



Description

The TPH1R104PB,L1XHQ use advanced SGT MOSFET technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable.

General Features

$V_{DS} = 40V$ $I_D = 219A$

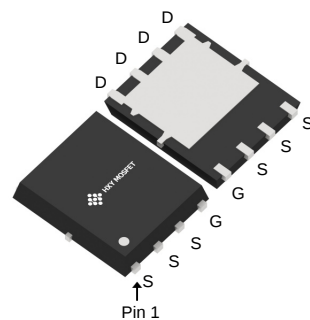
$R_{DS(ON)} < 1.5m\Omega$ $V_{GS}=10V$

Applications

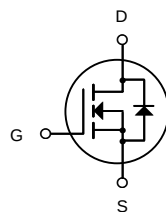
Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications



DFN5X6-8L



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
TPH1R104PB,L1XHQ	DFN5X6-8L	HXY MOSFET	5000

Absolute Maximum Ratings ($T_c=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_c=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V$	219	A
$I_D@T_c=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V$	138	A
I_{DM}	Pulsed Drain Current	345	A
EAS	Single Pulse Avalanche Energy	69	mJ
$P_D@T_c=25^{\circ}C$	Total Power Dissipation	114	W
T_{STG}	Storage Temperature Range	-50 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-50 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	43.2	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	1.1	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max	Unit
Static Characteristics						
BV _{DSS}	Drain Source breakdown voltage	V _{GS} =0V, I _b =250uA, T _J =25°C	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	-	-	1	uA
I _{GSS}	Gate-to-Source Forward Leakage	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _b =250uA	1.4	-	2.3	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A	-	1.2	1.5	mΩ
		V _{GS} =5V, I _D =20A	-	1.7	2.2	mΩ
R _G	Gate Resistance	f = 1 MHz	-	1.5	-	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	VGS = 0V VDS = 20V f = 150KHz	-	6461	-	pF
C _{oss}	Output Capacitance		-	3257	-	pF
C _{rss}	Reverse Transfer Capacitance		-	196	-	pF
Switching Characteristics						
T _{D(on)}	Turn-on Delay Time	VDD = 20V VGS = 4.5V RG = 3Ω ID = 20A	-	24	-	ns
T _r	Turn-on Rise Time		-	84	-	ns
T _{D(off)}	Turn-off Delay Time		-	62	-	ns
T _f	Turn-off Fall Time		-	20	-	ns
Q _g	Total Gate Charge	V _{DD} = 20V V _{GS} = 4.5V I _D = 20A	-	55	-	nC
Q _{gs}	Gate Source Charge		-	15	-	nC
Q _{gd}	Gate Drain Charge		-	19	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
V _{SD}	Drain-Source Diode Forward Voltage	I _S = 50A, VGS = 0V	-	0.8	1.2	V
T _{rr}	Reverse Recovery Time	I _S = 20A, VGS = 0V di/dt = 100A/μs	-	171	-	ns
Q _{rr}	Reverse Recovery Charge		-	381	-	nC

Notes:

1. Rated according to R_{θJC}
2. Rated according to R_{θJA}
3. Surface mounted on 1 inch² FR4 board, 2 oz Cu
4. Limited by maximum T_J
5. Starting T_J = 25°C, V_{DD} = 30V, V_{GS} = 10V, L = 0.5mH
6. Pulse width limited by maximum T_J



Typical Characteristics

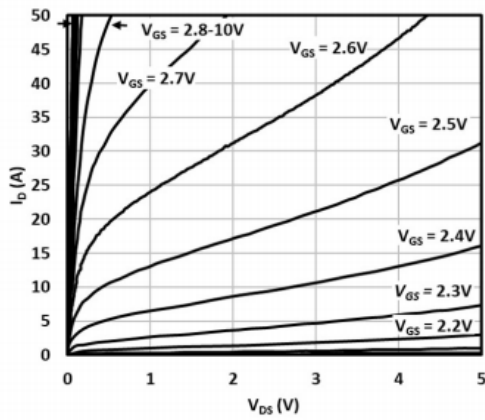


Fig. 1 Output characteristics

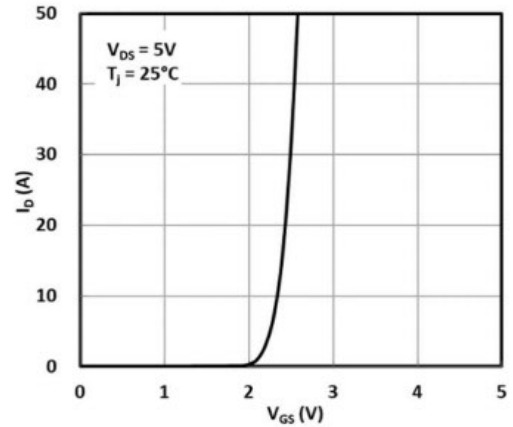


Fig. 2 Transfer characteristics

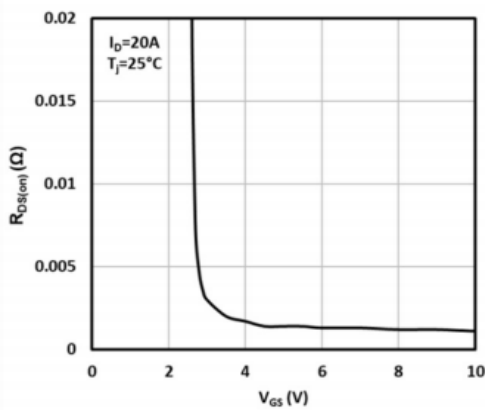


Fig.3 On-resistance vs. gate voltage

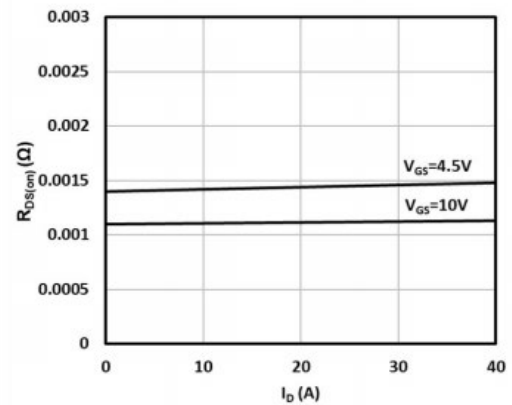


Fig.4 On-resistance vs. drain current

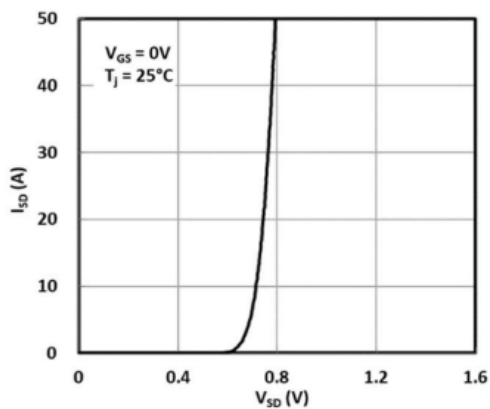


Fig.5 Source-to-drain diode forward characteristics

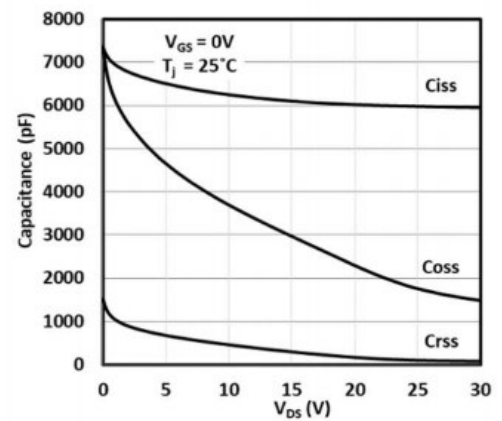


Fig.6 Capacitance vs. drain-to-source voltage

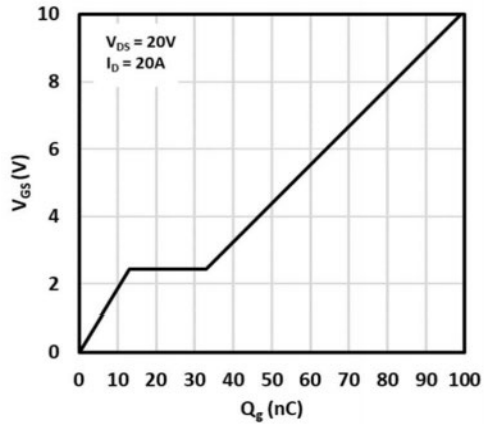


Fig.7 Gate-to-source voltage vs. gate charge

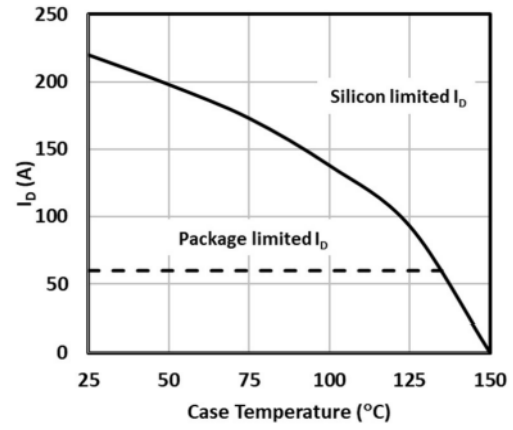


Fig.8 Maximum drain current vs. case temperature

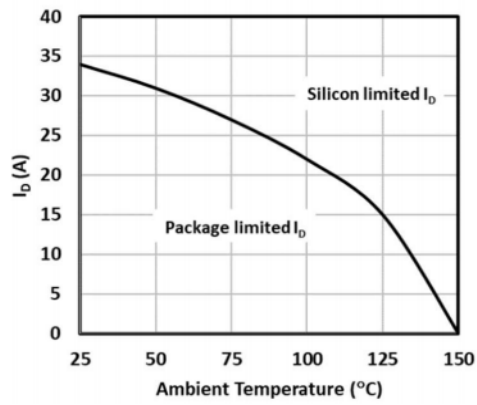
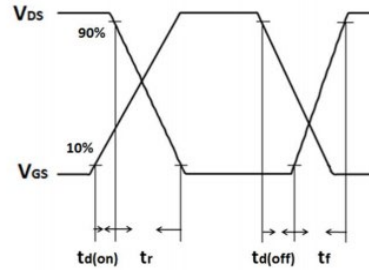
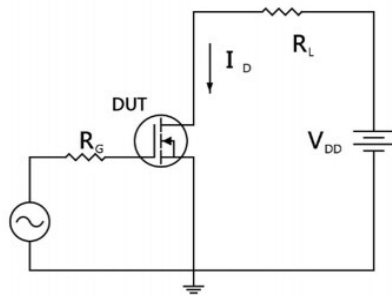


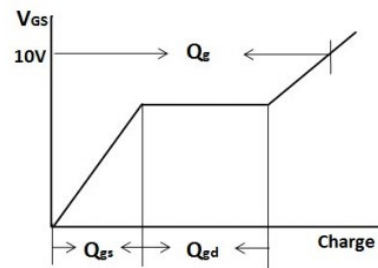
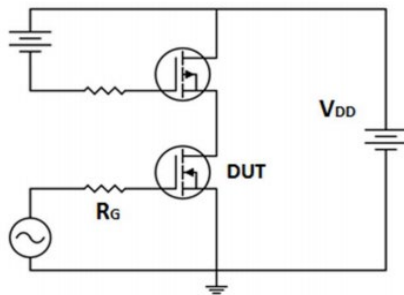
Fig. 9 Maximum drain current vs. ambient temperature



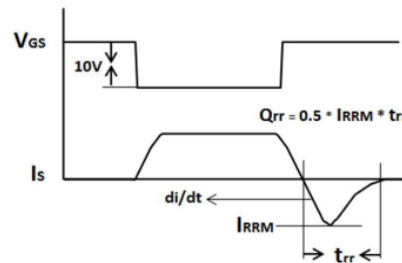
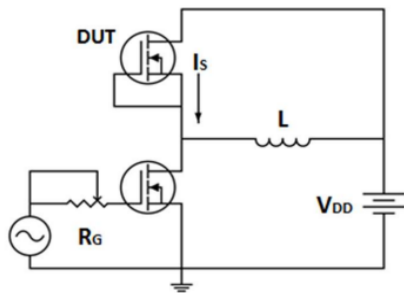
Test Circuits and Waveforms



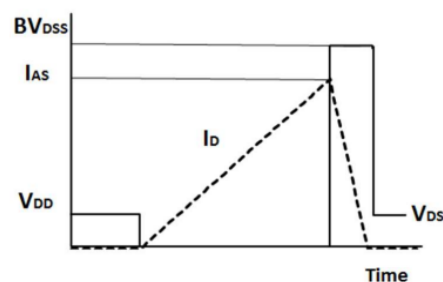
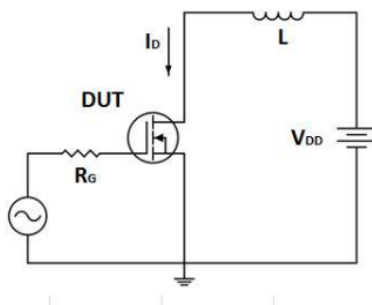
Resistive switching time test circuit & waveforms



Gate charge test circuit & waveform



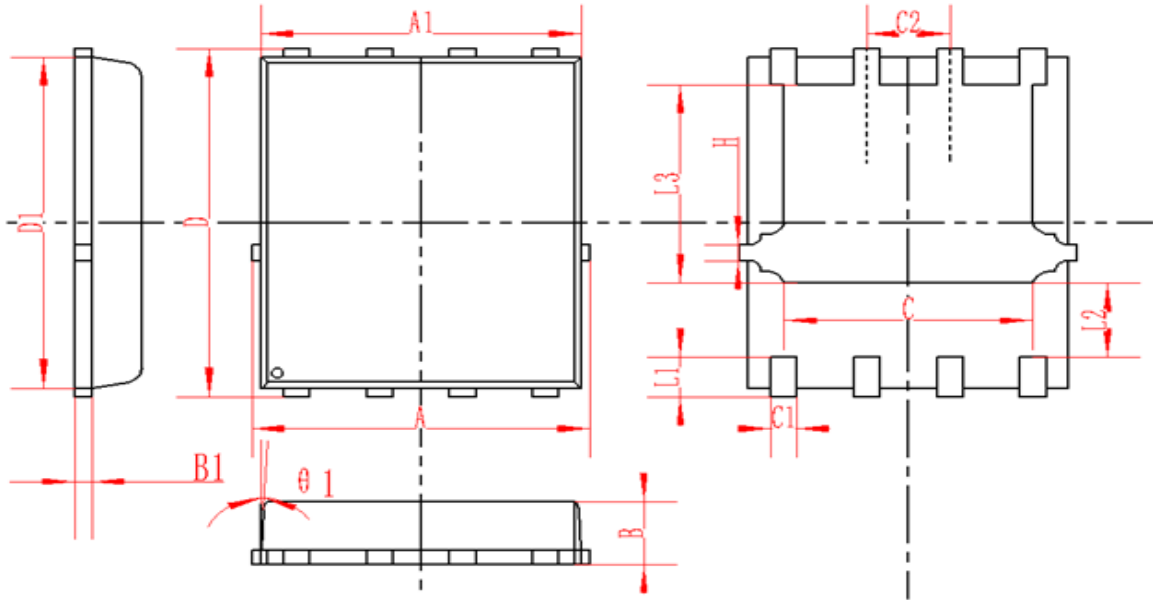
Peak diode recovery dv/dt test circuit & waveforms



Unclamped inductive switching test circuit & waveforms



DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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