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AP180N03G-TP
N-Channel Enhancement MOSFET

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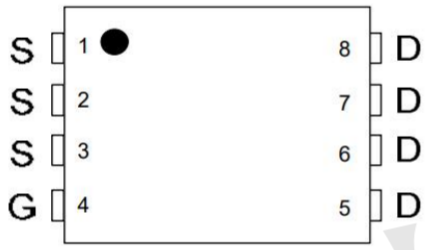
Product Summary

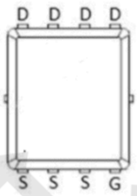
- V_{DS} 30 V
- I_{DS} (at V_{GS}=10V) 160A
- $R_{DS\ (ON)}$ (at V_{GS}=10V) ≤1.4mΩ (TYP)

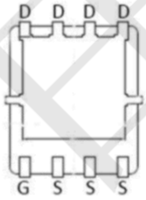
Application

- Load switch
- High Frequency Switching and Synchronous Rectification
- Active Clamp in Intermediate
- DC/DC Power Supplies

Package and Pin Configuration







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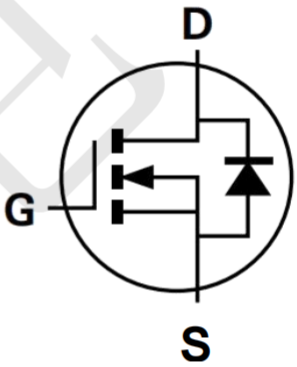
Circuit diagram



Absolute Maximum Ratings

(T_A=25℃unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25℃	I_D	160	A
	T_C=100℃		100	
Pulsed Drain Current		I_{DM}	640	A
Single Pulse Avalanche Energy		EAS	870	mJ
Total Power Dissipation	T_C=25℃	P_{DTOT}	57	W
Operating Junction Temperature Range		T_J	-55 to +150	℃
Storage Temperature Range		T_{stg}	-55 to +150	℃

Thermal Characteristic

PARAMETER		Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance	PCB Mount (Note)	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction-Case		$R_{\theta JC}$	2.2	°C/W

Note : The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

Electrical Characteristics (T_A=25℃unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	BV_{DSS}	30	--	--	V
Gate-Source Threshold Voltage	V_{DS}=V_{GS}, I_D= 250μA	$V_{GS(th)}$	1.0	1.5	2.2	V
Gate-Source Leakage	V_{DS}=0V, V_{GS}= ±20V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS}= 30V, V_{GS}=0V	I_{DSS}	--	0.1	1.0	μA
	V_{DS}=30V, T_J=55°C		--	1.0	5.0	μA
Drain-Source On-State Resistance (Note 1)	V_{GS}= 10V, I_D= 20A	R_{DS}(on)	--	1.4	2.2	mΩ
	V_{GS}= 4.5V, I_D= 15A		--	2.1	3.2	
Forward Transconductance (Note 2)	V_{DS}= 5V, I_D= 20A	g_{fs}	--	75	--	S
Dynamic (Note 2)						
Total Gate Charge (Note 3)	V_{DS} = 30V, I_D = 30A, V_{GS} = 10V	Q_g	--	142	--	nC
Gate-Source Charge (Note 3)		Q_{gs}	--	92	--	
Gate-Drain Charge (Note 3)		Q_{gd}	--	18	--	
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, F= 1.0MHz	C_{iss}	--	7428	--	pF
Output Capacitance		C_{oss}	--	664	--	
Reverse Transfer Capacitance		C_{rss}	--	544	--	
Switching						
Turn-On Delay Time (Note 3)	V_{DD} =20V, I_D= 1A, V_{GS} = 10V, R_G = 10Ω	$t_{d(on)}$	--	18	--	nS
Rise Time (Note 3)		t_r	--	10	--	
Turn-Off Delay Time (Note 3)		$t_{d(off)}$	--	64	--	
Fall Time (Note 3)		t_f	--	16	--	
Source-Drain Diode Ratings and Characteristics (Note 2)						
Forward Voltage	V_{GS} = 0V, I_F = 10A	V_{SD}	--	0.7	1.2	V
Continuous Source Current	Integral reverse diode in the MOSFET	I_S	--	--	160	A
Pulsed Current (Note 1)		I_{SM}	--	--	640	A

Notes:

1. Pulse test; pulse width ≤ 300 μS, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.
3. Independent of operating temperature

Typical Electrical and Thermal Characteristics

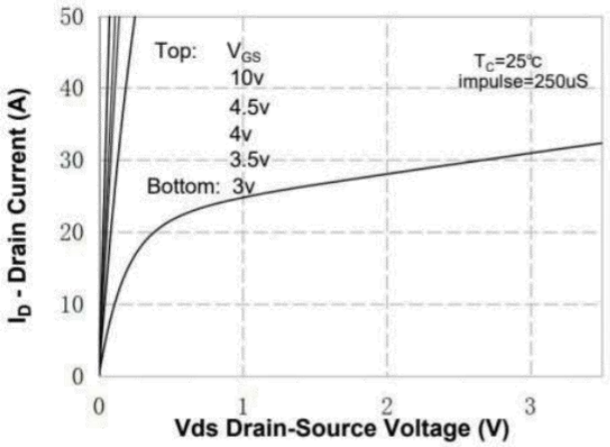


Figure 1. On-Region Characteristics

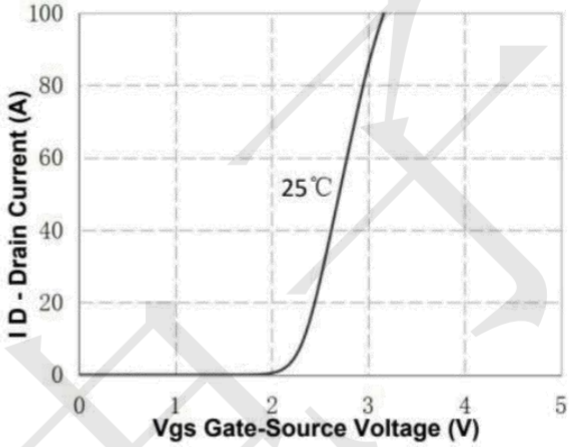


Figure 2. Transfer Characteristics

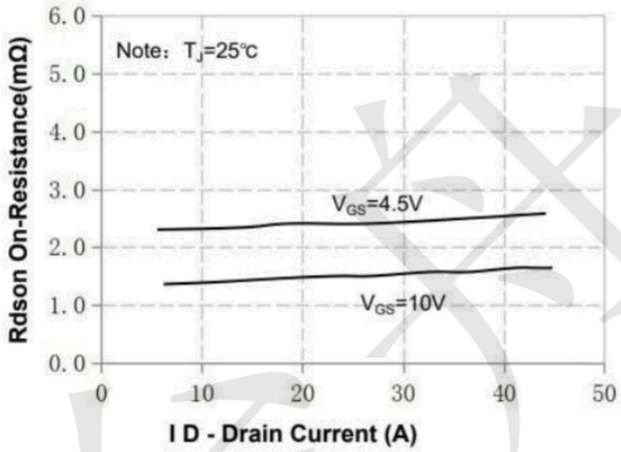


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

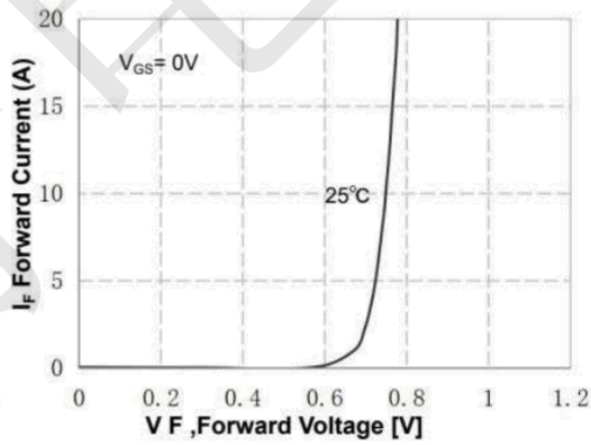


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

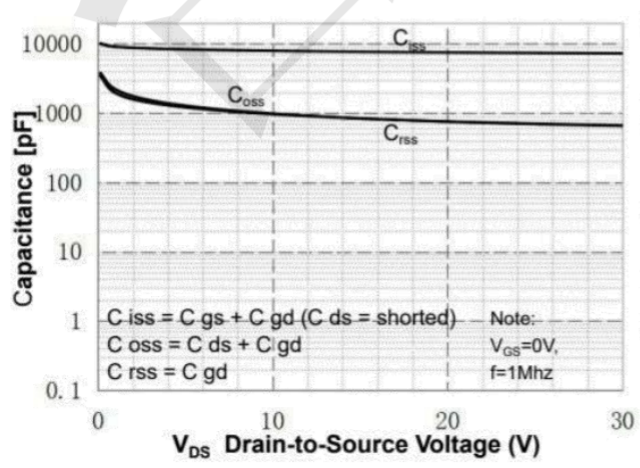


Figure 5. Capacitance Characteristics

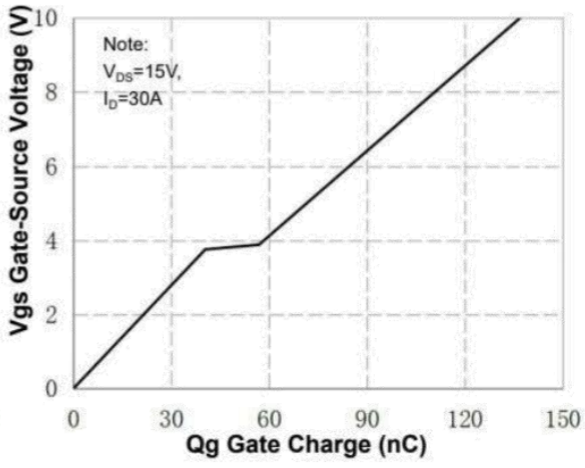


Figure 6. Gate Charge Characteristics

Package Information

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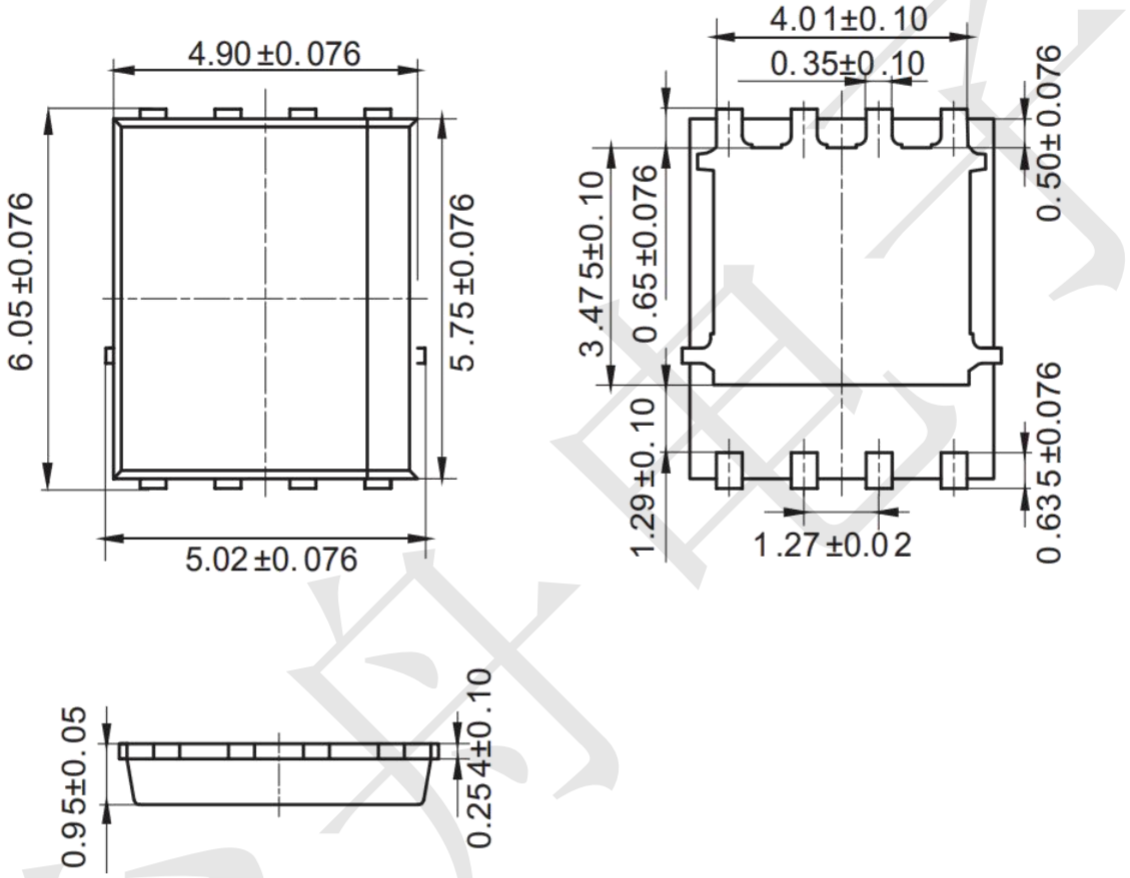

Mounting Pad Layout (unit: mm)

