

OptiMOS®-P Power-Transistor

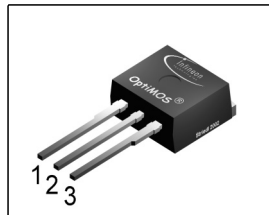
Feature

- 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

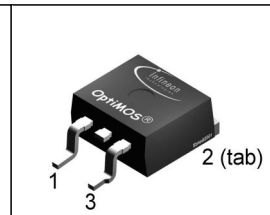
Product Summary

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

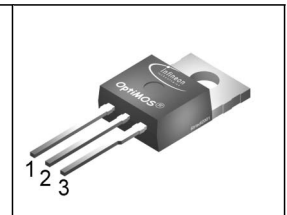
P- TO262 -3-1



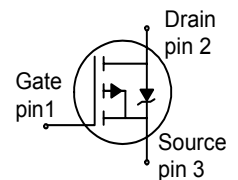
P- TO263 -3-2



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

Parameter	Symbol	Value	Unit
Continuous drain current ¹⁾ $T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	I_D	-80 -80	A
Pulsed drain current $T_C=25^\circ\text{C}$	$I_{D \text{ puls}}$	-320	
Avalanche energy, single pulse $I_D=-80 \text{ A}$, $V_{DD}=-25\text{V}$, $R_{GS}=25\Omega$	E_{AS}	432	mJ
Reverse diode dv/dt $I_S=-80\text{A}$, $V_{DS}=-24\text{V}$, $di/dt=200\text{A}/\mu\text{s}$, $T_{jmax}=175^\circ\text{C}$	dv/dt	-6	kV/ μs
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_C=25^\circ\text{C}$	P_{tot}	200	W
Operating and storage temperature	T_j, T_{stg}	-55... +175	$^\circ\text{C}$
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}	-	0.5	0.75	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 ²⁾		-	-	40	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage $V_{GS}=0, I_D=-250\mu A$	$V_{(BR)DSS}$	-30	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D=-430\mu A$	$V_{GS(th)}$	-1	-1.5	-2	
Zero gate voltage drain current $V_{DS}=-30V, V_{GS}=0, T_j=25^{\circ}C$ $V_{DS}=-30V, V_{GS}=0, T_j=150^{\circ}C^{3)}$	I_{DSS}	- -	-0.1 -10	-1 -100	μA
Gate-source leakage current $V_{GS}=\pm 20V, V_{DS}=0$	I_{GSS}	-	± 10	± 100	
Drain-source on-state resistance ⁴⁾ $V_{GS}=-4.5V, I_D=-50A$ $V_{GS}=-4.5V, I_D=-50A, SMD\ version$	$R_{DS(on)}$	- -	6.3 6	7.6 7.3	m Ω
Drain-source on-state resistance ⁴⁾ $V_{GS}=-10V, I_D=-80A$ $V_{GS}=-10V, I_D=-80A, SMD\ version$	$R_{DS(on)}$	- -	3.5 3.2	4.3 4	

¹Current 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°C , for detailed information see app.-note ANPS071E available at www.infineon.com/optimos

²Device 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; $t \leq 10$ sec.

³Defined by design. Not subject to production test.

⁴Diagrams 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