

TO-252 Plastic-Encapsulate MOSFETS

Features

- $V_{DS}=60V$
- $I_D=12A$
- $R_{DS(on)}@V_{GS}=10V < 75m\Omega$
- $R_{DS(on)}@V_{GS}=4.5V < 90m\Omega$
- Avalanche energy tested
- Fast Switching Speedze
- Improved dv/dt capability, high ruggedness

Drain-source Voltage
60 V
Drain Current
12 Ampere

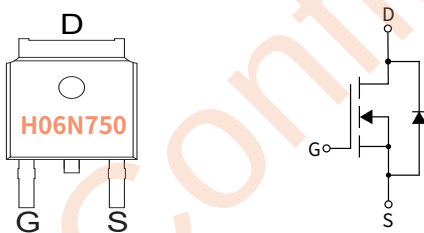
Applications

- Power Switching Application
- Load switch
- Power management

Mechanical Data

- Case: TO-252
Molding compound meets UL 94V-0 flammability rating, RoHS-compliant,halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750,Method 2026

Function Diagram



Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
TO-252	R3	0.305	2500	5000	30000	13"

Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	V_{DS}	V	60
Gate-source Voltage	V_{GS}	V	± 20
Drain Current	I_D	A	12
Pulsed Drain Current ⁽¹⁾	I_{DM}	A	48
Total Power Dissipation	P_D	W	16.6
Single pulse avalanche energy ⁽²⁾	EAS	mJ	4.8
Junction temperature	T_J	°C	-55 ~+150
Storage temperature	T_{stg}	°C	-55 ~+150
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	°C / W	7.5

● Static Parameter Characteristics (Tj=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	V	60	—	—
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	μA	—	—	1.0
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	nA	—	—	±100
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	V	1.0	2	3
Static Drain-Source On-Resistance ⁽³⁾	R _{DS(ON)}	V _{GS} = 10V, I _D =6A	mΩ	—	57	75
		V _{GS} = 4.5V, I _D =3A		—	78	90

● Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1MHZ	pF	—	384	—
Output Capacitance	C _{oss}			—	33	—
Reverse Transfer Capacitance	C _{rss}			—	25	—

● Switching Parameters

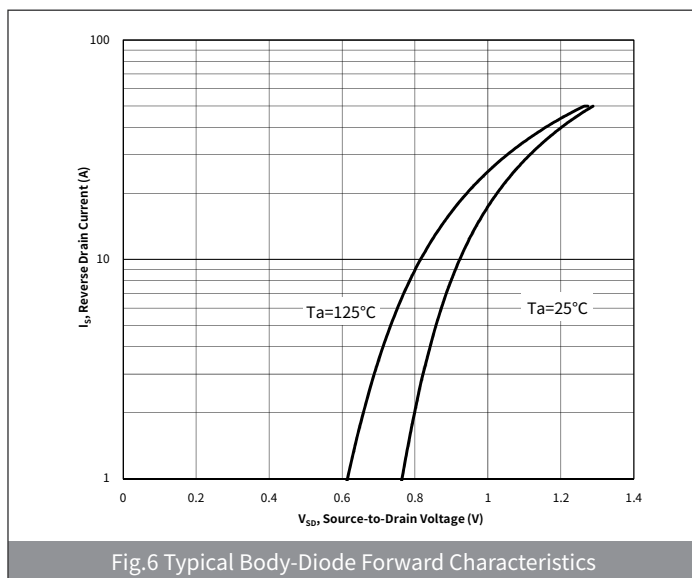
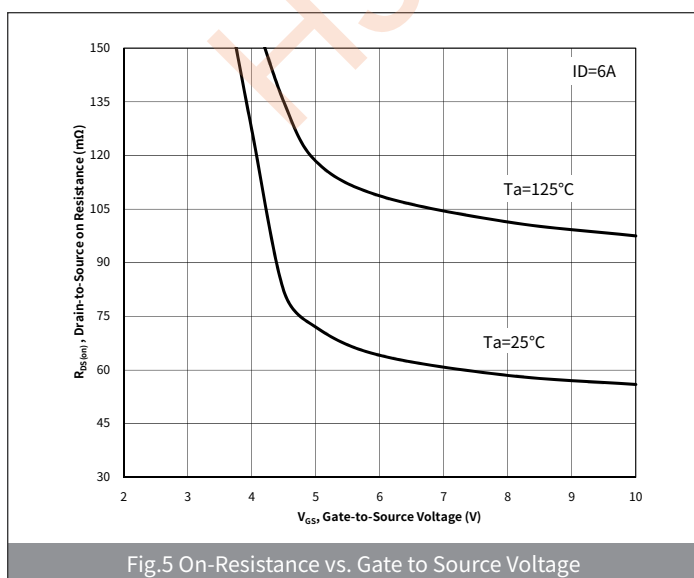
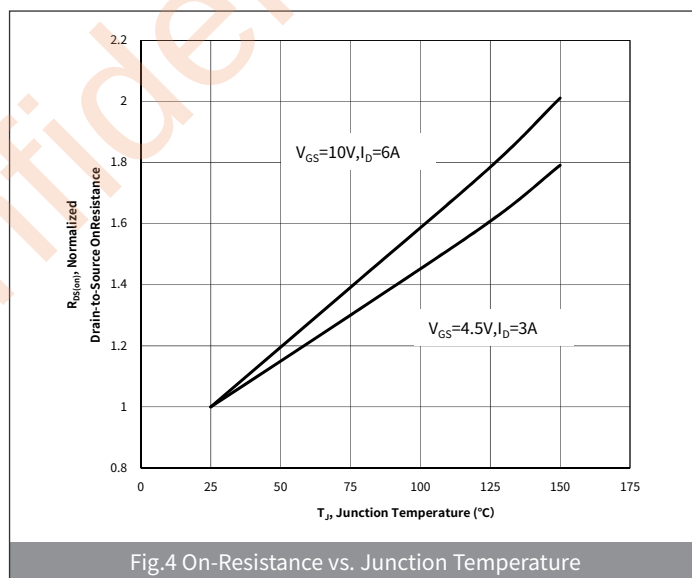
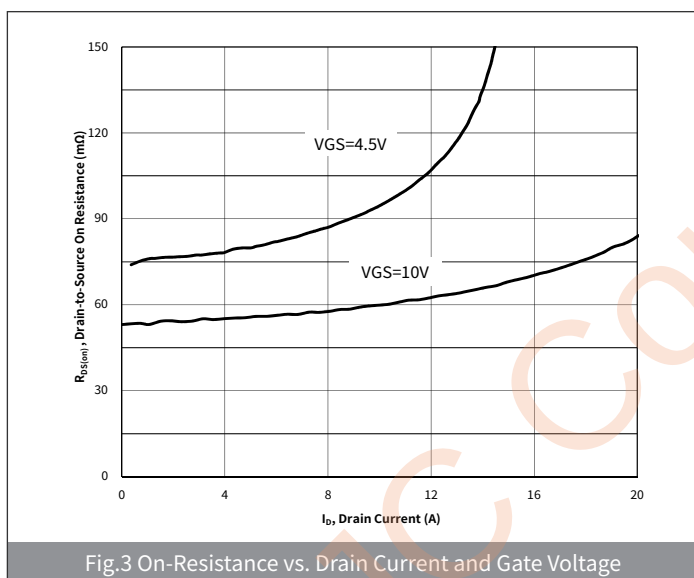
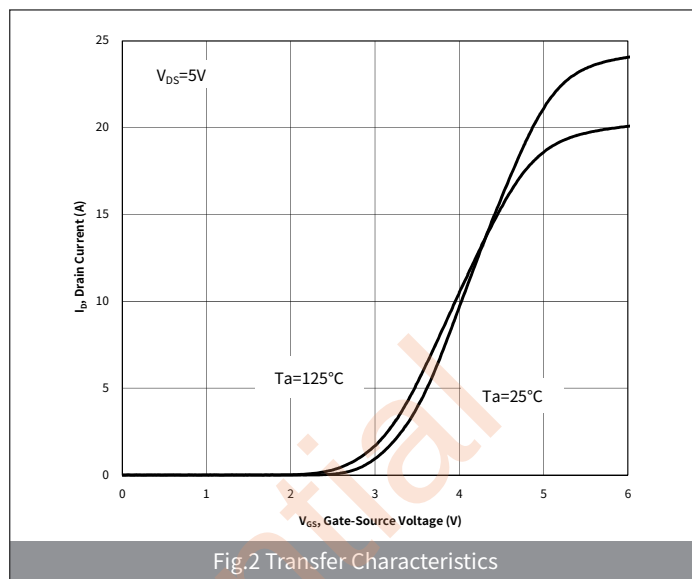
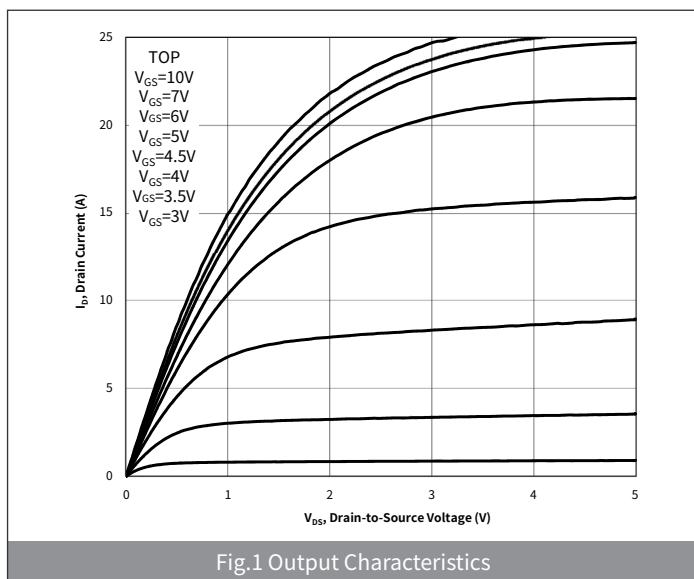
PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =30V, I _D =6A ,R _{GEN} =2.5Ω	nS	—	4.1	—
Turn-on Rise Time	t _r		nS	—	3.3	—
Turn-off Delay Time	t _{D(off)}		nS	—	15	—
Turn-off fall Time	t _f		nS	—	2	—
Total Gate Charge	Q _g	V _{DS} =30V, I _D =6A V _{GS} =10V	nC	—	8.7	—
Gate-Source Charge	Q _{gs}		nC	—	1.4	—
Gate-Drain Charge	Q _{gd}		nC	—	2.5	—

● Drian-Source Diode Characteristics

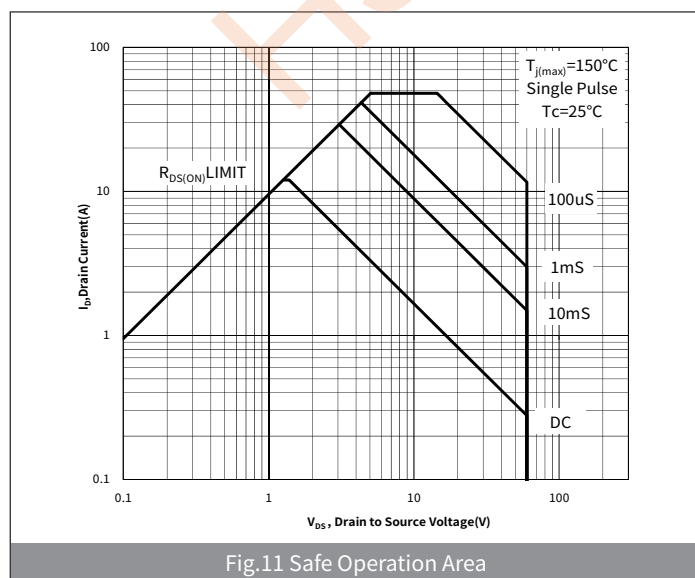
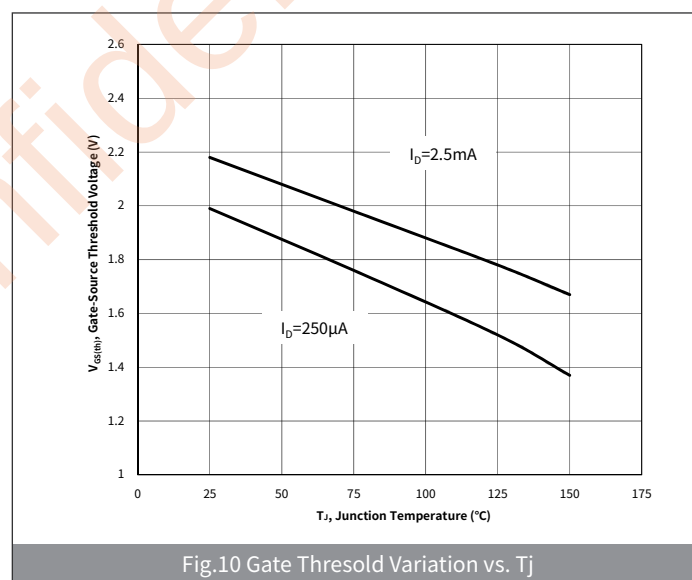
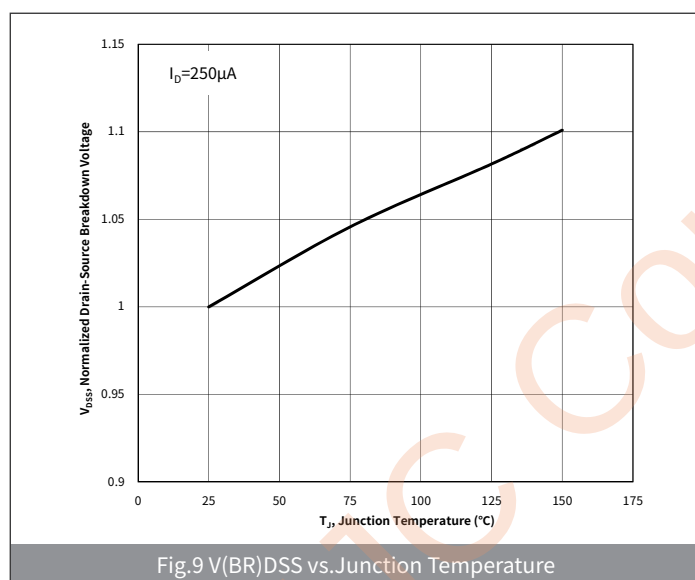
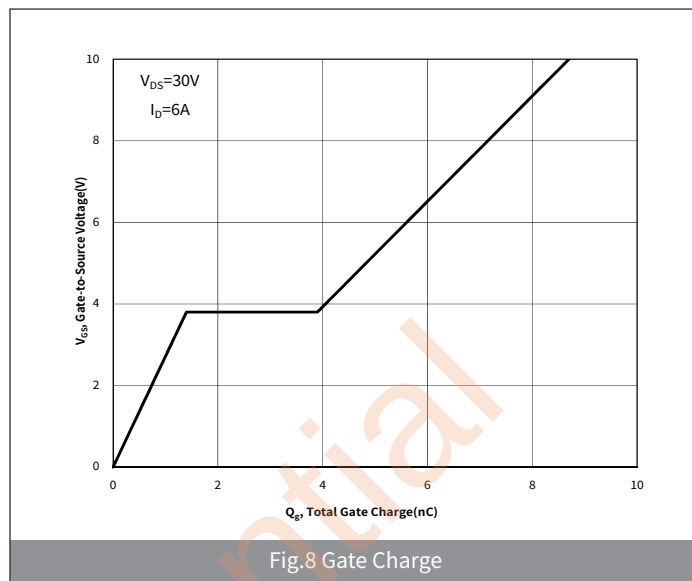
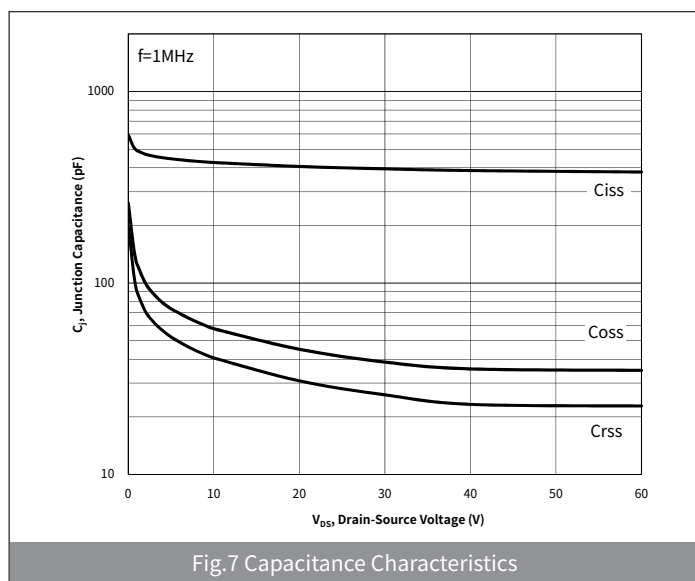
PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V _{SD}	I _S =10A, V _{GS} =0V	V	—	—	1.2
Maximum Body-Diode Continuous Current	I _S	—	A	—	—	12

Note :
(1)Repetitive Rating: Pulse width limited by maximum junction temperature.
(2)EAS condition : Tj=25°C ,VDD=30V,VG=10V,L=0.5mH,IAS=4.4A,Rg=25Ω.
(3)Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

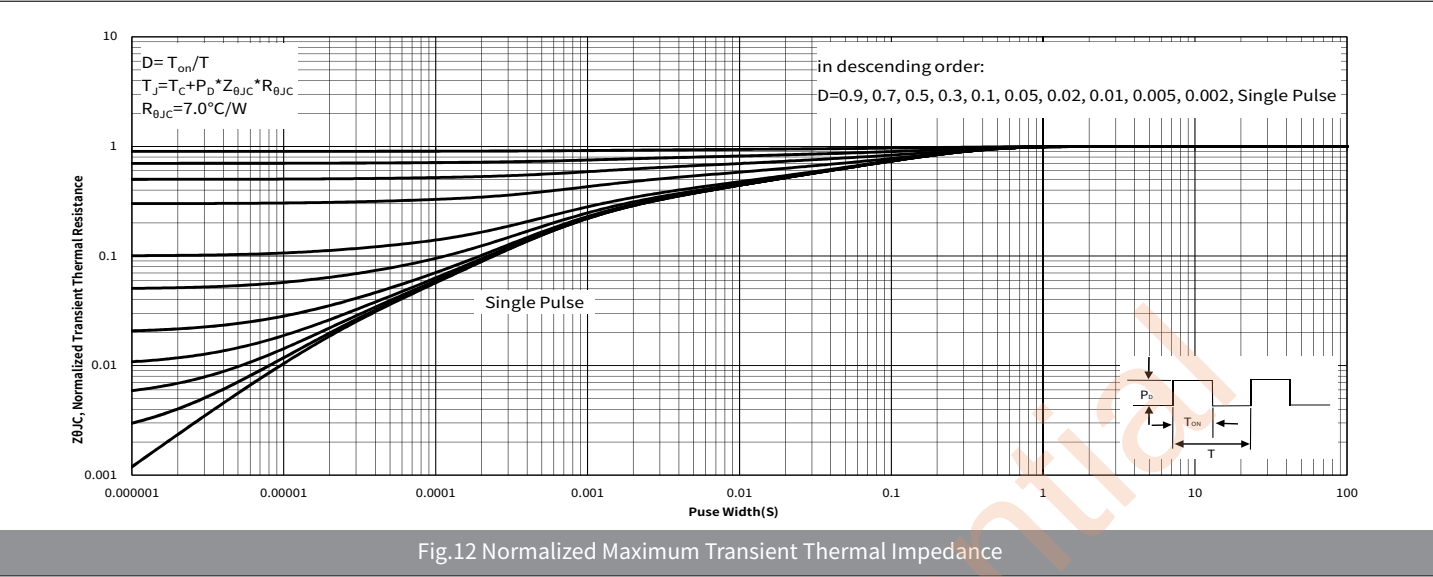
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



● **Ratings And Characteristics Curves** ($T_a=25^\circ\text{C}$ Unless otherwise specified)



● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



● Package Outline Dimensions (TO-252)

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.50	6.70	0.256	0.264
B	5.10	5.46	0.201	0.215
C	1.40	1.80	0.055	0.071
D	6.00	6.20	0.236	0.244
E	10.00	10.40	0.394	0.409
F	2.16	2.36	0.085	0.093
G	0.66	0.86	0.026	0.034
φ	1.05	1.35	0.041	0.053
H	0.46	0.58	0.018	0.023
J	2.20	2.40	0.087	0.094
K	-	0.30	-	0.012
L	0.89	2.29	0.035	0.090
M	2.73	3.08	0.107	0.121
N	0.43	0.58	0.017	0.023

● Suggested Pad Layout

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
a	3.70	-	0.146	-
b	4.37	-	0.172	-
X	-	5.80	-	0.228
X1	-	1.20	-	0.047
Y	-	5.85	-	0.230
Y1	-	2.00	-	0.079

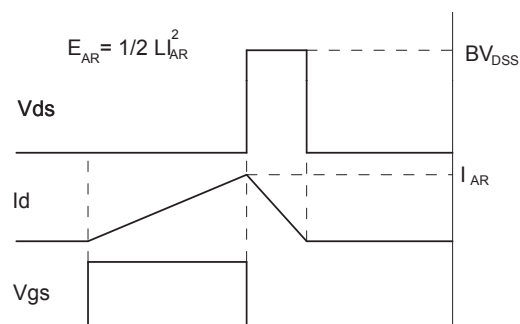
1. Gate Charge Test Circuit & Waveforms



2. Resistive Switching Test Circuit & Waveforms



3. Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



4. Diode Recovery Test Circuit & Waveforms

