

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

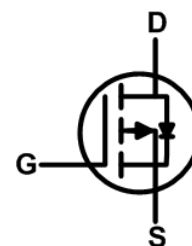
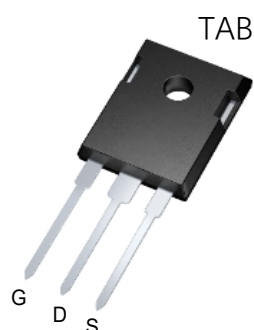


BVDSS	RDSON	ID
-100V	11mΩ	-120A

Applications

- Battery switching application
- Hard switched and high frequency circuits
- Power management

TO247 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	-120	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	-64	A
I_{DM}	Pulsed Drain Current ²	-600	A
EAS	Single Pulse Avalanche Energy ³	1458	mJ
I_{AS}	Avalanche Current	---	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	300	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	60	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.45	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	---	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-22A$	---	11	14	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-2	-3	-4	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-100V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-100V$, $V_{GS}=0V$, $T_J=100^\circ\text{C}$	---	---	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-10V$, $I_D=-5A$	---	---	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	---	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-50V$, $V_{GS}=-10V$, $I_D=-5A$	---	136	---	nC
Q_{gs}	Gate-Source Charge		---	36	---	
Q_{gd}	Gate-Drain Charge		---	24.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=-10V$, $V_{DS}=-50V$, $I_D=-22A$, $R_G=1\Omega$	---	18	---	ns
T_r	Rise Time		---	43	---	
$T_{d(off)}$	Turn-Off Delay Time		---	125	---	
T_f	Fall Time		---	43	---	
C_{iss}	Input Capacitance	$V_{DS}=-50V$, $V_{GS}=0V$, $f=1MHz$	---	9349	---	pF
C_{oss}	Output Capacitance		---	798	---	
C_{rss}	Reverse Transfer Capacitance		---	111.2	---	

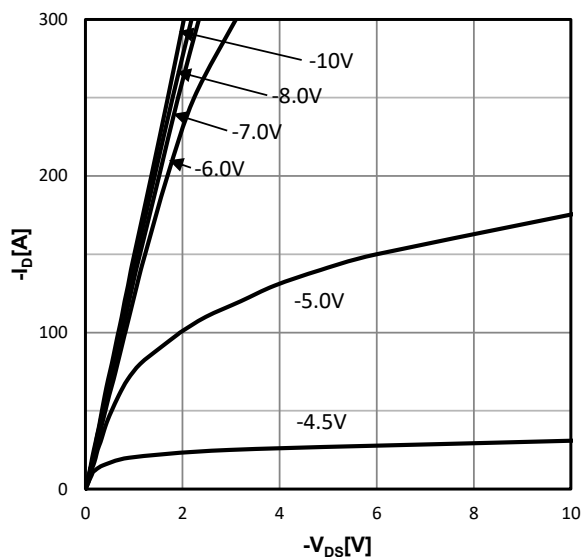
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	-120	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-20A$, $T_J=25^\circ\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-20A$, $di/dt=100A/\mu s$	---	107	---	nS
Q_{rr}	Reverse Recovery Charge	μs , $T_J=25^\circ\text{C}$	---	216.8	---	nC

a1: Repetitive rating; pulse width limited by maximum junction temperature
a2: $V_{DD}=-50V$, $L=1mH$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

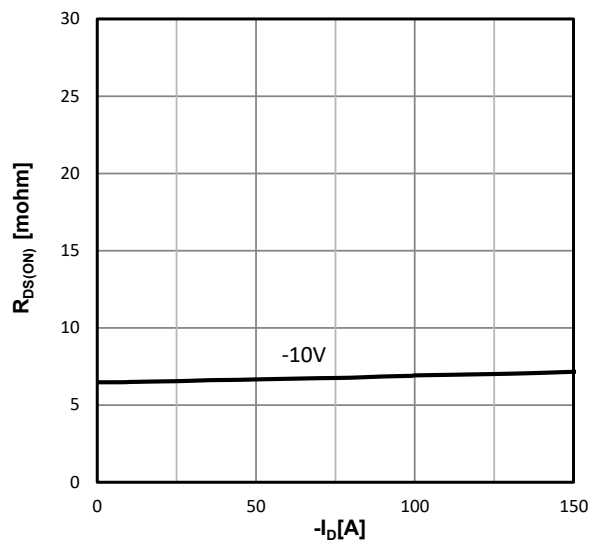
Characteristics Curve:

Figure 1: Typ. output characteristics



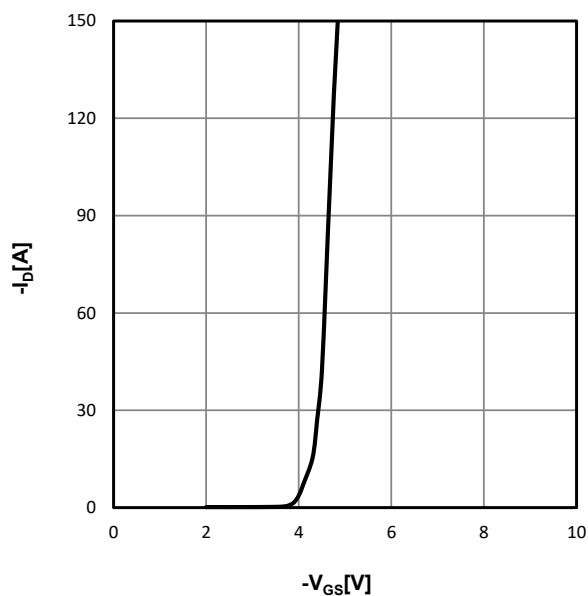
$$I_D = f(V_{DS}), T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$$

Figure 2: Typ. drain-source on resistance



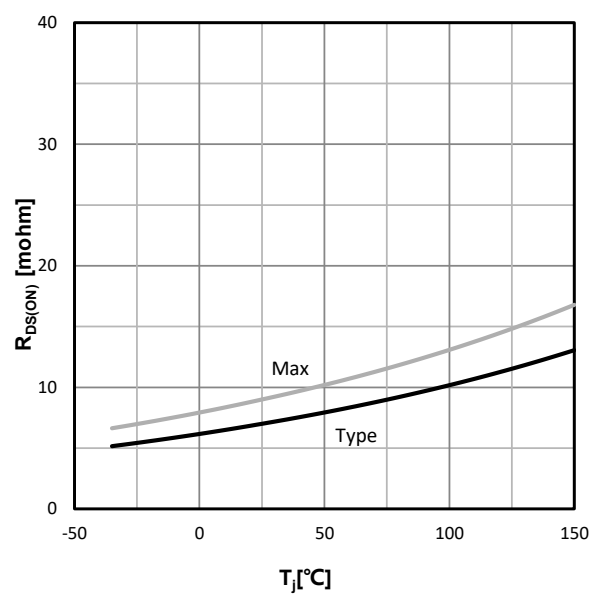
$$R_{DS(on)} = f(I_D), T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$$

Figure 3: Typ. transfer characteristics



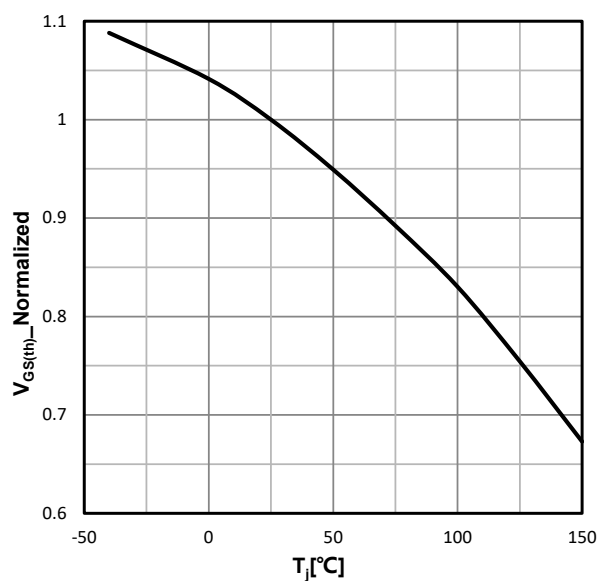
$$I_D = f(V_{GS}), |V_{DS}| > 2|I_D|R_{DS(on)max};$$

Figure 4: drain-source on resistance



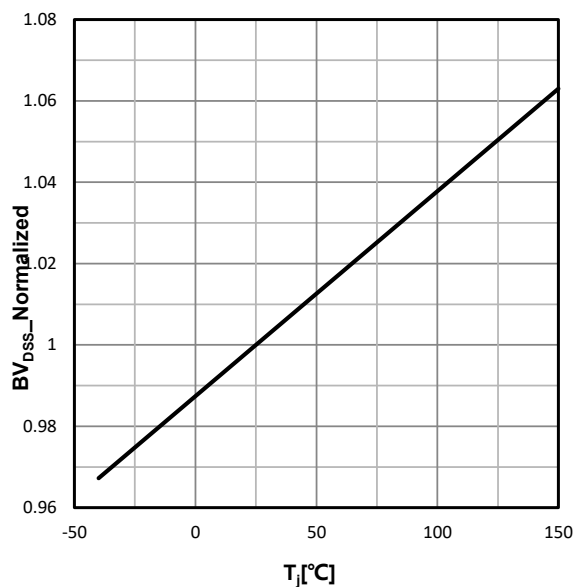
$$R_{DS(on)} = f(T_j), I_D = -20\text{A}, V_{GS} = -10\text{V};$$

Figure 5: Typ. gate threshold voltage



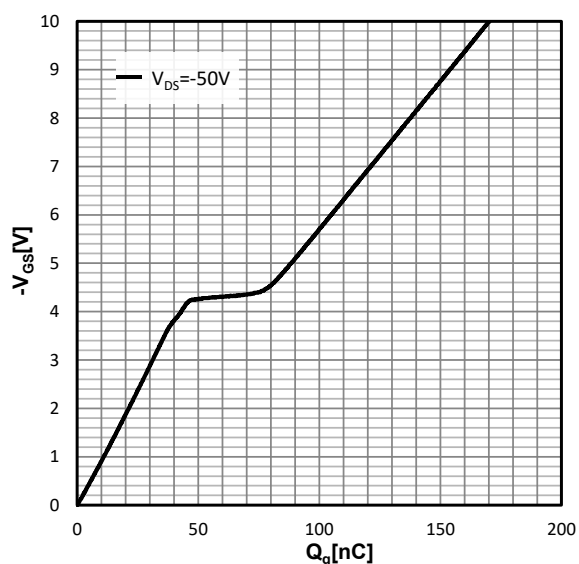
$$V_{GS}=f(T_j), V_{GS}=V_{DS}, I_D=-250\mu A;$$

Figure 6: Drain-source breakdown voltage



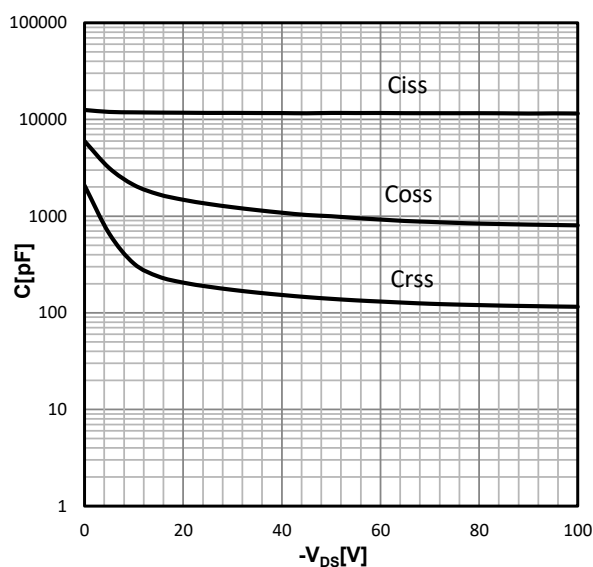
$$V_{BR(DSS)}=f(T_j); I_D=-250\mu A;$$

Figure 7: Typ. gate charge



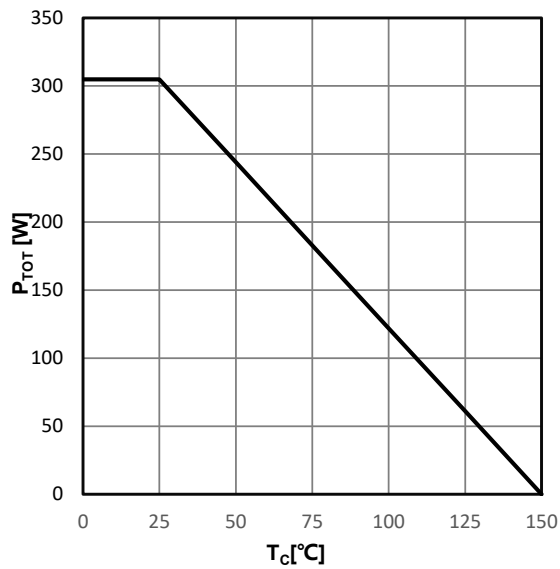
$$V_{GS}=f(Q_g), I_D=-20A, T_j=25^{\circ}C; \text{parameter: } V_{DS}$$

Figure 8: Typ. Capacitances



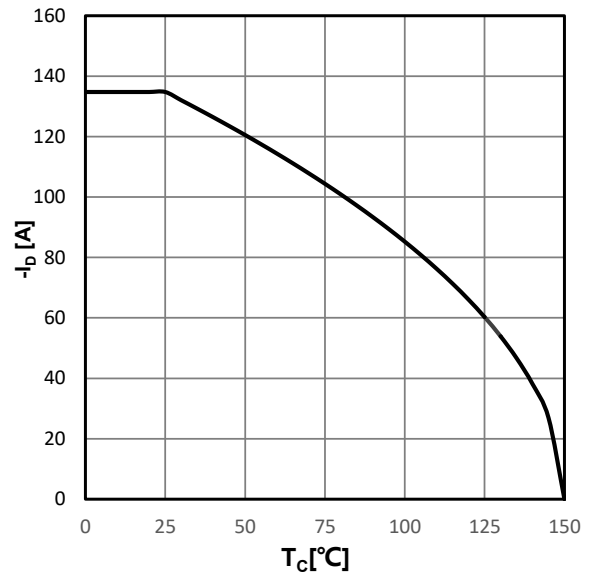
$$C=f(V_{DS}); V_{GS}=0V; f=1.0\text{ MHz};$$

Figure 9: Power dissipation



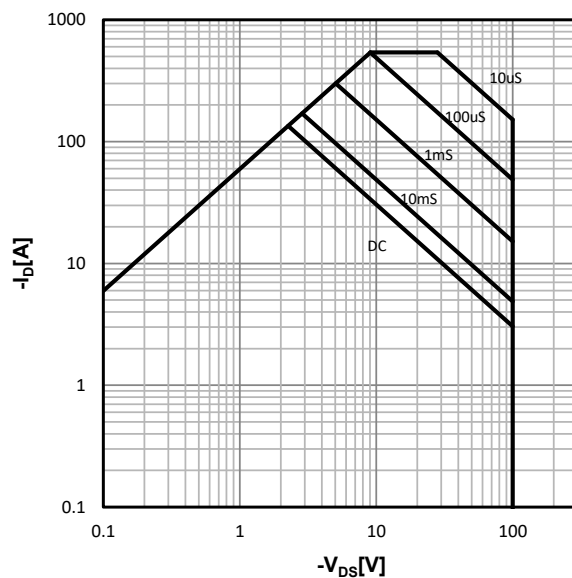
$$P_{\text{tot}} = f(T_c);$$

Figure 10: Drain current



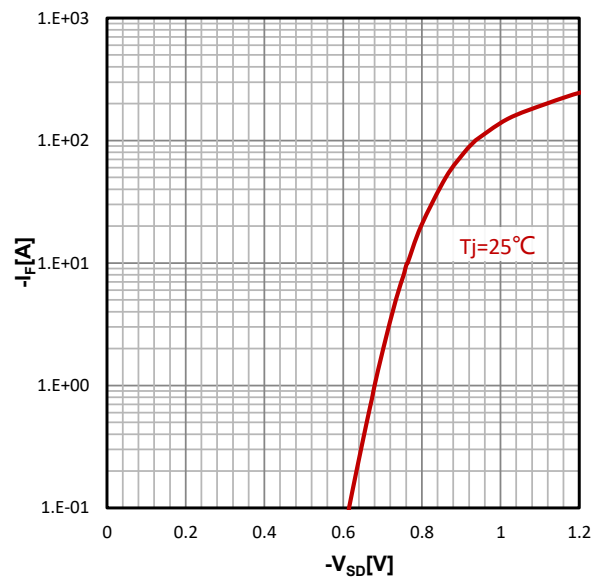
$$I_D = f(T_c);$$

Figure 11: Safe operating area



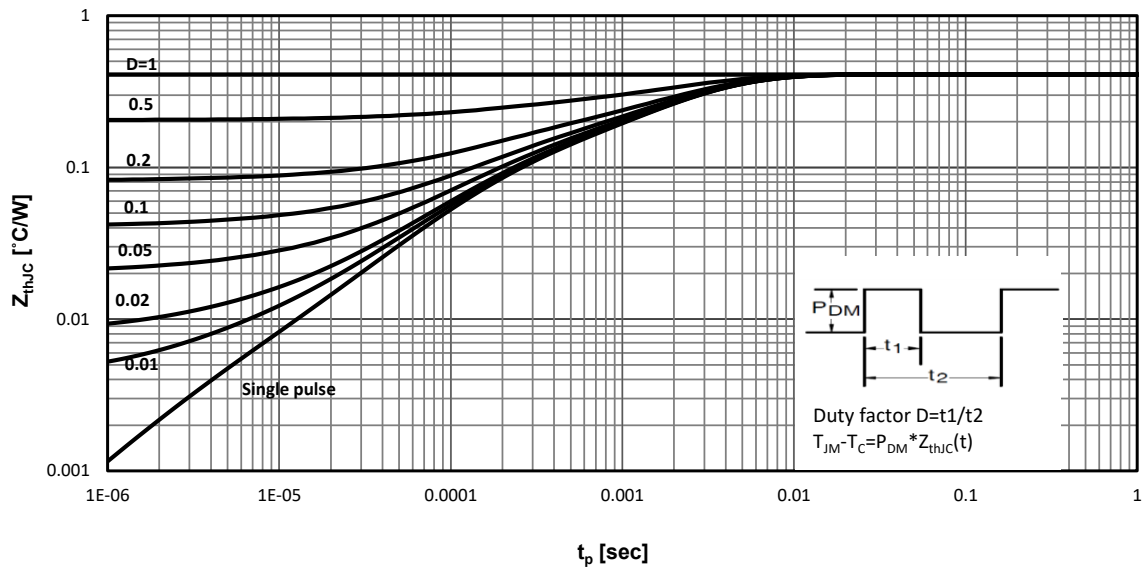
$$I_D = f(V_{DS}); T_c = 25^{\circ}\text{C}; D = 0; \text{parameter: } t_p$$

Figure 12: Typ. forward characteristics



$$I_F = f(V_{SD});$$

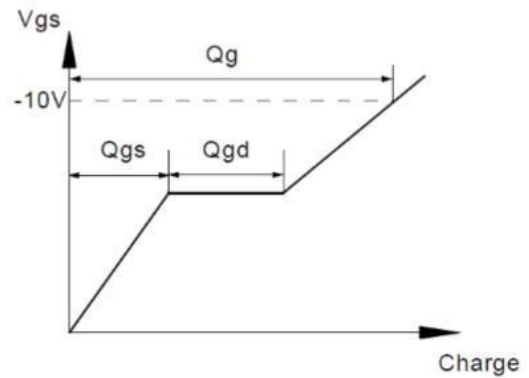
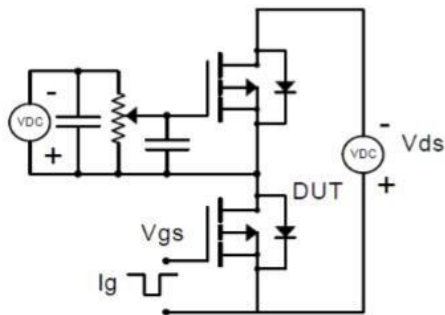
Figure 13: Max. Transient Thermal Impedance



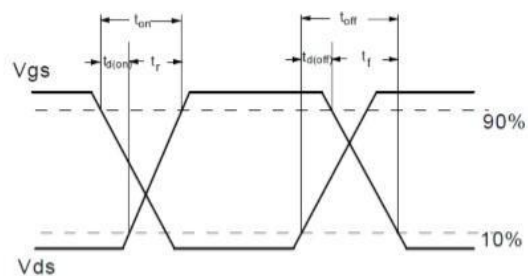
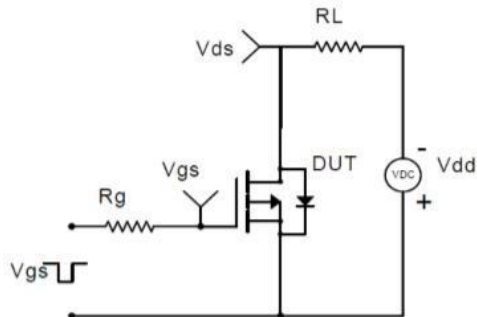
$$Z_{thJC} = f(t_p); \text{ parameter: } D$$

Test Circuit and Waveform:

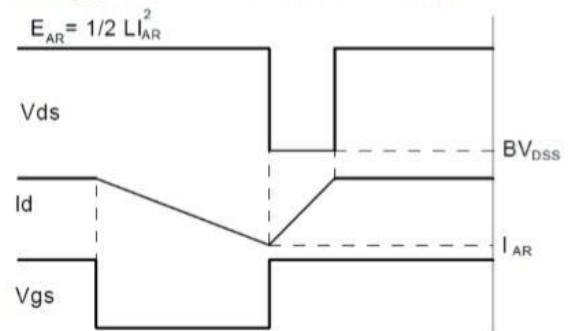
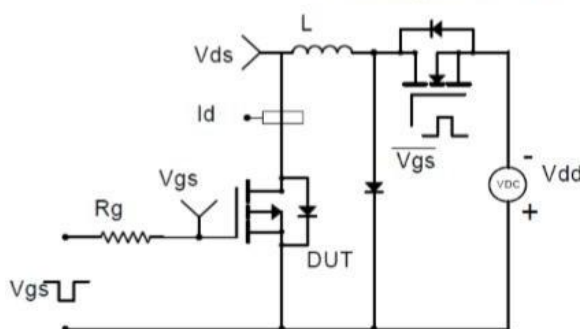
Gate Charge Test Circuit & Waveform



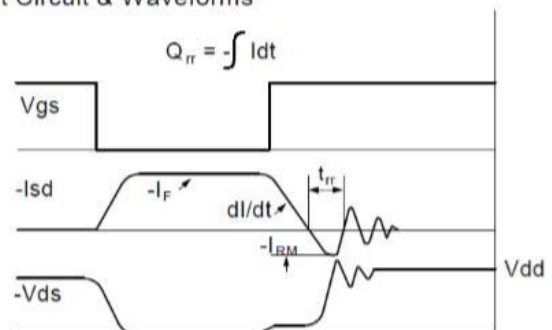
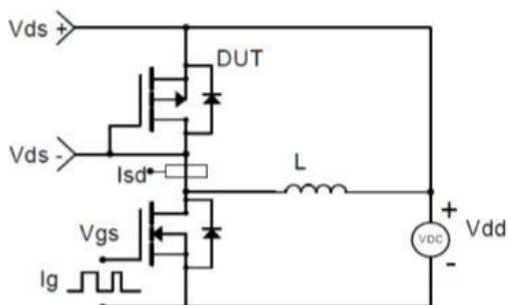
Resistive Switching Test Circuit & Waveforms



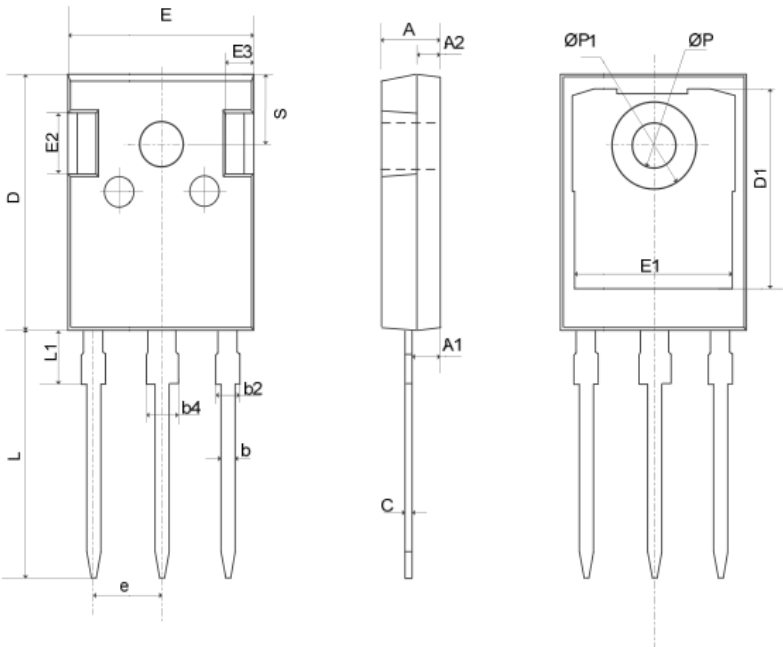
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Mechanical Dimensions for TO-247



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.11	1.36
b2	1.91	2.21
b4	2.91	3.21
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.44BSC	
L	19.62	20.22
L1	—	4.30
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	