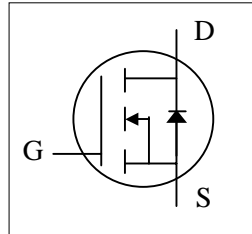




- ▼ Simple Drive Requirement
- ▼ Lower Gate Charge
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

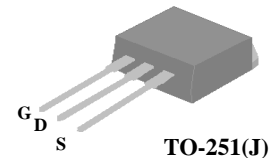
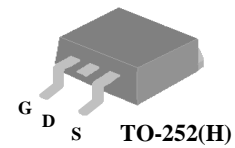


BV_{DSS}	100V
$R_{DS(ON)}$	30m Ω
I_D	37A

Description

AP50T10 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-252 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance. The through-hole version (AP50T10GJ) is available for low-profile applications.



Absolute Maximum Ratings @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	37	A
$I_D @ T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	23	A
I_{DM}	Pulsed Drain Current ¹	120	A
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation	89.2	W
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation ³	2	W
E_{AS}	Single Pulse Avalanche Energy ⁴	60	mJ
I_{AR}	Avalanche Current ¹	20	A
E_{AR}	Repetitive Avalanche Energy ¹	8.9	mJ
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	1.4	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) ³	62.5	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	$^\circ\text{C}/\text{W}$



AP50T10GH/J-HF

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=24A$	-	-	30	$m\Omega$
		$V_{GS}=5V, I_D=16A$	-	-	70	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	3	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=24A$	-	30	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V$	-	-	25	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Q_g	Total Gate Charge	$I_D=24A$	-	42	67	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=80V$	-	8	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=10V$	-	19	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=50V$	-	11	-	ns
t_r	Rise Time	$I_D=24A$	-	42	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=1\Omega$	-	26	-	ns
t_f	Fall Time	$V_{GS}=10V$	-	8.5	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	1840	2940	pF
C_{oss}	Output Capacitance	$V_{DS}=25V$	-	190	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	130	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	1.7	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=24A, V_{GS}=0V$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$I_S=10A, V_{GS}=0V$	-	40	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	80	-	nC

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in² copper pad of FR4 board
4. Starting $T_j=25^\circ\text{C}$, $V_{DD}=50V$, $L=0.3\text{mH}$, $R_G=25\Omega$, $I_{AS}=20A$.

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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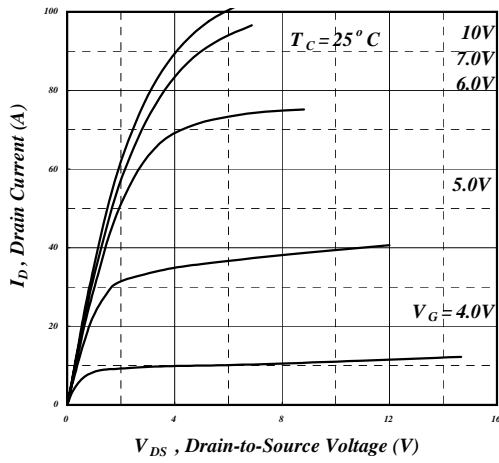


Fig 1. Typical Output Characteristics

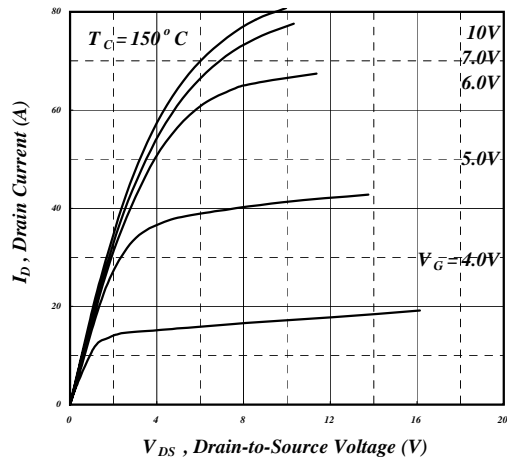


Fig 2. Typical Output Characteristics

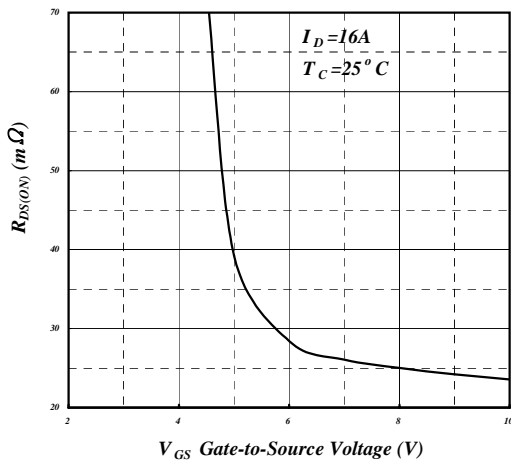


Fig 3. On-Resistance v.s. Gate Voltage

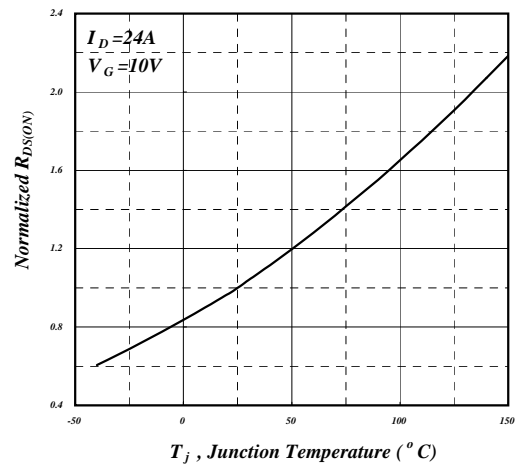


Fig 4. Normalized On-Resistance v.s. Junction Temperature

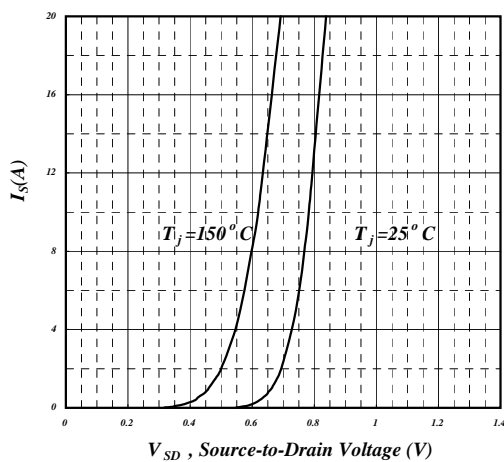


Fig 5. Forward Characteristic of Reverse Diode

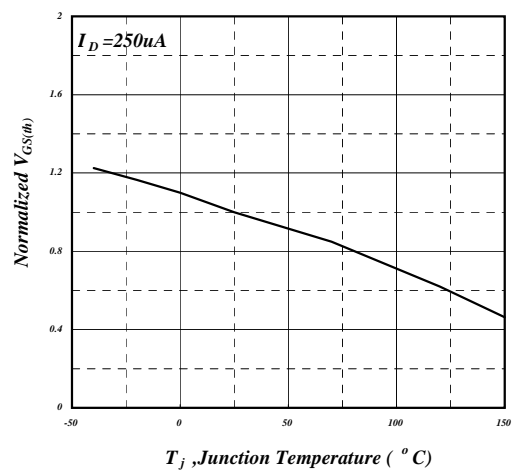


Fig 6. Gate Threshold Voltage v.s. Junction Temperature



AP50T10GH/J-HF

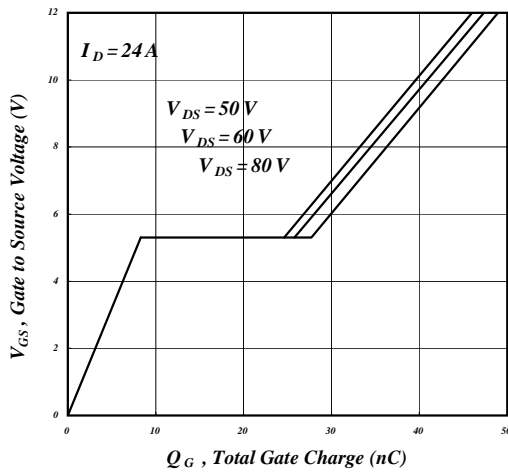


Fig 7. Gate Charge Characteristics

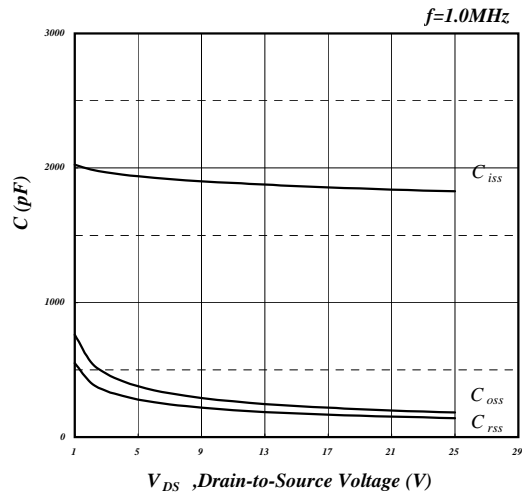


Fig 8. Typical Capacitance Characteristics

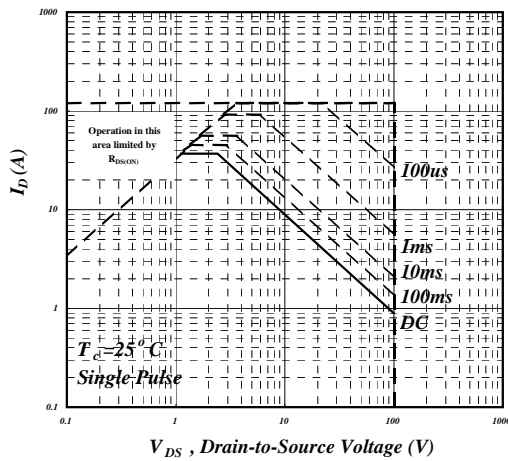


Fig 9. Maximum Safe Operating Area

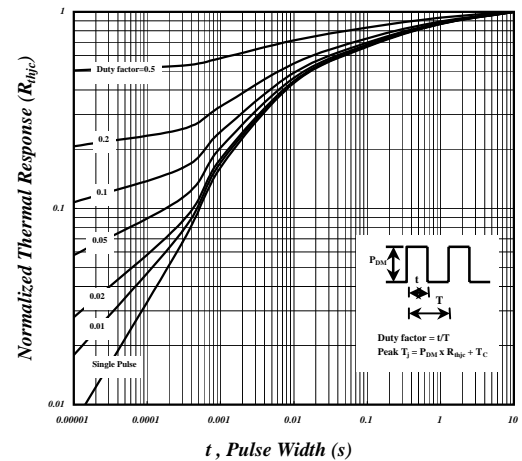


Fig 10. Effective Transient Thermal Impedance

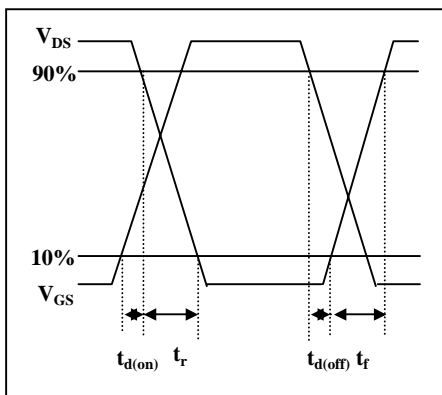


Fig 11. Switching Time Waveform

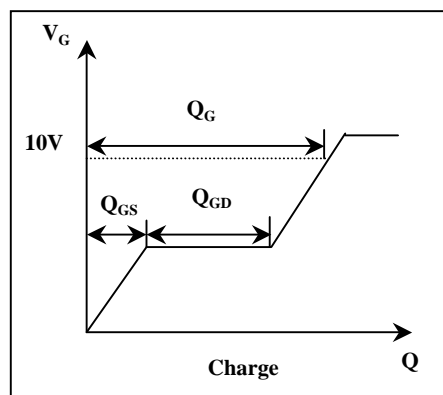
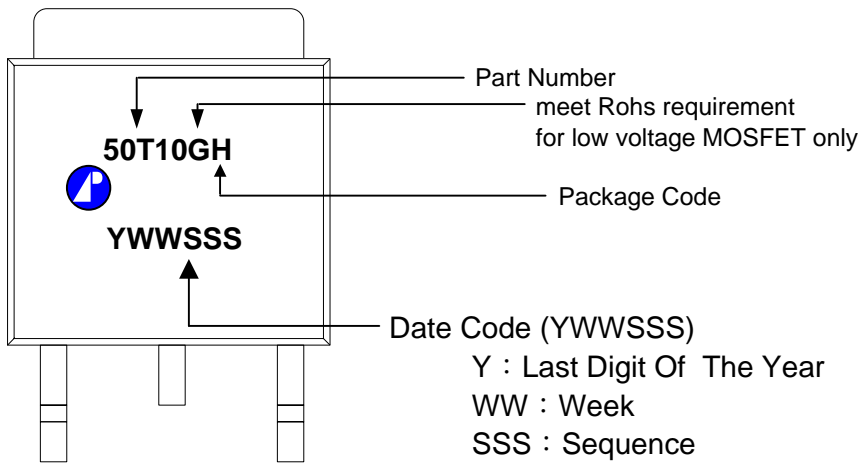


Fig 12. Gate Charge Waveform

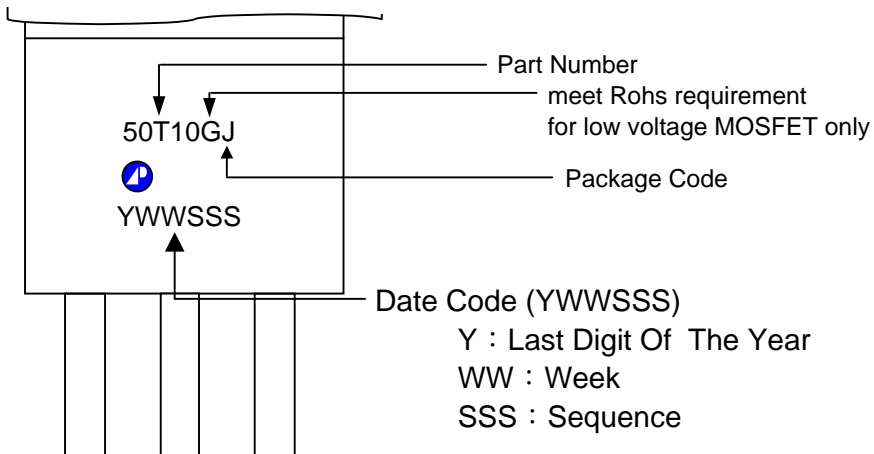


MARKING INFORMATION

TO-252

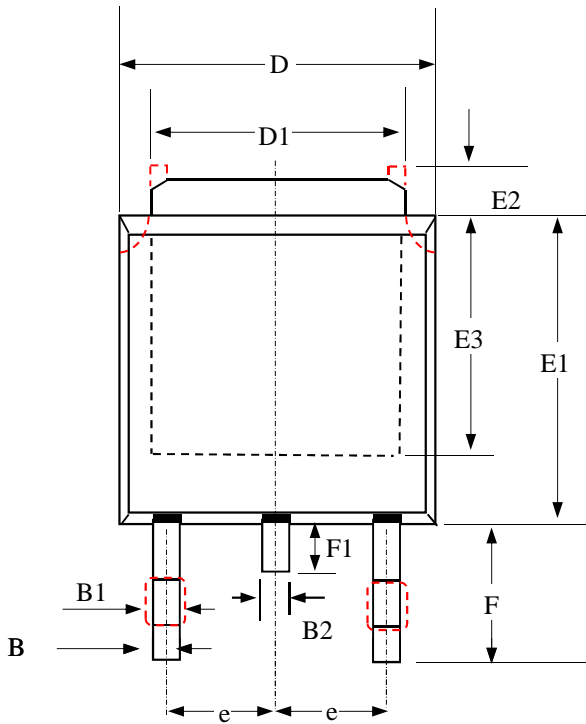


TO-251

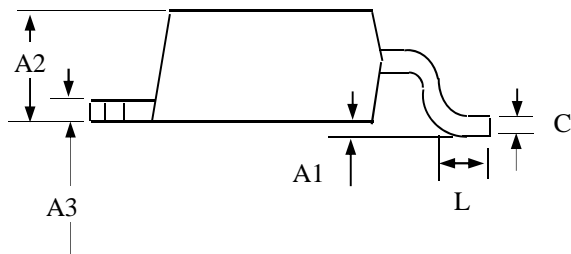




Package Outline : TO-252



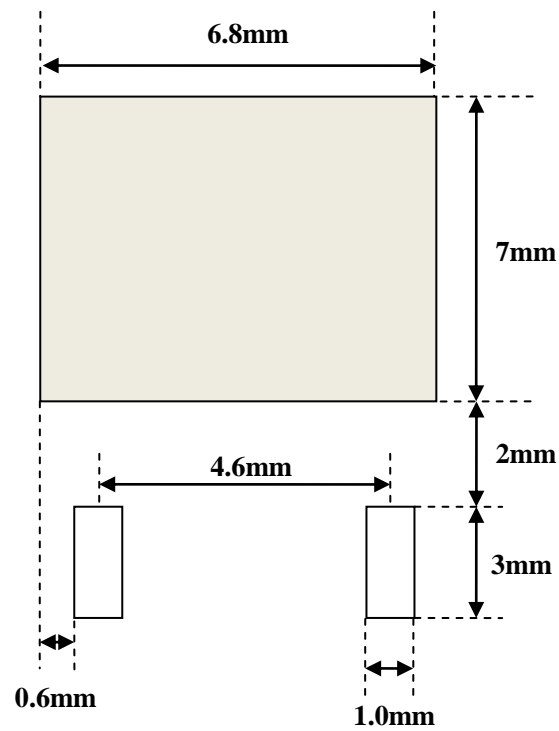
SYMBOLS	Millimeters		
	MIN	NOM	MAX
A2	2.10	2.30	2.50
A3	0.40	0.50	0.65
B	0.40	0.70	1.00
B1	0.50	0.85	1.20
D	6.00	6.50	6.80
D1	4.80	5.35	5.90
E3	4.00 (ref.)		
F	2.00	2.63	3.05
F1	0.50	0.85	1.20
E1	5.00	5.70	6.30
E2	0.50	1.10	1.80
e	2.3 (ref)		
C	0.35	0.525	0.70
A1	0.00	—	0.25
B2	—	—	1.25
L	0.90	1.34	1.78



1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.
3. Thermal PAD, Body and Pin contour is for reference, it may has little difference by option.



TO-252 FOOTPRINT :



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