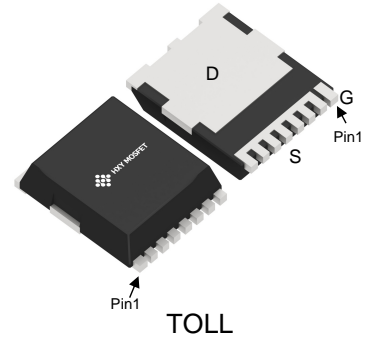




General Description

The HXYG400N06L use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness.



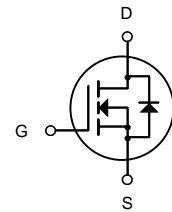
General Features

$V_{DS} = 60V$ $I_D = 400A$

$R_{DS(ON)} < 1.55m\Omega @ V_{GS}=10V$

Applications

Battery Protection
Power Distribution



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXYG400N06L	TOLL	HXY MOSFET	2000

Absolute Maximum Ratings at $T_J=25^\circ C$ unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	400	A
	$T_C=100^\circ C$		268	
Pulsed Drain Current ¹		I_{DM}	1512	A
Single Pulse Avalanche Energy ²		EAS	500	mJ
Total Power Dissipation	$T_C=25^\circ C$	P_D	454.5	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^\circ C$
Thermal Resistance from Junction-to-Ambient ³		$R_{\theta JA}$	39	$^\circ C/W$
Thermal Resistance from Junction-to-Case		$R_{\theta JC}$	0.33	$^\circ C/W$



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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J = 25^\circ\text{C}$	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	μA
	$T_J = 100^\circ\text{C}$		-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	2.9	4	V
Drain-Source on-Resistance ⁴	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	1.25	1.55	m Ω
Forward Transconductance ⁴	g_{fs}	$V_{DS} = 10V, I_D = 20A$	-	62	-	S
Dynamic Characteristics⁵						
Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1\text{MHz}$	-	5990	-	μF
Output Capacitance	C_{oss}		-	2257	-	
Reverse Transfer Capacitance	C_{rss}		-	86	-	
Gate Resistance	R_g	$f = 1\text{MHz}$	-	2.6	-	Ω
Switching Characteristics⁵						
Total Gate Charge	Q_g	$V_{GS} = 10V, V_{DS} = 30V, I_D = 20A$	-	102	-	nC
Gate-Source Charge	Q_{gs}		-	24.6	-	
Gate-Drain Charge	Q_{gd}		-	28.2	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 30V, R_G = 3\Omega, I_D = 20A$	-	15.6	-	ns
Rise Time	t_r		-	29	-	
Turn-off Delay Time	$t_{d(off)}$		-	63	-	
Fall Time	t_f		-	51	-	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	80	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	114	-	nC
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ⁴	V_{SD}	$I_S = 20A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current	$T_C = 25^\circ\text{C}$	I_S	-	-	400	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 175^\circ\text{C}$.
2. The test condition is $V_{DD} = 90V, V_{GS} = 10V, L = 0.4\text{mH}, I_{AS} = 50A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.



Typical Characteristics

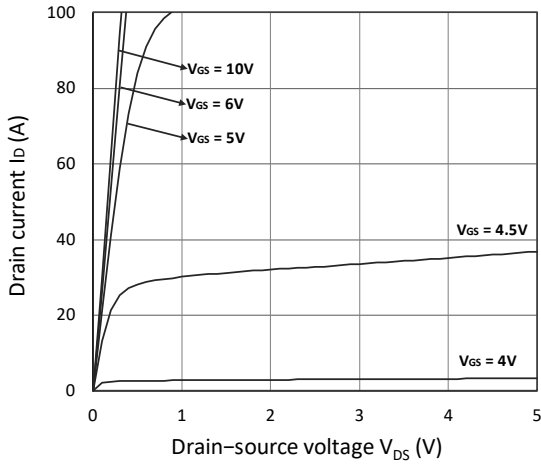


Figure 1. Output Characteristics

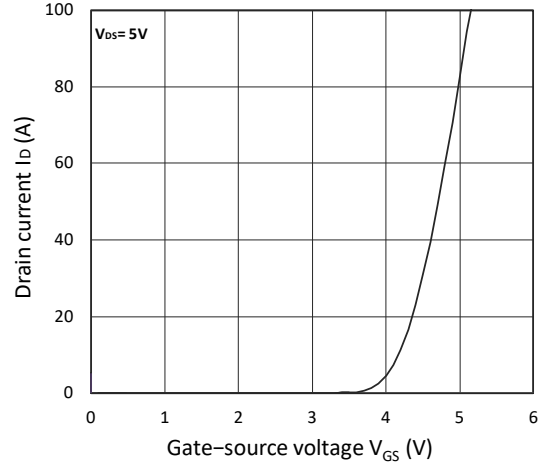


Figure 2. Transfer Characteristics

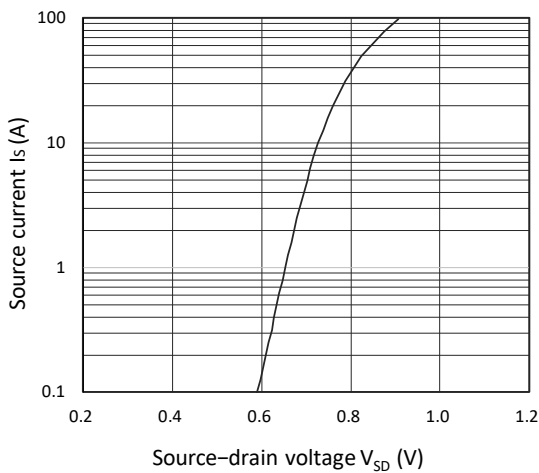


Figure 3. Forward Characteristics of Reverse

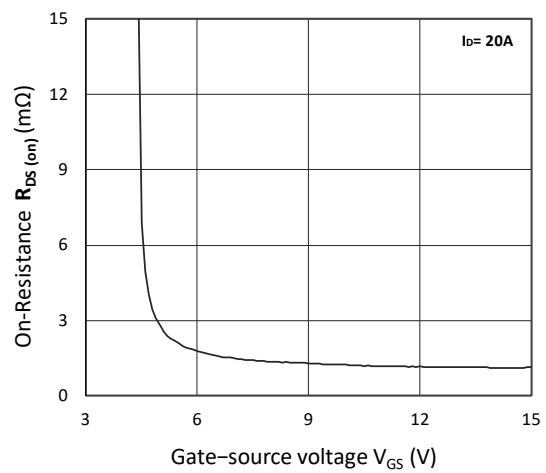


Figure 4. $R_{DS(on)}$ vs. V_{GS}

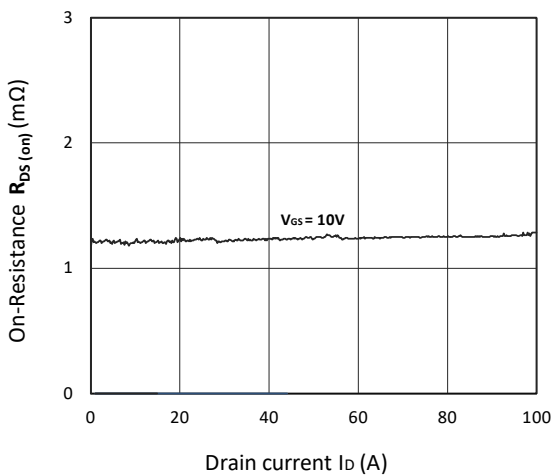


Figure 5. $R_{DS(on)}$ vs. I_D

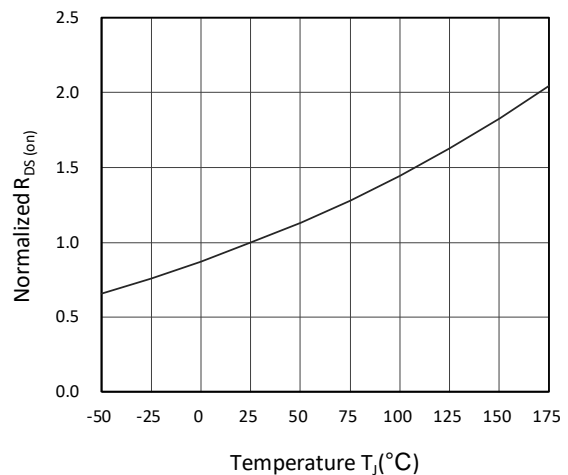


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

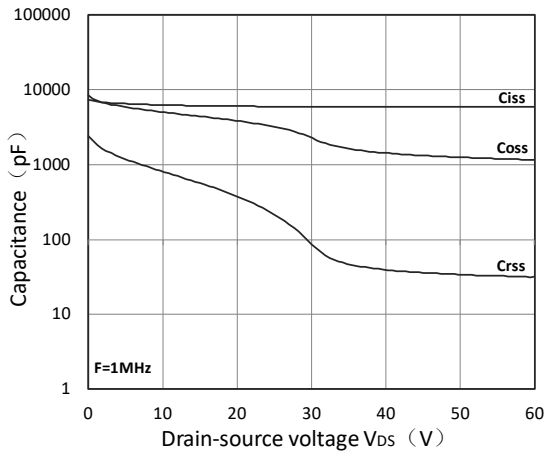


Figure 7. Capacitance Characteristics

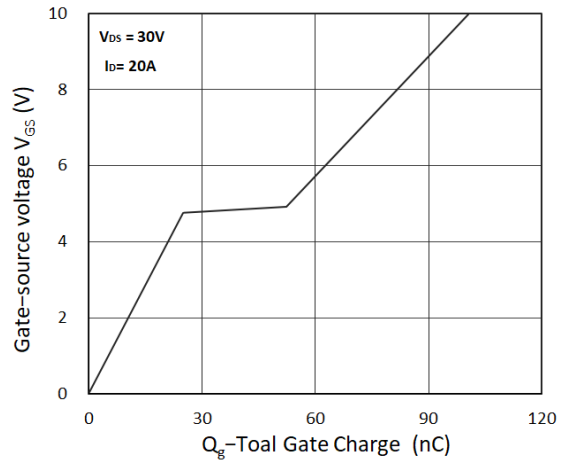


Figure 8. Gate Charge Characteristics

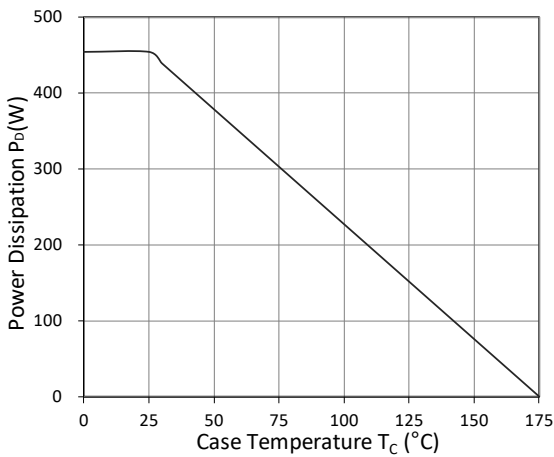


Figure 9. Power Dissipation

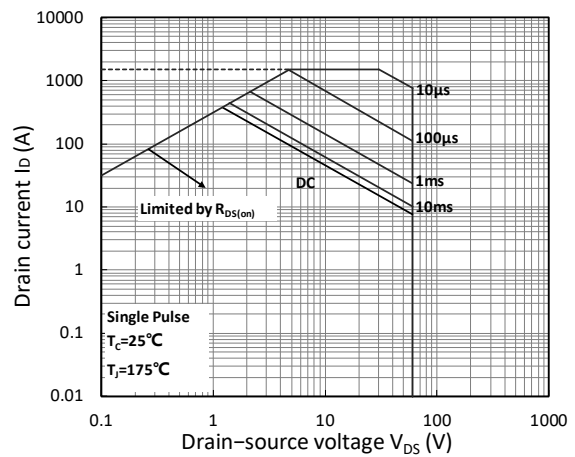


Figure 10. Safe Operating Area

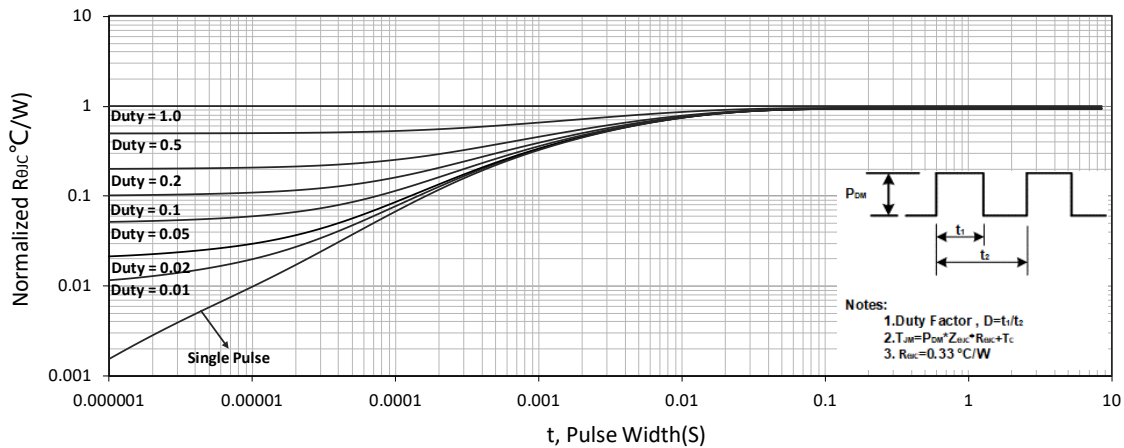


Figure 11. Normalized Maximum Transient Thermal Impedance



Test Circuit

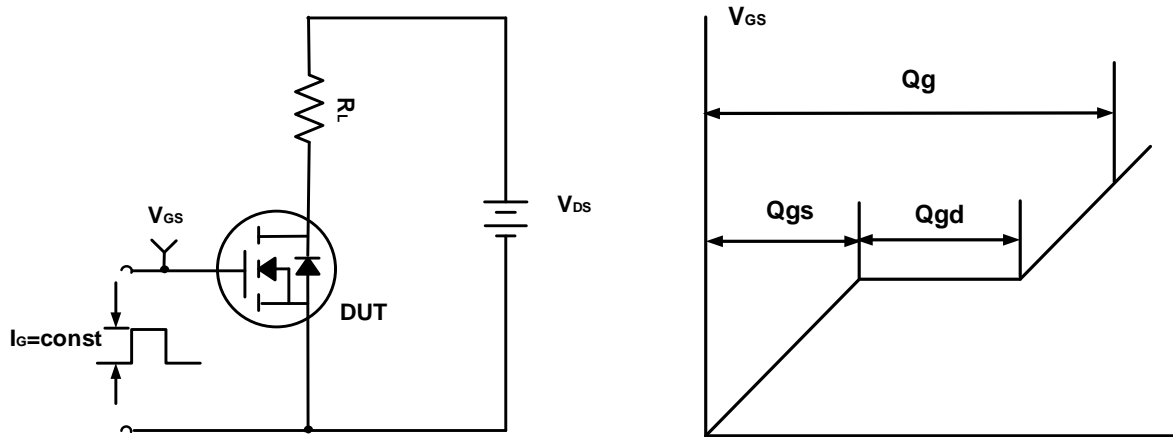


Figure A. Gate Charge Test Circuit & Waveforms

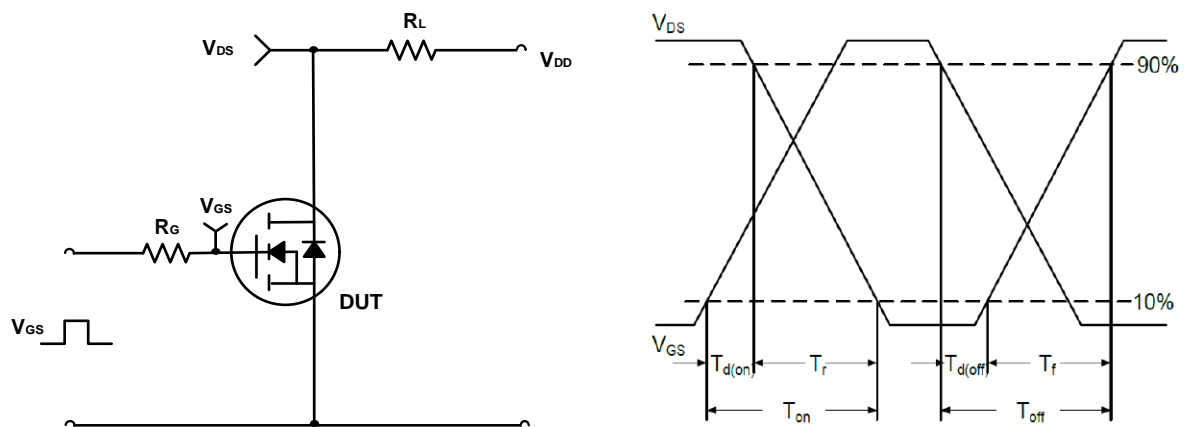


Figure B. Switching Test Circuit & Waveforms

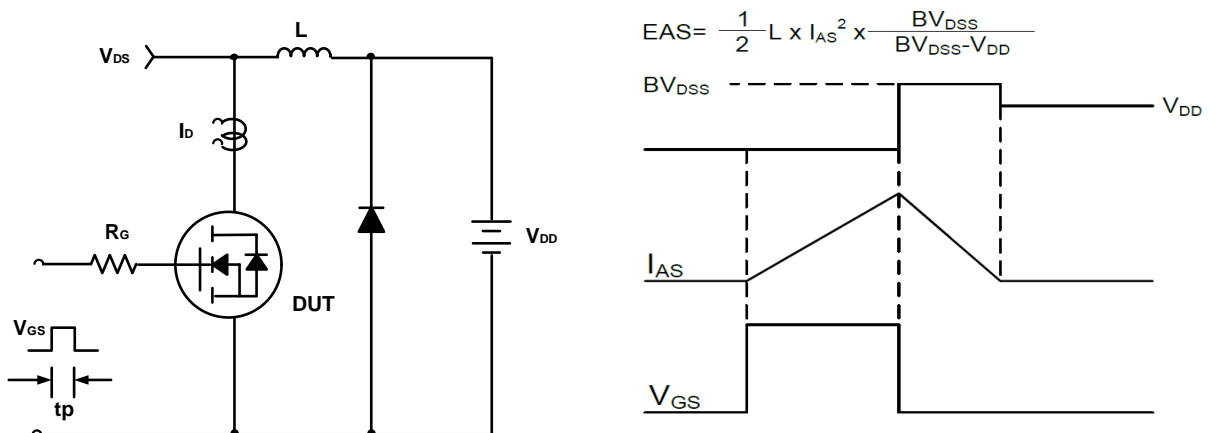
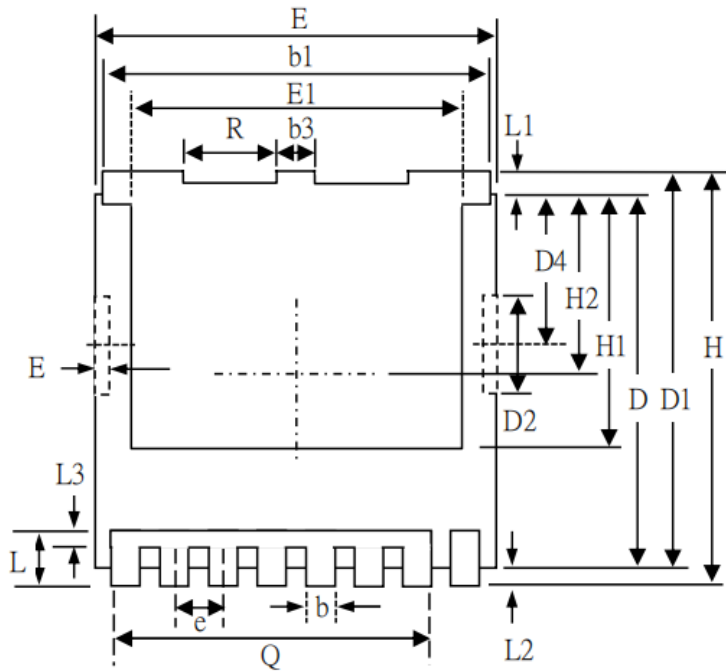


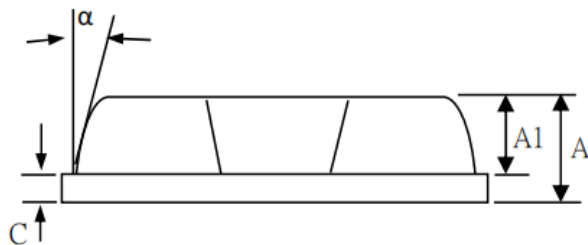
Figure C. Unclamped Inductive Switching Circuit & Waveforms



TOLL Package Information



BACKSIDE VIEW



Symbol	mm	
	Min	Max
A	2.20	2.40
b	0.60	0.90
b1	9.70	9.90
c	0.40	0.60
D	10.20	10.60
D1	3.10	3.50
D2	4.45	4.75
E	9.70	10.10
E1	7.80BSC	
E2	0.50	0.70
e	1.200 BSC	
H	11.45	11.90
H1	6.75 BSC	
K	3.10 REF	
L	1.70	2.10
L1	0.60	0.80
L2	0.50	0.70
θ	10° REF	

- 1.All Dimension Are In Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.



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