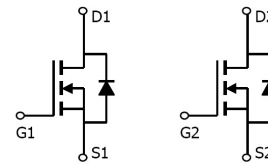


**Feature**

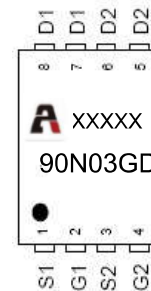
- 30V,80A  
 $R_{DS(ON)} < 5.8m\Omega @ V_{GS}=10V$  TYP:5.2 m $\Omega$   
 $R_{DS(ON)} < 9.5m\Omega @ V_{GS}=4.5V$  TYP:6.8 m $\Omega$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



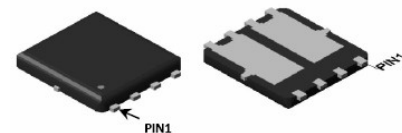
Schematic diagram

**Application**

- PWM applications
- Load Switch
- Power management



Marking and pin assignment



Top View

Bottom View

**Package Marking and Ordering Information**

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
90N03GD	AP90N03GD	PDFN5X6	13 inch	-	5000

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current (T <sub>a</sub> =25°C)	I <sub>D</sub>	80	A
Continuous Drain Current (T <sub>a</sub> =100°C)	I <sub>D</sub>	47	A
Pulsed Drain Current <sup>(1)</sup>	I <sub>DM</sub>	330	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	E <sub>AS</sub>	180	mJ
Power Dissipation	P <sub>D</sub>	90	W
Thermal Resistance from Junction to Case <sup>(4)</sup>	R <sub>θJC</sub>	2.5	°C/W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55~ +150	°C

MOSFET ELECTRICAL CHARACTERISTICS( $T_a=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.5	2.5	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	-	5.2	5.8	m $\Omega$
		$V_{GS} = 4.5V, I_D = 20A$	-	6.8	9.5	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$	-	1950	-	pF
Output Capacitance	$C_{oss}$		-	320	-	
Reverse Transfer Capacitance	$C_{rss}$		-	240	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 30A,$ $V_{GS} = 10V, R_G = 3\Omega$	-	13	-	ns
Turn-on rise time	$t_r$		-	36	-	
Turn-off delay time	$t_{d(off)}$		-	43	-	
Turn-off fall time	$t_f$		-	16	-	
Total Gate Charge	$Q_g$	$V_{DS} = 15V, I_D = 30A,$ $V_{GS} = 10V$	-	42	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.9	-	
Gate-Drain Charge	$Q_{gd}$		-	14	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = 1A$	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	$I_S$		-	-	80	A

**Notes:**

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:  $T_J = 25^\circ\text{C}, V_{DD} = 15V, R_G = 25\Omega, L = 0.5mH$
3. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
4. Surface Mounted on FR4 Board,  $t \leq 10$  sec

**Test Circuit**

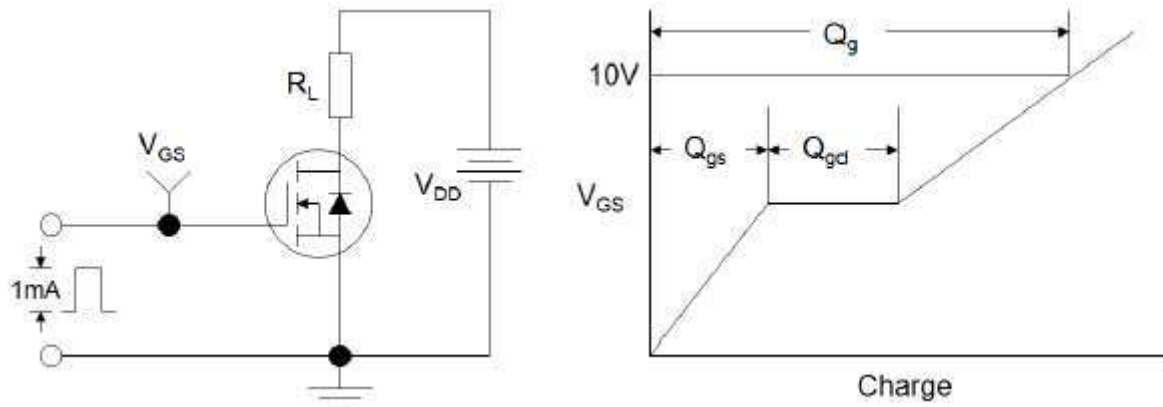


Figure1:Gate Charge Test Circuit & Waveform

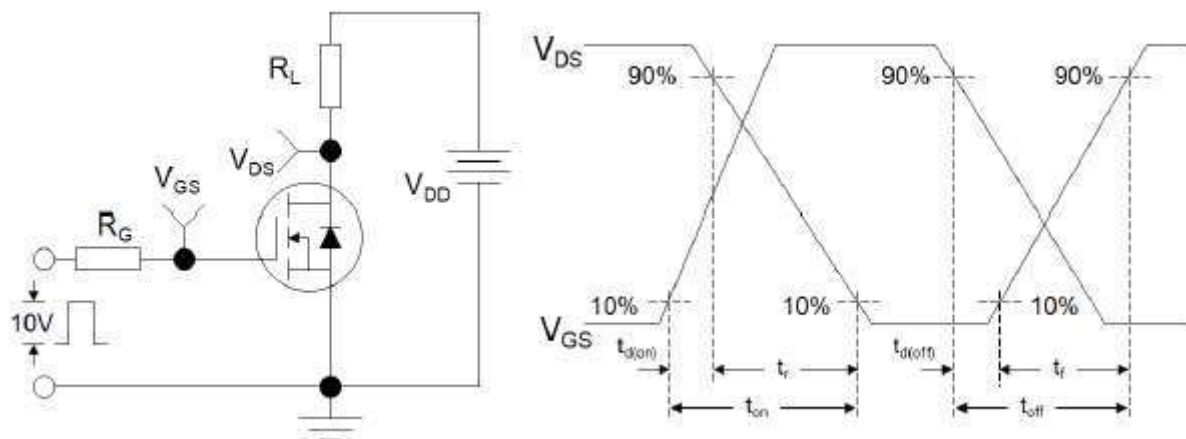


Figure 2: Resistive Switching Test Circuit & Waveforms

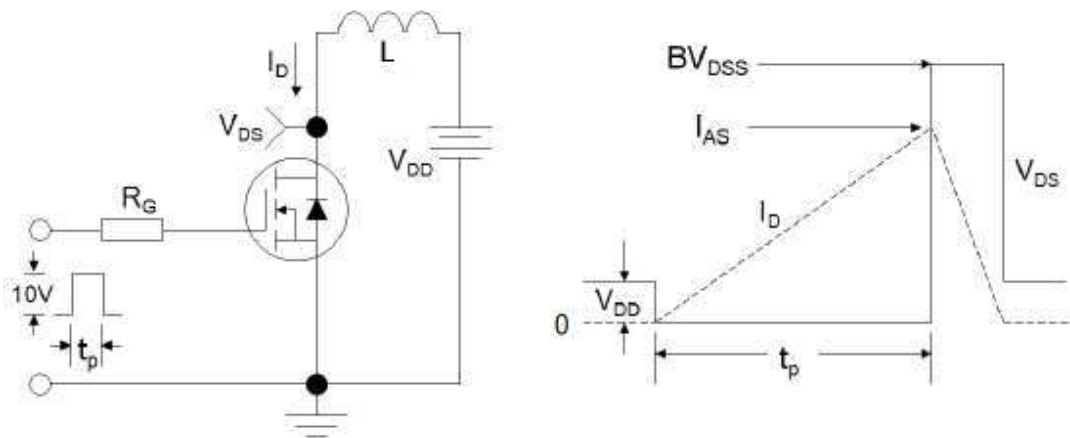
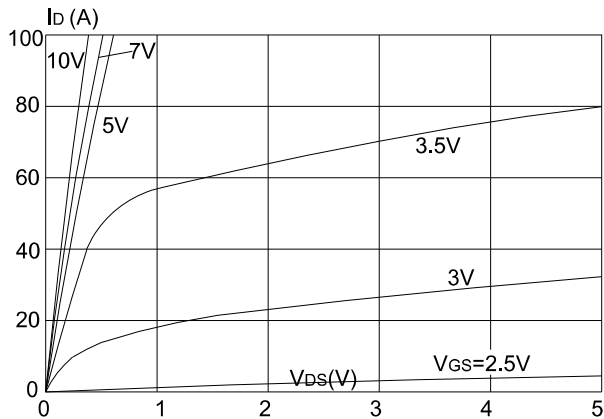


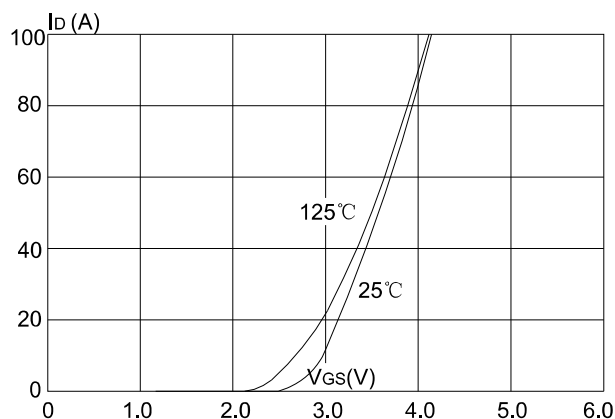
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

**Typical Performance Characteristics**

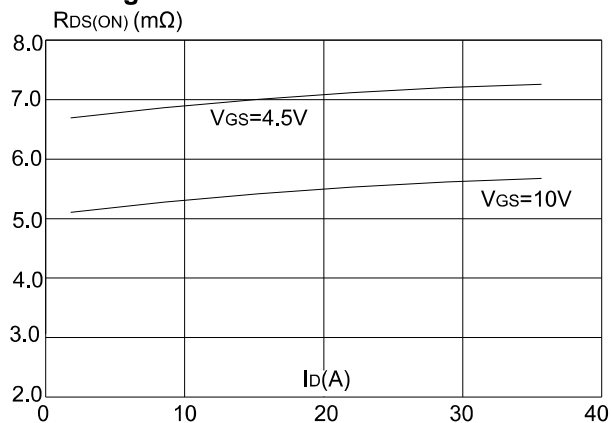
**Figure 1: Output Characteristics**



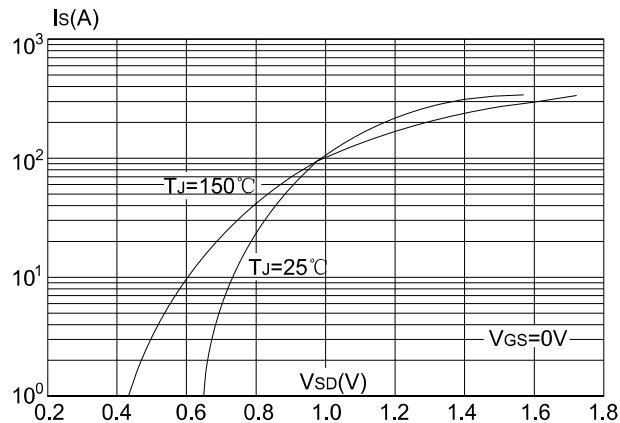
**Figure 2: Typical Transfer Characteristics**



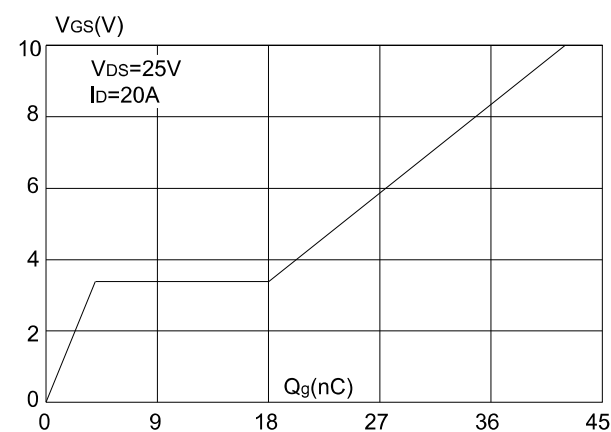
**Figure 3: On-resistance vs. Drain Current**



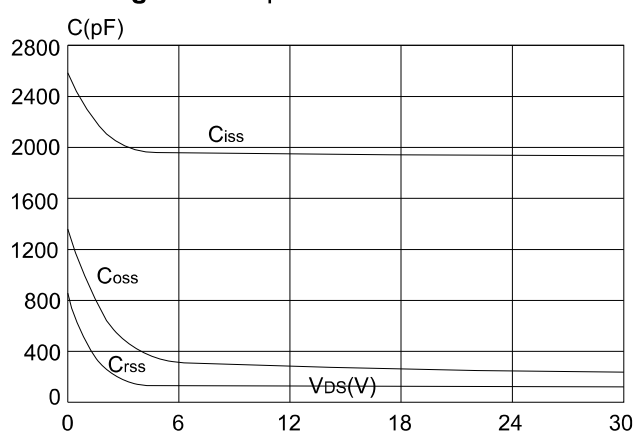
**Figure 4: Body Diode Characteristics**



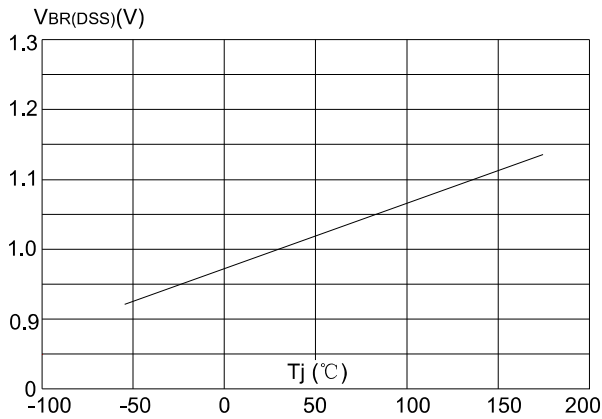
**Figure 5: Gate Charge Characteristics**



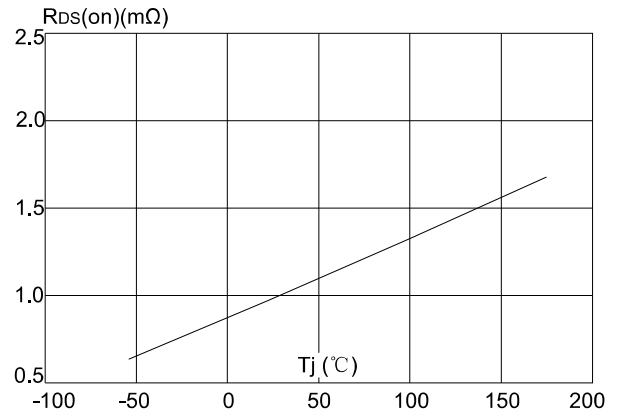
**Figure 6: Capacitance Characteristics**



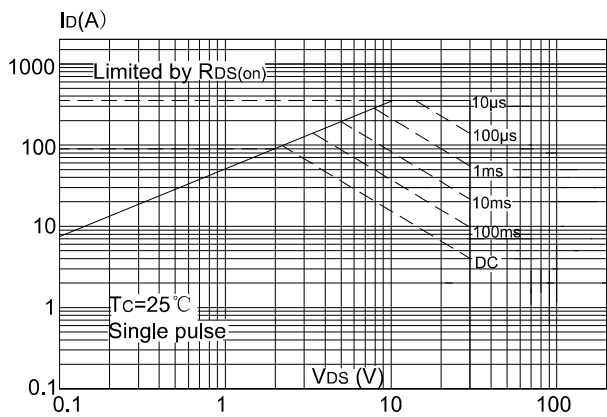
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



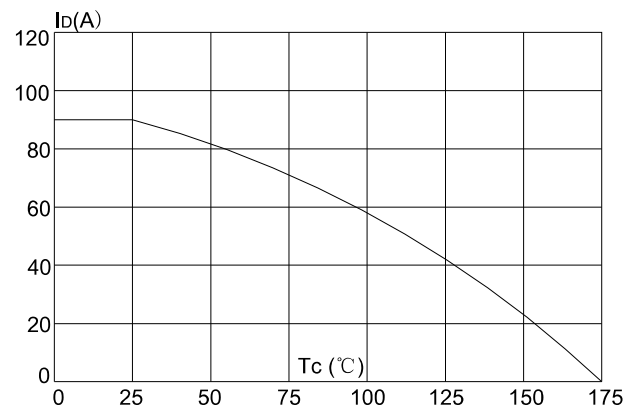
**Figure 8:** Normalized on Resistance vs. Junction Temperature



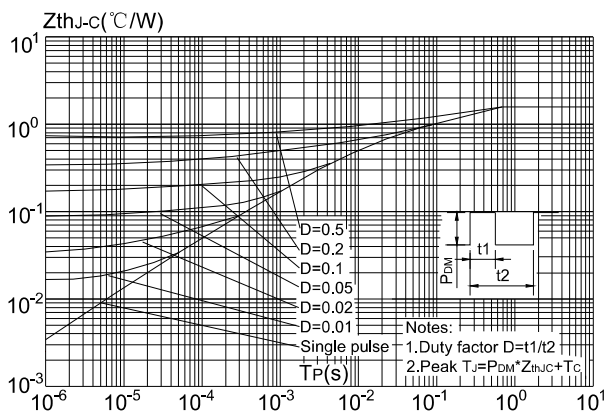
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

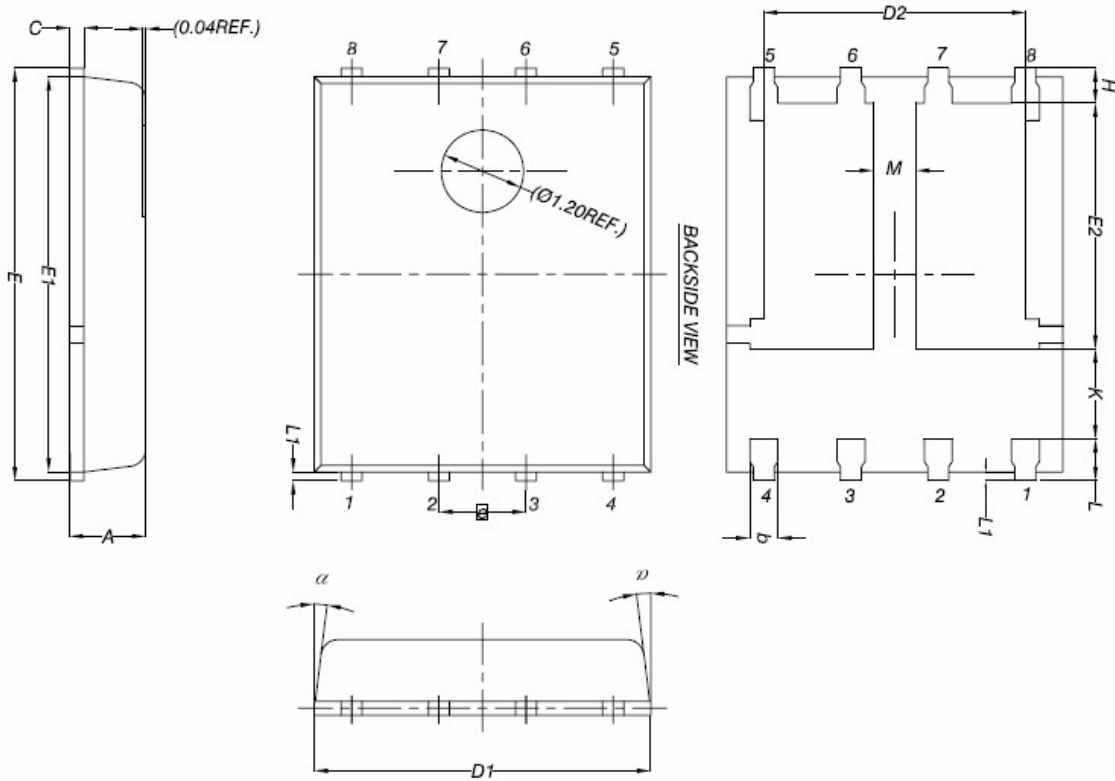


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-252)



**AP90N03GD**  
N-Channel Enhancement Mosfet

**PDFN5X6** Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
<span style="border: 1px solid black; padding: 2px;">e</span>	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	-	-
α	0°	-	12°