

## OptiMOS<sup>®</sup>-P Power-Transistor

### Feature

- P-Channel
- Enhancement mode
- Logic Level
- Automotive AEC Q101 qualified
- Green package (lead free)
- MSL1 up to 260°C peak reflow temperature
- 175°C operating temperature
- Avalanche rated
- dv/dt rated

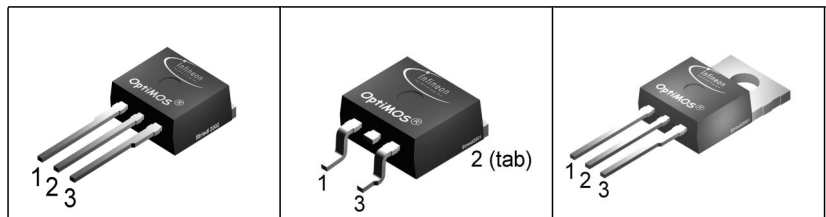
### Product Summary

$V_{DS}$	-30	V
$R_{DS(on)}$ max. SMD version	4	mΩ
$I_D$	-80	A

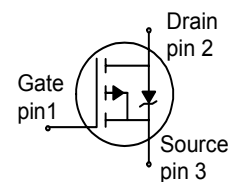
P- TO262 -3-1

P- TO263 -3-2

P- TO220 -3-1



Type	Package	Ordering Code	Marking
IPP80P03P3L-04	P- TO220 -3-1	-	3P03L04
IPB80P03P3L-04	P- TO263 -3-2	-	3P03L04
IPI80P03P3L-04	P- TO262 -3-1	-	3P03L04



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

Parameter	Symbol	Value	Unit
Continuous drain current <sup>1)</sup>	$I_D$		A
$T_C=25\text{ °C}$		-80	
$T_C=100\text{ °C}$		-80	
Pulsed drain current	$I_D$ puls	-320	
$T_C=25\text{ °C}$			
Avalanche energy, single pulse	$E_{AS}$	432	mJ
$I_D=-80\text{ A}$ , $V_{DD}=-25\text{ V}$ , $R_{GS}=25\text{ Ω}$			
Reverse diode dv/dt	dv/dt	-6	kV/μs
$I_S=-80\text{ A}$ , $V_{DS}=-24\text{ V}$ , $di/dt=200\text{ A/μs}$ , $T_{jmax}=175\text{ °C}$			
Gate source voltage	$V_{GS}$	±20	V
Power dissipation	$P_{tot}$	200	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.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$	-	0.5	0.75	K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$	-	-	62	
SMD version, device on PCB: @ min. footprint @ 6 cm <sup>2</sup> cooling area <sup>2)</sup>	$R_{thJA}$	-	-	62 40	

### 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 $V_{GS}=0, I_D=-250\mu\text{A}$	$V_{(BR)DSS}$	-30	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D=-430\mu\text{A}$	$V_{GS(th)}$	-1	-1.5	-2	
Zero gate voltage drain current $V_{DS}=-30\text{V}, V_{GS}=0, T_j=25^\circ\text{C}$ $V_{DS}=-30\text{V}, V_{GS}=0, T_j=150^\circ\text{C}^3)$	$I_{DSS}$	-	-0.1 -10	-1 -100	$\mu\text{A}$
Gate-source leakage current $V_{GS}=\pm 20\text{V}, V_{DS}=0$	$I_{GSS}$	-	$\pm 10$	$\pm 100$	
Drain-source on-state resistance <sup>4)</sup> $V_{GS}=-4.5\text{V}, I_D=-50\text{A}$ $V_{GS}=-4.5\text{V}, I_D=-50\text{A}, \text{SMD version}$	$R_{DS(on)}$	-	6.3 6	7.6 7.3	m $\Omega$
Drain-source on-state resistance <sup>4)</sup> $V_{GS}=-10\text{V}, I_D=-80\text{A}$ $V_{GS}=-10\text{V}, I_D=-80\text{A}, \text{SMD version}$	$R_{DS(on)}$	-	3.5 3.2	4.3 4	

<sup>1</sup>Current limited by bondwire ; with an  $R_{thJC} = 0.75\text{K/W}$  the chip is able to carry  $I_D = 171\text{A}$  at  $25^\circ\text{C}$ , for detailed information see app.-note ANPS071E available at [www.infineon.com/optimos](http://www.infineon.com/optimos)

<sup>2</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air;  $t \leq 10$  sec.

<sup>3</sup>Defined by design. Not subject to production test.

<sup>4</sup>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 $ , $R_{DS(on)max}$ , $I_D = -80A$	63	125	-	S
Input capacitance	$C_{iss}$	$V_{GS} = 0$ , $V_{DS} = -25V$ , $f = 1MHz$	-	7720	-	pF
Output capacitance	$C_{oss}$		-	2050	-	
Reverse transfer capacitance	$C_{rss}$		-	1673	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15V$ , $V_{GS} = -10V$ , $I_D = -1A$ , $R_G = 6\Omega$	-	30	45	ns
Rise time	$t_r$		-	45	68	
Turn-off delay time	$t_{d(off)}$		-	200	300	
Fall time	$t_f$		-	180	270	

**Gate Charge Characteristics**

Gate to source charge	$Q_{gs}$	$V_{DD} = -24V$ , $I_D = -80A$	-	-25	-38	nC
Gate to drain charge	$Q_{gd}$		-	-85	-128	
Gate charge total	$Q_g$	$V_{DD} = -24V$ , $I_D = -80A$ , $V_{GS} = 0$ to $-10V$	-	-200	-300	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = -24V$ , $I_D = -80A$	-	-3	-	V

**Reverse Diode**

Inverse diode continuous forward current	$I_S$	$T_A = 25^\circ C$	-	-	-80	A
Inv. diode direct current, pulsed	$I_{SM}$		-	-	-320	
Inverse diode forward voltage	$V_{SD}$	$V_{GS} = 0$ , $ I_F  =  I_D $	-	-1.1	-1.3	V
Reverse recovery time	$t_{rr}$	$V_R = -15V$ , $ I_F  =  I_D $ , $di_F/dt = 100A/\mu s$	-	60	75	ns
Reverse recovery charge	$Q_{rr}$		-	75	95	nC

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**Further information**

Please notice that the part number is BIPP80P03P3L-04, BIPB80P03P3L-04 and BIP80P03P3L-04, for simplicity the device is referred to by the term IPP80P03P3L-04, IPB80P03P3L-04 and IPI80P03P3L-04 throughout this documentation