

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low RDS(ON)

Product Summary

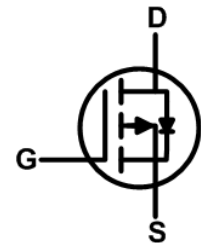
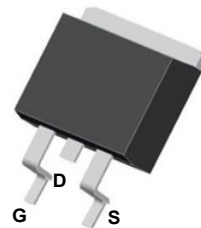


BVDSS	R <sub>DS(on)</sub>	I <sub>D</sub>
-100V	12mΩ	-120A

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

TO-18 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-100	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1,6</sup>	-120	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1,6</sup>	-64	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-600	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	1458	mJ
I <sub>AS</sub>	Avalanche Current	---	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	300	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	65	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	0.50	°C/W

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-100	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	---	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-22A	---	12	15	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-2	-3	-4	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	---	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V, T <sub>J</sub> =100°C	---	---	---	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-5A	---	---	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	---	---	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-50V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A	---	136	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	36	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	24.8	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-50V, I <sub>D</sub> =-22A, R <sub>G</sub> =1Ω	---	18	---	ns
T <sub>r</sub>	Rise Time		---	43	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	125	---	
T <sub>f</sub>	Fall Time		---	43	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-50V, V <sub>GS</sub> =0V, f=1MHz	---	9349	---	pF
C <sub>oss</sub>	Output Capacitance		---	798	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	111.2	---	

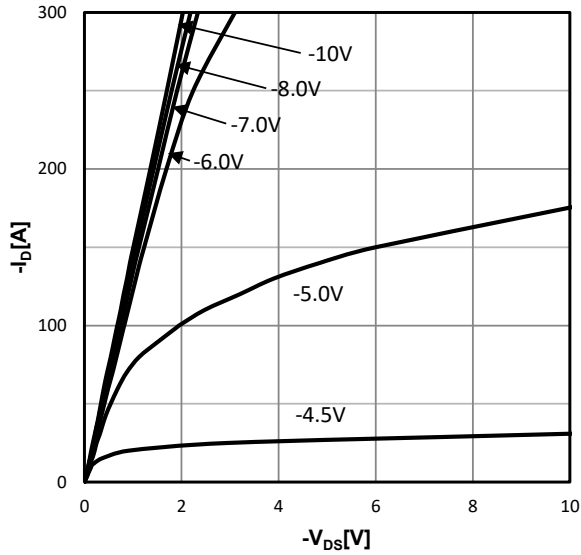
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,4</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-120	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =-20A, T <sub>J</sub> =25°C	---	---	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-20A, di/dt=100A/ μs, T <sub>J</sub> =25°C	---	107	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	216.8	---	nC

a1: Repetitive rating; pulse width limited by maximum junction temperature  
a2: V<sub>DD</sub>=-50V, L=1mH, R<sub>G</sub>=25Ω, Starting T<sub>j</sub>=25°C

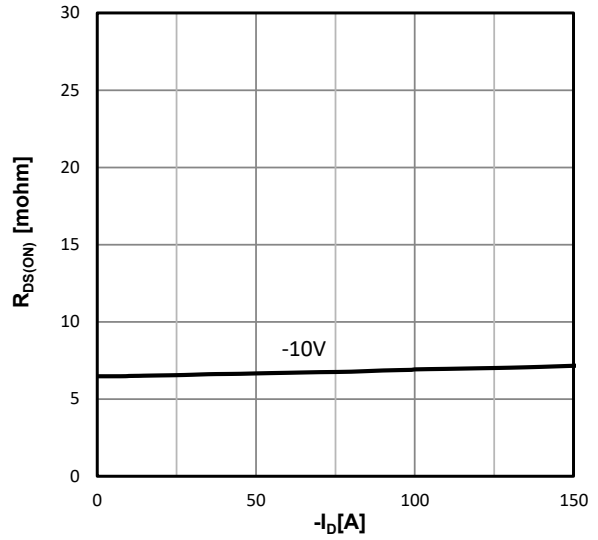
Characteristics Curve:

Figure 1: Typ. output characteristics



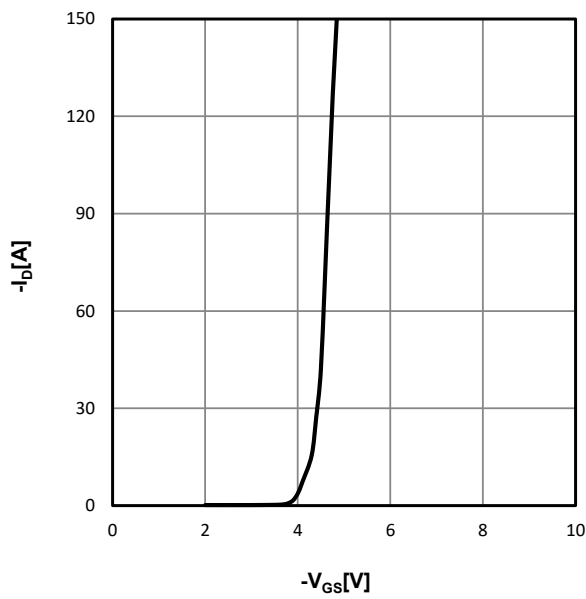
$I_D=f(V_{DS}), T_j=25\text{ }^\circ\text{C};$  parameter:  $V_{GS}$

Figure 2: Typ. drain-source on resistance



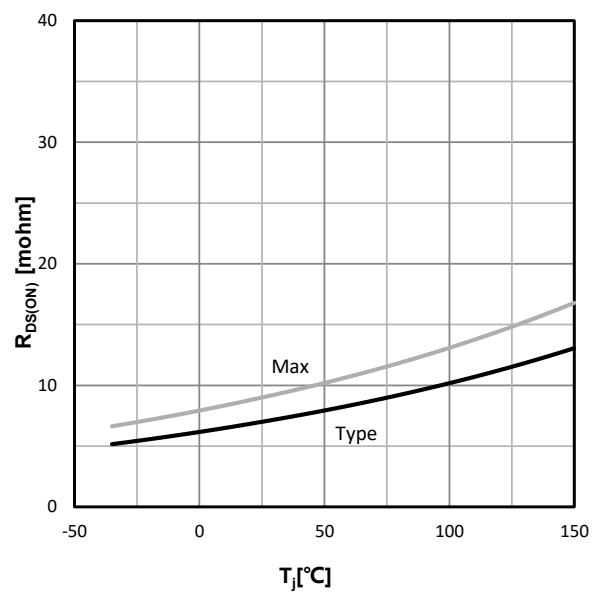
$R_{DS(on)}=f(I_D), T_j=25\text{ }^\circ\text{C};$  parameter:  $V_{GS}$

Figure 3: Typ. transfer characteristics



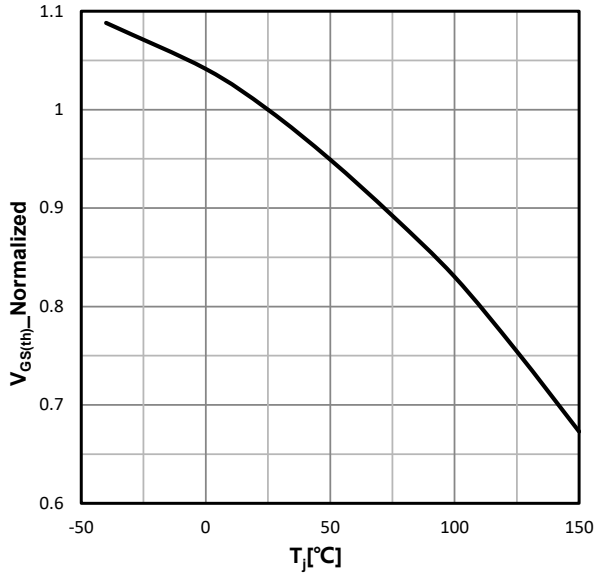
$I_D=f(V_{GS}), |V_{DS}|>2|I_D|R_{DS(on)max};$

Figure 4: drain-source on resistance



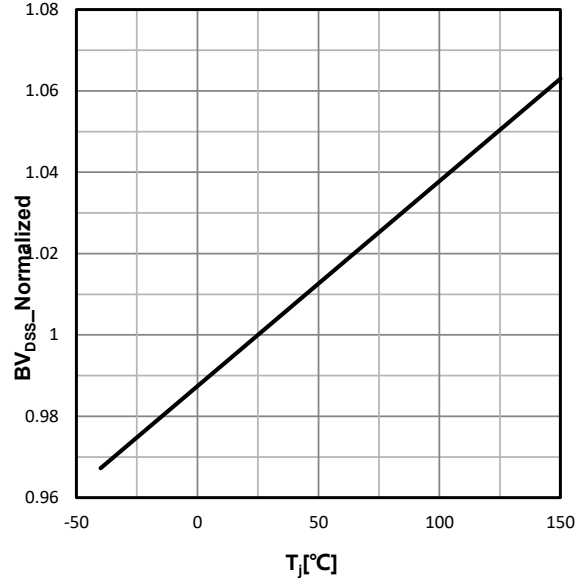
$R_{DS(on)}=f(T_j), I_D=-20A, V_{GS}=-10V;$

Figure 5: Typ. gate threshold voltage



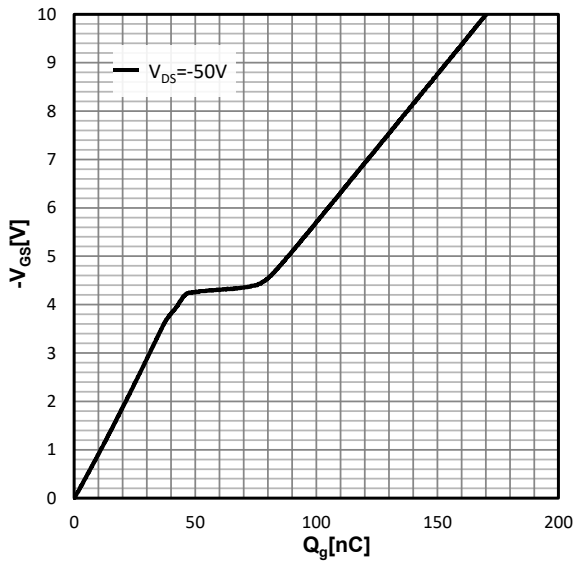
$V_{GS}=f(T_j), V_{GS}=V_{DS}, I_D=-250\mu A;$

Figure 6: Drain-source breakdown voltage



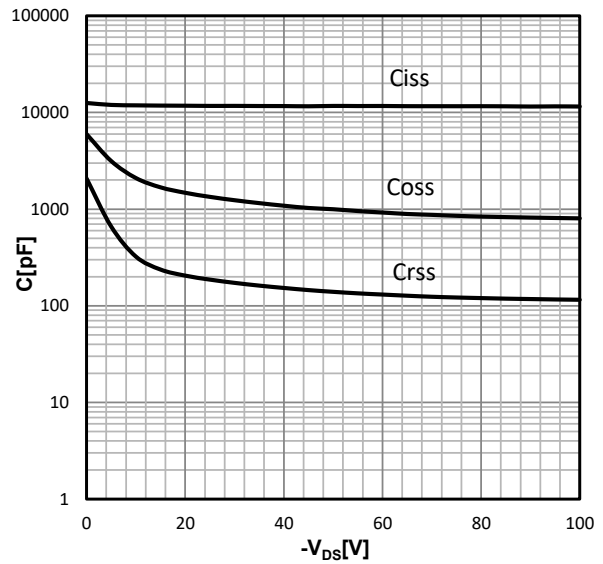
$V_{BR(DSS)}=f(T_j); I_D=-250\mu A;$

Figure 7: Typ. gate charge



$V_{GS}=f(Q_g), I_D=-20A, T_j=25\text{ }^\circ\text{C};$  parameter: V<sub>DS</sub>

Figure 8: Typ. Capacitances



$C=f(V_{DS}); V_{GS}=0V; f=1.0\text{ MHz};$

Figure 9: Power dissipation

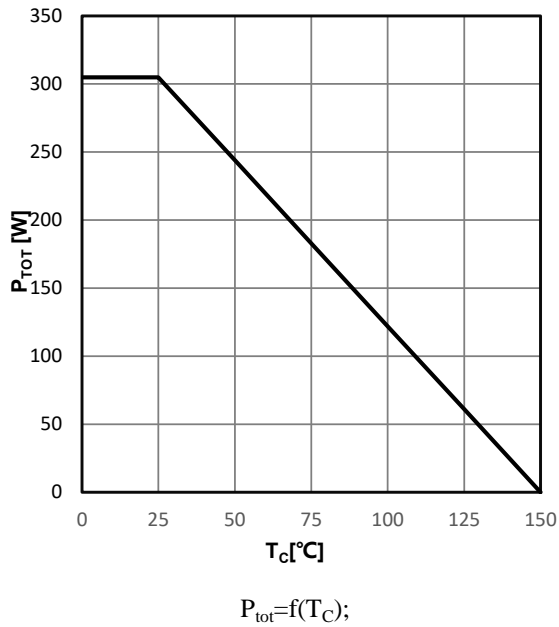


Figure 10: Drain current

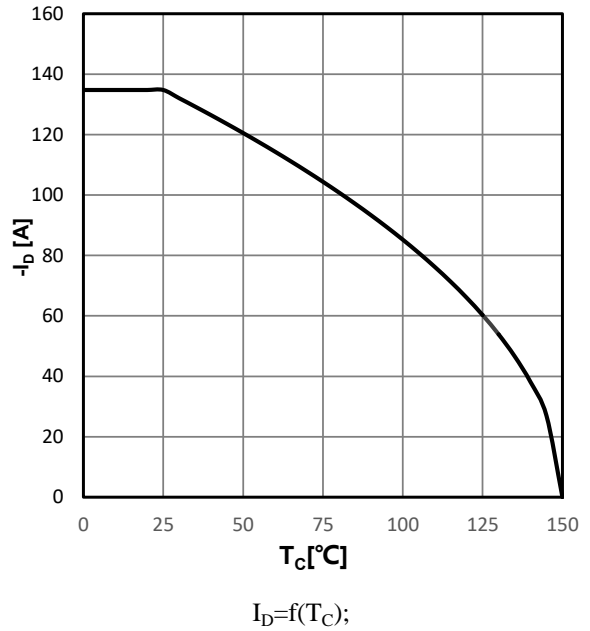
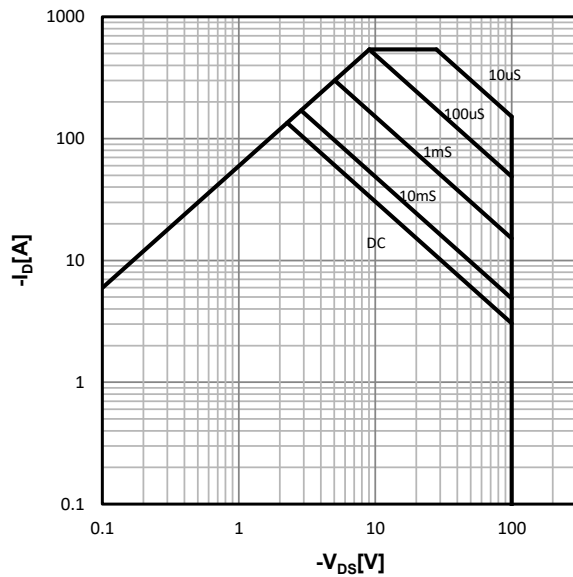
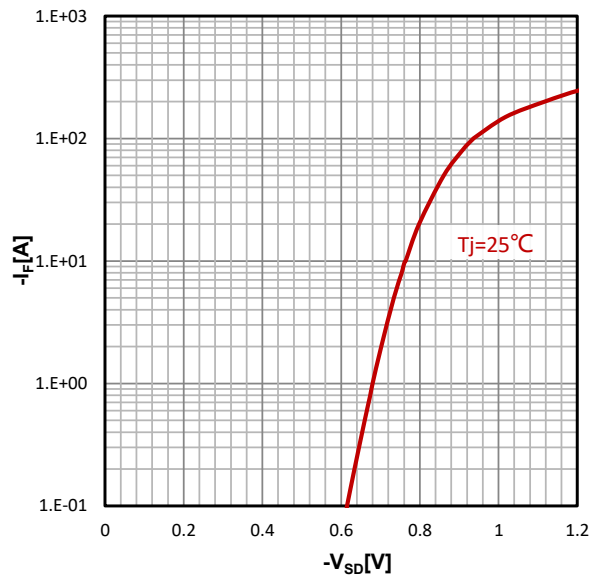


Figure 11: Safe operating area



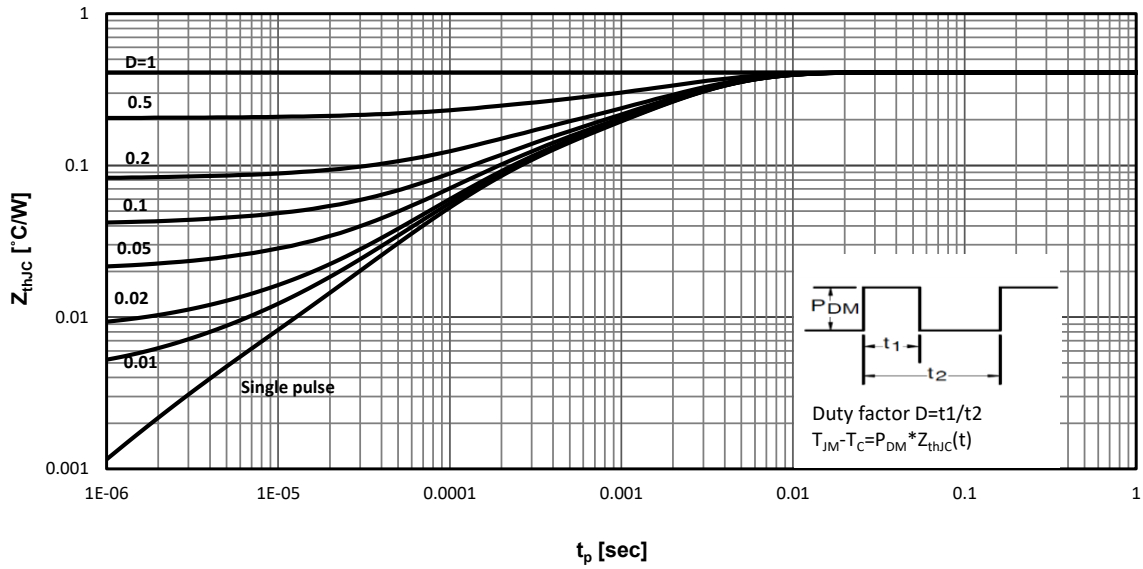
$I_D=f(V_{DS}); T_C=25\text{ }^\circ\text{C}; D=0$ ; parameter: tp

Figure 12: Typ. forward characteristics



$I_F=f(V_{SB})$

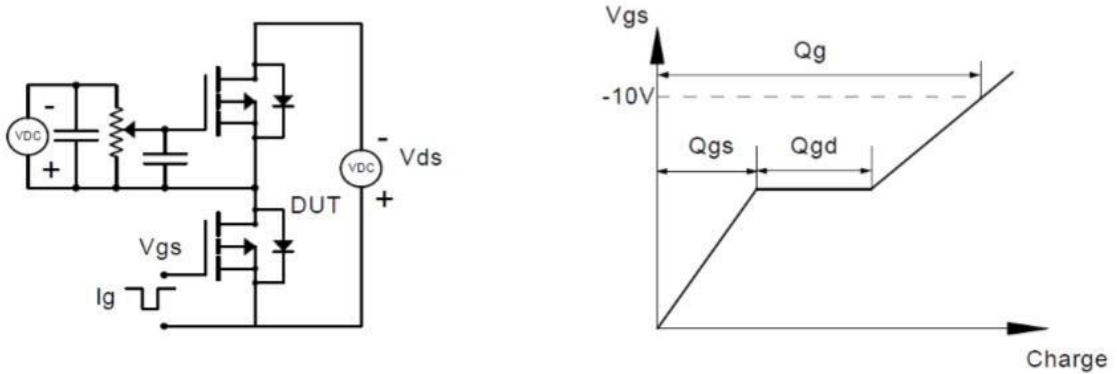
Figure 13: Max. Transient Thermal Impedance



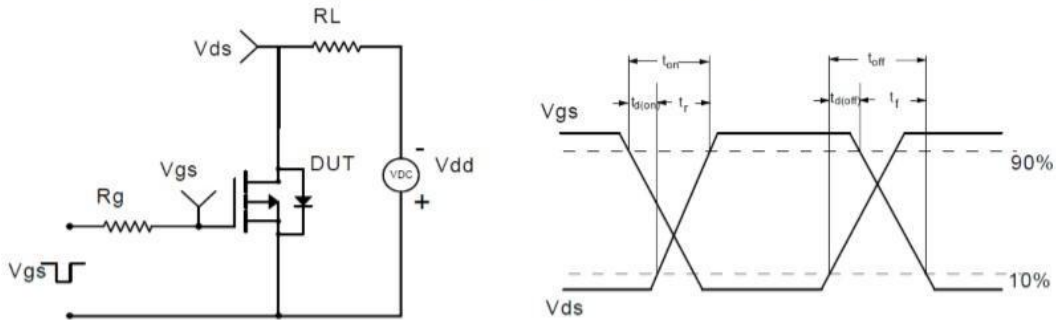
$Z_{thJC} = f(t_p)$ ; parameter: D

Test Circuit and Waveform:

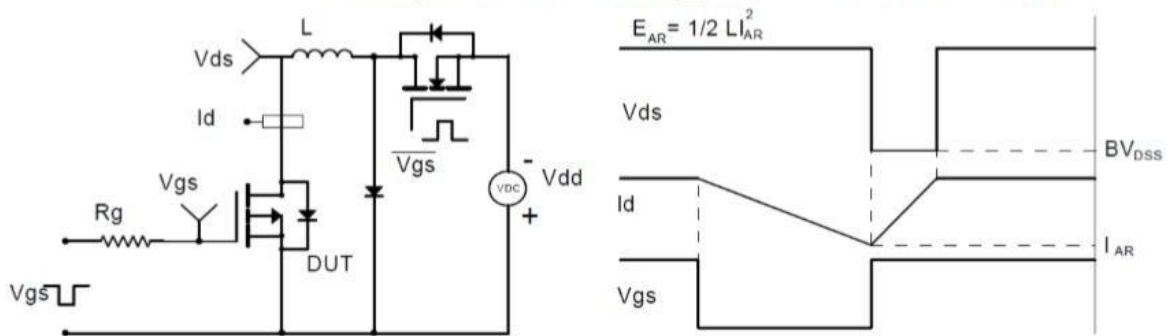
Gate Charge Test Circuit & Waveform



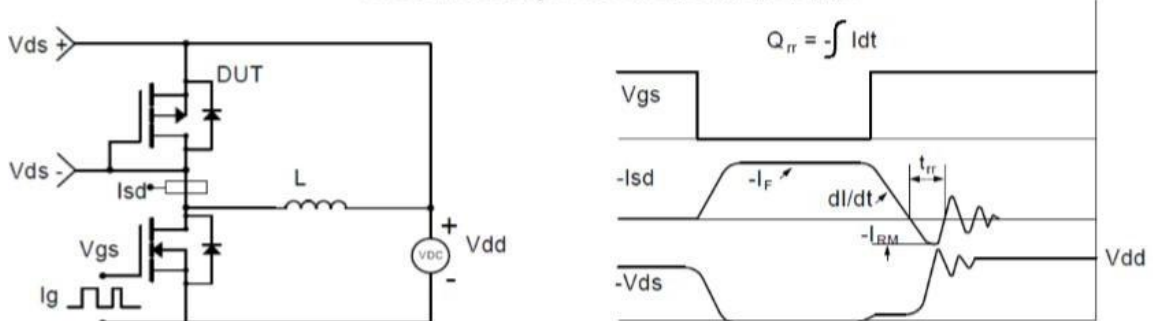
Resistive Switching Test Circuit & Waveforms



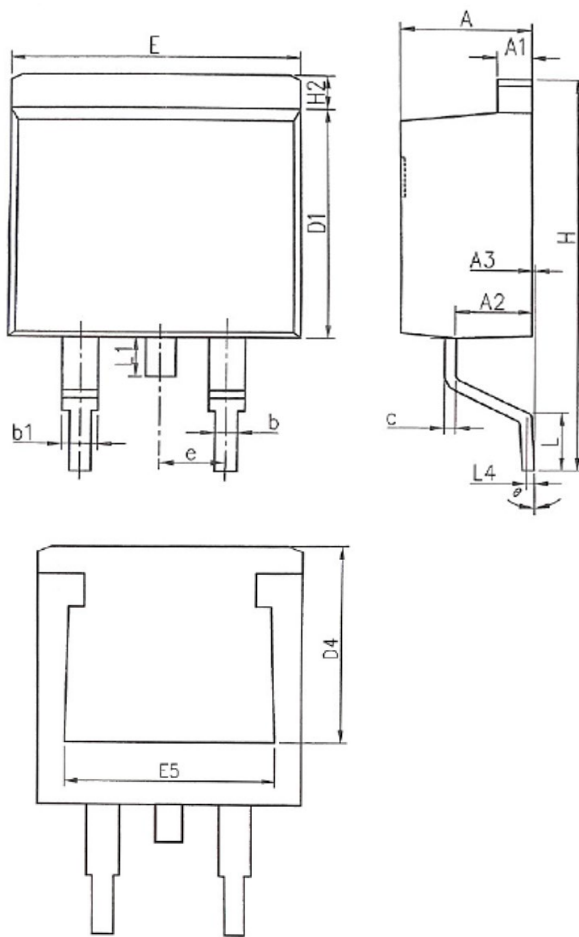
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Mechanical Dimensions for TO-263**



**COMMON DIMENSIONS**

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
$\theta$	0°	9°