=2.2Ω	-	22	33	ns
Rise time	t_r		-	325	490	
Turn-off delay time	$t_{d(off)}$		-	90	140	
Fall time	t_f		-	110	160	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=24V, I_D=80A	-	26	34	nC
Gate to drain charge	Q_{gd}		-	45	68	
Gate charge total	Q_g	V_{DD}=24V, I_D=80A, V_{GS}=0 to 10V	-	110	150	
Gate plateau voltage	$V_{(plateau)}$	V_{DD} = 24 V , I_D=80A	-	5.2	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_C=25°C	-	-	80	A
Inv. diode direct current, pulsed	I_{SM}		-	-	320	
Inverse diode forward voltage	V_{SD}	V_{GS}=0V, I_F=80A	-	0.9	1.3	V
Reverse recovery time	t_{rr}	V_R=15V, I_F=I_S, di_F/dt=100A/µs	-	65	80	ns
Reverse recovery charge	Q_{rr}		-	87	110	nC