

N-Channel Enhancement MOSFET

Features

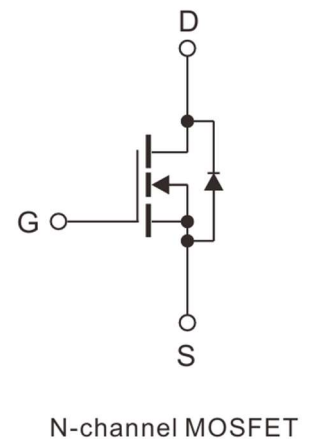
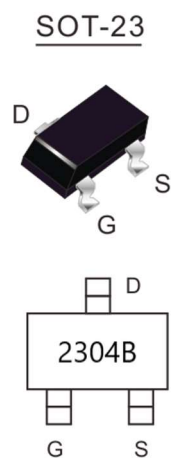
- Trench Power MV MOSFET technology
- High Power and current handing capability
- Voltage Controlled Small Signal Switch
- Halogen-Free & Lead-Free

Product Summary		
V _{DS}	R _{DS(on)} (mΩ) Typ	I _D (A)
30V	46@ 4.5V 3A	4.0
	28@ 10V 4A	

Application

- Load Switch for Portable Devices
- Solid-state relays
- DC/DC Converter

Marking information



Absolute Maximum Ratings (at T_A = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous drain current (T _A =25 °C)	I _D	4.0	A
Continuous drain current (T _A =70 °C)	I _D	2.5	A
Peak Drain Current, Pulsed ¹⁾	I _{DM}	20	A
Power Dissipation	P _D	1.0	W
Operating Junction	T _J	-55~150	°C
Storage Temperature Range	T _{stg}	-55~150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ²⁾	R _{θJA}	125	°C/W

Note:

1. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.
2. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Characteristics at T_J = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at V _{GS} =0V, I _D =250μA	BV _{DSS}	30			V
Drain-Source Leakage Current at V _{DS} =30V, V _{GS} =0V	I _{DSS}			1	μA
Gate Leakage Current at V _{GS} =±20V, V _{DS} =0V	I _{GSS}			±0.1	μA
Gate-Source Threshold Voltage at V _{DS} =V _{GS} , I _D =250μA	V _{GS(th)}	1.0	1.6	2.2	V
Drain-Source On-State Resistance at V _{GS} =10V, I _D =4A at V _{GS} =4.5V, I _D =3A	R _{DS(on)}		28 46	36 60	mΩ
DYNAMIC PARAMETERS					
Input Capacitance at V _{DS} =15V, V _{GS} =0V, f=1MHz	C _{iss}		280		pF
Output Capacitance at V _{DS} =15V, V _{GS} =0V, f=1MHz	C _{oss}		45		pF
Reverse Transfer Capacitance at V _{DS} =15V, V _{GS} =0V, f=1MHz	C _{rss}		35		pF
Gate charge total at V _{DS} =15V, V _{GS} =10V, I _D =4A	Q _g		6.5		nC
Gate to Source Charge at V _{DS} =15V, V _{GS} =10V, I _D =4A	Q _{gs}		1.0		nC
Gate to Drain Charge at V _{DS} =15V, V _{GS} =10V, I _D =4A	Q _{gd}		2.0		nC
Reverse Recovery Time at I _F =4A, di/dt=300A/μs	t _{rr}		6.5		nS
Reverse Recovery Charge at I _F =4A, di/dt=300A/μs	Q _{rr}		5.0		nC
Turn-On Delay Time at V _{DD} =15V, I _D =4A, R _{GEN} =2.2Ω, V _{GS} =10V	t _{d(on)}		3		nS
Turn-On Rise Time at V _{DD} =15V, I _D =4A, R _{GEN} =2.2Ω, V _{GS} =10V	t _r		15		ns
Turn-Off Delay Time at V _{DD} =15V, I _D =4A, R _{GEN} =2.2Ω, V _{GS} =10V	t _{d(off)}		12		nS
Turn-Off Fall Time at V _{DD} =15V, I _D =4A, R _{GEN} =2.2Ω, V _{GS} =10V	t _f		3		ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I _S =3.6A, V _{GS} =0V	V _{SD}			1.2	V
Maximum Body-Diode Continuous Current	I _S			4.0	A

Electrical Characteristics Curves

Figure 1. Output Characteristics

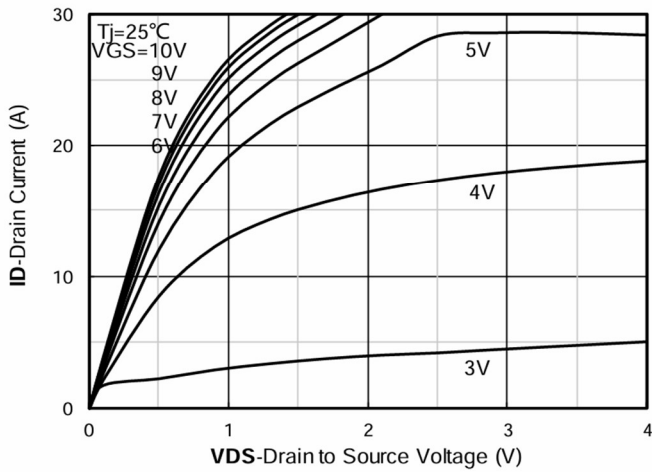


Figure 3. Capacitance Characteristics

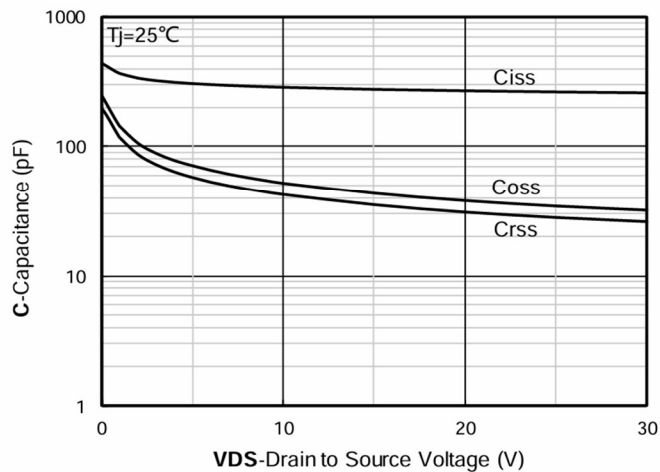


Figure 5. On-Resistance vs Gate to Source Voltage

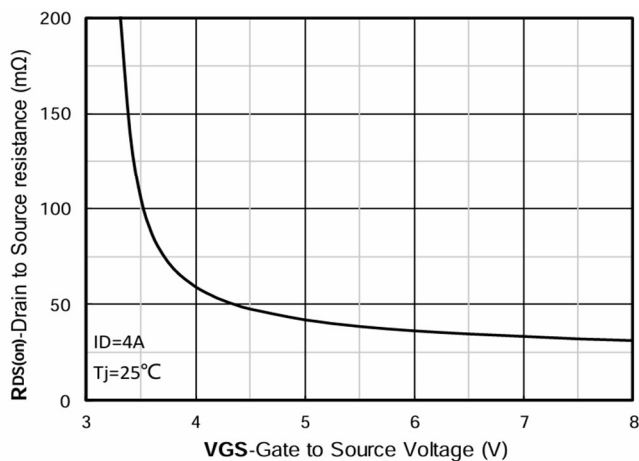


Figure 2. Transfer Characteristics

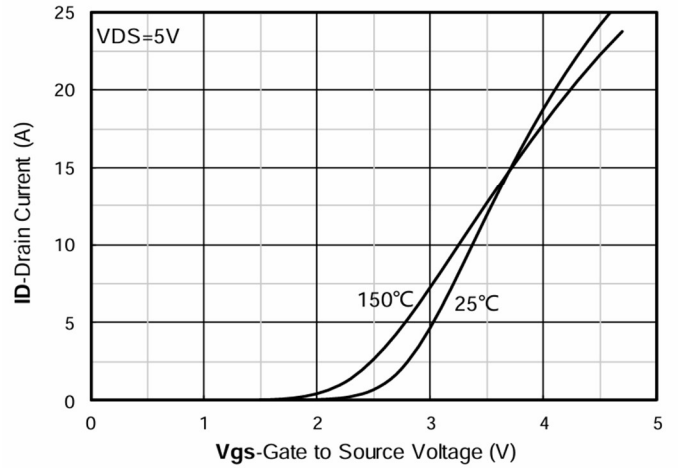


Figure 4. Gate Charge

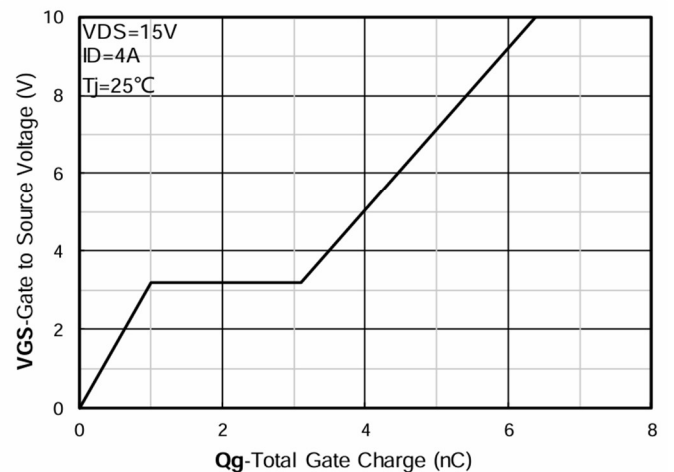
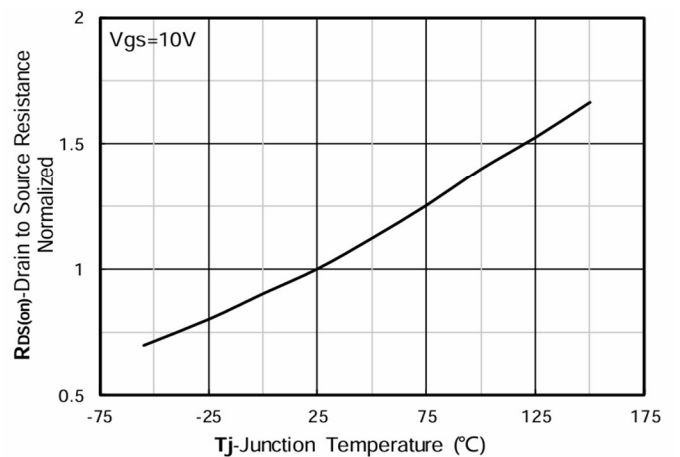


Figure 6. Normalized On-Resistance



Electrical Characteristics Curves

Figure 7. $R_{DS(on)}$ VS Drain Current

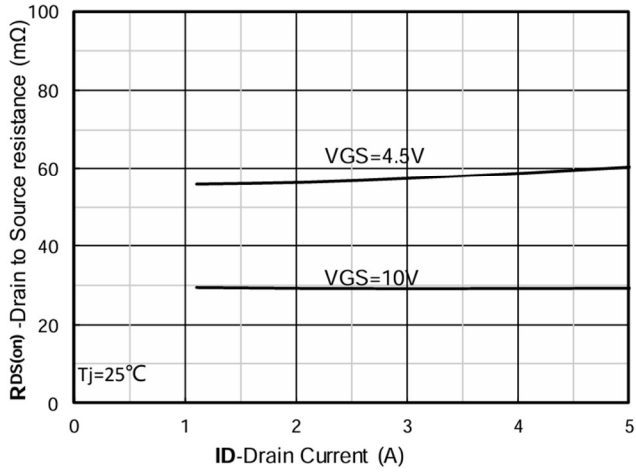


Figure 9. Normalized breakdown voltage

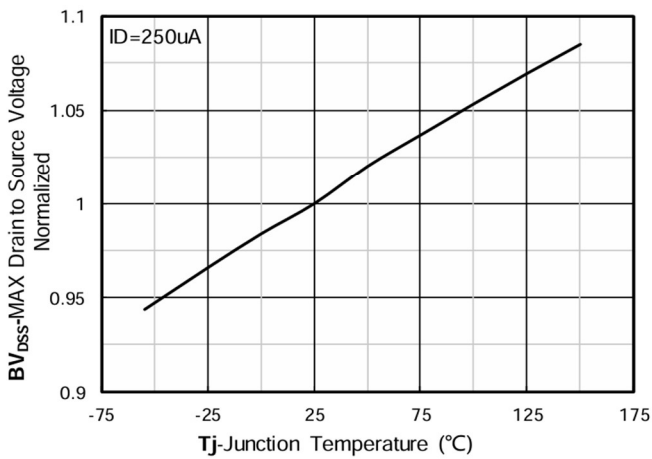


Figure 11. Current dissipation

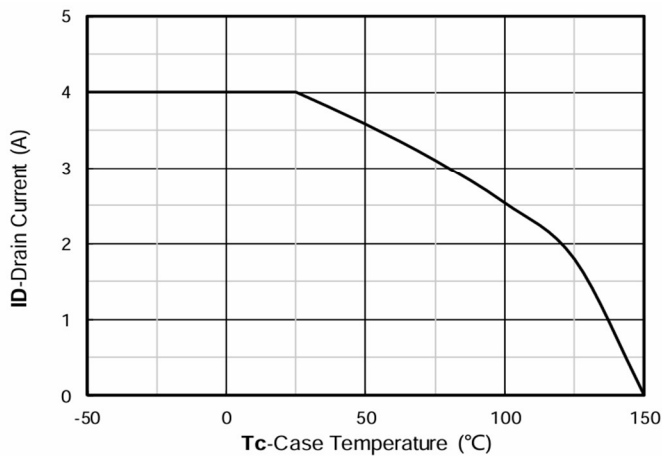


Figure 8. Forward characteristics of reverse diode

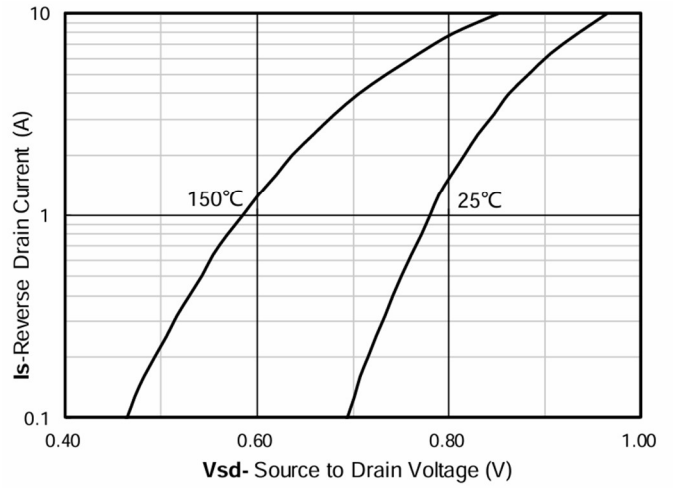


Figure 10. Normalized Threshold voltage

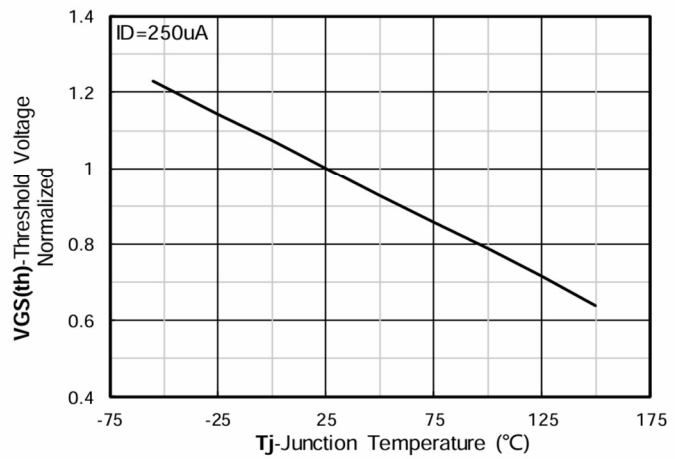
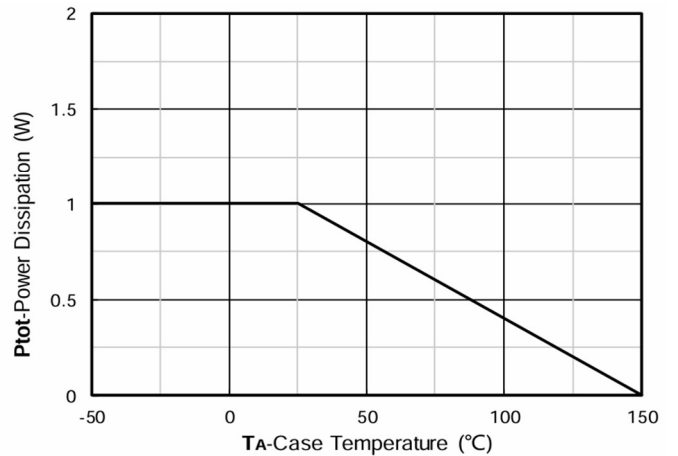


Figure 12. Power dissipation



Electrical Characteristics Curves

Figure 13. Maximum Transient Thermal Impedance

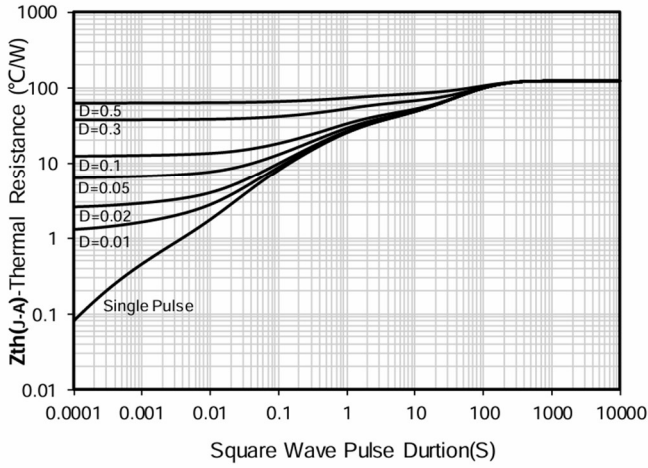
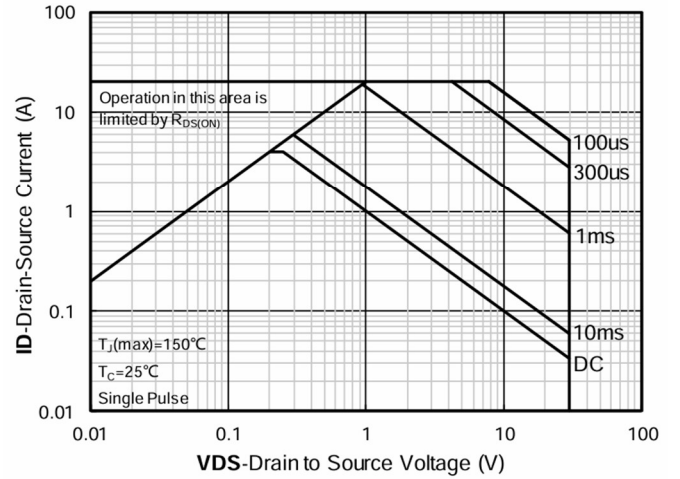
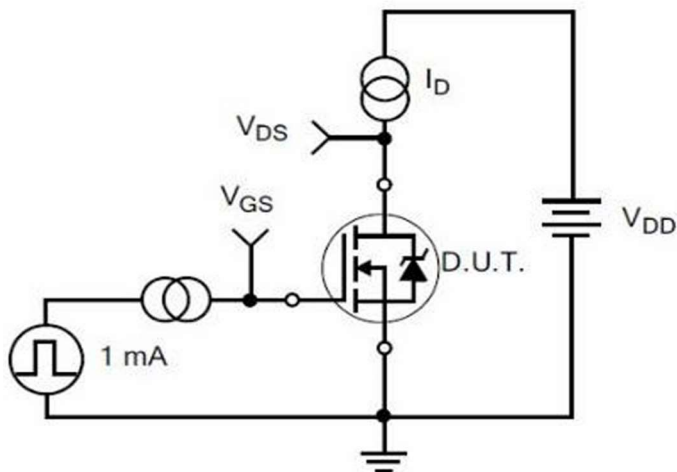


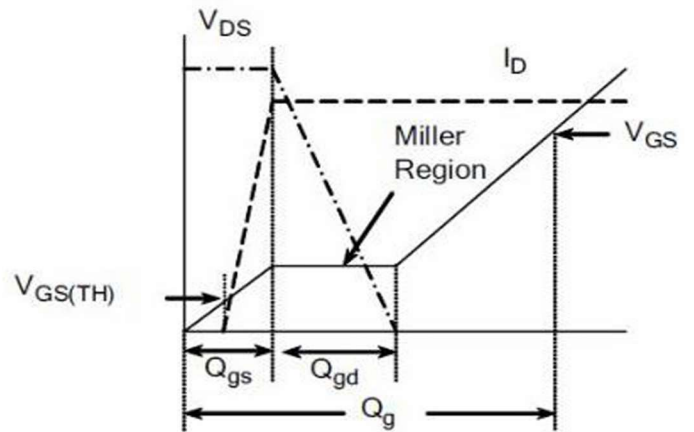
Figure 14. Safe Operation Area



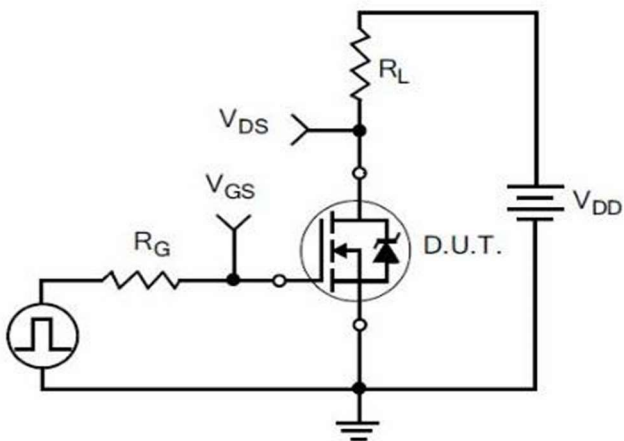
Typical Test Circuit



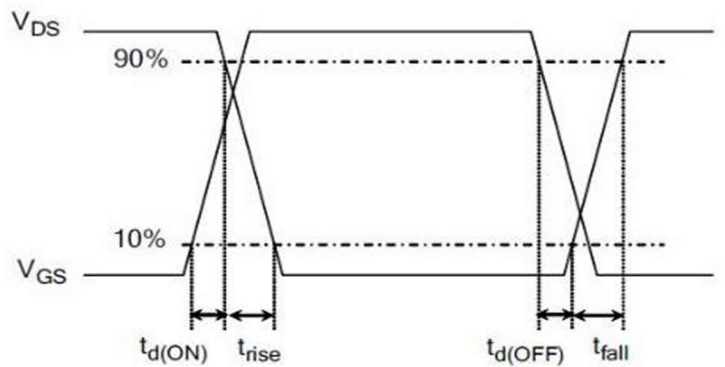
1) Gate Charge Test Circuit



2) Gate Charge Waveform

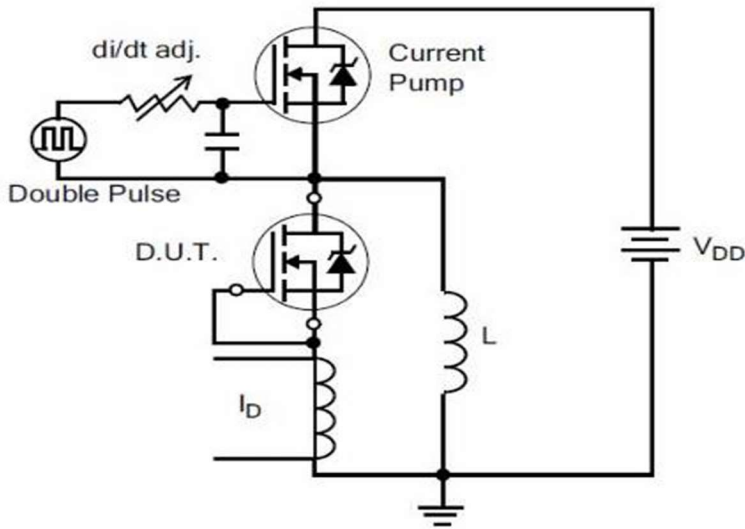


3) Resistive Switching Test Circuit

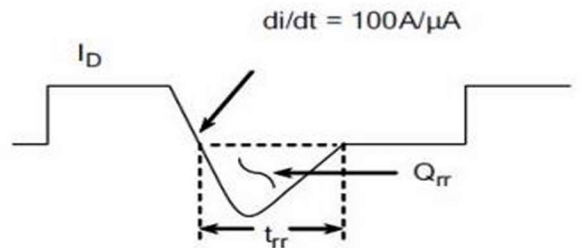


4) Resistive Switching Waveforms

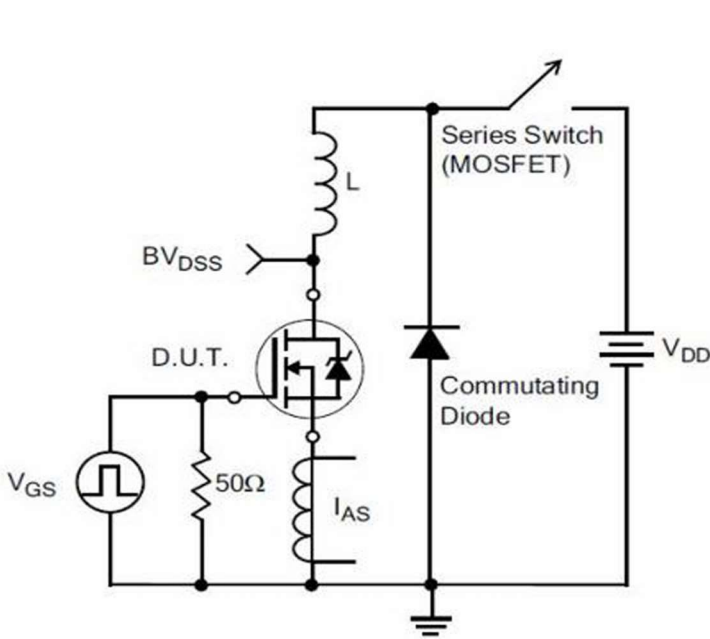
Typical Test Circuit



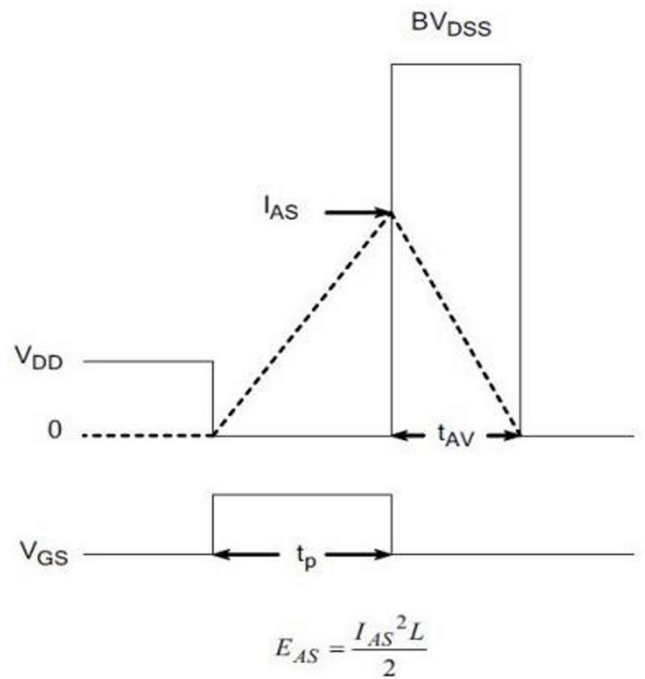
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

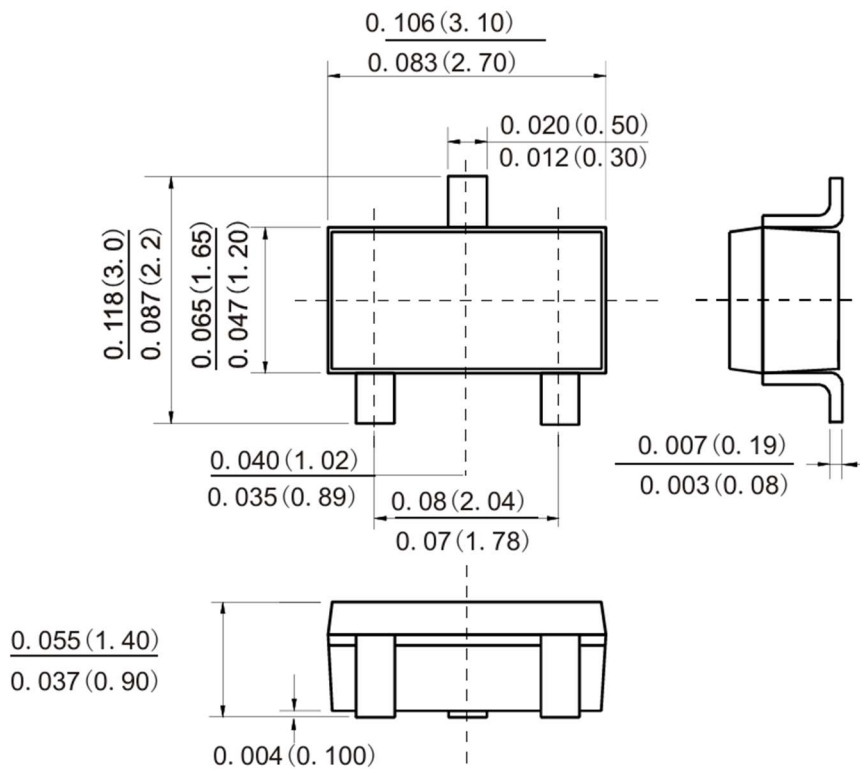


7) . Unclamped Inductive Switching Test Circuit



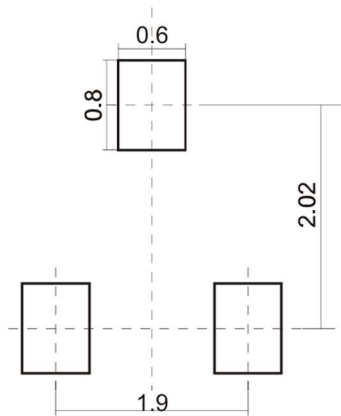
8) Unclamped Inductive Switching Waveforms

Package Outline Dimensions (Units: mm) SOT-23



Dimensions in inches and (millimeters)

Suggested Pad Layout



Dimensions in millimeters

Order Information

Part Number	Package	Quantity
Sh2304B	SOT-23	3000