

TO-252 Plastic-Encapsulate MOSFETS

Features

- $V_{DS}=40V$
- $I_D=40A$
- $R_{DS(on)}@V_{GS}=10V < 7.5m\Omega$
- $R_{DS(on)}@V_{GS}=4.5V < 10.5m\Omega$
- SGT technology
- Avalanche energy tested
- Fast Switching Speedze

Drain-source Voltage
40 V
Drain Current
40 Ampere

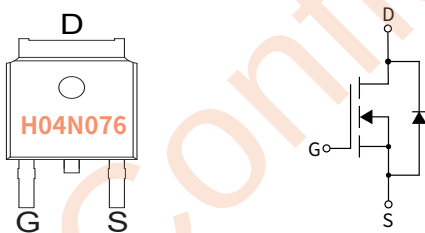
Applications

- Battery protection
- 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



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	49
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
Thermal resistance, junction – ambient	R_{thJA}	°C / W	62

Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
TO-252	R3	0.305	2500	5000	50000	13"

● 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	2.2
Static Drain-Source On-Resistance ⁽³⁾	R _{DS(ON)}	V _{GS} = 10V, I _D =40A	mΩ	—	6.8	7.5
		V _{GS} = 4.5V, I _D =25A		—	9.3	10.5
Forward Transconductance	g _{FS}	V _{DS} =5.0V, I _D =15A	S	—	17.5	—

● Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHZ	pF	—	630	—
Output Capacitance	C _{oss}			—	265	—
Reverse Transfer Capacitance	C _{rss}			—	7.5	—

● Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =20V, I _D =40A, R _{GEN} =3.5Ω	nS	—	4	—
Turn-on Rise Time	t _r		nS	—	8	—
Turn-off Delay Time	t _{D(off)}		nS	—	11	—
Turn-off fall Time	t _f		nS	—	18	—
Total Gate Charge	Q _g	V _{DS} =32V, I _D =40A V _{GS} =10V	nC	—	23	—
Gate-Source Charge	Q _{gs}		nC	—	5.8	—
Gate-Drain Charge	Q _{gd}		nC	—	2.6	—

● Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V _{SD}	I _S =40A, V _{GS} =0V	V	—	—	1.3
Maximum Body-Diode Continuous Current	I _S	—	A	—	—	40
Reverse Recovery Time	t _{rr}	T _j =25°C, I _F =40A di/dt=100A/μs	nS	—	34	—
Reverse Recovery Charge	Q _{rr}		nC	—	27	—

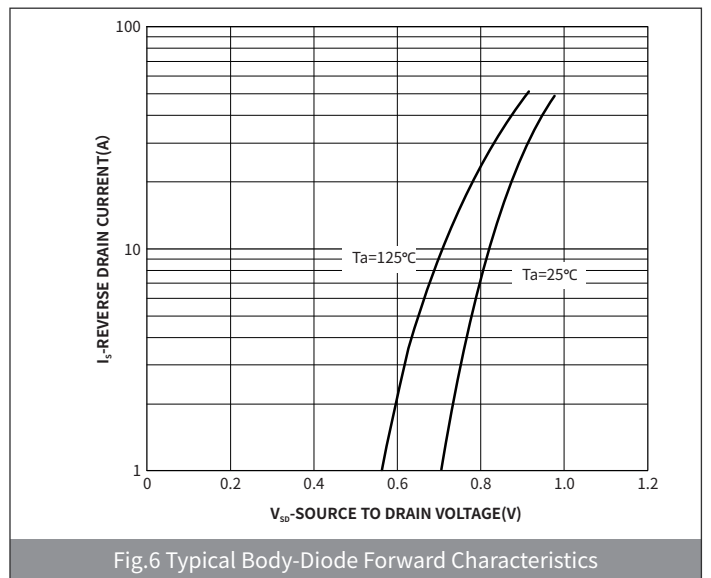
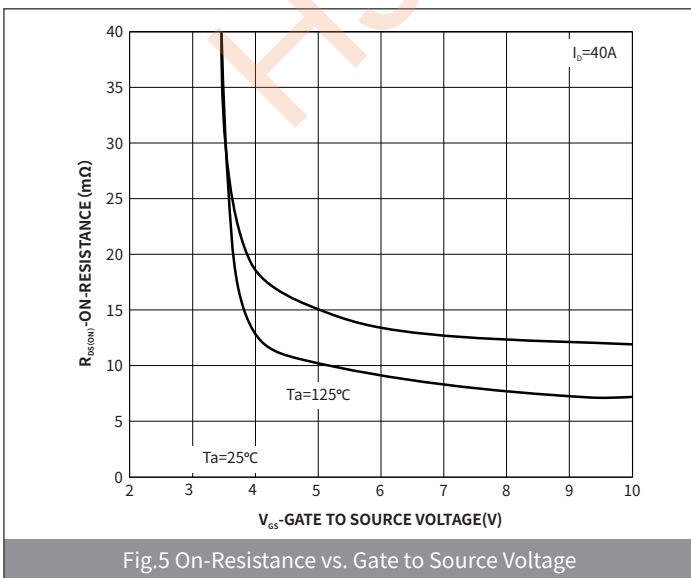
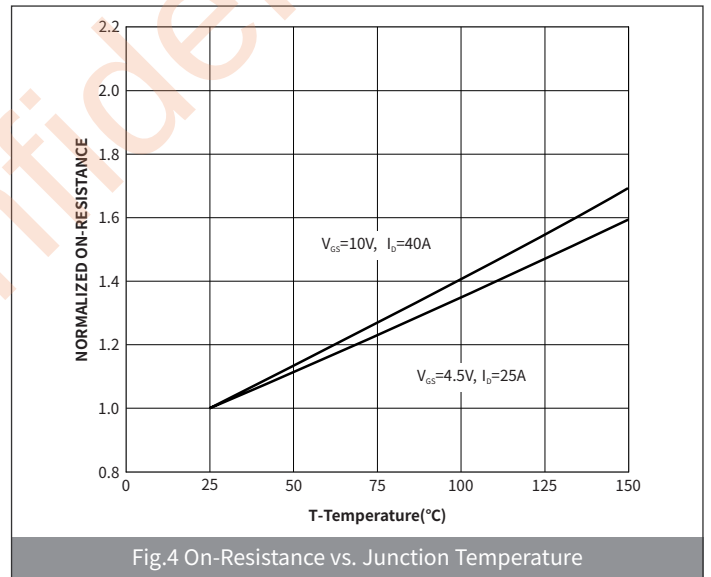
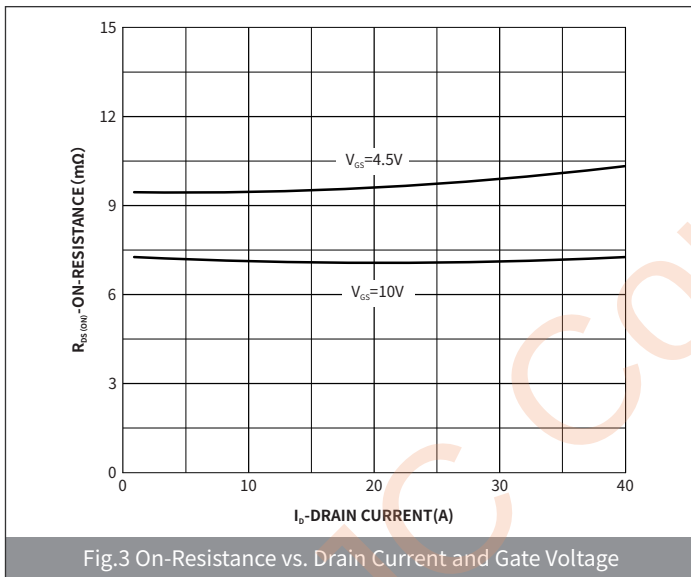
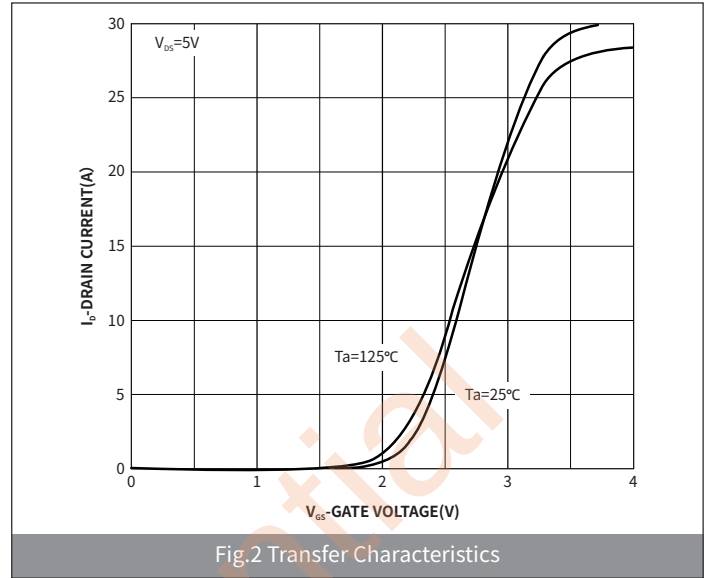
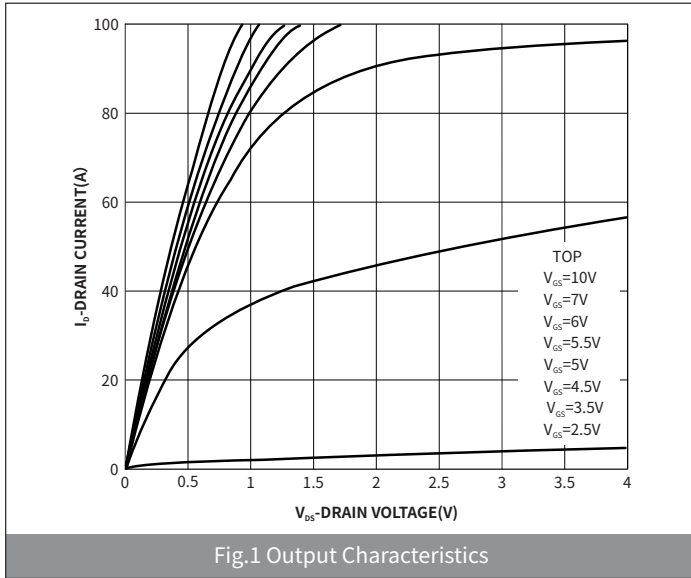
Note :

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

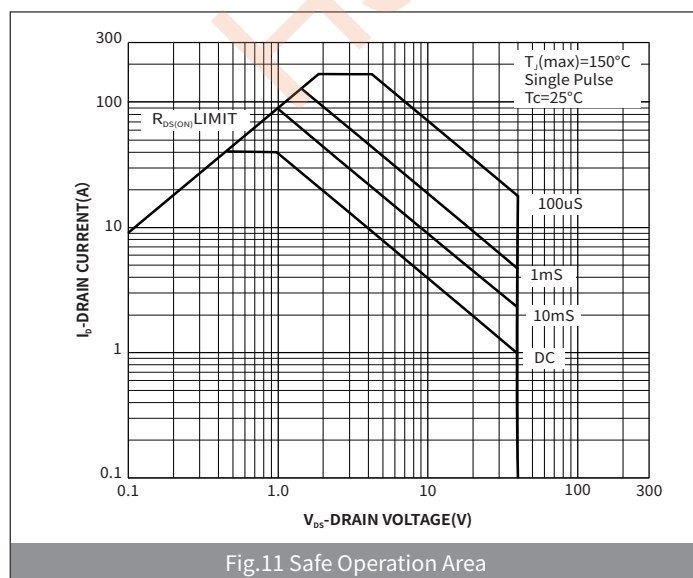
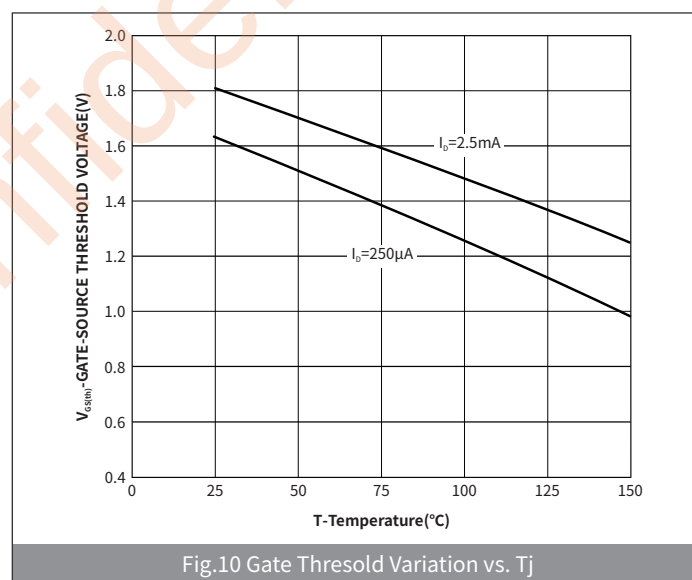
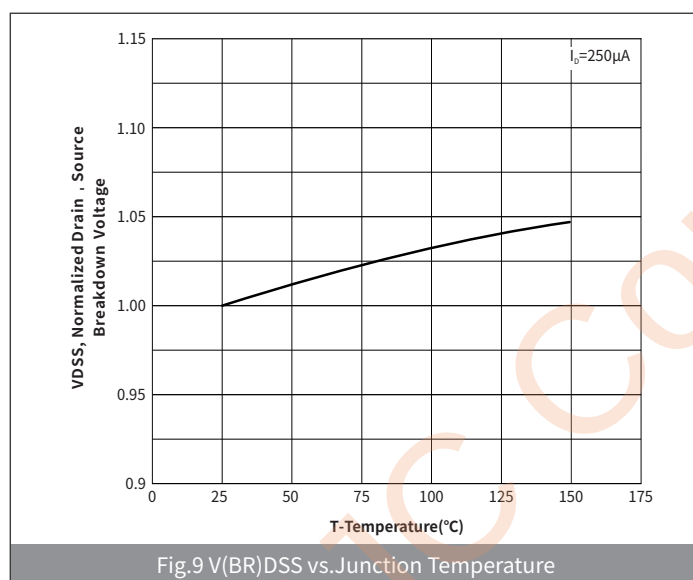
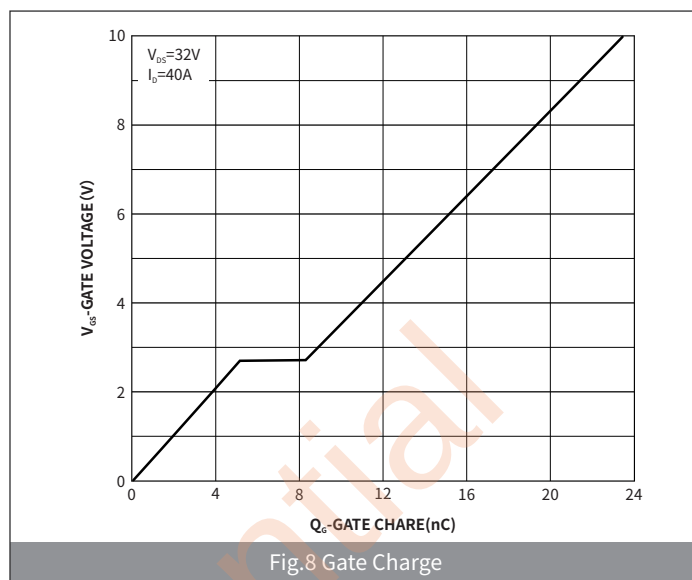
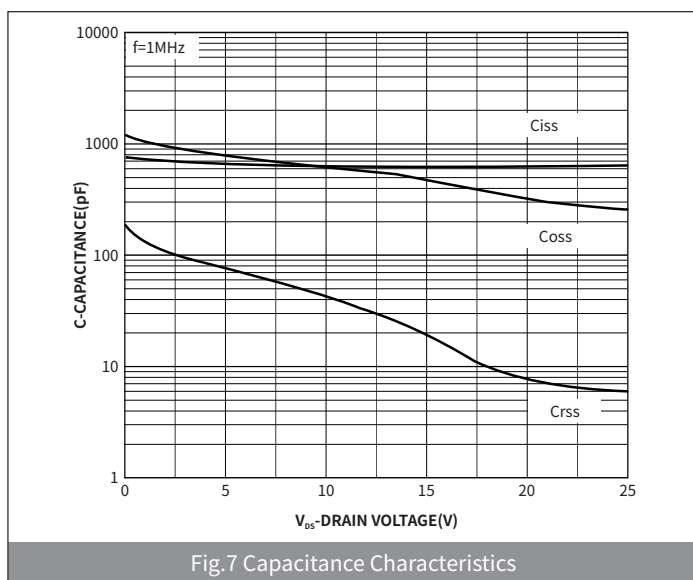
(2) EAS condition : T_j=25°C, V_{DD}=20V, V_G=10V, L=0.5mH, I_{AS}=14A, R_g=25Ω.

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

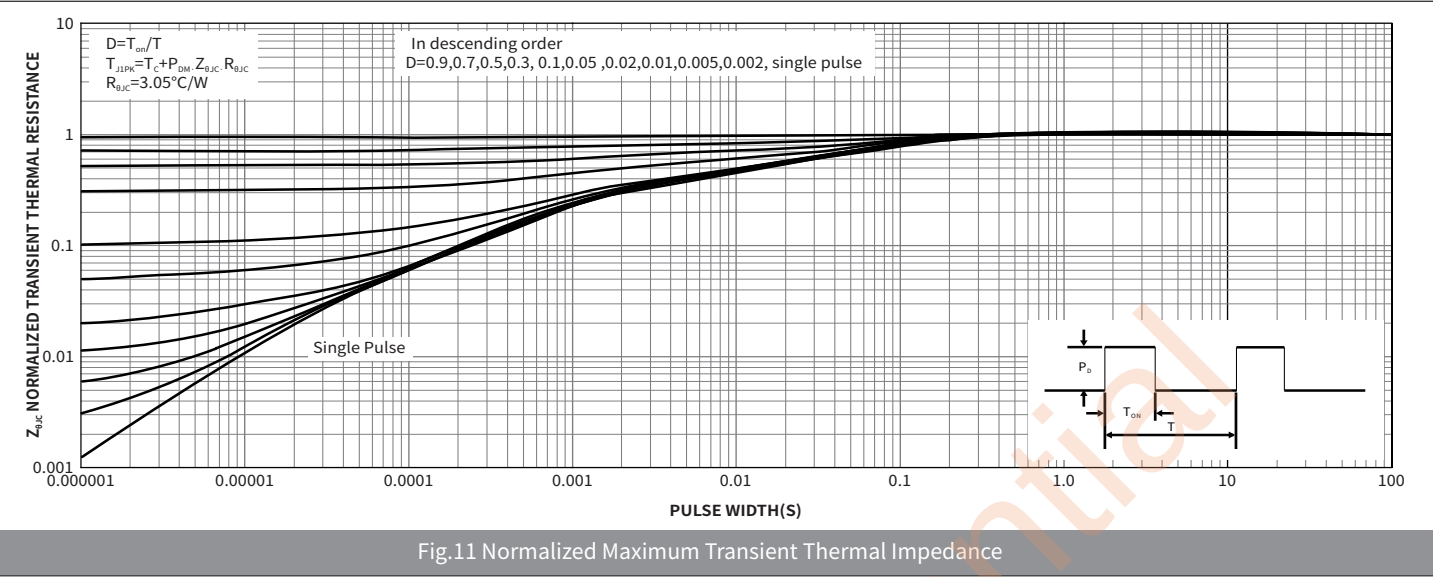
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



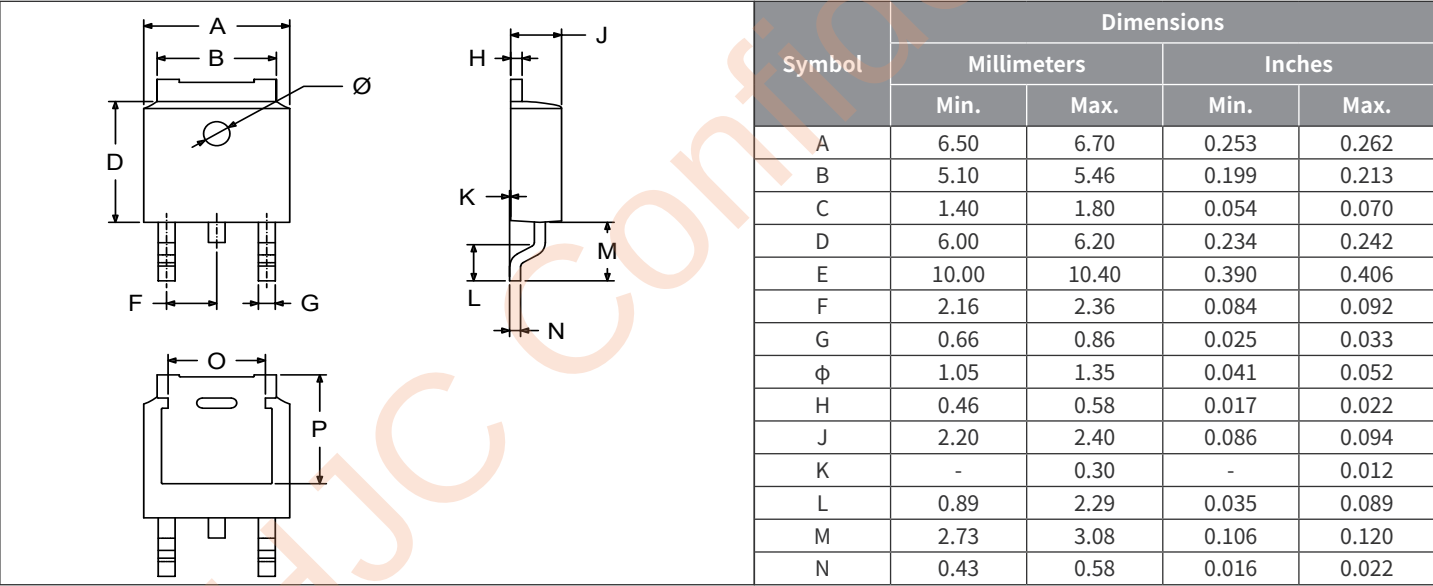
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



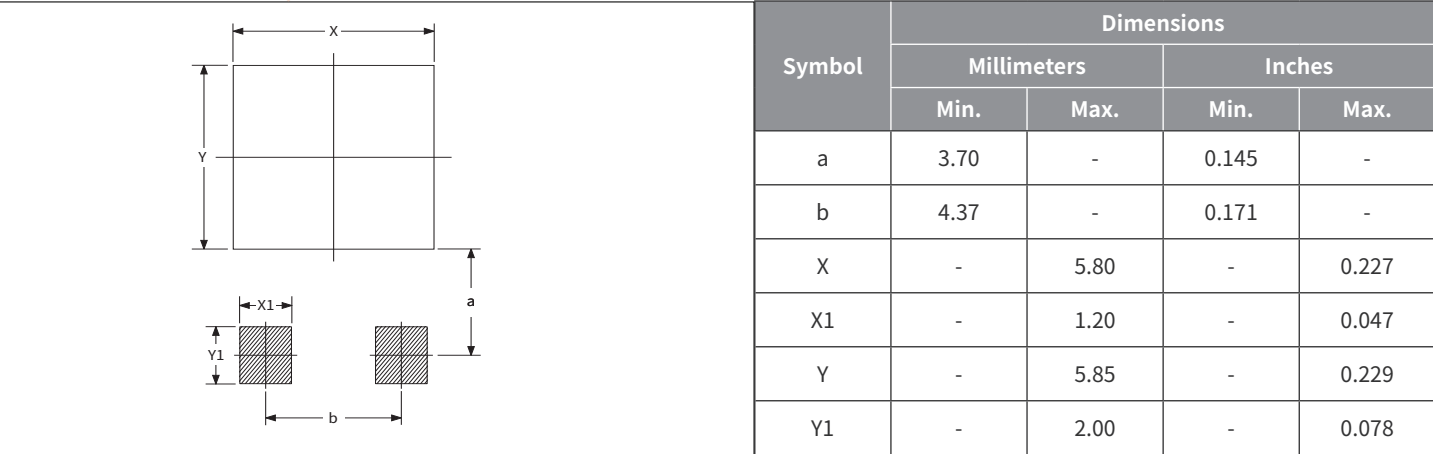
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



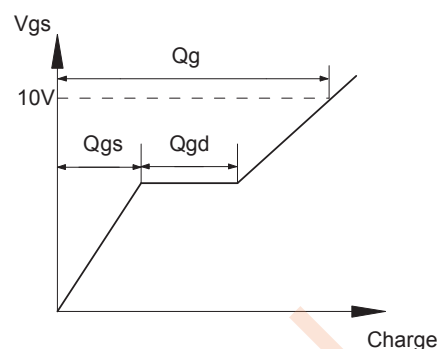
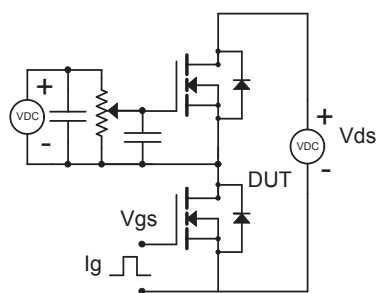
● Package Outline Dimensions (TO-252)



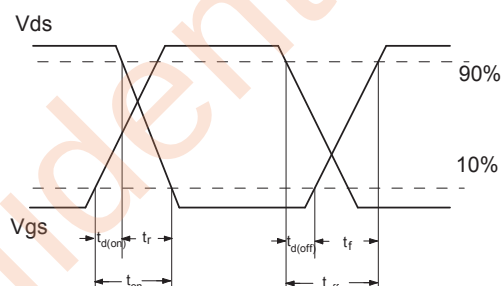
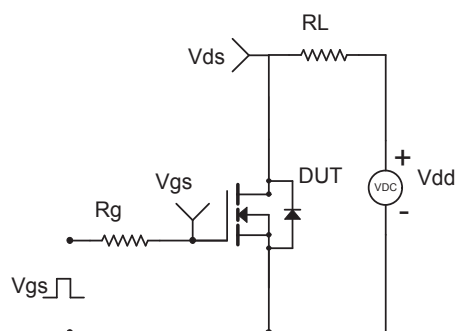
● Suggested Pad Layout



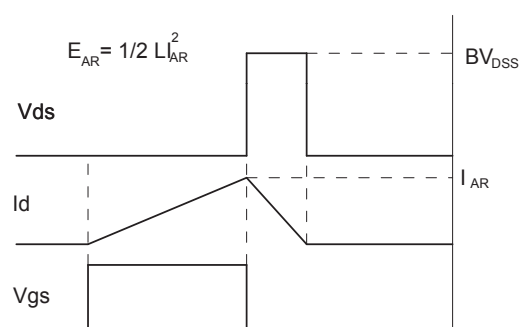
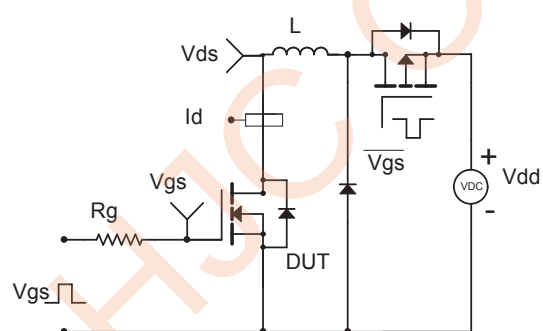
1. Gate Charge Test Circuit & Waveforms



2. Resistive Switching Test Circuit & Waveforms



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



4. Diode Recovery Test Circuit & Waveforms

