



Features

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

Product Summary

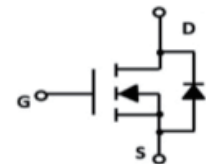
RoHS

BVDSS	RDSON	ID
120V	6mΩ	125A

Description

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

TO-220AB Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V _{DS}	Drain-to-Source Voltage		120	V
V _{GS}	Gate-to-Source Voltage		±20	V
I _D	Continuous Drain Current	T _C = 25°C	125	A
		T _C = 100°C	80	
I _{DM}	Pulsed Drain Current ⁽¹⁾		320	A
E _{AS}	Single Pulsed Avalanche Energy ⁽²⁾		326	mJ
P _D	Power Dissipation	T _C = 25°C	119	W
R _{θJA}	Thermal Resistance, Junction to Ambient ⁽³⁾		52	°C/W
R _{θJC}	Thermal Resistance, Junction to Case		1.05	
T _J , T _{STG}	Junction & Storage Temperature Range		-55 to 150	°C
T _I	Maximum Temperature for Soldering		260	°C

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	120	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} =0V,	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	2.5	3	3.5	V
R _{DS(on)}	Static Drain-Source on-Resistance	V _{GS} = 10V, I _D = 20A	-	6	7.5	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =60V, V _{GS} =0V, f=1.0MHz	-	3614	-	pF
C _{oss}	Output Capacitance		-	423	-	pF
C _{rss}	Reverse Transfer Capacitance		-	12	-	pF
R _g	Gate Resistance		-	0.84	-	Ω
Resistive Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} = 60V, I _D = 20A, V _{GS} = 0~10V	-	60.8	-	nC
Q _{gs}	Gate-Source Charge		-	18.8	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	14.7	-	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} = 60V, I _D = 20A, V _{GS} = 10V R _G = 5Ω	-	20	-	ns
t _r	Turn-on Rise Time		-	65	-	ns
t _{d(off)}	Turn-off Delay Time		-	32	-	ns
t _f	Turn-off Fall Time		-	49	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	95	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = 20A	-	0.83	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _S =40A,dI/dt=100A/μs	-	60	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	109	-	nC

Notes:

1.Repetitive rating; pulse width limited by maximum junction temperature

2. $V_{DD}=60V, L=0.5mH, R_g=25\Omega$, Starting $T_J=25^\circ\text{C}$

Typical Electrical and Thermal Characteristics (Curves)

Figure1: Typ. output characteristics

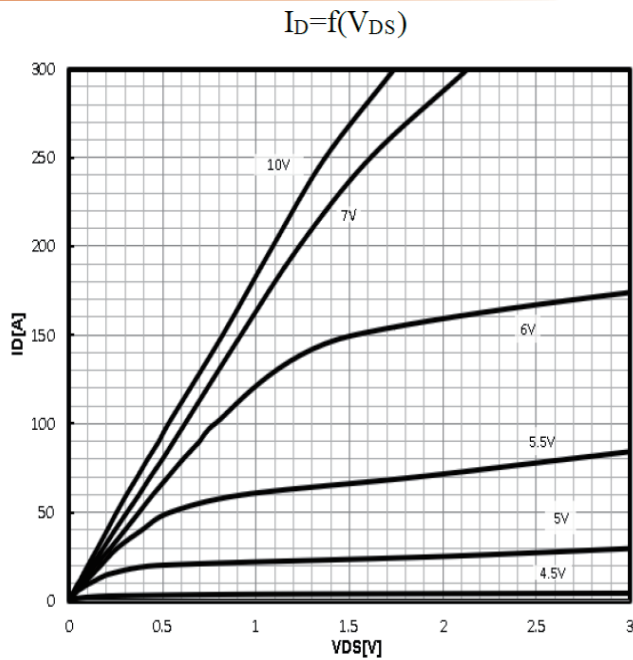


Figure 2: Typ. drain-source on resistance

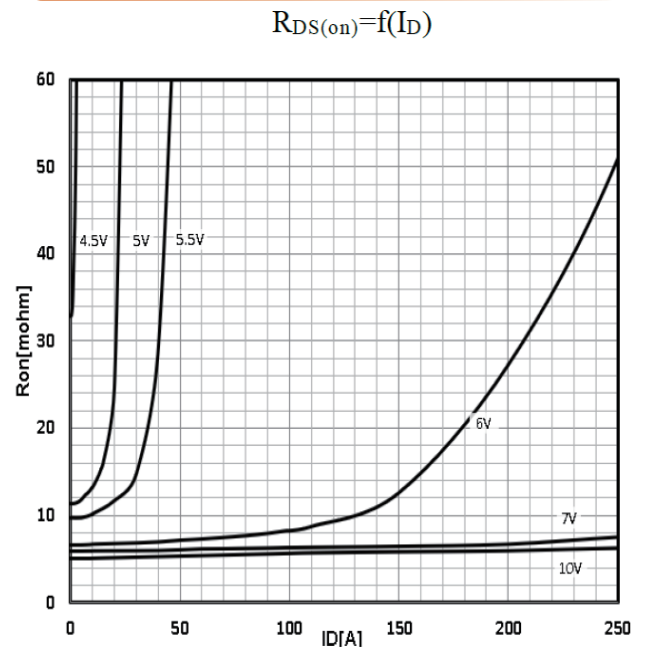


Figure 3: Typ. transfer characteristics

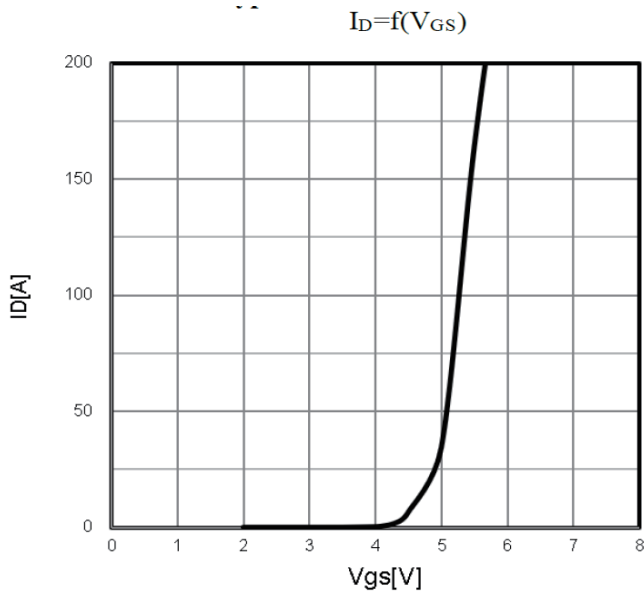
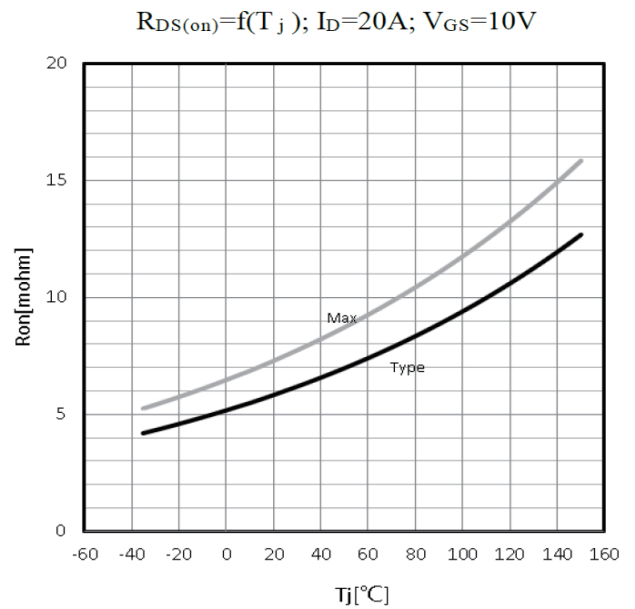


Figure 4: Drain-source on-state resistance



Typical Performance Characteristics

Figure 5: Gate Threshold Voltage

$$V_{TH}=f(T_j); I_D=250\mu A$$

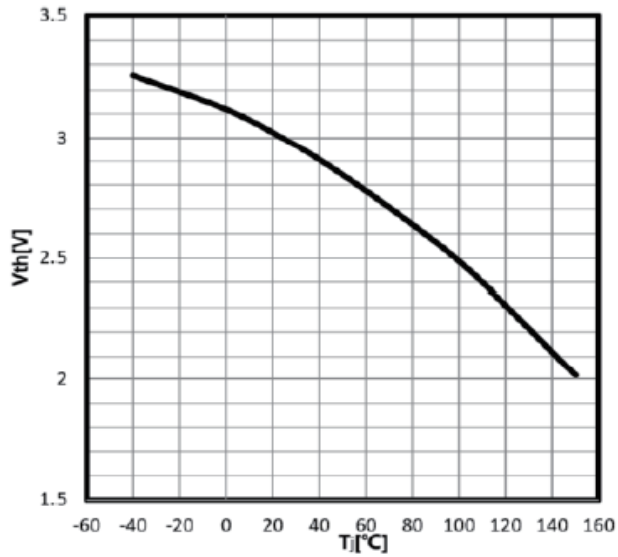


Figure 6: Drain-source breakdown voltage

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

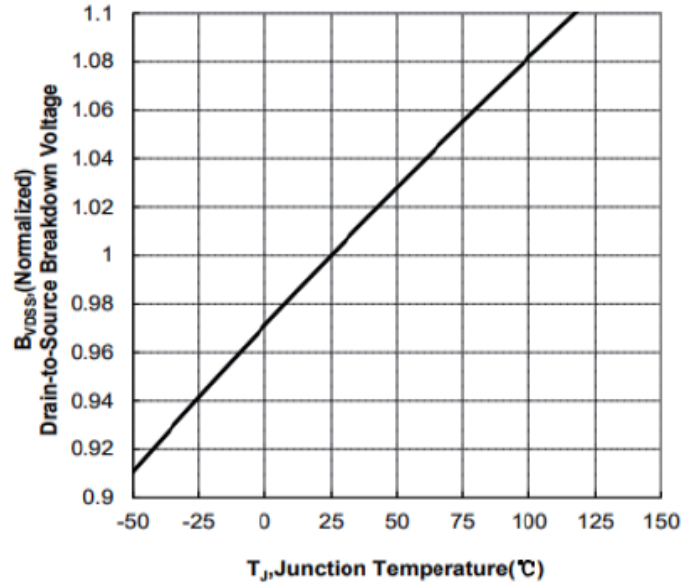


Figure 7: Typ. gate charge

$$\bar{V}_{GS}=f(Q_{gate})$$

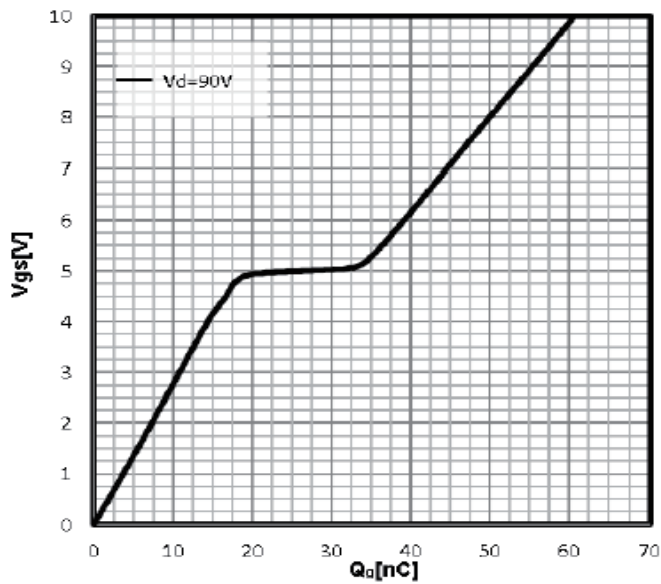
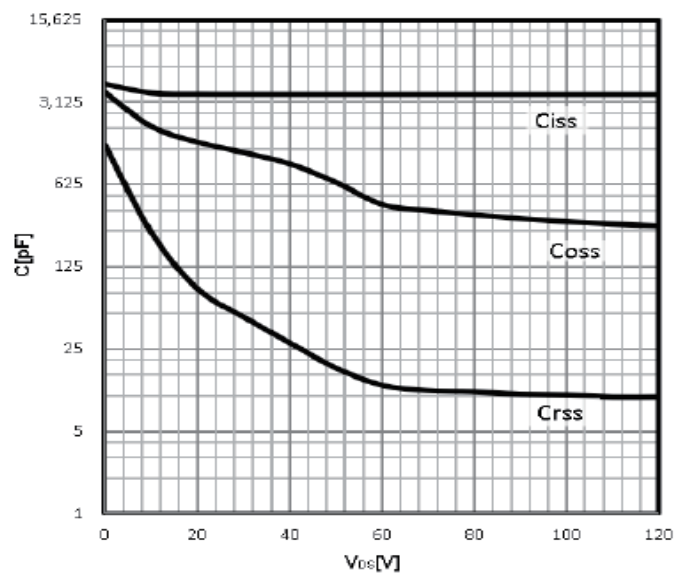


Figure 8: Typ. capacitances

$$C=f(\bar{V}_{DS}); \bar{V}_{GS}=0V; f=1MHz$$



Typical Performance Characteristics

Figure 9: Power Dissipation

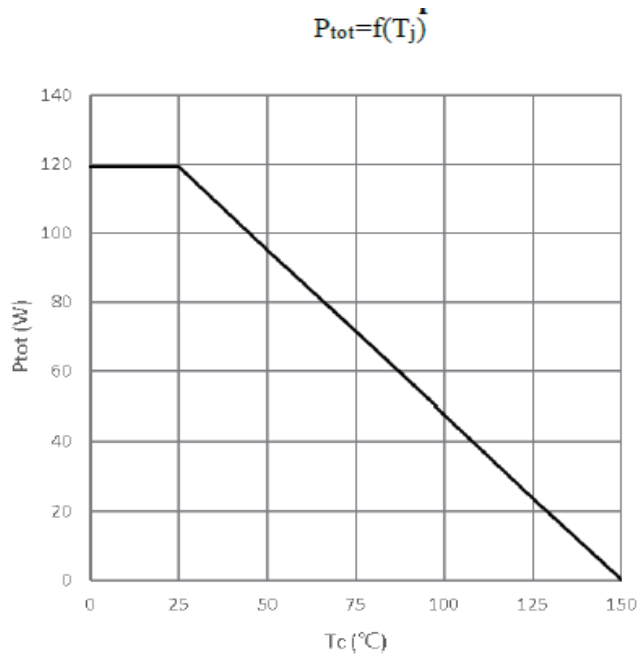


Figure 10: Maximum Drain Current

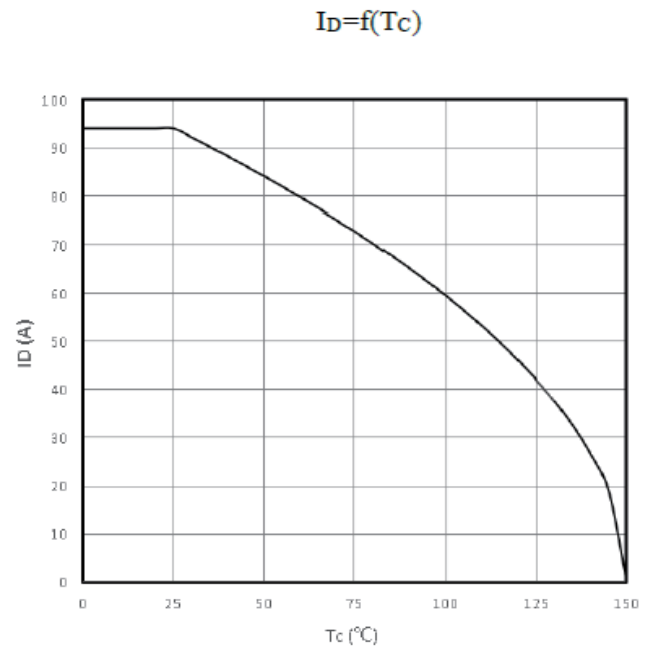


Figure 11: Safe operating area

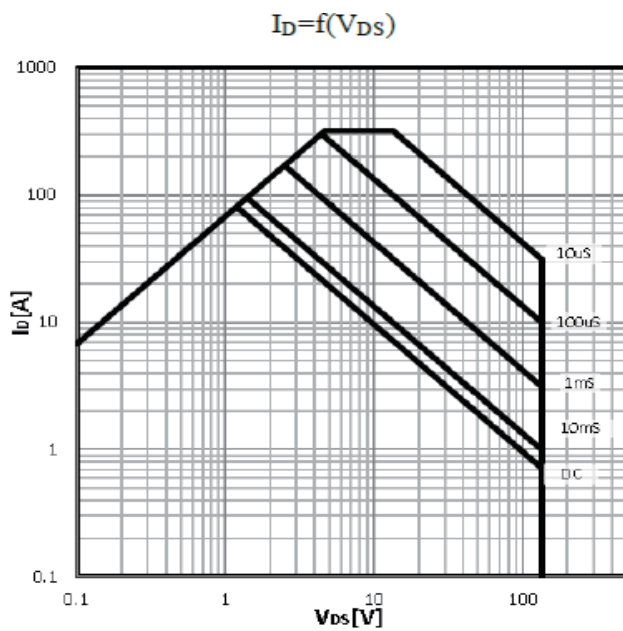
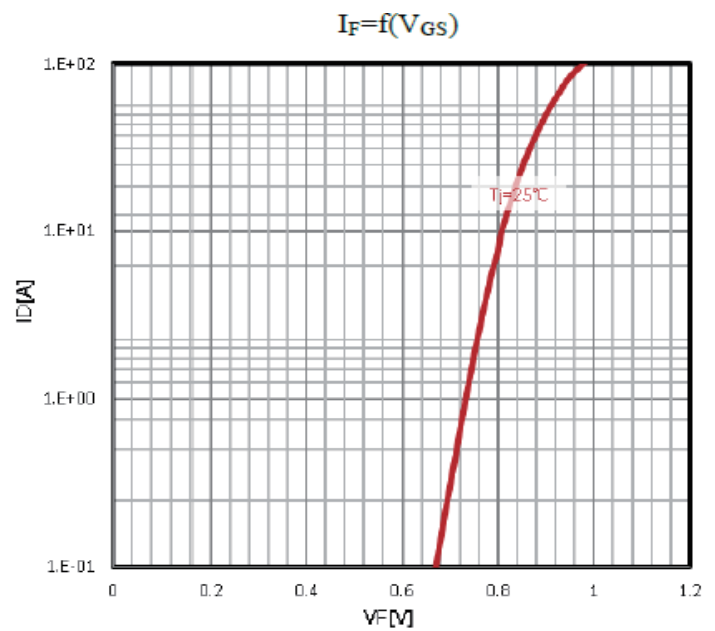
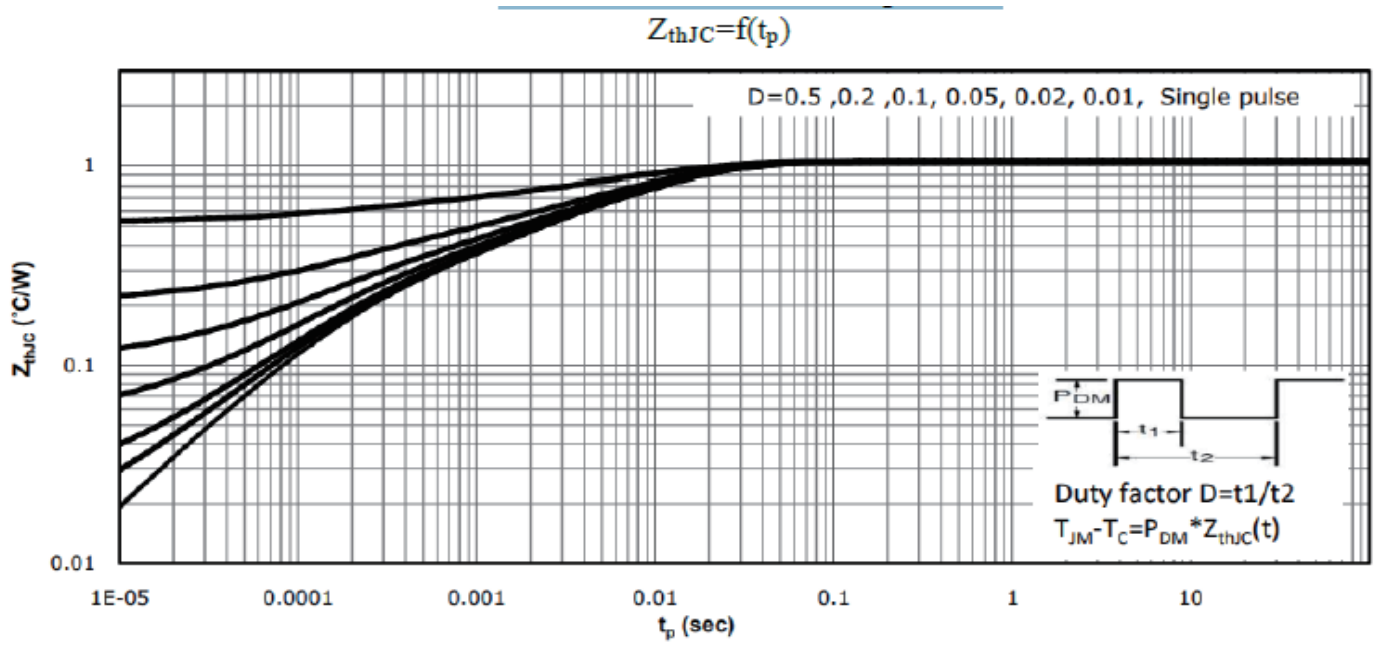


Figure 12: Body Diode Forward Voltage V_F

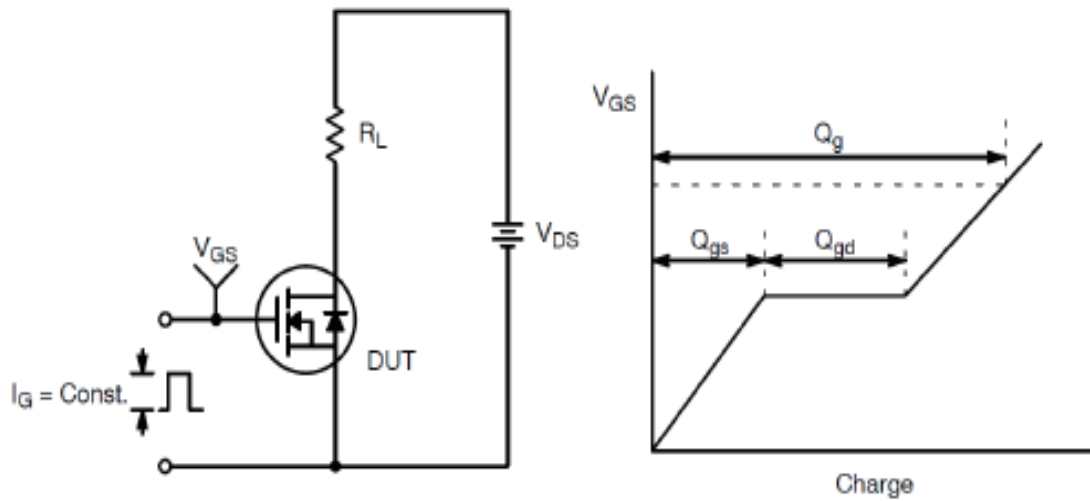


Typical Performance Characteristics

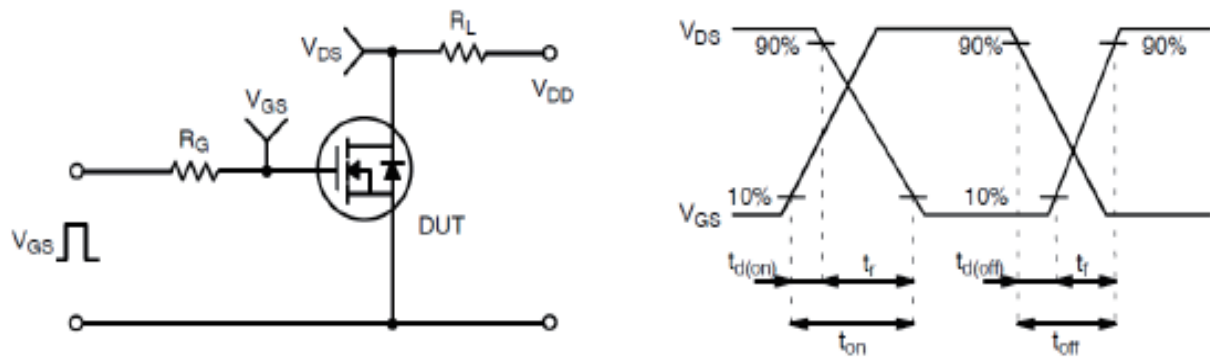
Figure 7:Max. transient thermal impedance



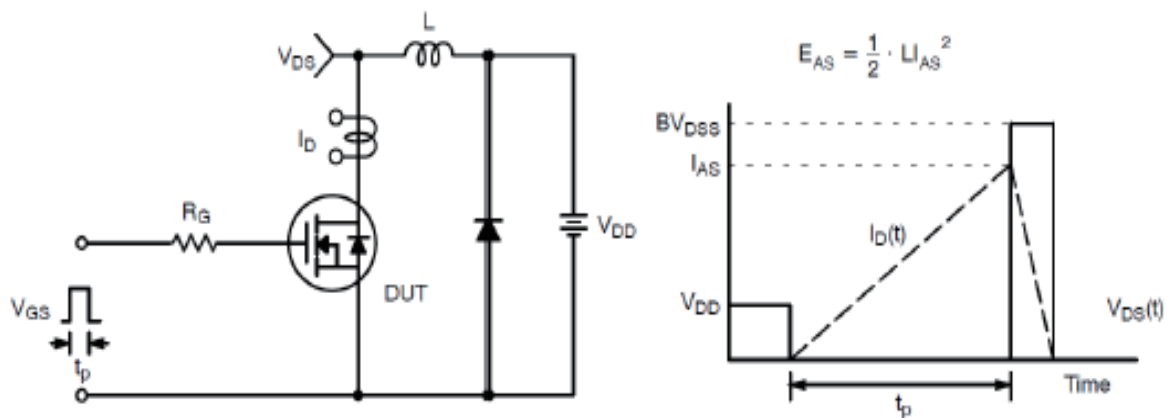
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

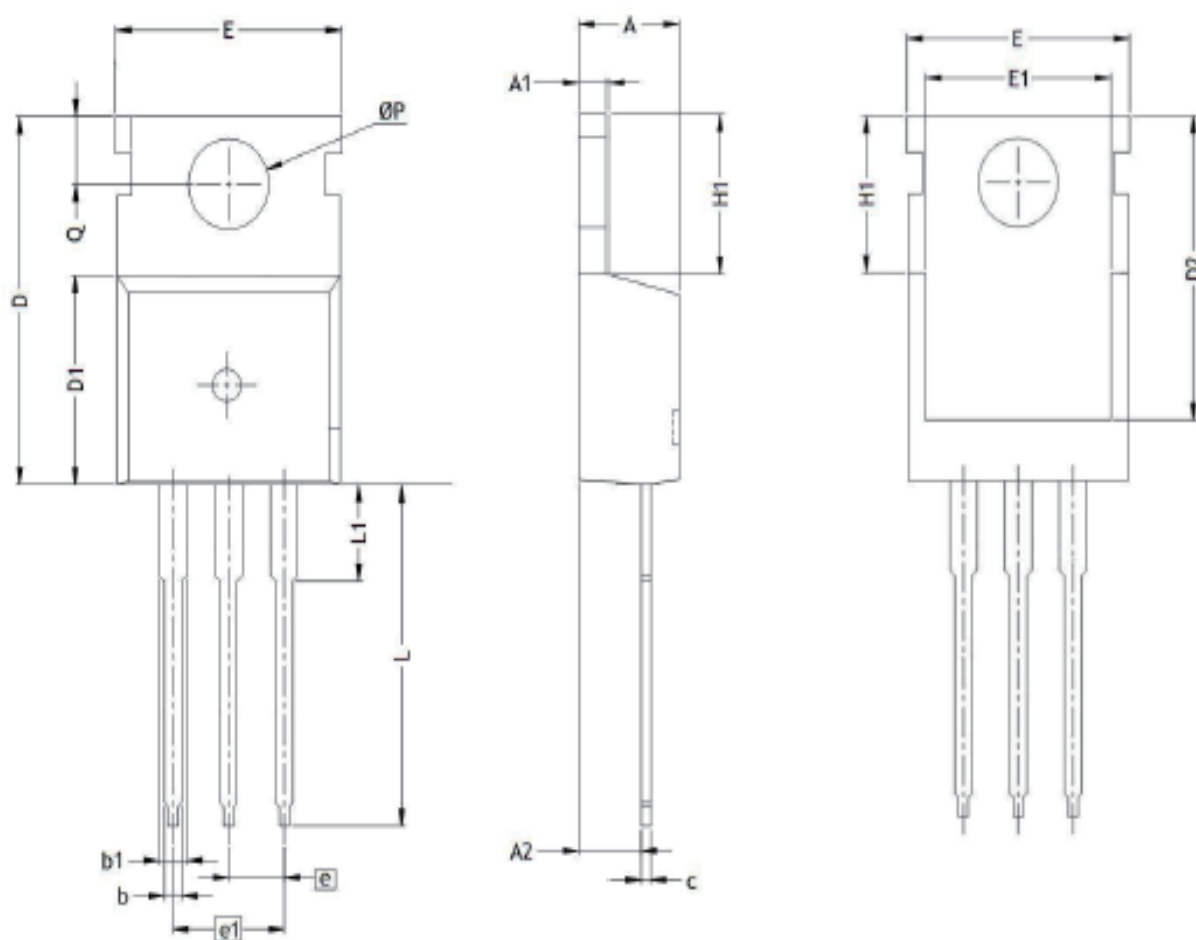


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Mechanical Dimensions for TO-220AB



UNIT: mm

SYMBOLS	A	A1	A2	b	b1	c	D	D1	D2	E	E1	e
MIN	4.25	1.25	2.35	0.7	1.15	0.45	14.35	8.80	13.05	9.90	7.85	2.540
MAX	4.65	1.35	2.55	0.9	1.75	0.60	15.95	9.50	13.65	10.35	8.85	BSC
SYMBOLS	e1	H1	L	L1	Q	ØP						
MIN	5.080	6.30	12.85	2.85	2.70	3.50						
MAX	BSC	6.65	13.50	3.25	2.90	3.70						