

# AP50T03GH/J

**RoHS-compliant Product**

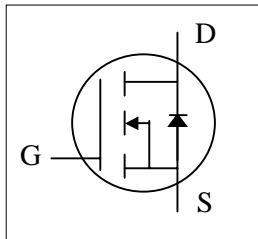


**Advanced Power  
Electronics Corp.**

*N-CHANNEL ENHANCEMENT MODE*

*POWER MOSFET*

- ▼ Simple Drive Requirement
- ▼ Low On-resistance
- ▼ Fast Switching Characteristic

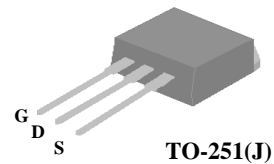
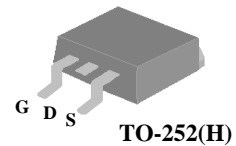


$BV_{DSS}$	30V
$R_{DS(ON)}$	16m $\Omega$
$I_D$	37A

## 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 all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters. The through-hole version (AP50T03GJ) are available for low-profile applications.



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current	37	A
$I_D@T_C=100^\circ C$	Continuous Drain Current	24	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	110	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	34.7	W
	Linear Derating Factor	0.28	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	3.6	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>3</sup>	62.5	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	$^\circ C/W$



# AP50T03GH/J

## Electrical Characteristics @T<sub>j</sub>=25°C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	-	0.02	-	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	-	12.7	16	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =18A	-	23.7	30	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	-	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =25A	-	8	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	uA
	Drain-Source Leakage Current (T <sub>j</sub> =125°C)	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	250	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =25A	-	10	16	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =24V	-	3.5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	6	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V	-	9	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =25A	-	75	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =10V	-	17	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =0.6Ω	-	4	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	815	1304	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	180	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	130	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.3	2	Ω

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =25A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =25A, V <sub>GS</sub> =0V,	-	24	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	10	-	nC

### Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse width ≤300us, duty cycle ≤2%.
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.

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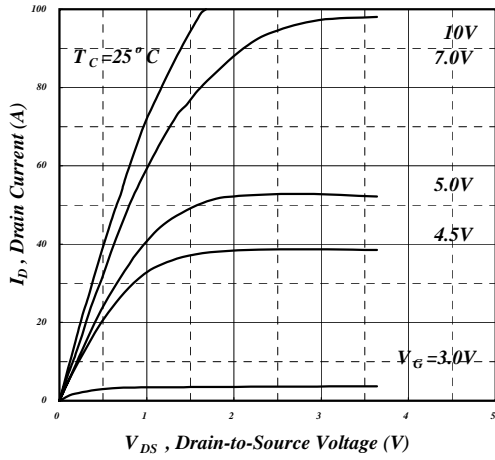


Fig 1. Typical Output Characteristics

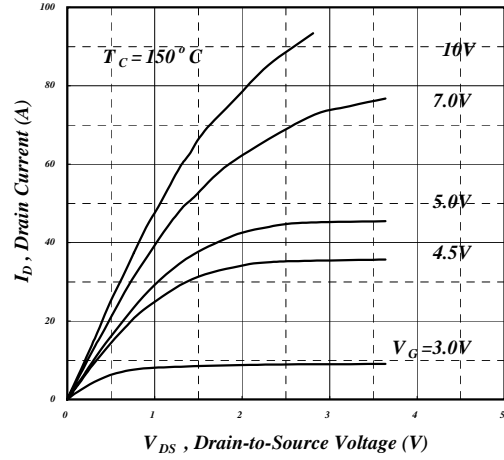


Fig 2. Typical Output Characteristics

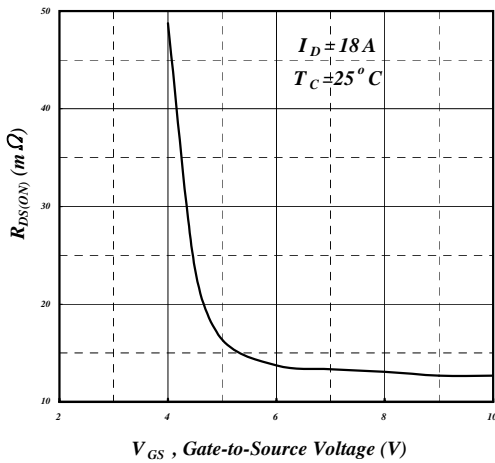


Fig 3. On-Resistance v.s. Gate Voltage

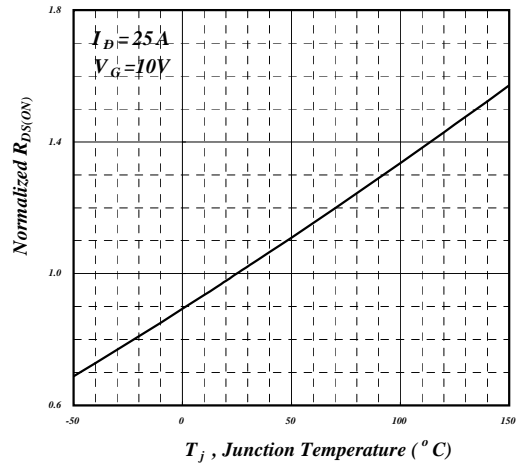


Fig 4. Normalized On-Resistance v.s. Junction Temperature

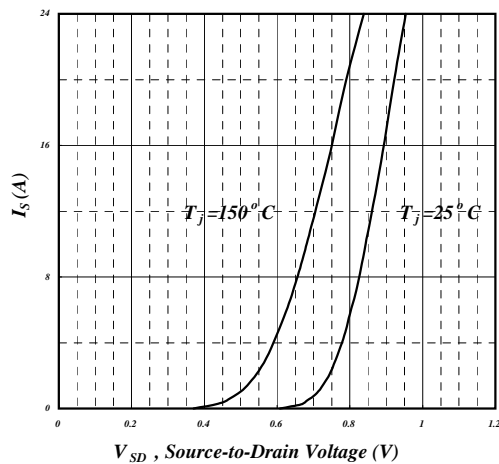


Fig 5. Forward Characteristic of Reverse Diode

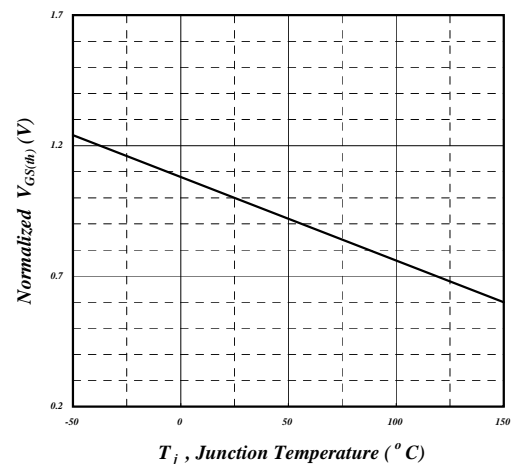


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

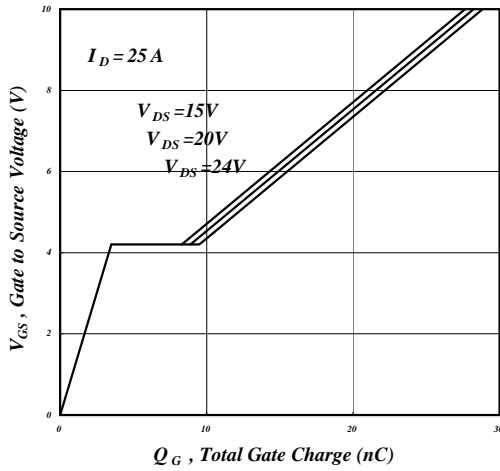


Fig 7. Gate Charge Characteristics

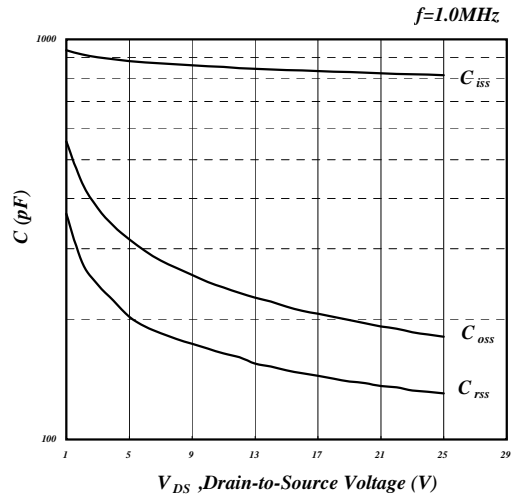


Fig 8. Typical Capacitance Characteristics

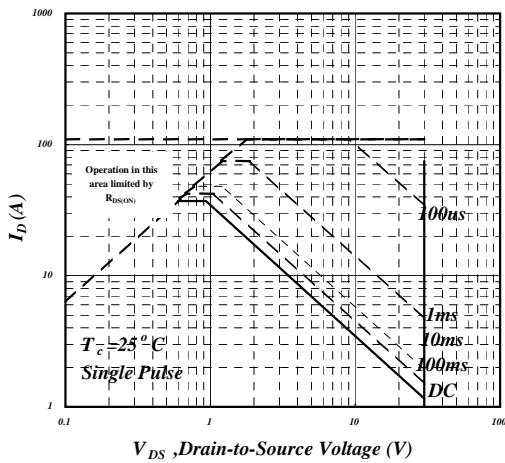


Fig 9. Maximum Safe Operating Area

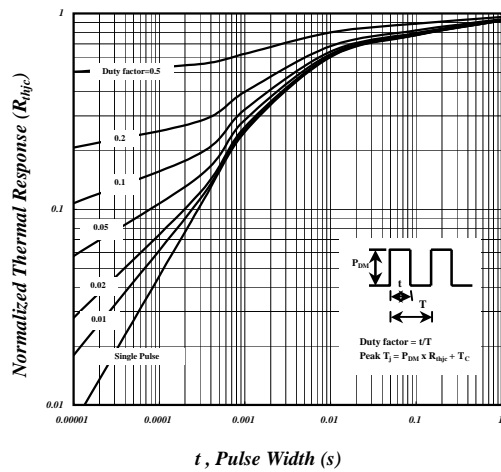


Fig 10. Effective Transient Thermal Impedance

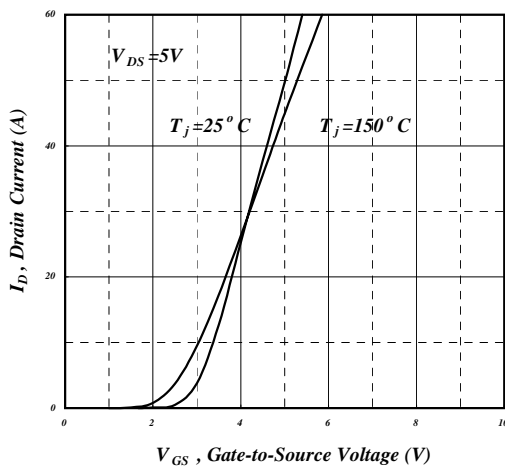


Fig 11. Transfer Characteristics

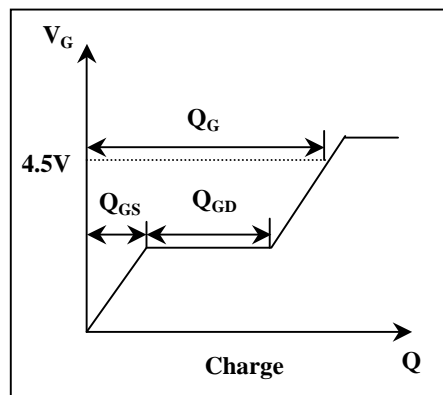


Fig 12. Gate Charge Waveform