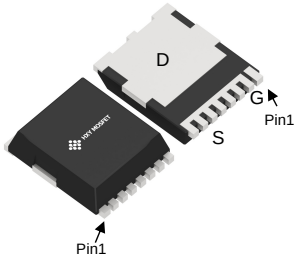
General Description

The IPT022N10NF2SATMA1 use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellentavalanche characteristics. This device is specially designed to get better ruggedness.

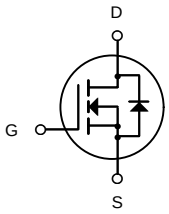


TOLL

General Features

V_{DS} = 100V I_D = 300A

$R_{DS(ON)}$ < 2.6mΩ @ V_{GS}=10V



N-Channel MOSFET

Applications

Battery Protection

Power Distribution

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IPT022N10NF2SATMA1	TOLL	HXY MOSFET	2000

Absolute Maximum Ratings at Tj=25°C unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [1]	T_C=25°C	I_D	300	A
	T_C=100°C		163	
Pulsed Drain Current[2]		I_{DM}	1028	A
Single Pulse Avalanche Energy[3]		EAS	583	mJ
Avalanche Current		I_{AS}	54	A
Total Power Dissipation	T_C=25°C	P_D	379	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance from Junction-to-Ambient[1]		$R_{\theta JA}$	59	°C/W
Thermal Resistance from Junction-to-Case [1]		$R_{\theta JC}$	0.33	°C/W

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	2.0	2.6	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	3	4	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=100V, V_{GS}=0V , T_J=100℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=20A	---	76	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.3	---	Ω
Q_g	Total Gate Charge	V_{DS}=50V , V_{GS}=10V , I_D=20A	---	150	---	nC
Q_{gs}	Gate-Source Charge		---	32.5	---	
Q_{gd}	Gate-Drain Charge		---	49	---	
$T_{d(on)}$	Turn-On Delay Time	VGS=10V, VDD=50V, RG=3Ω, ID=20A	---	27	---	ns
T_r	Rise Time		---	78.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	110	---	
T_f	Fall Time		---	86	---	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	9030	---	pF
C_{oss}	Output Capacitance		---	1505	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	300	A
I_{SM}	Pulsed Source Current[2,4]		---	---	1000	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF = 20A, di/dt =100A/μs	---	90	---	nS
Q_{rr}	Reverse Recovery Charge		---	175	---	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is TJ = 25ÁC,VDD=50V, VGS=10V, L=0.4mH, IAS=54A.

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

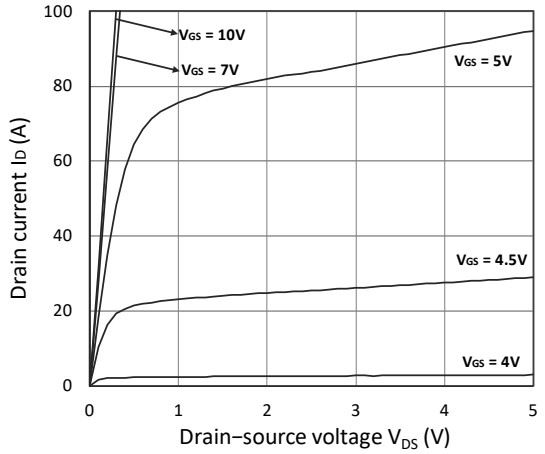


Figure 1. Output Characteristics

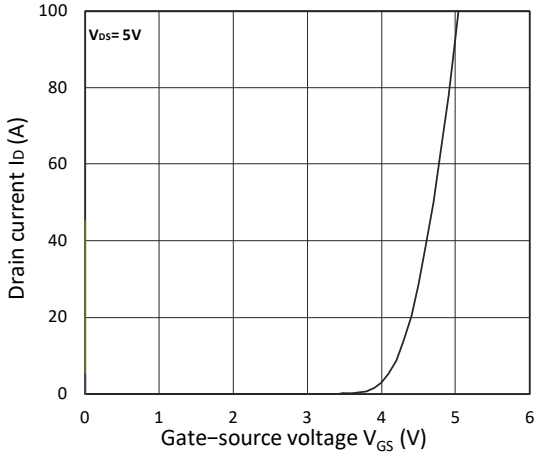


Figure 2. Transfer Characteristics

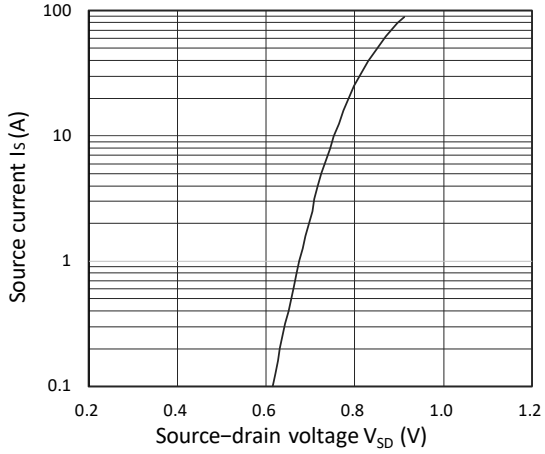


Figure 3. Forward Characteristics of Reverse

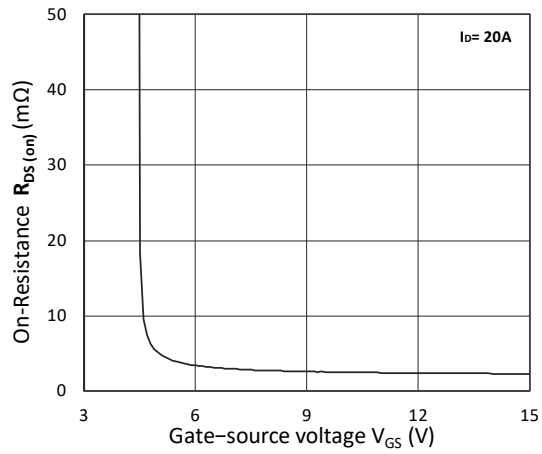


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

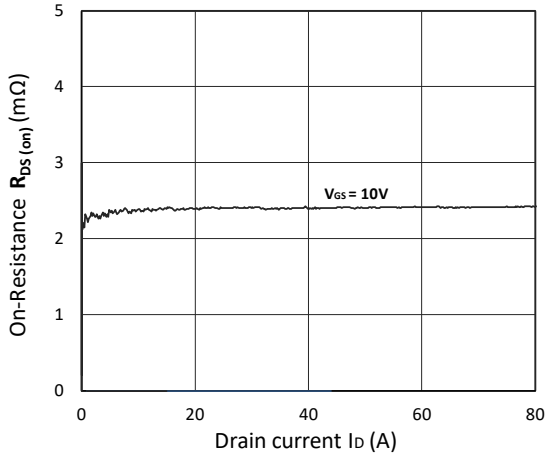


Figure 5. $R_{DS(ON)}$ vs. I_D

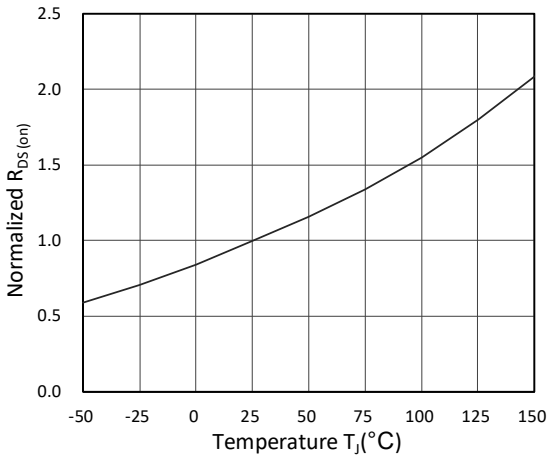


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

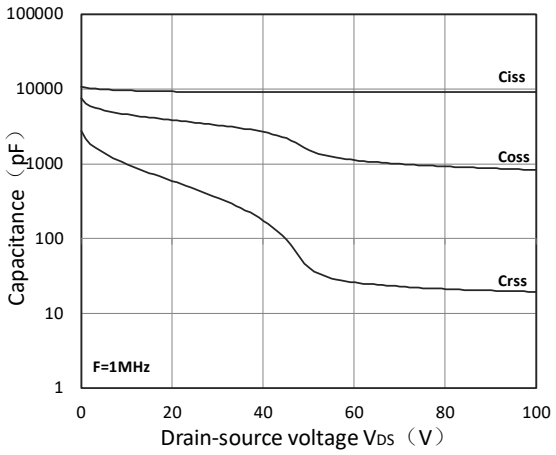


Figure 7. Capacitance Characteristics

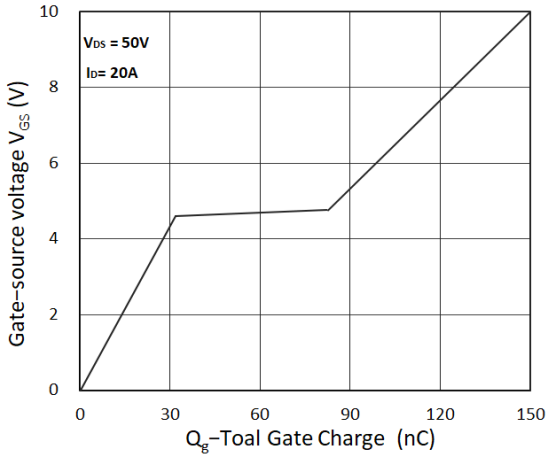


Figure 8. Gate Charge Characteristics

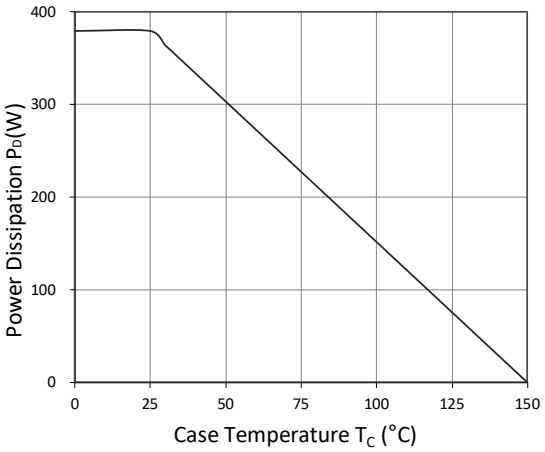


Figure 9. Power Dissipation

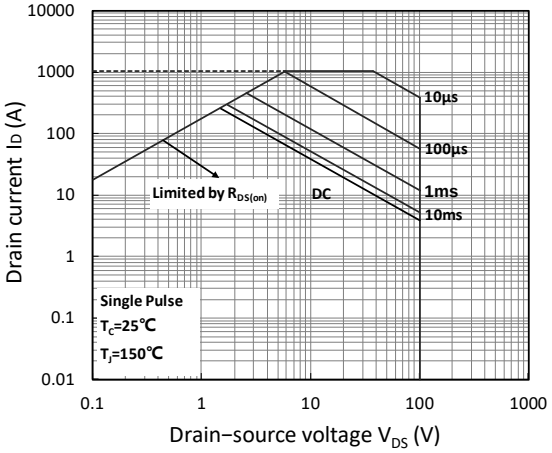


Figure10. Safe Operating Area

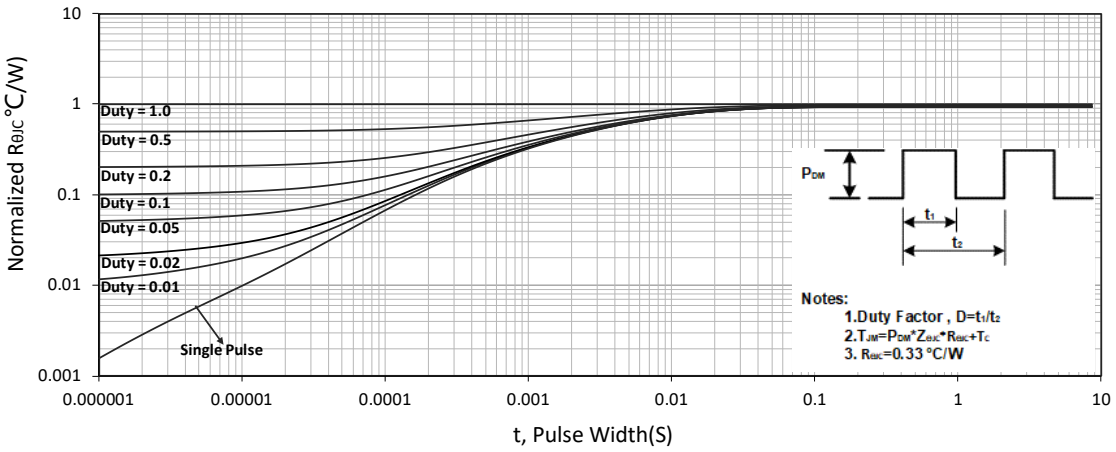


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

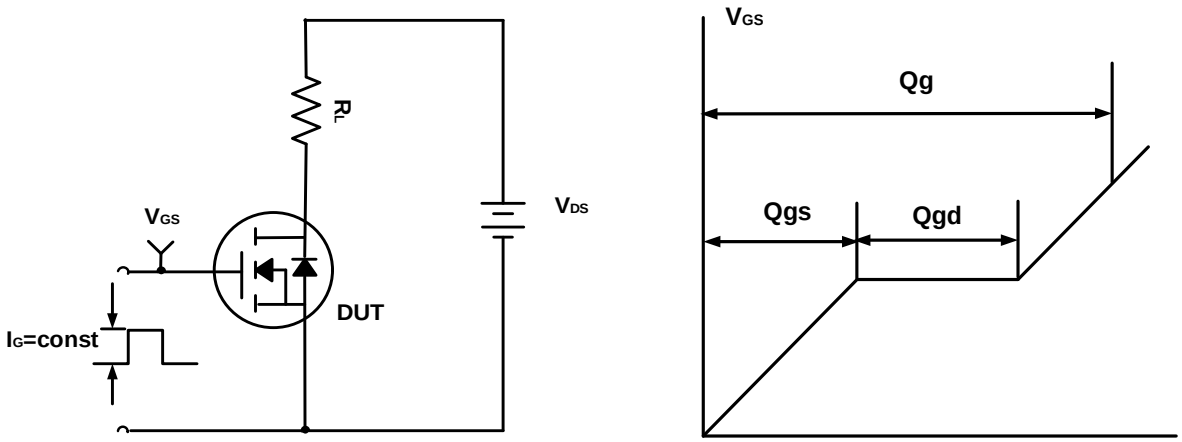


Figure A. Gate Charge Test Circuit & Waveforms

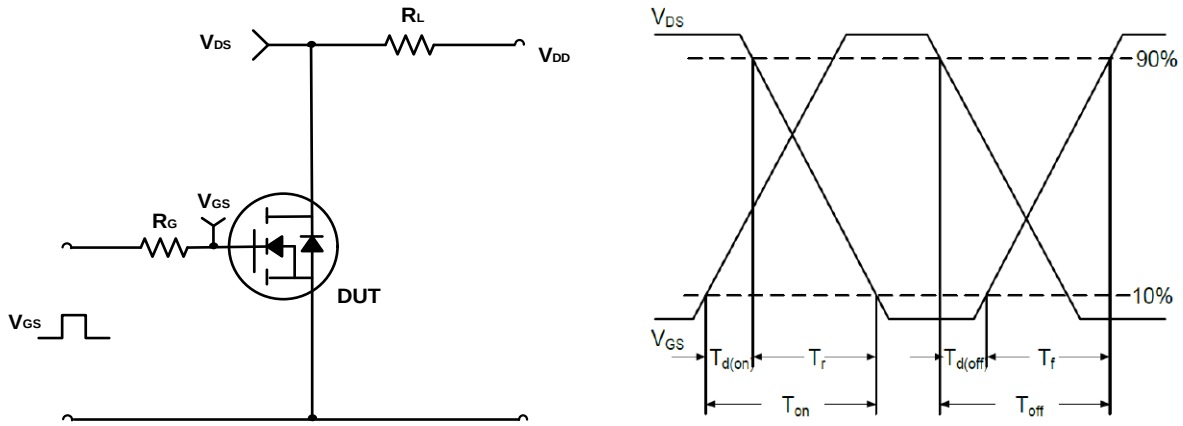
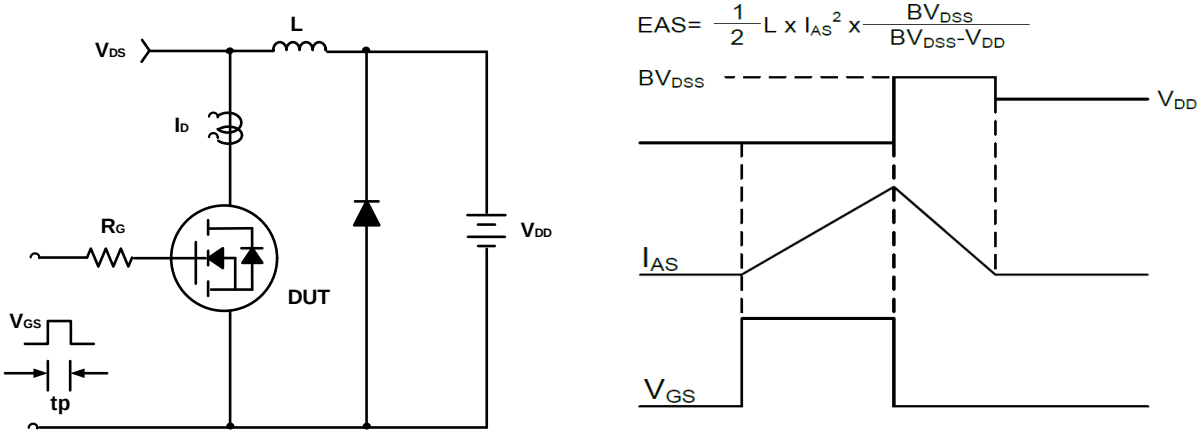
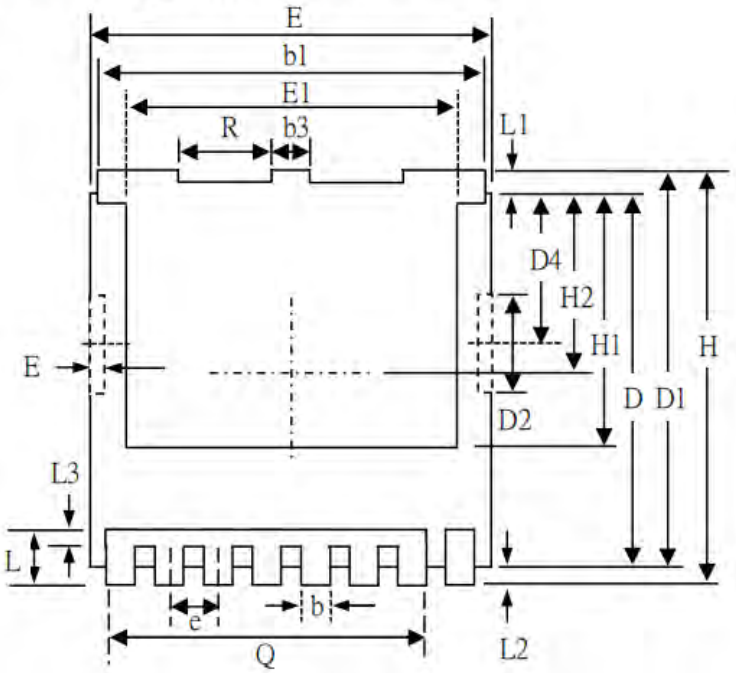


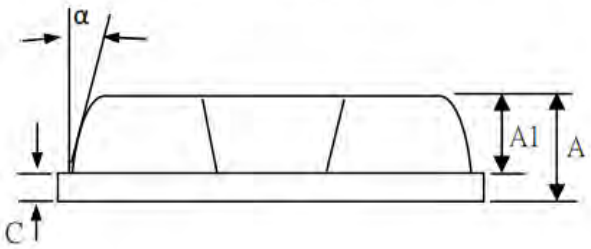
Figure B. Switching Test Circuit & Waveforms



TOLL Package Information



BACKSIDE VIEW



1.All Dimension Are In Millimeters.

2.Dimension Does Not Include Mold Protrusions.

SYMBOLS	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	1.70	1.80	1.90
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b3	1.10	1.20	1.30
c	0.40	0.50	0.60
D	10.28	10.38	10.58
D1	9.80	11.08	11.80
D2	3.10	3.30	3.50
D4	4.37	4.55	4.77
E	9.70	9.90	10.10
E1	7.90	8.10	8.30
E2	0.50	0.70	0.90
e	1.20BCS		
H	11.48	11.68	11.88
H1	6.95BCS		
H2	5.89BCS		
L	1.40	1.90	2.10
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	0.30	0.70	1.30
Q	8.00 REF.		
R	2.95	3.10	3.25
α	4°		10°

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