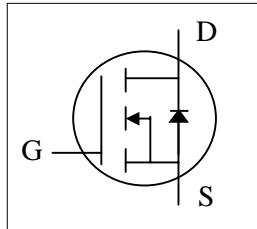
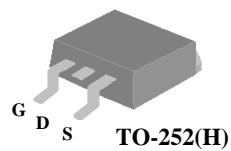




- ▼ Lower Gate Charge
- ▼ Capable of 2.5V Gate Drive
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	20V
$R_{DS(ON)}$	20mΩ
$I_D$	19.5A



## Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-252 package is widely preferred for commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	19.5	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	12.3	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	80	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	12.5	W
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>3</sup>	2	W
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Value	Units
$R_{thj-c}$	Maximum Thermal Resistance, Junction-case	10	°C/W
$R_{thj-a}$	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>3</sup>	62.5	°C/W



# AP9T16AGH-HF

## Electrical Characteristics@ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$V_{\text{GS}}=0\text{V}$ , $I_{\text{D}}=250\mu\text{A}$	20	-	-	V
$R_{\text{DS}(\text{ON})}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{\text{GS}}=4.5\text{V}$ , $I_{\text{D}}=12\text{A}$	-	-	20	$\text{m}\Omega$
		$V_{\text{GS}}=2.5\text{V}$ , $I_{\text{D}}=10\text{A}$	-	-	30	$\text{m}\Omega$
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	$V_{\text{DS}}=V_{\text{GS}}$ , $I_{\text{D}}=250\mu\text{A}$	0.3	-	1.2	V
$g_{\text{fs}}$	Forward Transconductance	$V_{\text{DS}}=5\text{V}$ , $I_{\text{D}}=12\text{A}$	-	29	-	S
$I_{\text{DSS}}$	Drain-Source Leakage Current	$V_{\text{DS}}=16\text{V}$ , $V_{\text{GS}}=0\text{V}$	-	-	10	$\mu\text{A}$
$I_{\text{GSS}}$	Gate-Source Leakage	$V_{\text{GS}}=\pm 12\text{V}$ , $V_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
$Q_{\text{g}}$	Total Gate Charge	$I_{\text{D}}=12\text{A}$	-	16	25.6	nC
$Q_{\text{gs}}$	Gate-Source Charge		-	2.5	-	nC
$Q_{\text{gd}}$	Gate-Drain ("Miller") Charge		-	6	-	nC
$t_{\text{d}(\text{on})}$	Turn-on Delay Time	$V_{\text{DS}}=10\text{V}$ $I_{\text{D}}=12\text{A}$	-	10	-	ns
$t_{\text{r}}$	Rise Time		-	50	-	ns
$t_{\text{d}(\text{off})}$	Turn-off Delay Time		-	24	-	ns
$t_{\text{f}}$	Fall Time		-	8	-	ns
$C_{\text{iss}}$	Input Capacitance	$V_{\text{GS}}=0\text{V}$ $V_{\text{DS}}=20\text{V}$	-	1300	2080	pF
$C_{\text{oss}}$	Output Capacitance		-	130	-	pF
$C_{\text{rss}}$	Reverse Transfer Capacitance		-	115	-	pF
$R_{\text{g}}$	Gate Resistance	$f=1.0\text{MHz}$	0.65	1.3	2.6	$\Omega$

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$\text{V}_{\text{SD}}$	Forward On Voltage <sup>2</sup>	$I_{\text{S}}=12\text{A}$ , $V_{\text{GS}}=0\text{V}$	-	-	1.2	V
$t_{\text{rr}}$	Reverse Recovery Time	$I_{\text{S}}=10\text{A}$ , $V_{\text{GS}}=0\text{V}$ ,	-	22	-	ns
$Q_{\text{rr}}$	Reverse Recovery Charge	$dI/dt=100\text{A}/\mu\text{s}$	-	13	-	nC

## Notes:

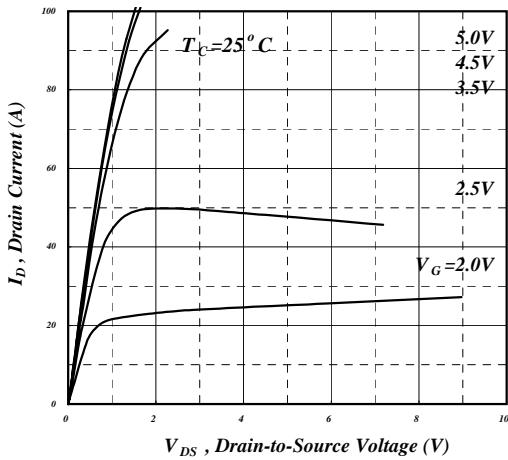
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

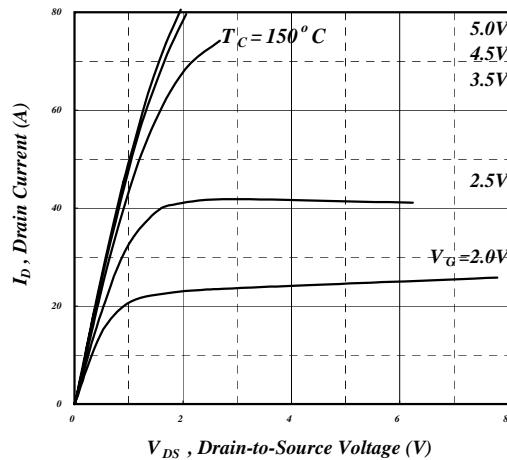
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

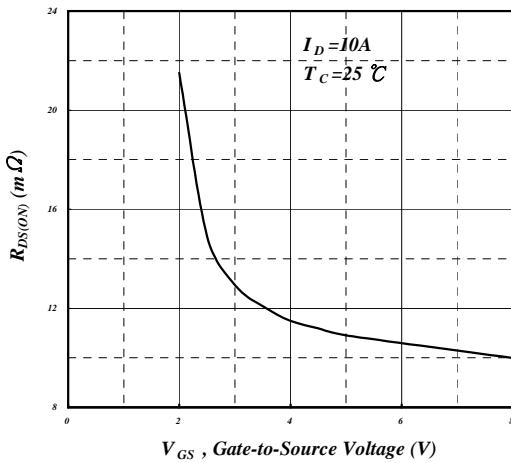
APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.



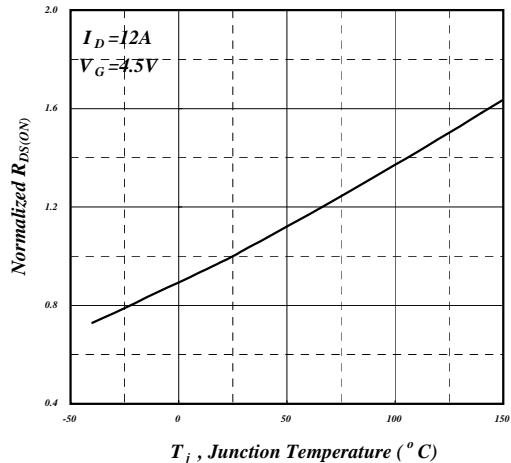
**Fig 1. Typical Output Characteristics**



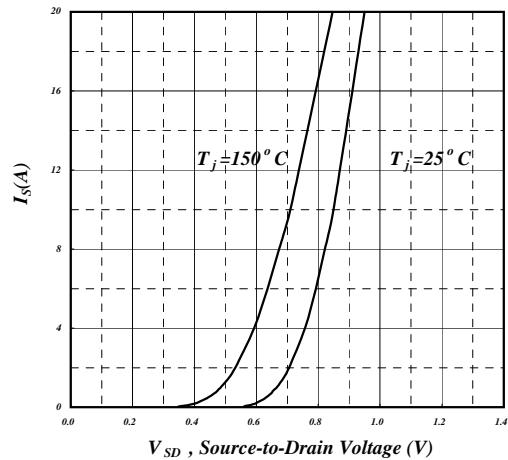
**Fig 2. Typical Output Characteristics**



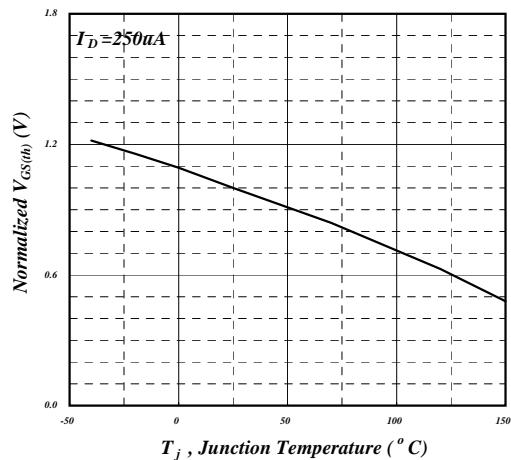
**Fig 3. On-Resistance v.s. Gate Voltage**



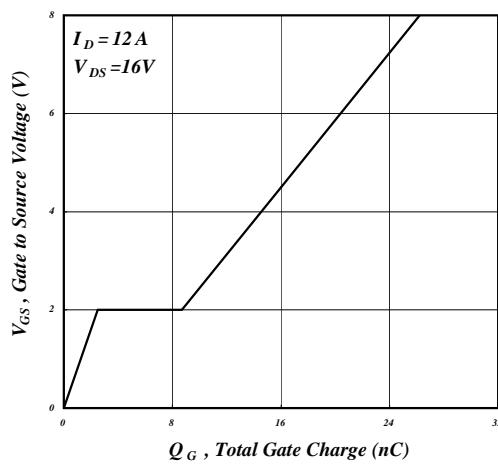
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



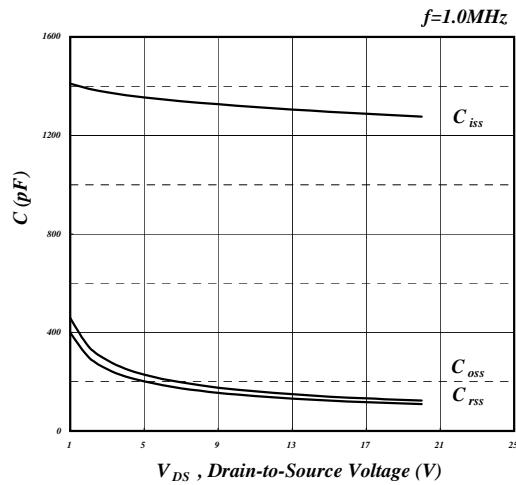
**Fig 5. Forward Characteristic of Reverse Diode**



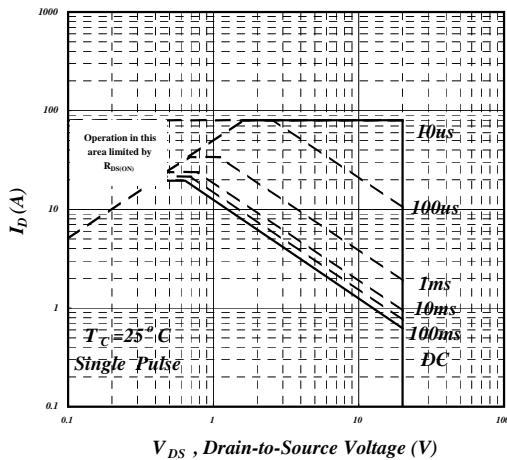
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



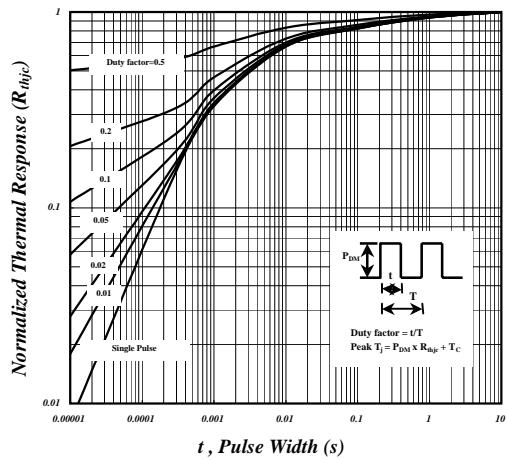
**Fig 7. Gate Charge Characteristics**



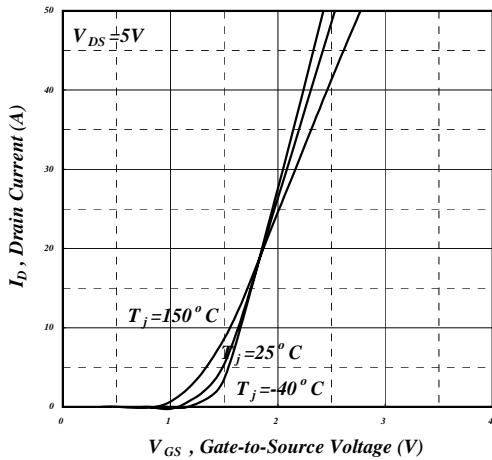
**Fig 8. Typical Capacitance Characteristics**



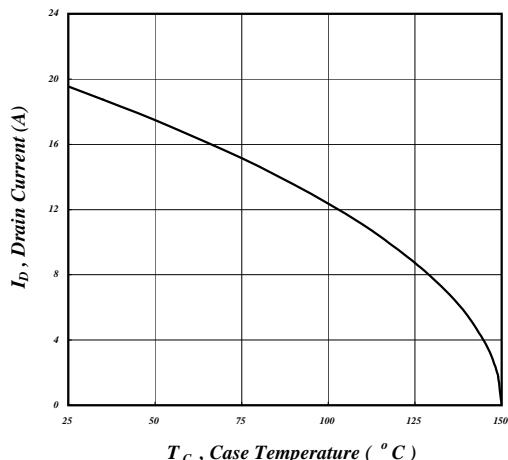
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Transfer Characteristics**



**Fig 12. Maximum Continuous Drain Current v.s. Case Temperature**