

TO-252 Plastic-Encapsulate MOSFETS

Features

- $V_{DS}=-40V$
- $I_D=-40A$
- $R_{DS(on)}@V_{GS}=-10V < 12m\Omega$
- $R_{DS(on)}@V_{GS}=-4.5V < 17m\Omega$
- Fast Switching
- Low Gate Charge and R_{dson}
- Advanced Split Gate Trench Technology

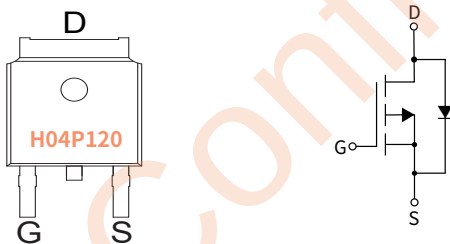
Applications

- Load switch
- PWM application
- 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



Drain-source Voltage
-40V
Drain Current
-40 Ampere



Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
TO-252	R3	0.305	2500	5000	25000	13"

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

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	V_{DS}	V	-40
Gate-source Voltage	V_{GS}	V	± 20
Drain Current	I_D	A	-40
Pulsed Drain Current ⁽¹⁾	I_{DM}	A	-160
Total Power Dissipation	P_D	W	40
Single pulse avalanche energy ⁽²⁾	EAS	mJ	95
Junction temperature	T_J	°C	-55 ~+150
Storage temperature	T_{stg}	°C	-55 ~+150
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	°C / W	3.1

● Static Parameter Characteristics (T_j=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	-40	—	—
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V, 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	-1.5	-2.5
Static Drain-Source On-Resistance ⁽³⁾	R _{DS(on)}	V _{GS} = -10V, I _D =-15A	mΩ	—	9	12
		V _{GS} = -4.5V, I _D =-10A		—	13	17

● Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V, f=1MHZ	pF	—	3398	—
Output Capacitance	C _{oss}			—	281	—
Reverse Transfer Capacitance	C _{rss}			—	274	—

● Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	t _{D(on)}	V _{GS} =-10V, V _{DS} =-20V, I _D =-11A, R _{GEN} =2.5Ω	nS	—	10	—
Turn-on Rise Time	t _r		nS	—	20	—
Turn-off Delay Time	t _{D(off)}		nS	—	51	—
Turn-off fall Time	t _f		nS	—	28	—
Total Gate Charge	Q _g	V _{DS} =-20V, I _D =-11A V _{GS} =-10V	nC	—	35	—
Gate-Source Charge	Q _{gs}		nC	—	6.2	—
Gate-Drain Charge	Q _{gd}		nC	—	7.3	—

● Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V _{SD}	I _S =-40A, V _{GS} =0V	V	—	—	-1.2
Maximum Body-Diode Continuous Current	I _S	—	A	—	—	-40

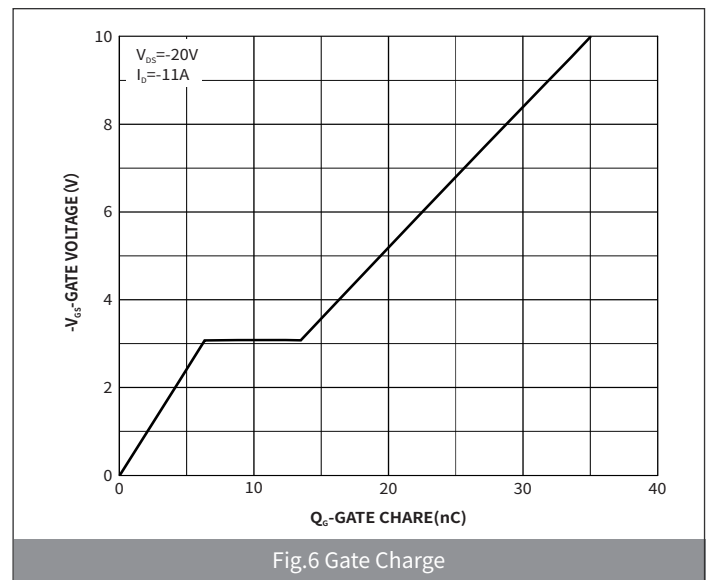
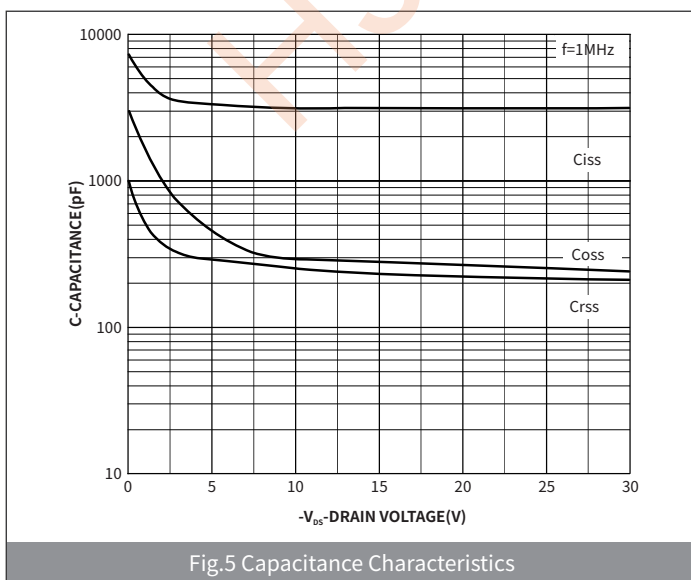
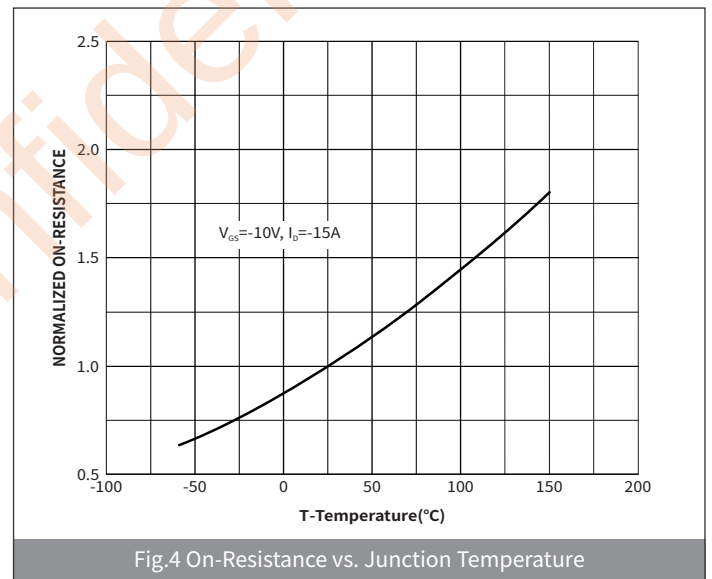
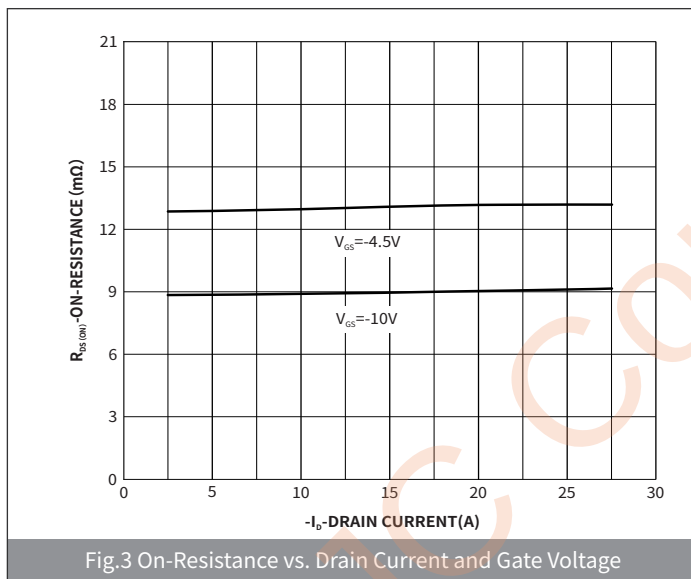
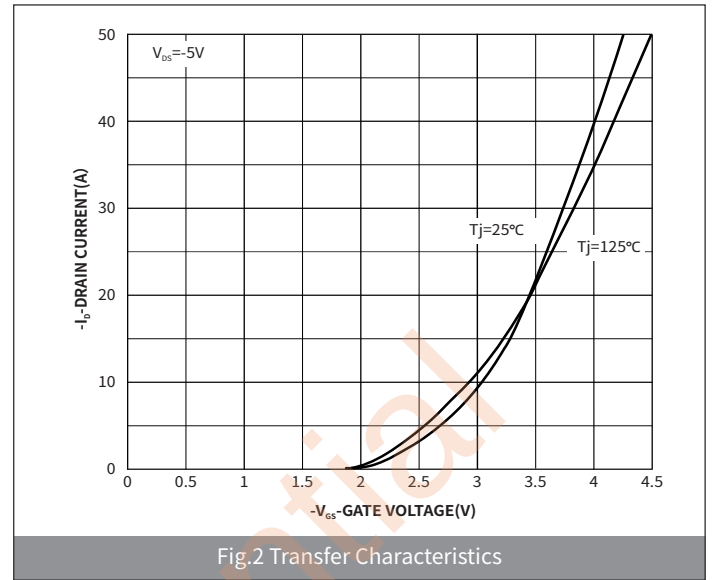
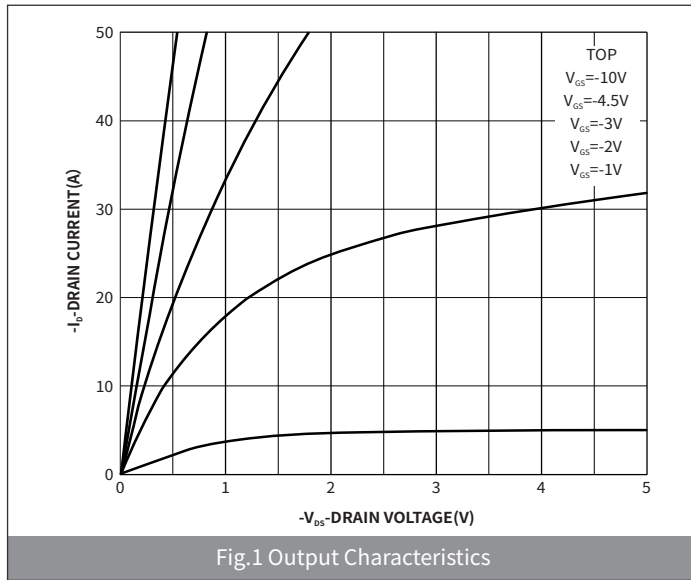
Note :

(1) Repetitive Rating: Pulse width limited by maximum junction temperature.

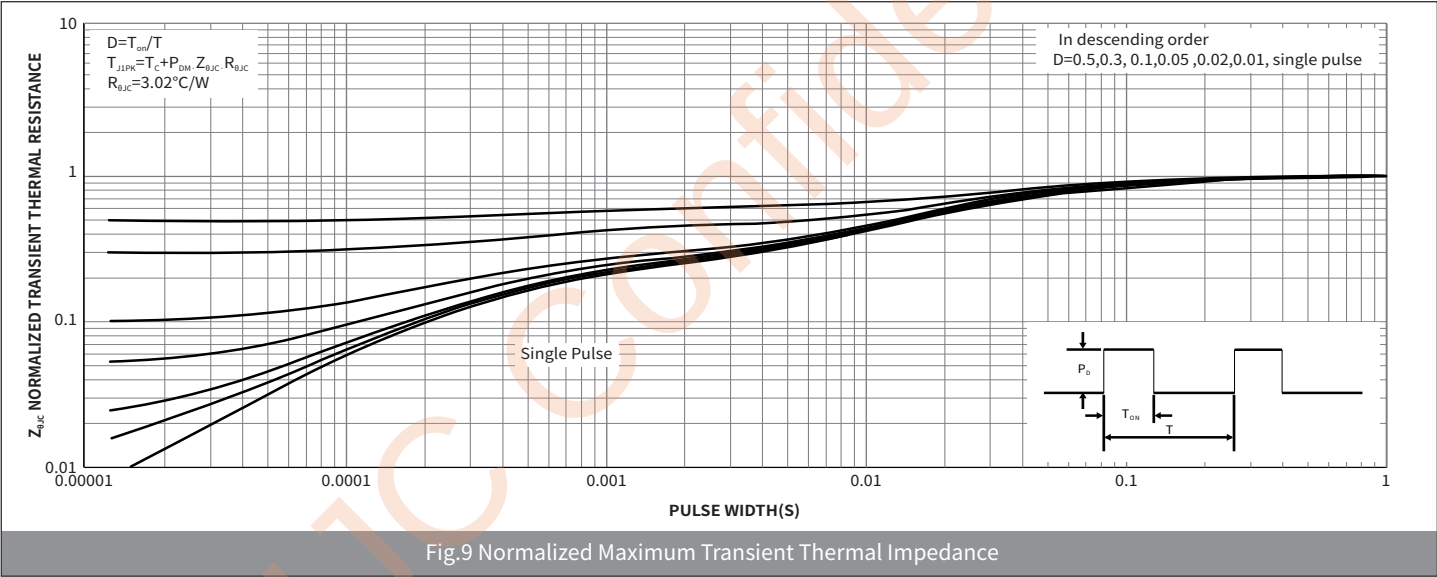
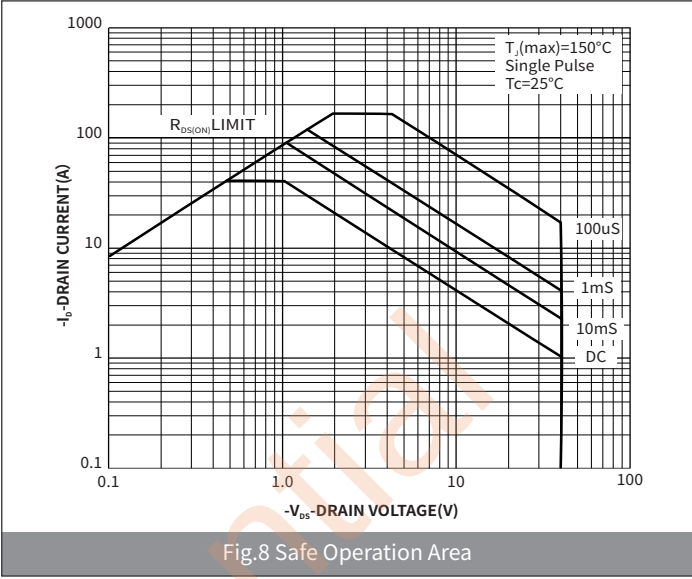
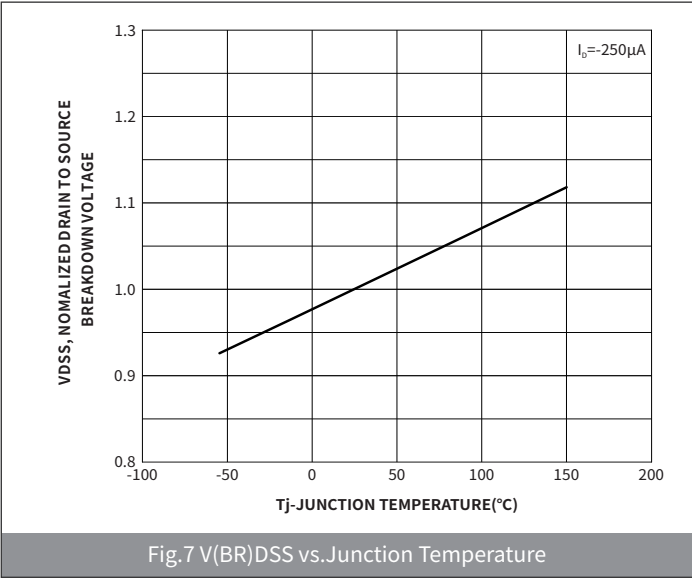
(2) EAS condition : T_j=25°C ,VDD=-20V,VG=-10V,L=0.5mH,IAS=-19.5A,Rg=25Ω.

(3) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

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



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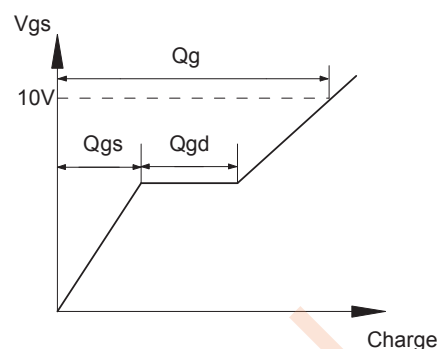
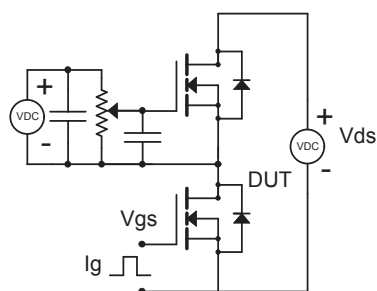
● Package Outline Dimensions (TO-252)

Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A2	0.90	1.10	0.035	0.043
b	0.66	0.86	0.026	0.034
b1	5.10	5.46	0.201	0.215
b2	4.27	4.37	0.168	0.172
b3	0.78	0.90	0.031	0.035
c	0.46	0.58	0.018	0.023
D	6.00	6.20	0.236	0.244
D1	5.35 REF.		0.211 REF.	
E	6.50	6.70	0.256	0.264
E1	4.83 REF.		0.190 REF.	
e	2.18	2.38	0.086	0.094
H	9.80	10.4	0.386	0.409
L1	2.90 REF.		0.114 REF.	
L3	0.90	1.20	0.035	0.047
L4	0.60	1.00	0.024	0.039
L5	1.6 REF.		0.063 REF.	
L6	-	0.12	-	0.005

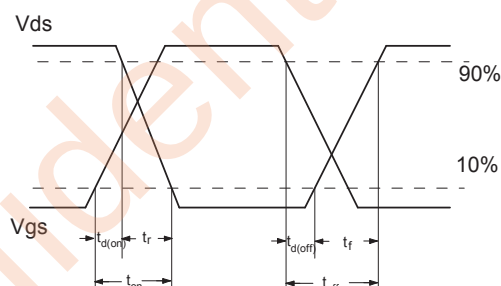
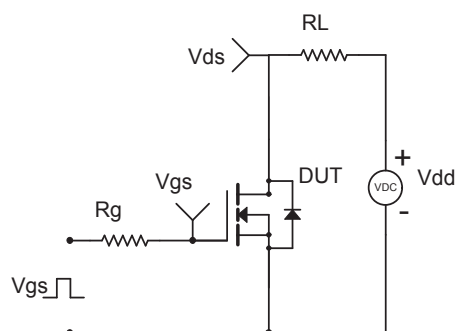
● Suggested Pad Layout

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

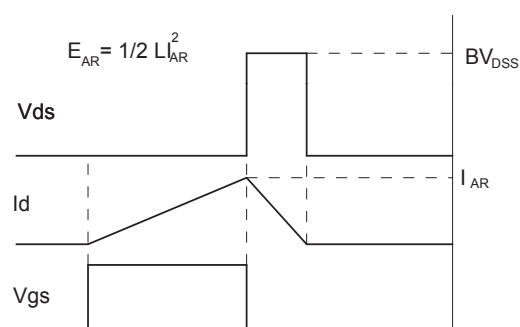
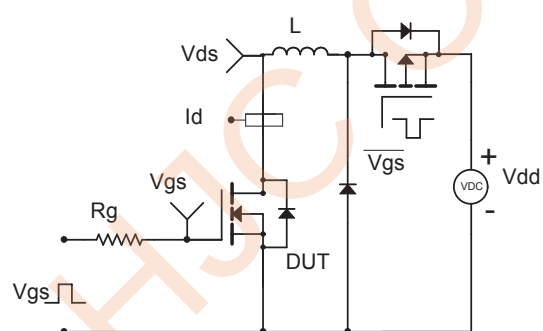
1. Gate Charge Test Circuit & Waveforms



2. Resistive Switching Test Circuit & Waveforms



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



4. Diode Recovery Test Circuit & Waveforms

