

N-Channel 150 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^a	Q _g (Typ.)
150	5.9 at V _{GS} = 10 V	119	75 nC

FEATURES

- DT-SGT Power MOSFET
- Very Low On-resistance
- 100% ΔVDS & UIS & Rg Tested



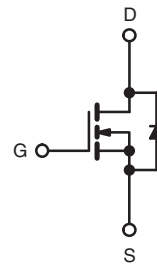
RoHS
COMPLIANT

APPLICATIONS

- DC-DC Converter
- Uninterruptible Power Supply
- Power Switching Application

TO-220 Pin Configuration

Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	150	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _C = 25 °C	119
		T _C = 100 °C	75
Pulsed Drain Current ^b	I _{DM}	476	A
Single Avalanche Energy	E _{AS}	380	mJ
Maximum Power Dissipation ^c	P _D	T _C = 25 °C	208
		T _C = 100 °C	83
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^d	R _{thJA}	33	°C/W
Junction-to-Case (Drain)	R _{thJC}	0.6	

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P_D is based on max. junction temperature, using junction-case thermal resistance.
- The value of R_{thJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	150	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 120 V, V _{GS} = 0 V, T _J = 150 °C	-	-	100	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	119	-	-	A
Drain-Source On-State Resistance ^a	R _{DSON}	V _{GS} = 10 V, I _D = 50 A	-	5.9	6.9	mΩ
Dynamic ^b						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, V _{DS} = 75 V, f = 1 MHz	-	6280	-	pF
Output Capacitance	C _{OSS}		-	470	-	
Reverse Transfer Capacitance	C _{RSS}		-	9	-	
Total Gate Charge ^c	Q _g	V _{DS} = 75 V, V _{GS} = 10 V, I _D = 50 A	-	75	-	nC
Gate-Source Charge ^c	Q _{gs}		-	25.3	-	
Gate-Drain Charge ^c	Q _{gd}		-	12.5	-	
Gate Resistance	R _g	f = 1 MHz	-	0.6	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 75 V, R _{GEN} = 2.7 Ω, I _D = 50 A, V _{GS} = 10 V	-	4.4	-	ns
Rise Time ^c	t _r		-	24.6	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	38.1	-	
Fall Time ^c	t _f		-	9.5	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	119	A
Pulsed Current	I _{SM}		-	-	476	A
Forward Voltage ^a	V _{SD}	I _F = 50 A, V _{GS} = 0 V	-	0.86	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs	-	97.4	-	ns
Reverse Recovery Charge	Q _{rr}		-	217	-	nC

Notes

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

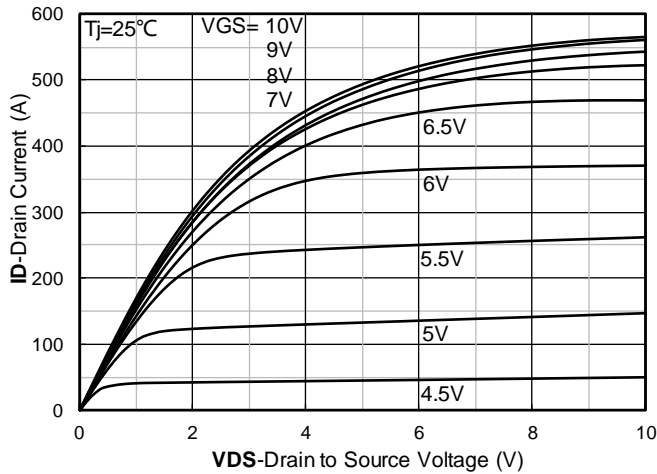


Figure 1. Output Characteristics; typical values

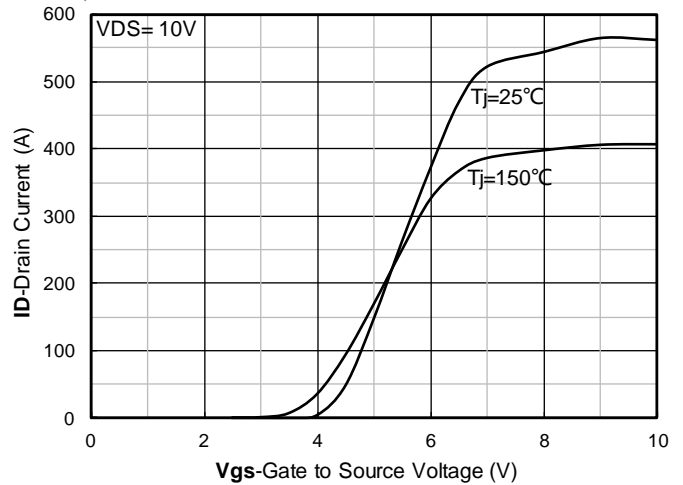


Figure 2. Transfer Characteristics; typical values

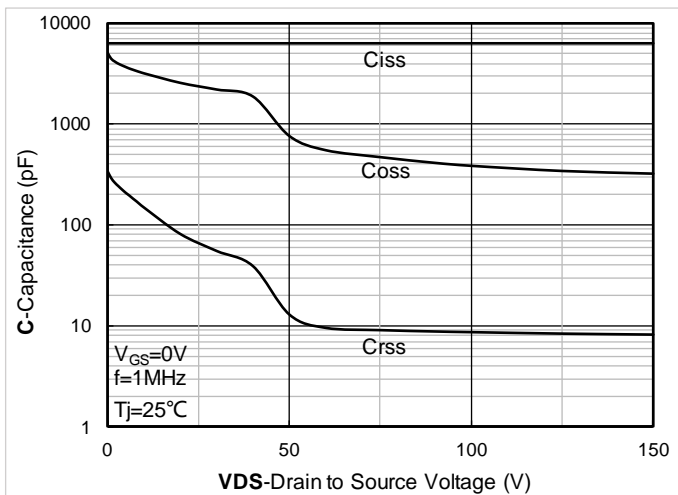


Figure 3. Capacitance Characteristics; typical values

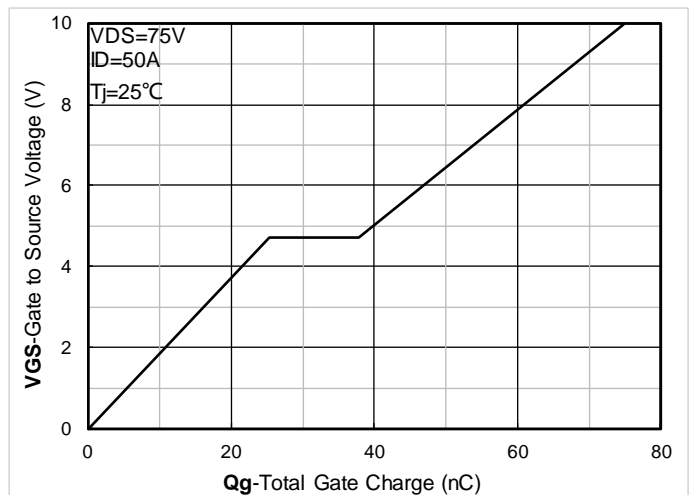


Figure 4. Gate Charge; typical values

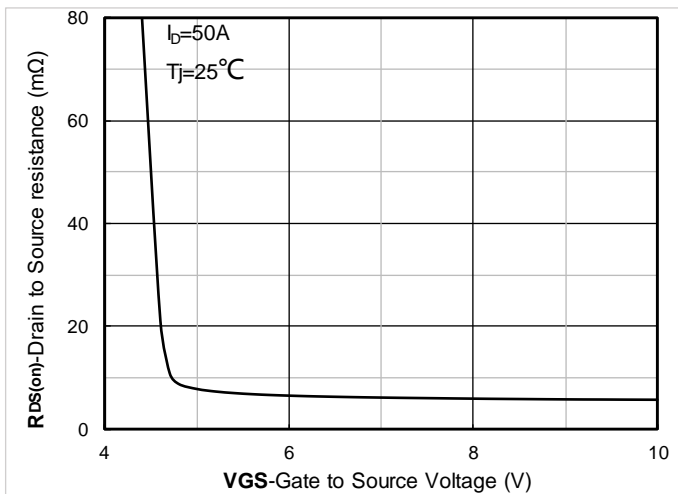


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

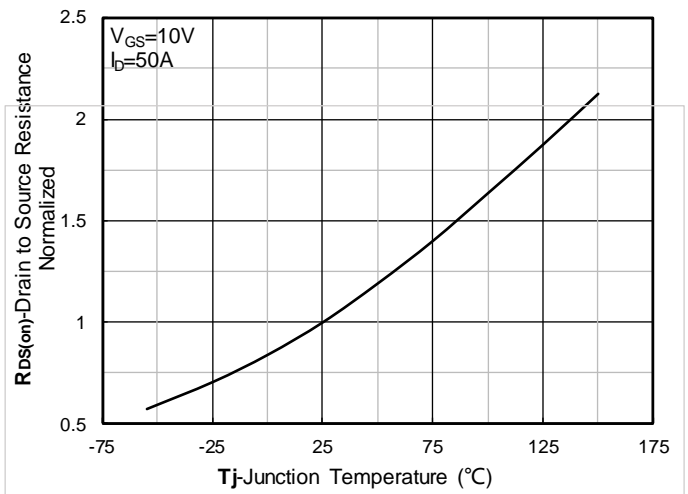


Figure 6. Normalized On-Resistance

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

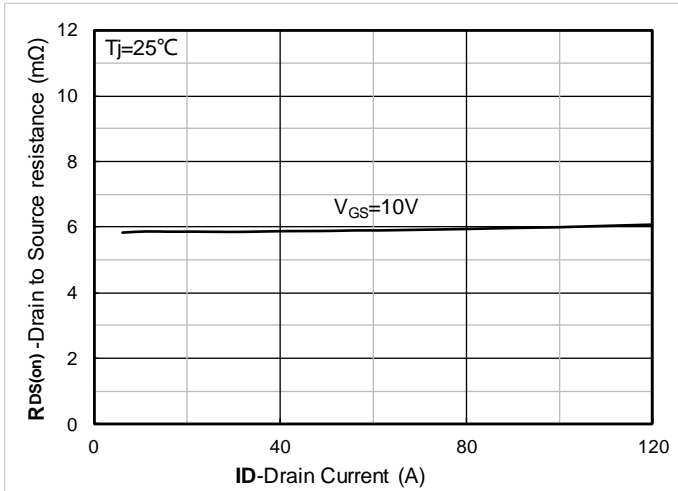


Figure 7. RDS(on) VS Drain Current; typical values

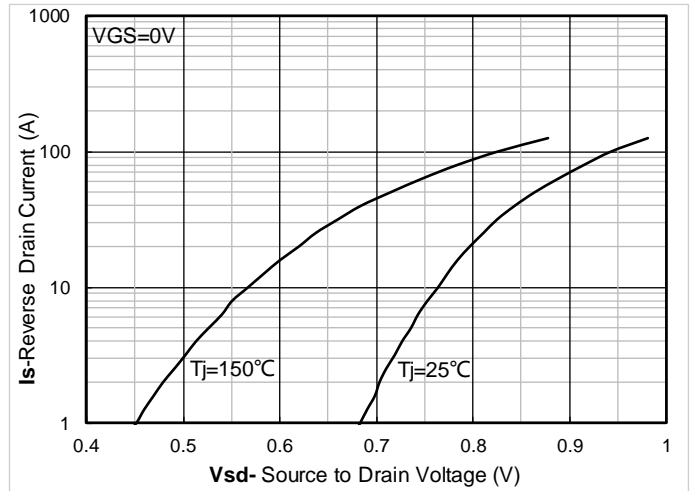


Figure 8. Forward characteristics of reverse diode; typical values

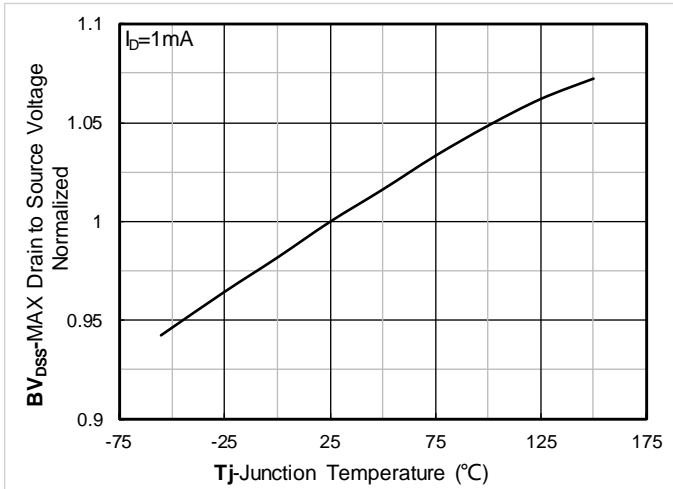


Figure 9. Normalized breakdown voltage

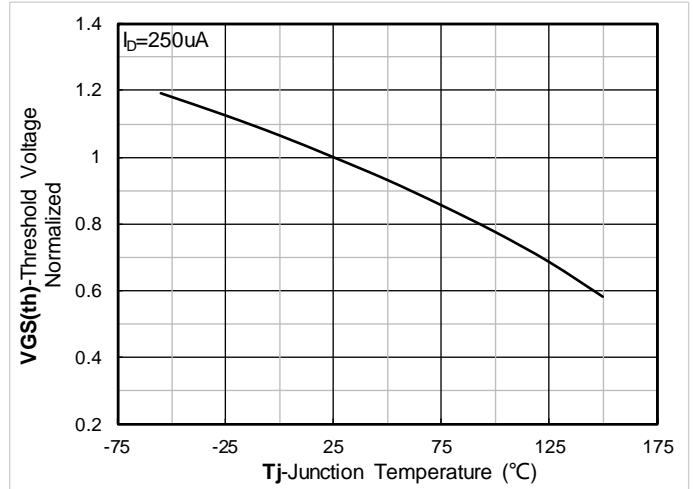


Figure 10. Normalized Threshold voltage

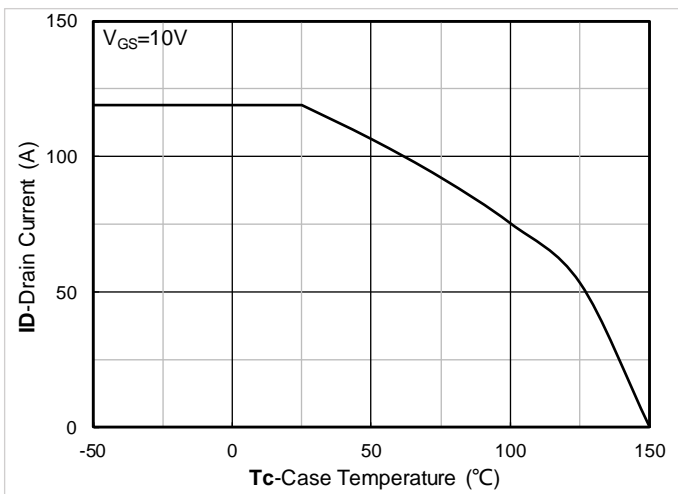


Figure 11. Current dissipation

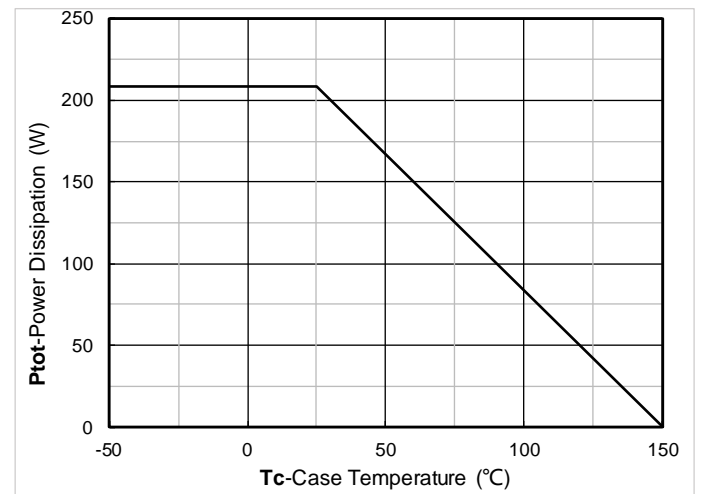


Figure 12. Power dissipation

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

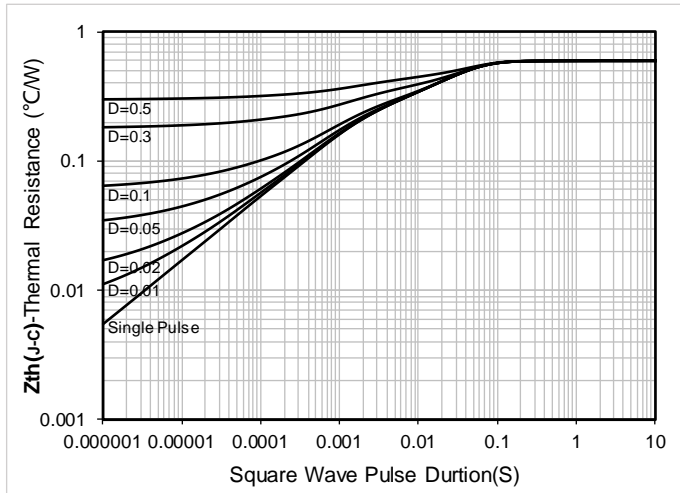


Figure 13. Maximum Transient Thermal Impedance

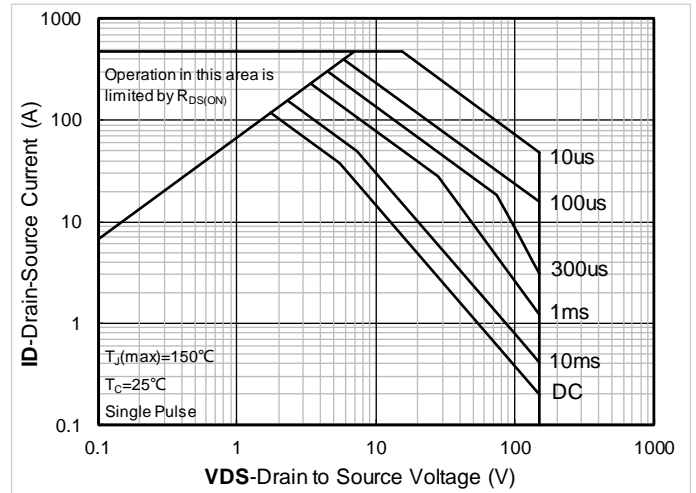


Figure 14. Safe Operation Area

Test Circuits & Waveforms

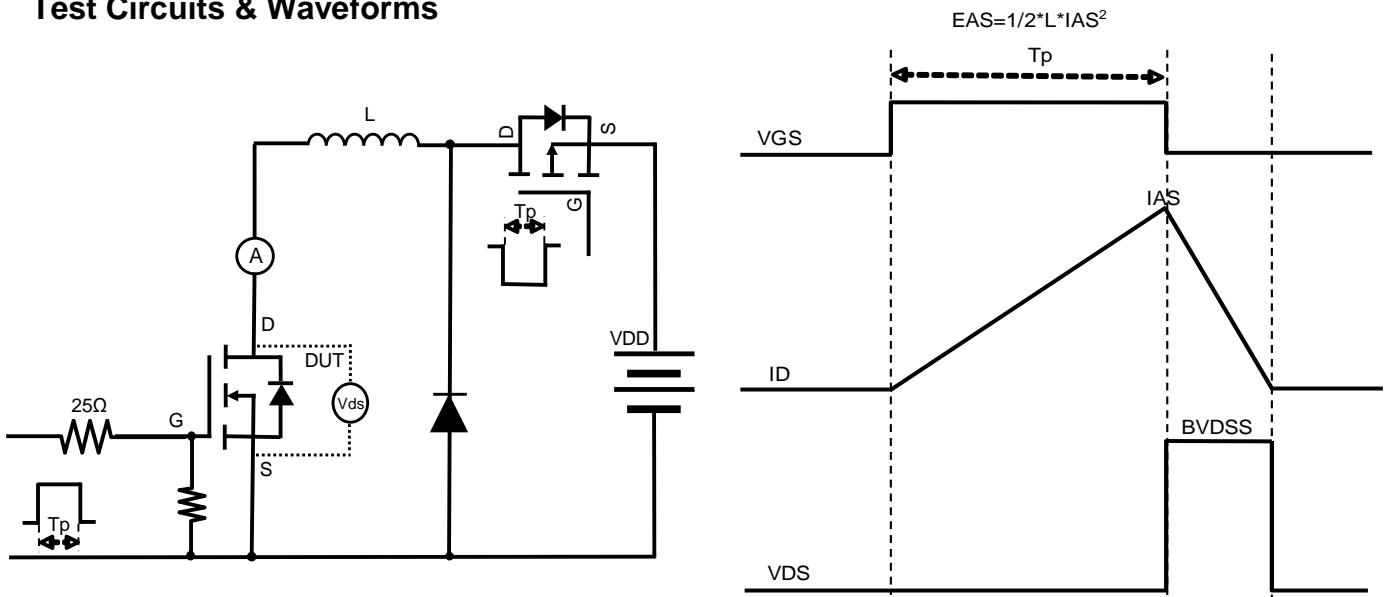


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

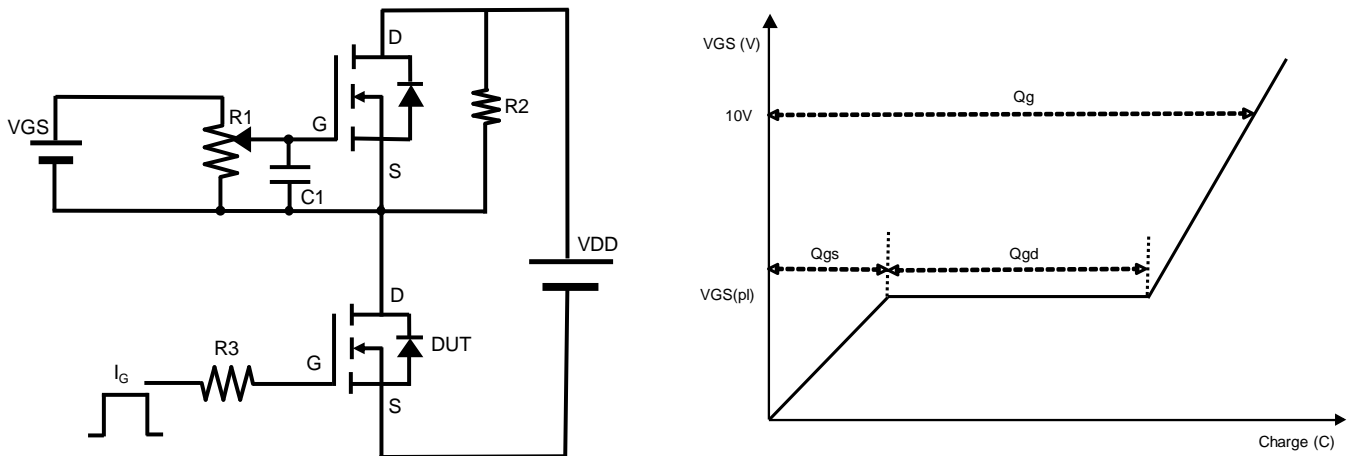


Figure B. Gate Charge Test Circuit & Waveform

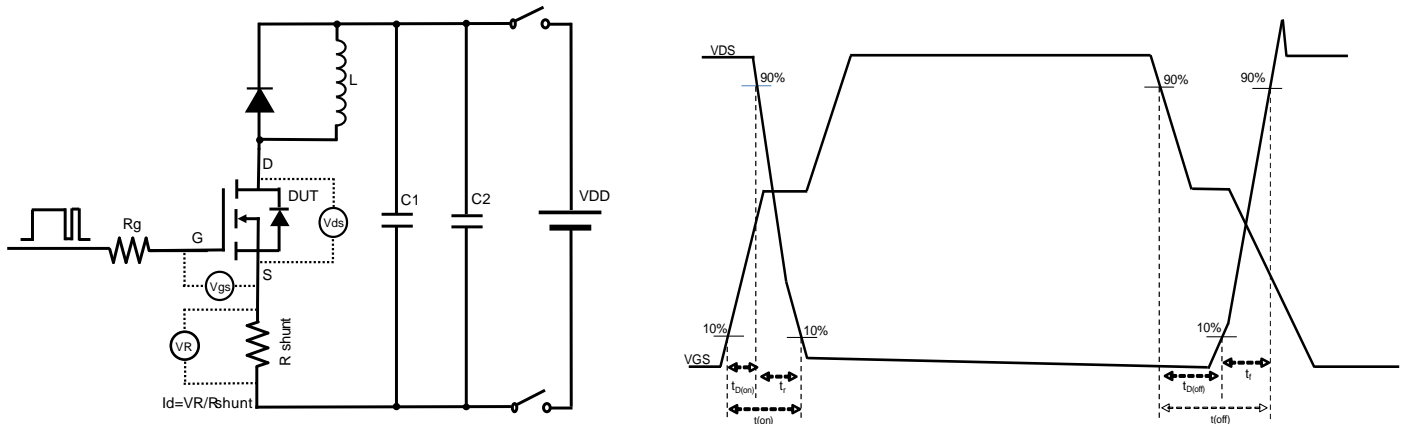


Figure C. Resistive Switching Test Circuit & Waveform

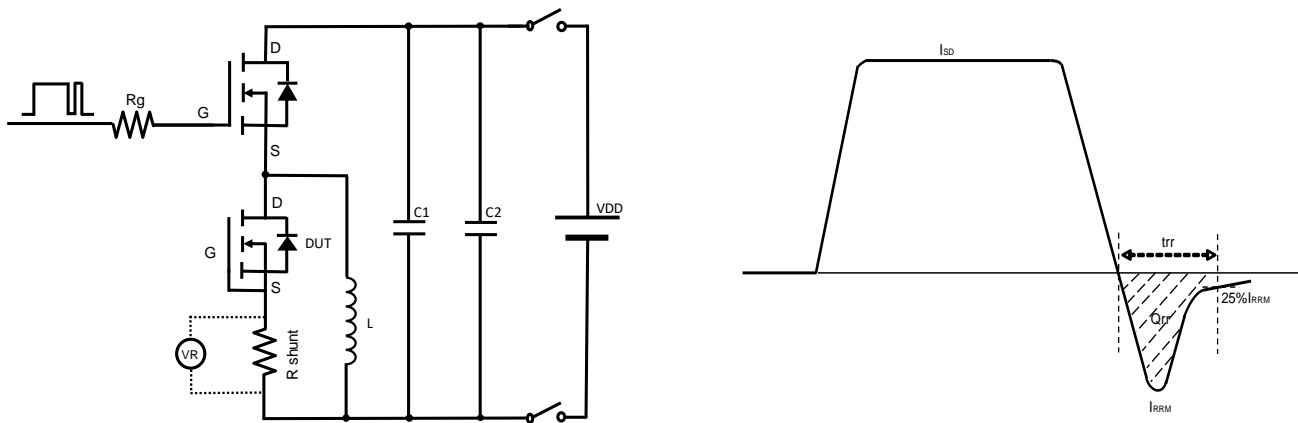
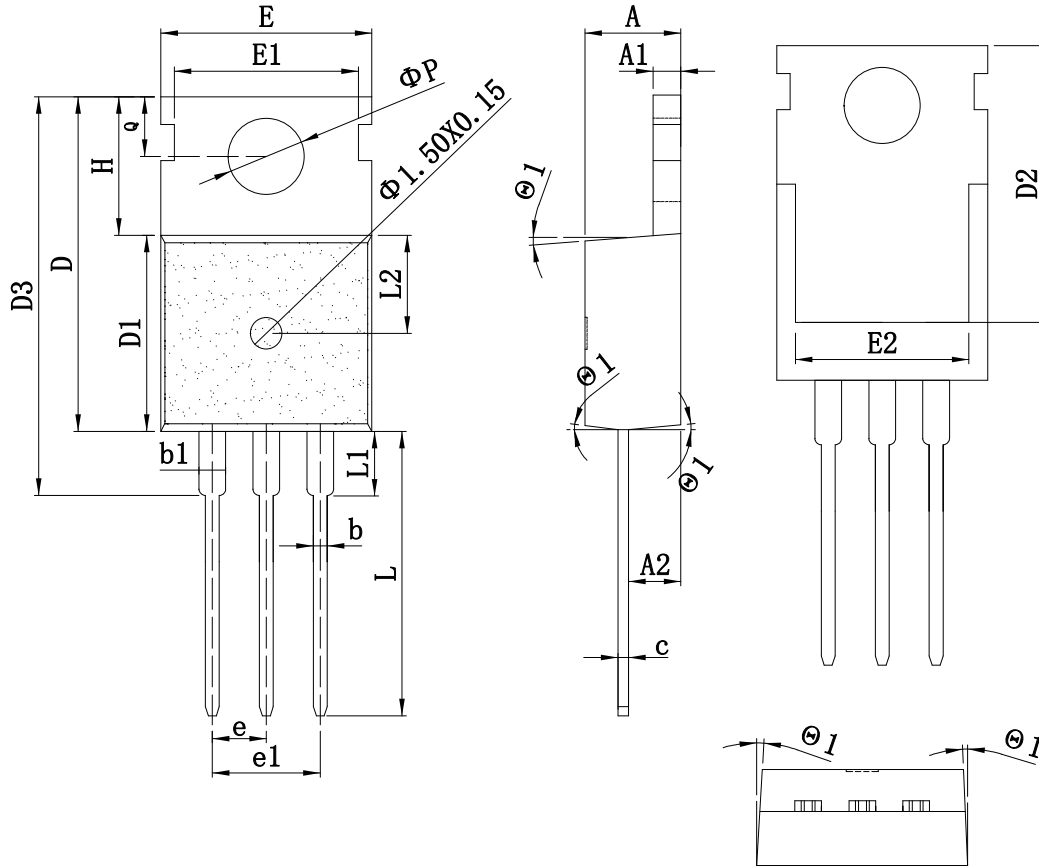


Figure D. Diode Recovery Test Circuit & Waveform

TO-220_3L-A PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE= MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	ϕP	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	θ	2°	-	7°

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