SFP(B)120N100B

SGT N-MOSFET100V, 120A, 4.0mΩ

Features

- Uses advanced SGT MOSFET technology
- Extremely low on-resistance $R_{DS(on)}$
- High Ruggedness
- 100% Avalance Tested

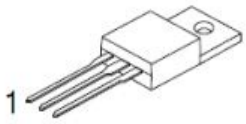
Application

- Motor Drives
- UPS (Uninterruptible Power Supplies)
- DC/DC converter
- General purpose applications

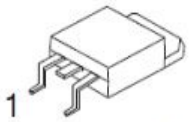
Product Summary

VDS	100V
$R_{DS(on)@VGS=10V}$	4.0 mΩ
I_D	120A

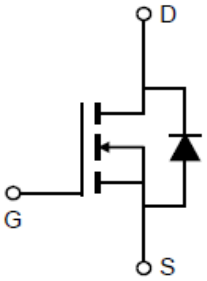
Part ID	Package Type	Marking
SFP120N100	TO-220	120N100
SFB120N100	TO-263	120N100



TO-220



TO-263



Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C (Package limit) T_C = 100°C (Package limit)	I_D	 120 90	A
Pulsed drain current T_C = 25°C, t_p limited by T_{jmax}	$I_{D\ pulse}$	480	
Avalanche energy, single pulse (L=0.033mH,VDS=80V)	E_{AS}	600	mJ
Gate-emitter voltage	V_{GS}	±20	V
Power dissipation T_C = 25°C	P_{tot}	227	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	℃

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.55	℃/W
Thermal resistance, junction – ambient. Max	R_{thJA}	62.0	

Electrical Characteristic, at Tj = 25 °C, unless otherwise specified

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	100	115	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA T_j=25°C T_j=125°C	2.0 -	3	4.0 -	
Zero gate voltage drain current	I_{DSS}	V_{DS}=80V,V_{GS}=0V T_j=25°C T_j=125°C	- -	0.05	1 5	μA
Gate-source leakage current	I_{GSS}	V_{GS}=20V,V_{DS}=0V	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=50A, T_j=25°C T_j=125°C	- -	3.3	4.0 -	mΩ
Transconductance	g_{fs}	V_{DS}=50V,I_D=20A	-	47	-	S
Dynamic Characteristic						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=50V, f=1MHz	-	6900	-	pF
Output Capacitance	C_{oss}		-	1250	-	
Reverse Transfer Capacitance	C_{rss}		-	47	-	
Gate Total Charge	Q_G	V_{GS}=10V, V_{DS}=50V, I_D=20A, f=1MHz	-	117	-	nC
Gate-Source charge	Q_{gs}		-	40	-	
Gate-Drain charge	Q_{gd}		-	37	-	
Turn-on delay time	$t_{d(on)}$	T_j=25°C, V_{GS}=10V, V_{DS}=50V, R_L=2.5Ω		48		ns
Rise time	t_r			56		
Turn-off delay time	$t_{d(off)}$			75		
Fall time	t_f			33		
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	2.6	-	Ω
Body Diode Characteristic						
Body Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_{SD}=50A	-	0.85	1.3	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=20A, dI/dt=500A/μs		60		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=20A, dI/dt=500A/μs		560		nC

Typical Performance Characteristics

Figure 1. Typ. Output Characteristics

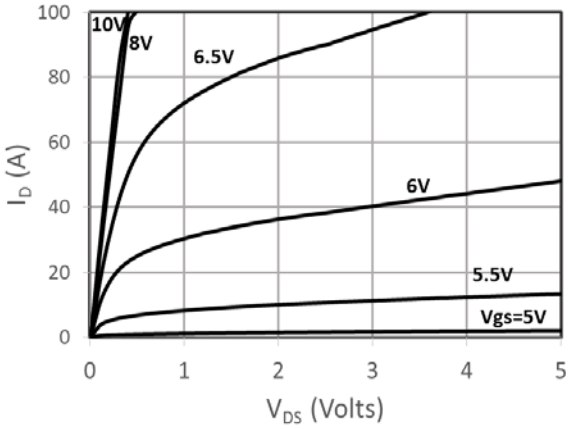


Figure 2. Transfer Characteristics (Junction Temperature)

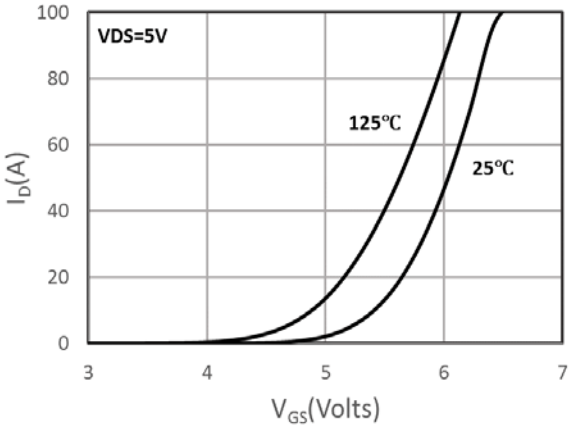


Figure 3. On-Resistance vs. Drain Current and Gate Voltage Figure

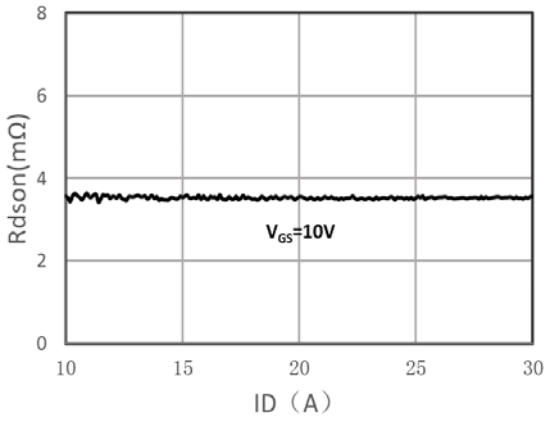


Figure 4. On-Resistance vs. Junction Temperature

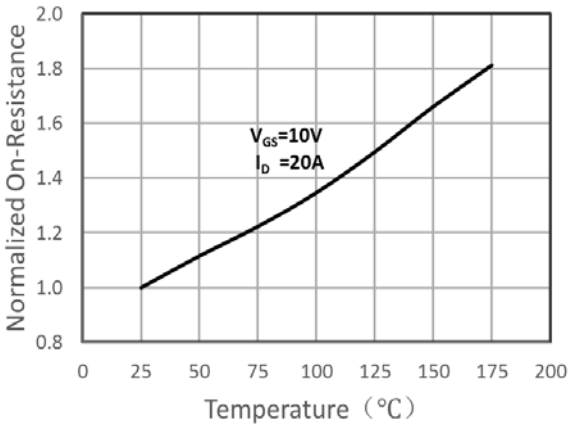


Figure 5. On-Resistance vs. Gate-Source Voltage (Junction Temperature)

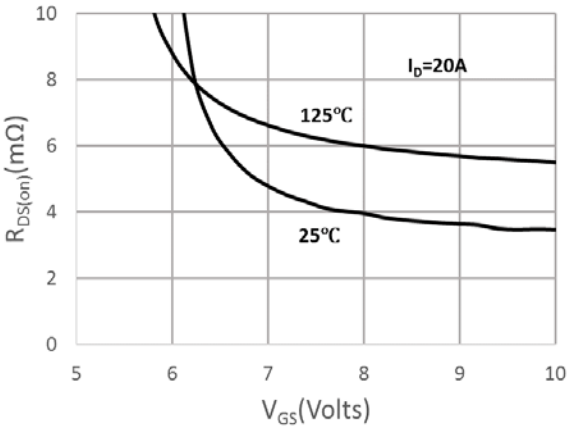


Figure 6. Body-Diode Characteristics (Junction Temperature)

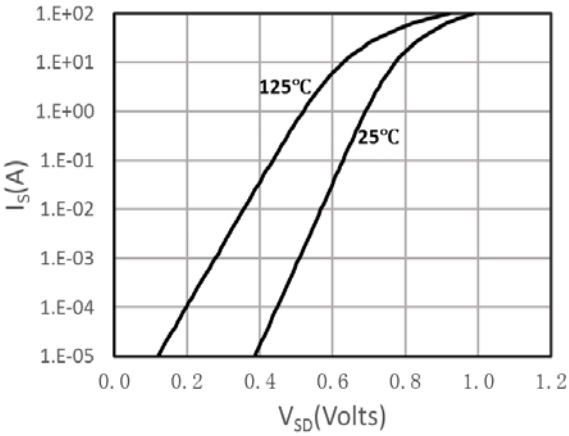


Figure 7. Gate-Charge Characteristics

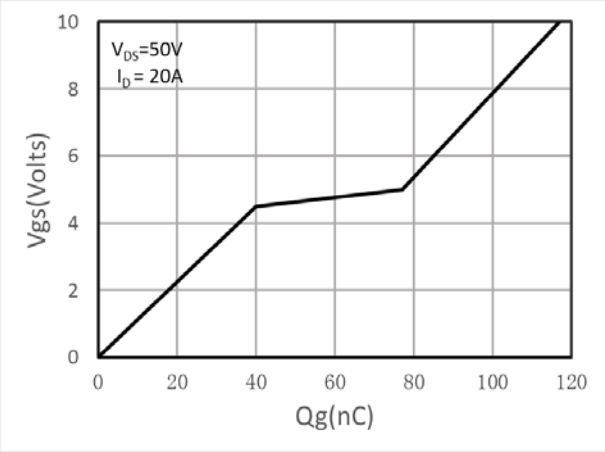


Figure 8. Capacitance Characteristics

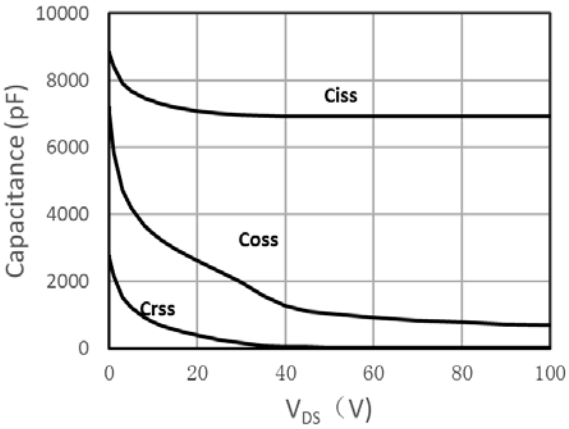


Figure 9: Normalized Maximum Transient Thermal Impedance (R_{thJC})

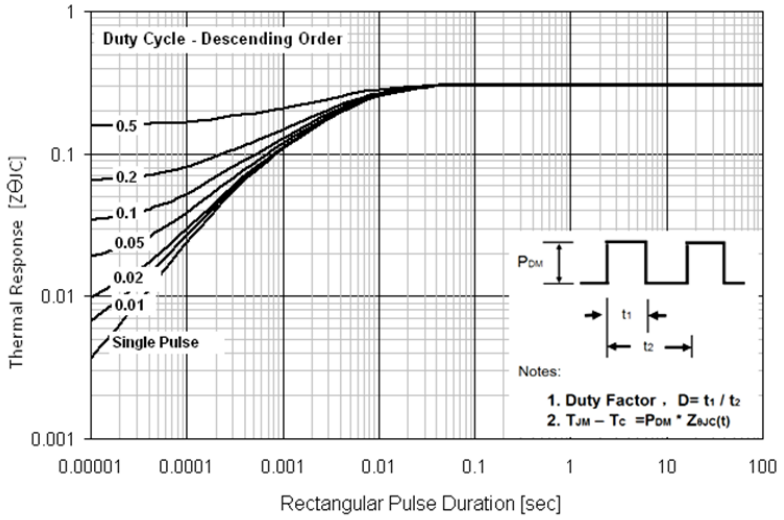


Figure 10: Normalized Maximum Transient Thermal Impedance (R_{thJA})

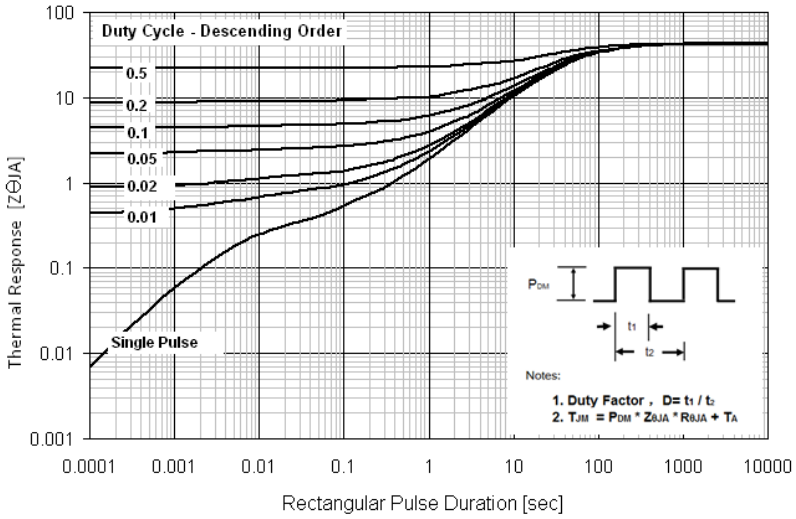


Fig 11 Typical Source-Drain Diode Forward Voltage

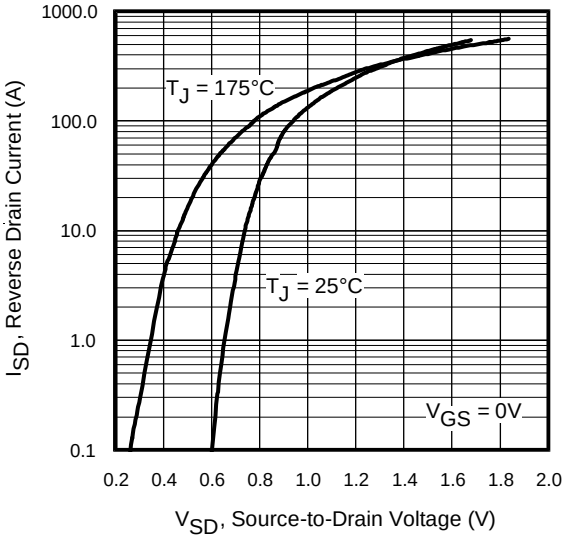


Fig 12 Maximum Safe Operating Area

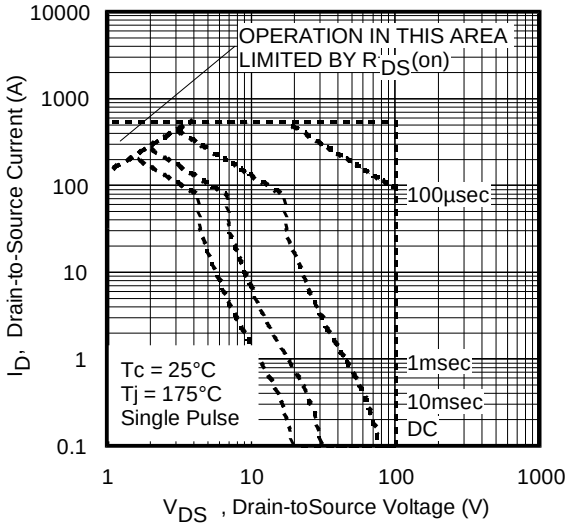


Fig 13 Maximum Drain Current vs. Case Temperature

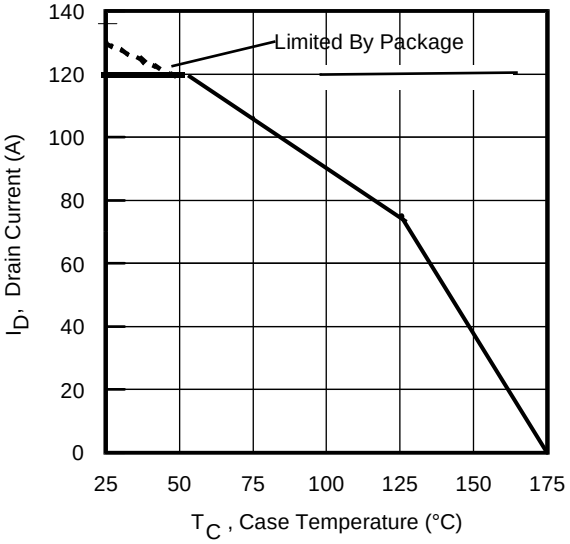


Fig 14 Drain-to-Source Breakdown Voltage

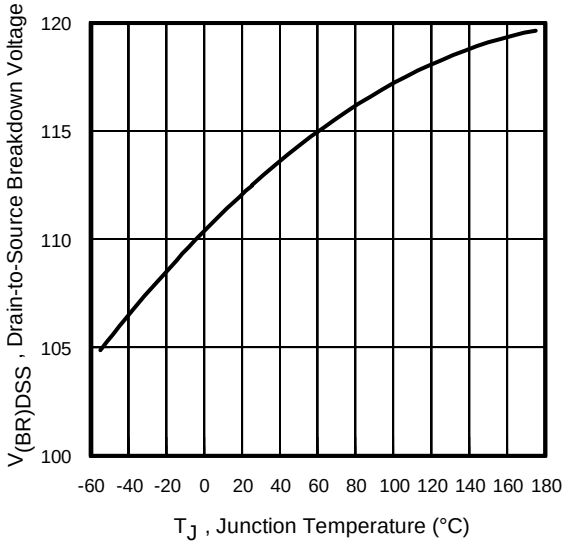


Fig 15 Typical C_{OSS} Stored Energy

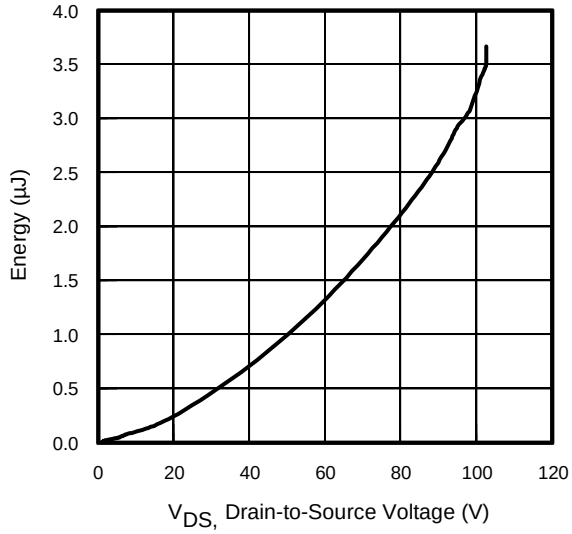
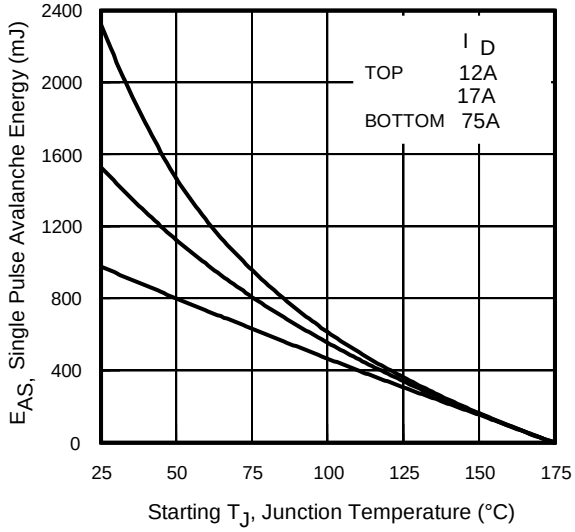
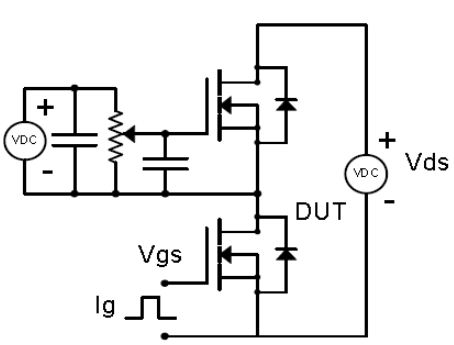


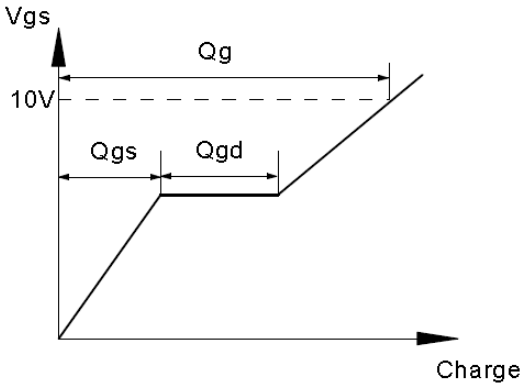
Fig 16 Maximum Avalanche Energy Vs. DrainCurrent



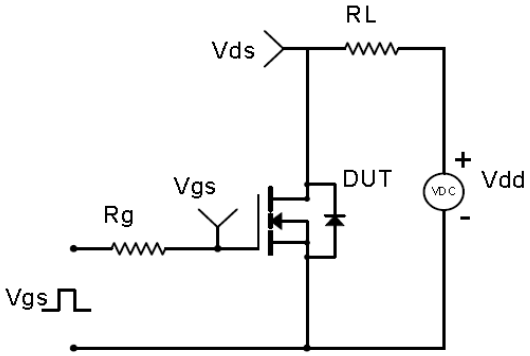
Test Circuit & Waveform

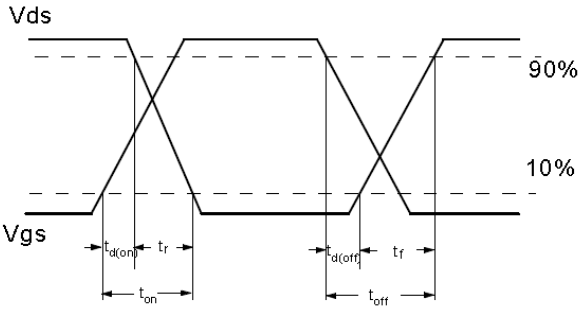
Gate Charge Test Circuit & Waveform



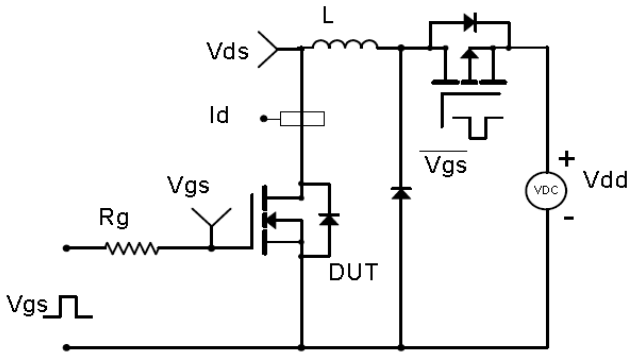


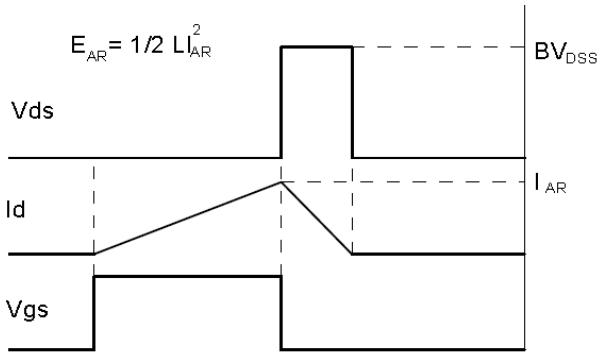
Resistive Switching Test Circuit & Waveforms



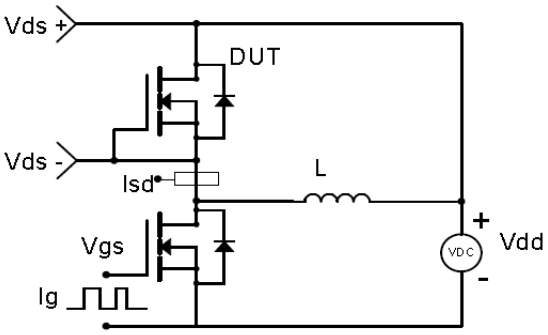


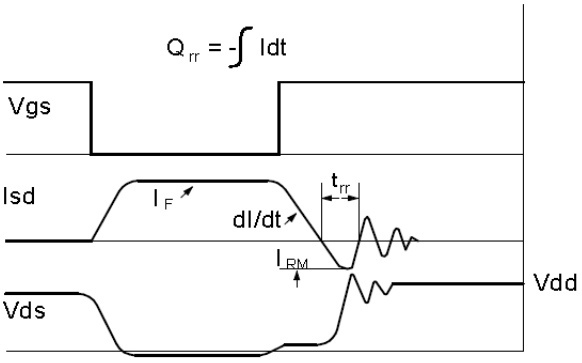
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





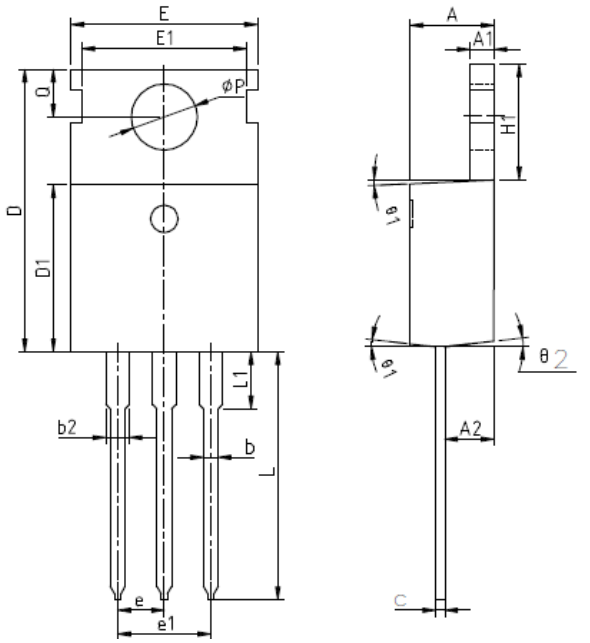
Diode Recovery Test Circuit & Waveforms





PACKAGE DIMENSION

TO-220



SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.65	10.00	10.35
E3	7.00	8.00	8.40
e		2.54 BSC	
e1		5.08 BSC	
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
ΦP	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ1	4°	7°	10°
θ2	0°	3°	6°

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