T1M45170D

SiC N-MOSFET 1700V, 45mΩ, 72A

Features

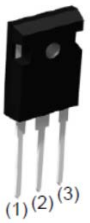
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

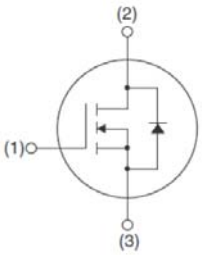
Product Summary

V_{DS}	1700V
$R_{DS(on)\_typ}$	45mΩ
I_D	72A

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC-DC Converters
- Batterry Chargers





Package Marking and Ordering Information

Part #	Marking	Package
T1M45170D	1M45170D	TO-247-3

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1700	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 72 50	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	160	A
Avalanche energy, single pulse (L=10mH)	E_{AS}	4	J
Gate-Source voltage（Absolute maximum values）	V_{GSmax}	-10/+25	V
Gate-Source voltage（Recommended operational values）	V_{GSop}	-5/+20	V
Power dissipation (T_C = 25°C)	P_{tot}	338	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

●Example of acceptable V_{GS} waveform

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.37	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

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

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	1700	-	-	V	V_{GS}=0V, I_D=100uA
Gate threshold voltage	$V_{GS(th)}$	2	2.6	4	V	V_{DS}=V_{GS},I_D=18mA
Zero gate voltage drain current	I_{DSS}	- -	1 10	100 -	μA	V_{DS}=1700V,V_{GS}=0V T_C=25°C T_C=175°C
Gate-source leakage current	I_{GSS}	-	10	600	nA	V_{GS}=20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	27 45	45 -	mΩ	V_{GS}=20V, I_D=50A, T_J=25°C T_J=150°C
Transconductance	g_{fs}	-	26.8	-	S	V_{DS}=20V,I_D=20A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	5070	-	pF	V_{GS}=0V, V_{DS}=1000V, f=1MHz
Output Capacitance	C_{oss}	-	240	-		
Reverse Transfer Capacitance	C_{rss}	-	50	-		
Gate Total Charge	Q_G	-	185	-	nC	V_{GS}=-5/+20V, V_{DS}=1200V, I_D=50A,
Gate-Source charge	Q_{gs}	-	45	-		
Gate-Drain charge	Q_{gd}	-	55	-		
Turn-On Switching Energy	E_{ON}	-	5.33	-	mJ	V_{GS}=-1.5/20V, I_D=50A, V_{DS}=1200V, Rg=15Ω,
Turn-Off Switching Energy	E_{OFF}	-	4.07	-		
Turn-on delay time	$t_{d(on)}$	-	18	-	ns	V_{GS}=-1.5/20V, I_D=50A, V_{DS}=1200V, Rg=15Ω, L=250μH Timing relative to V_{DS}
Rise time	t_r	-	64	-		
Turn-off delay time	$t_{d(off)}$	-	210	-		
Fall time	t_f	-	84	-		
Gate resistance	R_G	-	3.5	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}		5.4		V	V_{GS}=-5V,I_{SD}=25A, T_J=25°C
			4.8			V_{GS}=-5V,I_{SD}=25A, T_J=150°C
Body Diode Reverse Recovery Time	t_{rr}	-	96	-	ns	V_{GS}=-5V,Isd=50A dI/dt=1053A/us, Vds=1200V
Body Diode Reverse Recovery Charge	Q_{rr}	-	915	-	nC	

Typical Performance Characteristics

Fig 1. Output Characteristic (T_J=25℃)

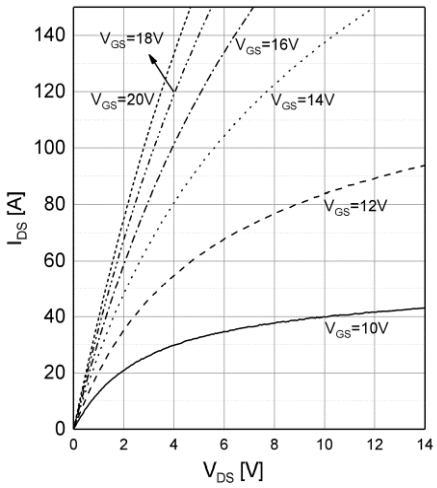


Fig 2. Output Characteristic (T_J=150℃)

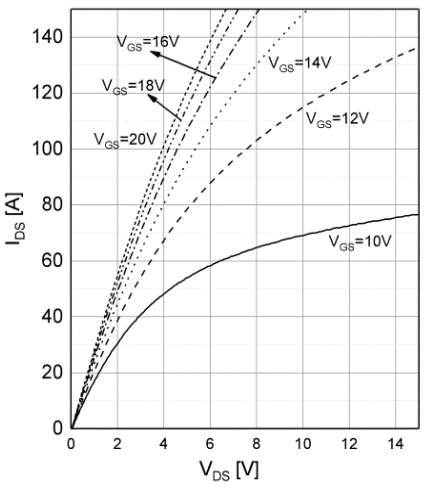


Fig 3: Transfer Characteristic （V_{DS}=20V）

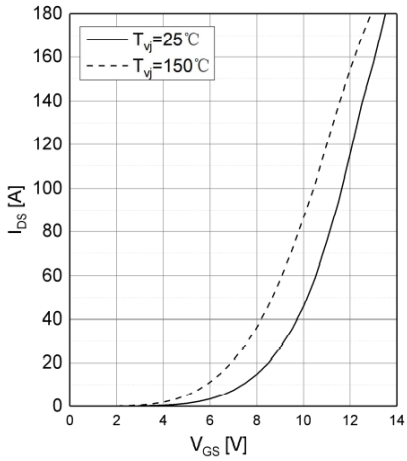


Fig 6: Body-diode Characteristic (TJ=25℃)

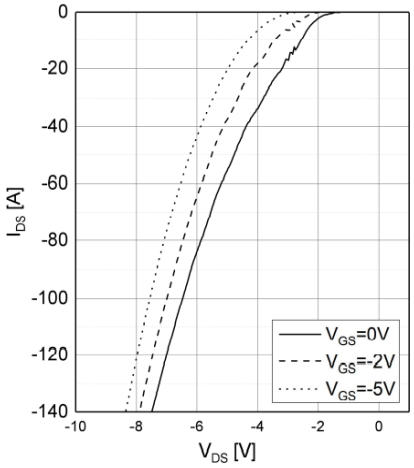
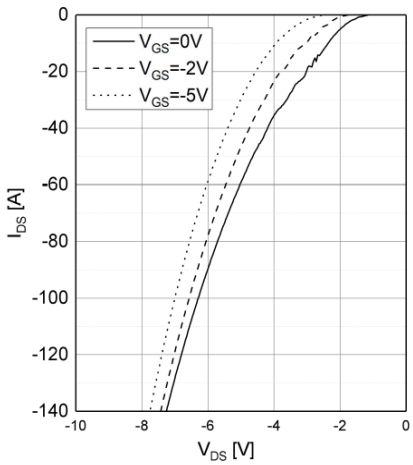
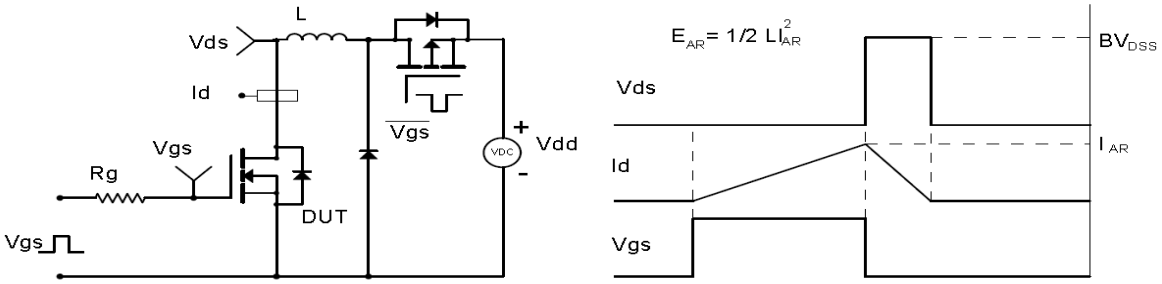


Fig 7: Body-diode Characteristic (T_J=150℃)

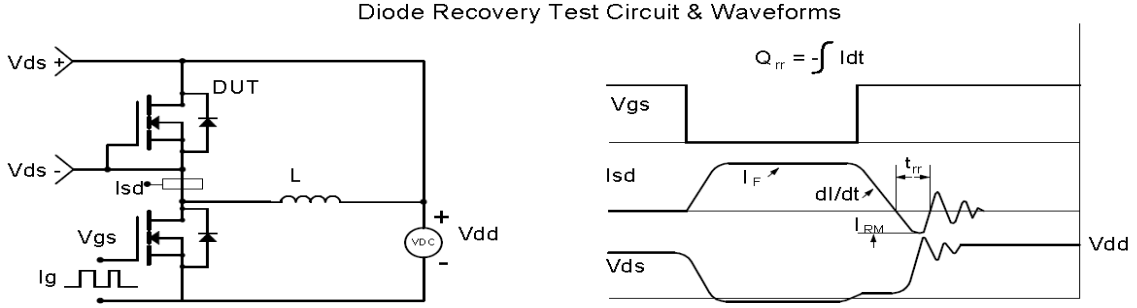


Test Circuit & Waveform

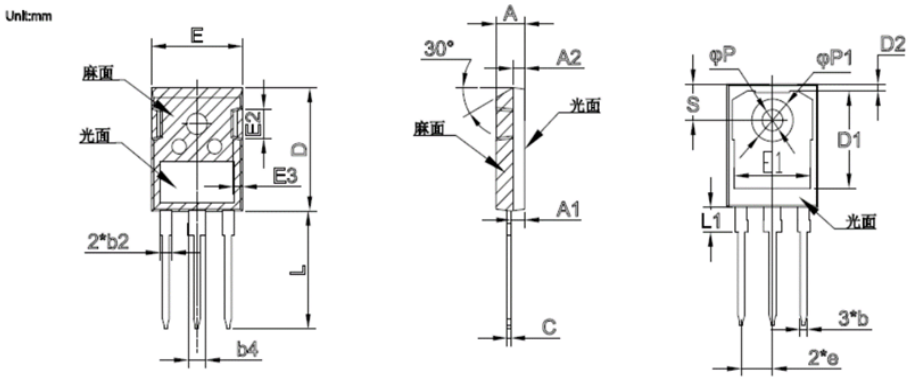
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline:



TO247-3L							
	Min	Nom	Max		Min	Nom	Max
A	4.70	5.00	5.20	E1	13.06	13.26	13.56
A1	2.30		2.50	E2	4.90	5.00	5.10
A2	1.90	2.00	2.10	E3	1.50	1.60	1.70
b	1.10	1.20	1.30	e	5.34	5.44	5.54
b2		2.00		L	19.80	20.00	20.32
b4		3.00		L1		4.17	4.50
C	0.5	0.6	0.7	P	3.50	3.60	3.70
D	20.8	20.95	21.1	P1	7.00	7.19	7.40
D1		16.55		S	6.04	6.15	6.3
D2	0.95	1.17	1.35				
E	15.48	15.88	16.28				

Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

Product Specification Statement

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