

**Description**

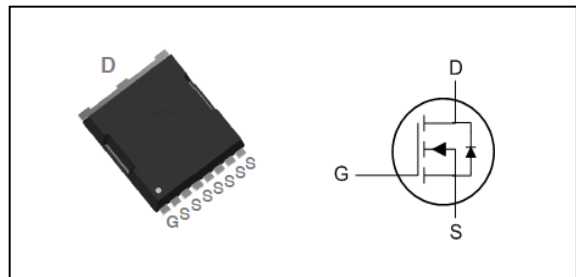
The HSY6074 is the high cell density SGT N-ch MOSFETs, which provide excellent R<sub>DS(ON)</sub> and gate charge for most of the synchronous buck converter applications.

The HSY6074 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Motor Control
- 100% EAS Guaranteed
- DC/DC Converter.
- Excellent CdV/dt effect decline
- Synchronous rectifier applications.

**Product Summary**

V <sub>DS</sub>	60	V
R <sub>DS(ON),typ</sub>	1.5	mΩ
I <sub>D</sub>	230	A

**TOLL Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current <sup>1,6</sup>	230	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current <sup>1,6</sup>	141	A
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current <sup>1</sup>	26	A
I <sub>D</sub> @T <sub>A</sub> =100°C	Continuous Drain Current <sup>1</sup>	17	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	400	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	306	mJ
I <sub>AS</sub>	Avalanche Current	35	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	180	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	50	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	0.7	°C/W

**N-Ch 60V Fast Switching MOSFETs**
**Electrical Characteristics ( $T_J=25\text{ }^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=20A$	---	1.5	2.0	$m\Omega$
		$V_{GS}=4.5V, I_D=20A$	---	2.2	3.0	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	---	2.3	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=52V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	$\mu A$
		$V_{DS}=52V, V_{GS}=0V, T_J=55^\circ C$	---	---	5	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=20A$	---	60	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	1.6	---	$\Omega$
$Q_g$	Total Gate Charge (10V)	$V_{DS}=30V, V_{GS}=10V, I_D=20A$	---	102	---	nC
$Q_{gs}$	Gate-Source Charge		---	16	---	
$Q_{gd}$	Gate-Drain Charge		---	28	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3\Omega, I_D=20A$	---	15	---	ns
$T_r$	Rise Time		---	12	---	
$T_{d(off)}$	Turn-Off Delay Time		---	60	---	
$T_f$	Fall Time		---	19	---	
$C_{iss}$	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1MHz$	---	5480	---	pF
$C_{oss}$	Output Capacitance		---	1822	---	
$C_{rss}$	Reverse Transfer Capacitance		---	88	---	

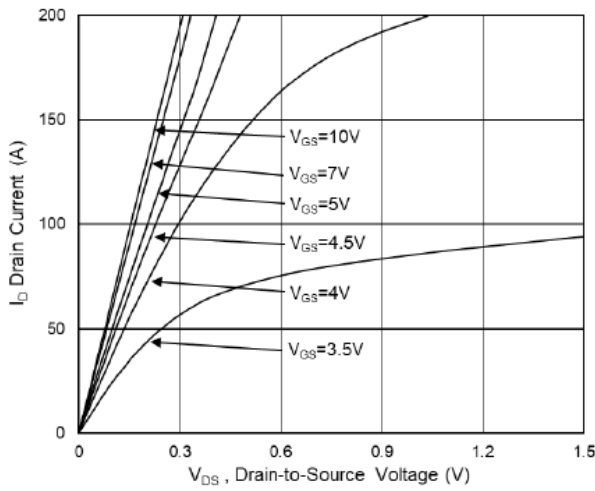
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	100	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s, T_J=25^\circ C$	---	50	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	72	---	nC

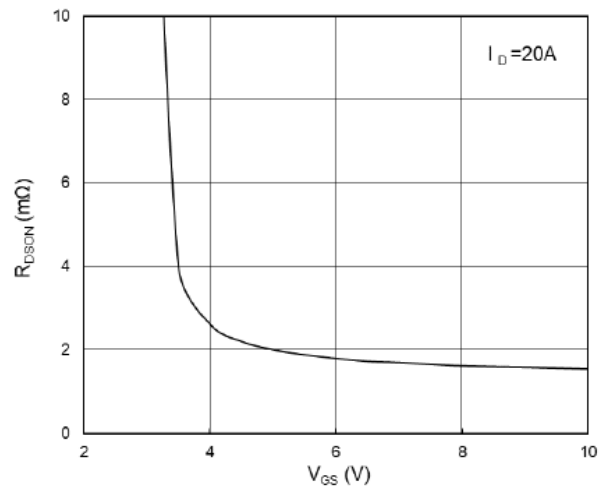
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=35A$
- 4.The power dissipation is limited by 150 $^\circ C$  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.
- 6.The maximum current rating is package limited.

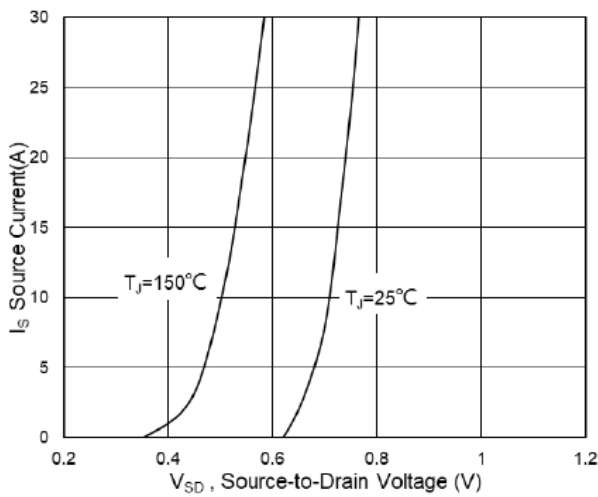
**Typical Characteristics**



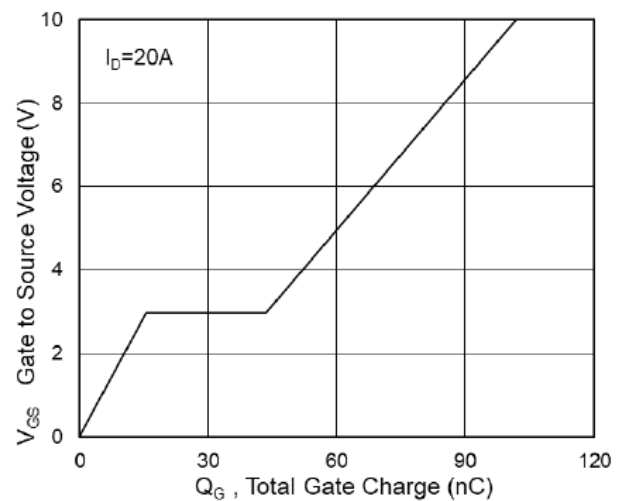
**Fig.1 Typical Output Characteristics**



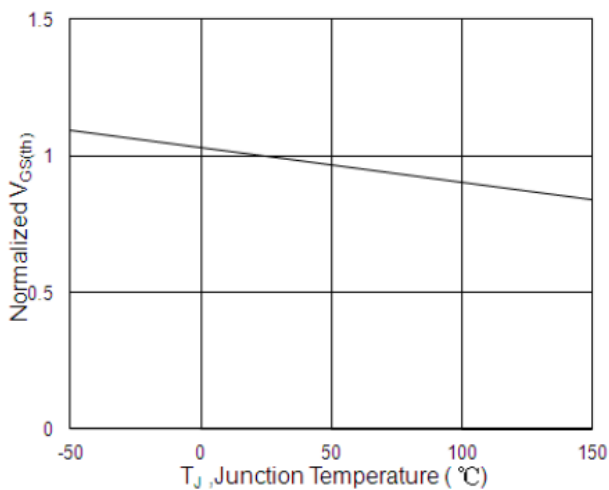
**Fig.2 On-Resistance vs G-S Voltage**



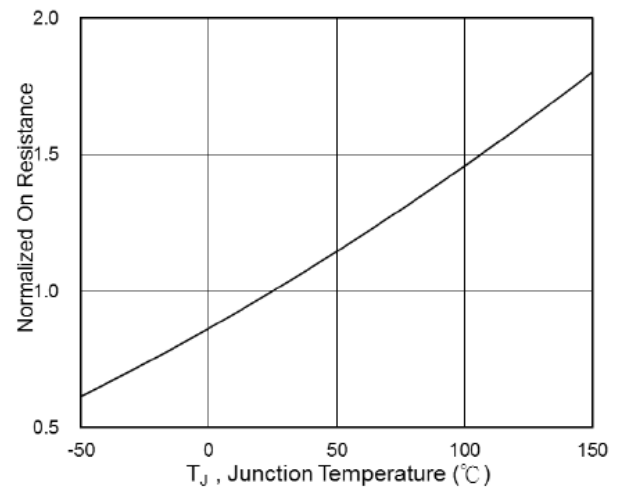
**Fig.3 Diode Forward Voltage vs. Current**



**Fig.4 Gate-Charge Characteristics**

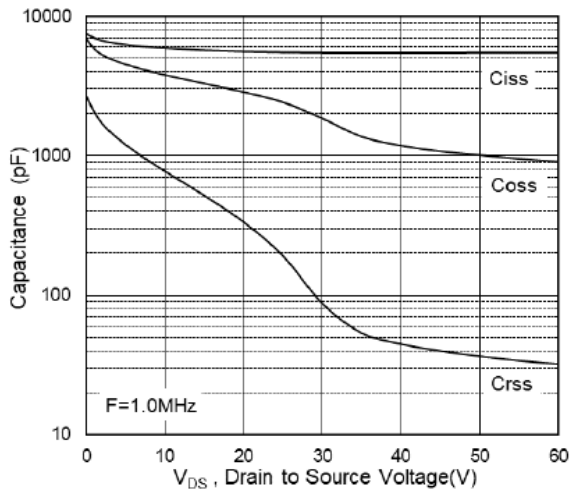


**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**

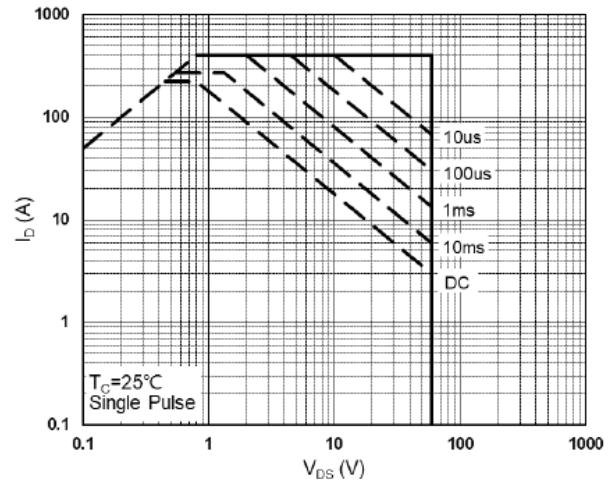


**Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$**

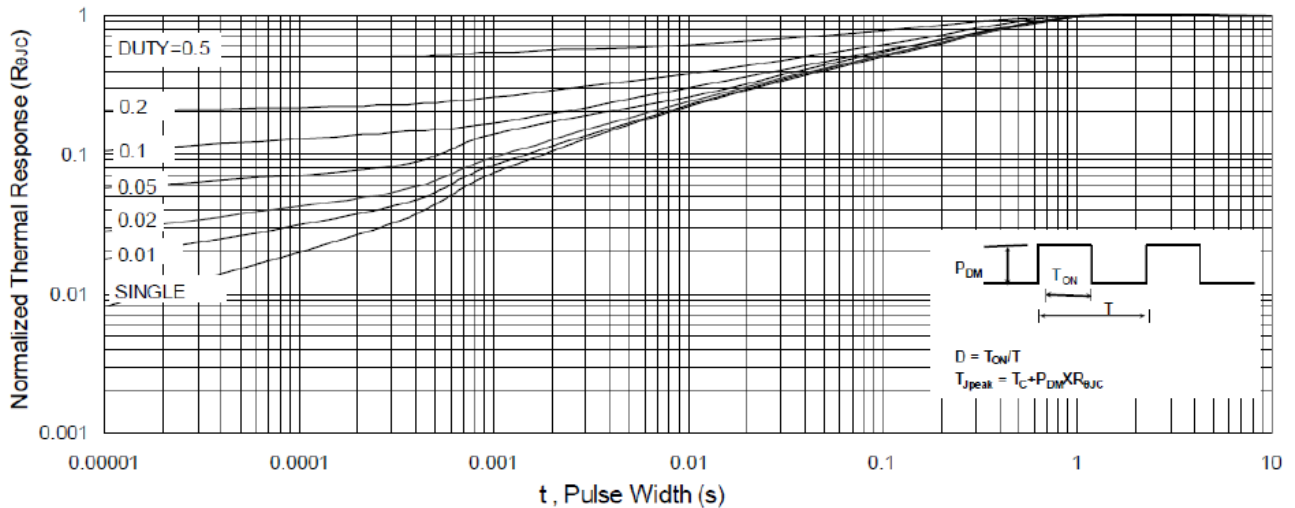
**N-Ch 60V Fast Switching MOSFETs**



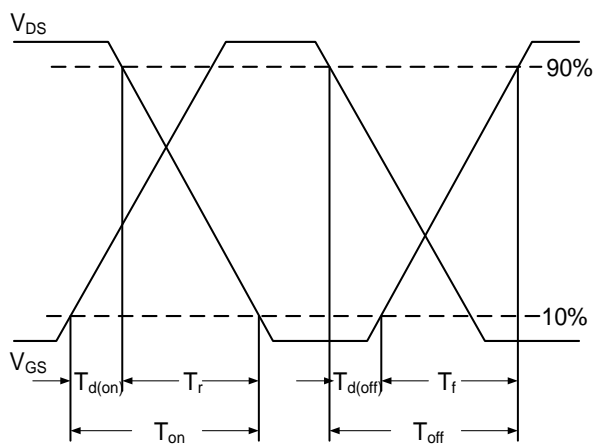
**Fig.7 Capacitance**



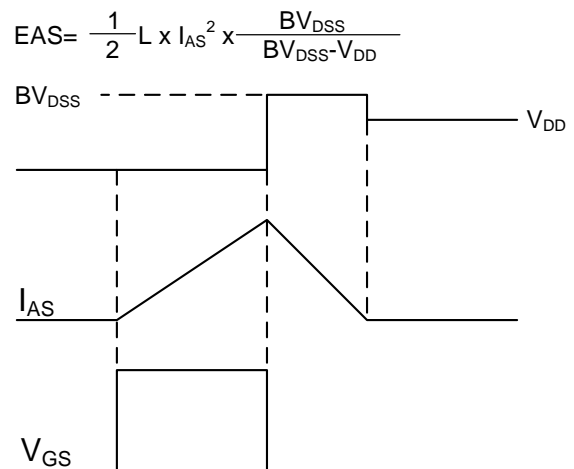
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



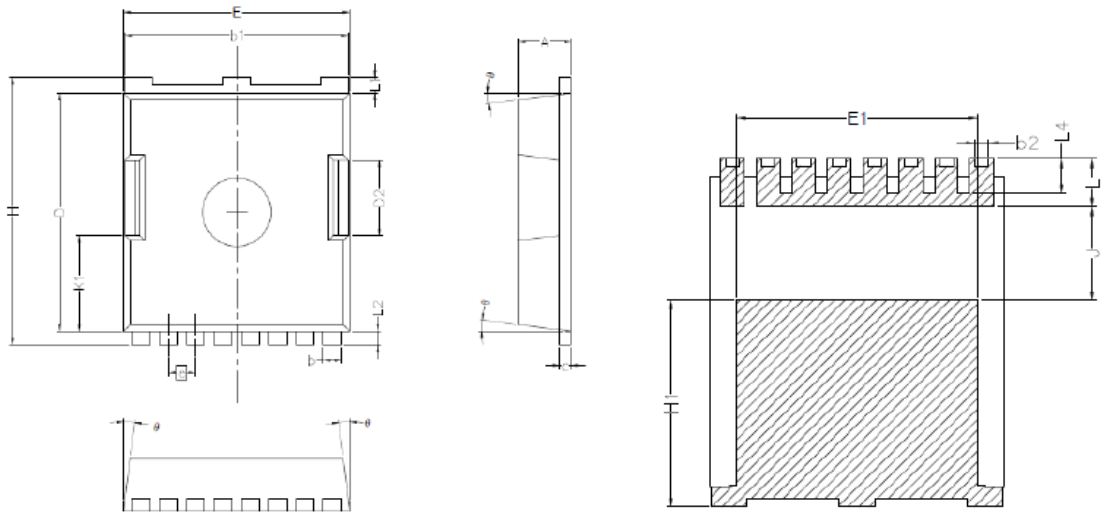
**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching**



■ TOLL-8L Package information



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.20	2.40
b	0.90	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D2	3.10	3.50
E	9.70	10.10
E1	7.90	8.30
e	1.20BSC	
H	11.48	11.88
H1	6.75	7.15
N	8	
J	3.00	3.30
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L4	1.00	1.30
$\theta$	4°	10°