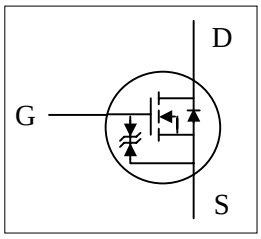
AP05N50EH/J-HF

Halogen-Free Product

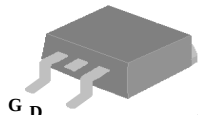
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

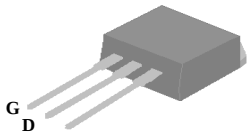
- ▼ **100% Avalanche Test**
- ▼ **Fast Switching Characteristic**
- ▼ **Simple Drive Requirement**
- ▼ **RoHS Compliant & Halogen-Free**



BV_{DSS}	500V
$R_{DS(ON)}$	1.6Ω
I_D	5A



TO-252(H)



TO-251(J)

Description

AP05N50E 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 (AP05N50EJ) are available for low-profile applications.

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	5	A
I_{DM}	Pulsed Drain Current[1]	20	A
P_D@T_C=25℃	Total Power Dissipation	73.5	W
P_D@T_A=25℃	Total Power Dissipation[4]	2	W
E_{AS}	Single Pulse Avalanche Energy[2]	12.5	mJ
I_{AR}	Avalanche Current	5	A
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	1.7	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount)[4]	62.5	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	500	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=2A	-	-	1.6	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=2A	-	3.5	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=400V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±25V, V_{DS}=0V	-	-	±10	uA
Q_g	Total Gate Charge[3]	I_D=1A	-	20	32	nC
Q_{gs}	Gate-Source Charge	V_{DS}=400V	-	4	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	8	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=250V	-	10	-	ns
t_r	Rise Time	I_D=1A	-	4	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	27	-	ns
t_f	Fall Time	V_{GS}=10V	-	18	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	775	1240	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	75	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	10	-	pF
R_g	Gate Resistance	f=1.0MHz	-	3.5	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	I_S=2A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time[3]	I_S=2A, V_{GS}=0V,	-	250	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	1.75	-	uC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω , I_{AS}=5A.

3.Pulse test

4.Surface mounted on 1 in^2 copper pad of FR4 board

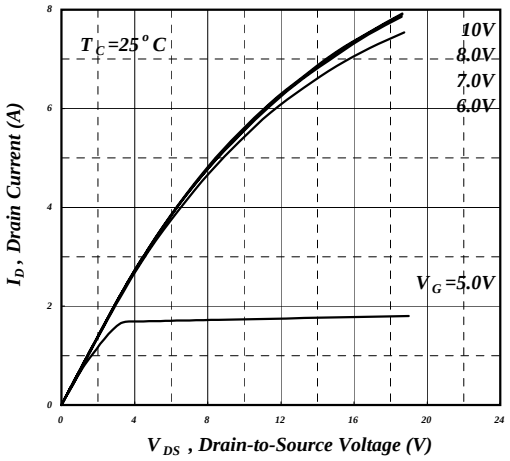


Fig 1. Typical Output Characteristics

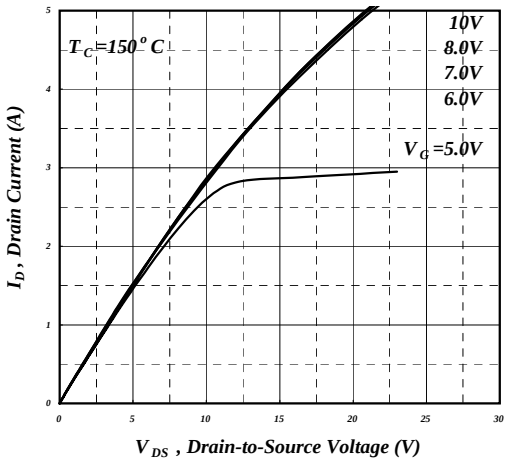


Fig 2. Typical Output Characteristics

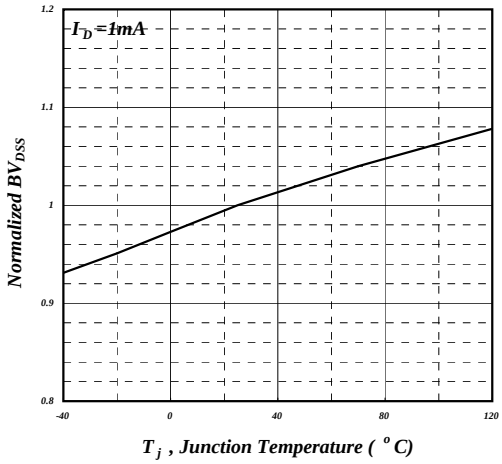


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

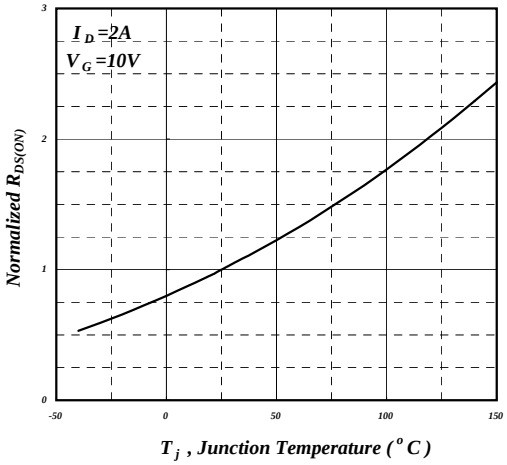


Fig 4. Normalized On-Resistance v.s. Junction Temperature

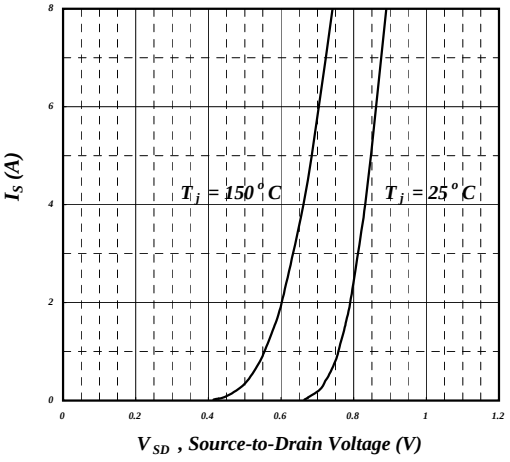


Fig 5. Forward Characteristic of Reverse Diode

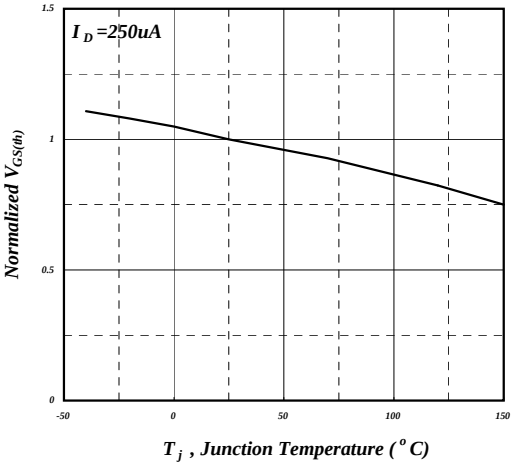


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

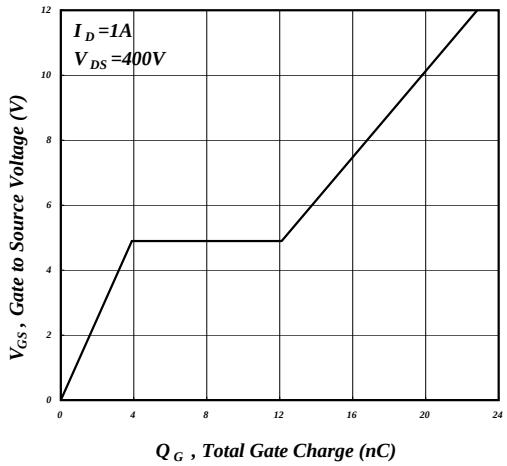


Fig 7. Gate Charge Characteristics

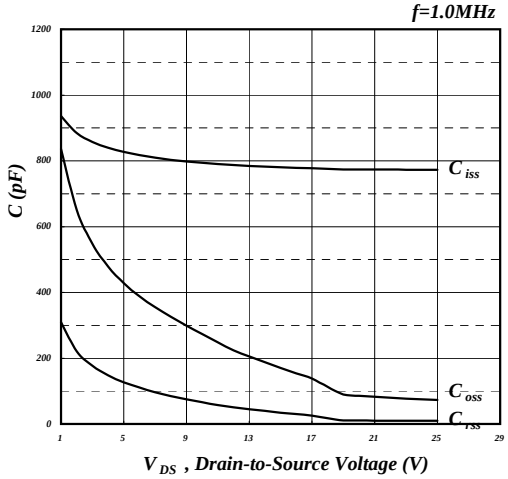


Fig 8. Typical Capacitance Characteristics

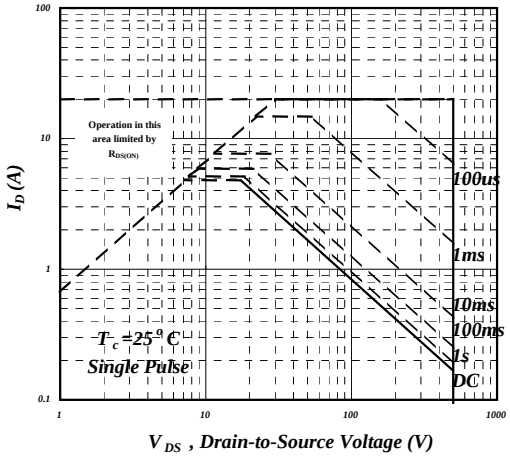


Fig 9. Maximum Safe Operating Area

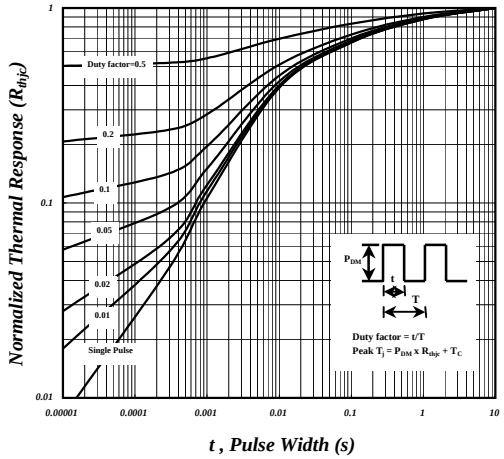


Fig 10. Effective Transient Thermal Impedance

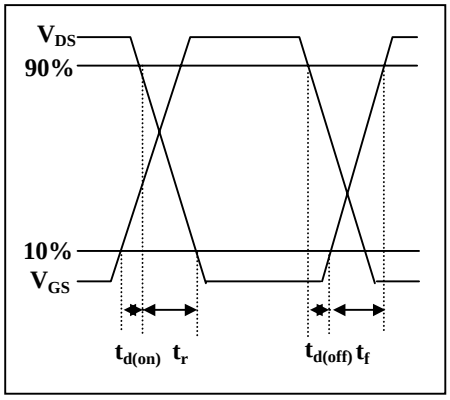


Fig 11. Switching Time Waveform

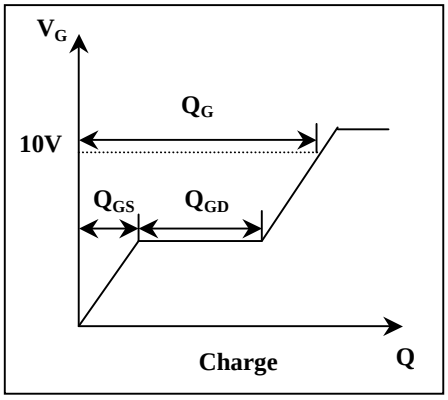
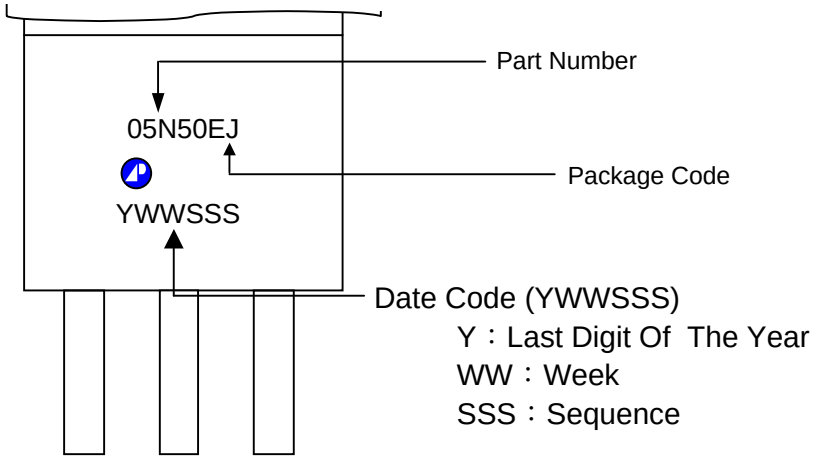


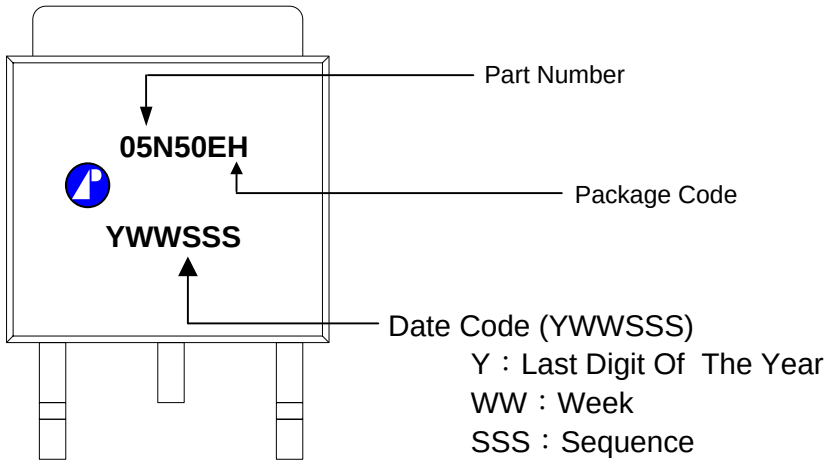
Fig 12. Gate Charge Waveform

MARKING INFORMATION

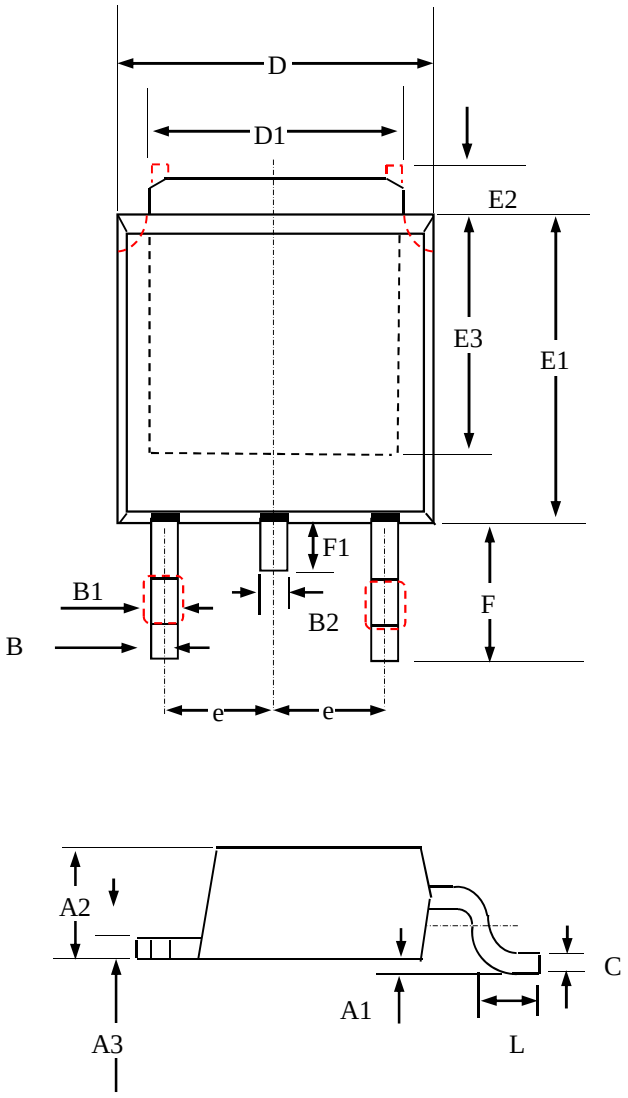
TO-251



TO-252



Package Outline : TO-252



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A2	2.18	2.30	2.40
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.

Draw No. M1-H3EFIMT-G-v10

TO-252 FOOTPRINT：