

100V N-Channel SGT Power MOSFET

Features

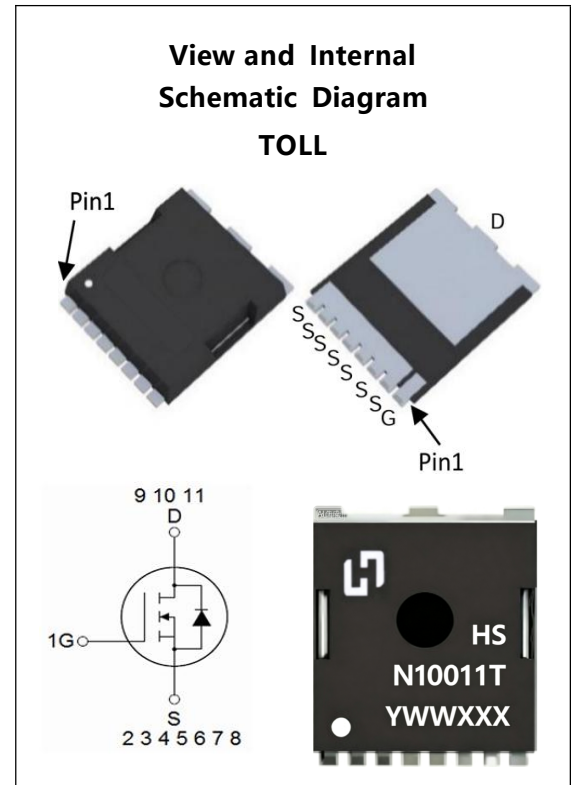
The HSN10011PTLT uses SupreTrench technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.

Applications

- ◆ Motor control and drive
- ◆ Battery management
- ◆ DC-DC control



Parameter	Values	Unit
V_{DS}	100	V
I_D	370	A
$R_{DS(on)}@10V$ Typ	1.1	m Ω



Ordering Code	Marking	Package	Devices Per Reel
HSN10011PTLT	HS N10011T Number	TOLL	2000

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

Parameter	Symbol	Values	Unit	Test Conditions
Drain-Source Voltage	V_{DS}	100	V	-
Gate-Source Voltage	V_{GS}	± 20	V	-
Continuous Drain Current(Note 1)	I_D	370	A	$T_C = 25^\circ\text{C}$
		247	A	$T_C = 100^\circ\text{C}$
Pulsed Drain Current(Note 2)	I_{DM}	1480	A	-
Single Pulse Avalanche Energy	E_{AS}	1400	mJ	-
Maximum Power Dissipation	P_D	410	W	$T_C = 25^\circ\text{C}$
		250	W	$T_C = 100^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_j, T_{STG}	-50 to 150	$^\circ\text{C}$	-

Thermal Characteristics

Parameter	Symbol	Values			Unit	Test Conditions
		Min	Typ	Max		
Thermal resistance , Junction to Case	$R_{th(J-C)}$	-	0.40	-	$^\circ\text{C/W}$	-
Thermal Resistance, Junction-to-Ambient	$R_{th(J-A)}$	-	33	-	$^\circ\text{C/W}$	-

Electrical Characteristics(T_j =25°C,unless otherwise noted)
Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	B _{VDSS}	100	-	-	V	V _{GS} =0V, I _D =250μA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μA	V _{DS} =100V, V _{GS} =0V
Gate-Body Leakage Current,Forward	I _{GSSF}	-	-	100	nA	V _{GS} =20V, V _{DS} =0V
Gate-Body Leakage Current,Reverse	I _{GSSR}	-	-	-100	nA	V _{GS} =-20V, V _{DS} =0V
Gate-Source Threshold Voltage	V _{GS(TH)}	2	3	4	V	V _{DS} =V _{GS} , I _D =250μA
Drain-Source On-State Resistance	R _{DS(ON)}	-	1.1	1.3	mΩ	V _{GS} =10V, I _D =50A
Gate Resistance	R _g	-	1.3	-	Ω	V _{GS} =0V, V _{DS} =0V, f=1MHz

Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	C _{ISS}	-	14658	-	pF	V _{DS} =50V, V _{GS} =0V, f=1MHz
Output Capacitance	C _{OSS}	-	2335	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	70	-	pF	
Turn-On Delay Time	t _{d(on)}	-	28	-	ns	V _{DD} =50V, R _G =1.6Ω, V _{GS} =10V, I _D =50A
Turn-On Rise Time	t _r	-	44	-	ns	
Turn-Off Delay Time	t _{d(off)}	-	89	-	ns	
Turn-Off Fall Time	t _f	-	29	-	ns	

Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	Q _g	-	208	-	nC	V _{DS} =50V, I _D =50A, V _{GS} =10V
Gate-Source Charge	Q _{gs}	-	56	-	nC	
Gate-Drain Charge	Q _{gd}	-	37	-	nC	

Reverse diode

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	I _S	-	-	370	A	-
Pulsed Diode Forward Current	I _{SM}	-	-	1480	A	-
Diode Forward Voltage	V _{SD}	-	-	1.2	V	I _S =30A, V _{GS} =0V
Reverse Recovery Time	t _{rr}	-	85	-	ns	V _{GS} =0V, I _S =50A
Reverse Recovery Charge	Q _{rr}	-	287	-	nC	di/dt =100A/μs

Notes

1. Computed continuous current assumes the condition of T_{j_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{j_Max} = 150^{\circ}C$.

RATING AND CHARACTERISTIC CURVES

Figure.1 Output Characteristics $T_j = 25^{\circ}C$

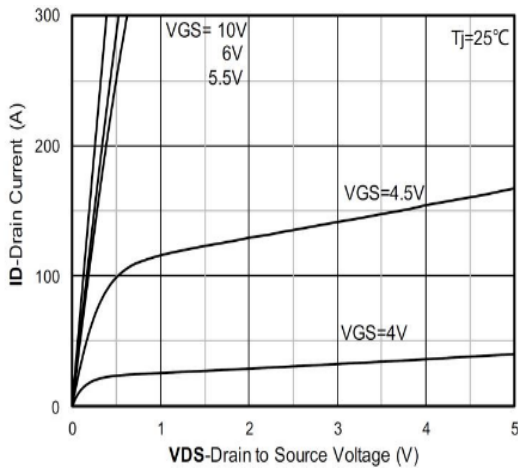


Figure.2 Drain Current

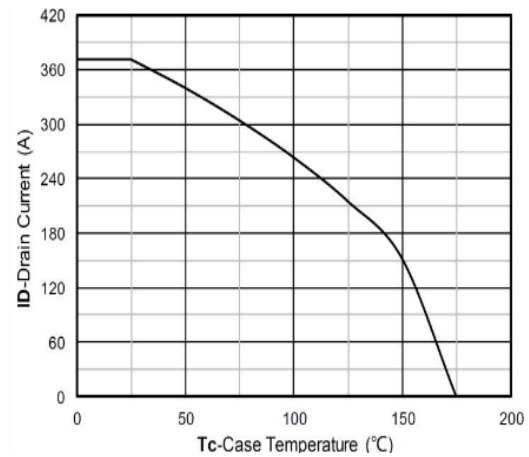


Figure.3 On-Resistance vs Drain Current For Various Gate voltage

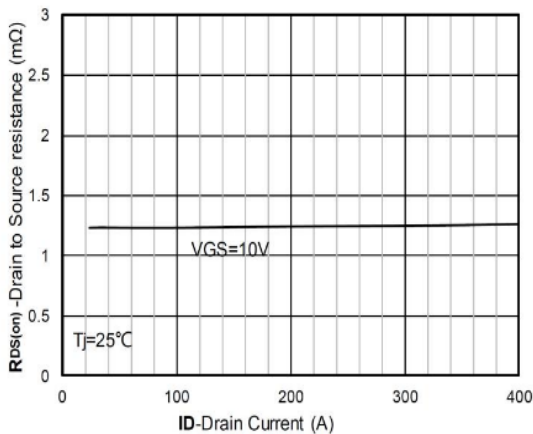


Figure.4 Typical On-Resistance vs Junction Temperature

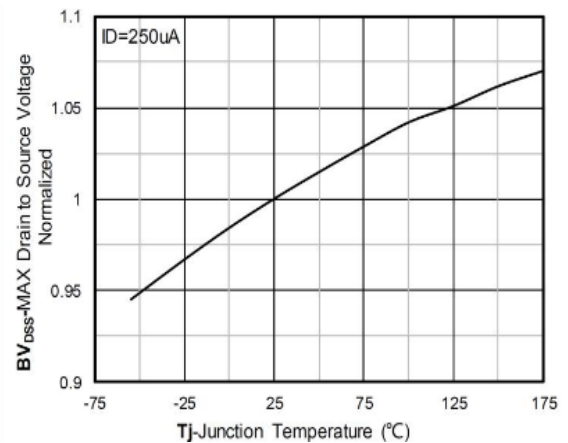


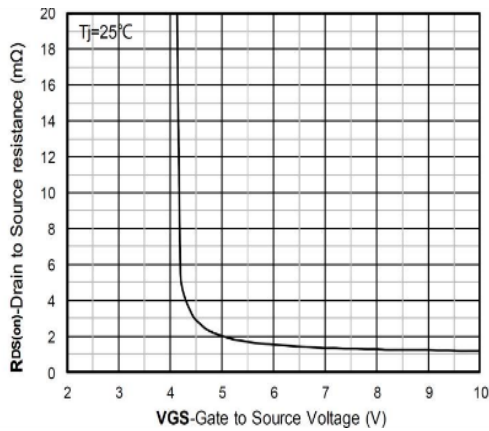
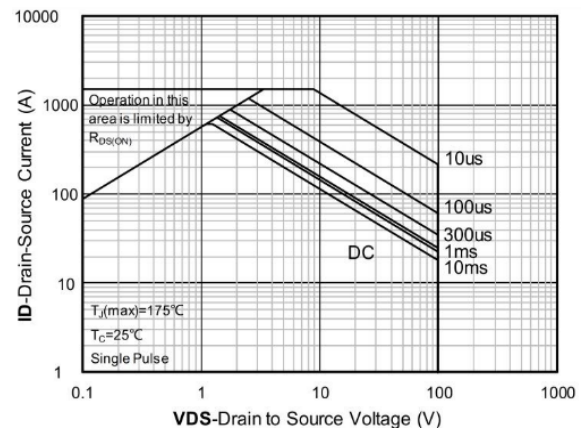
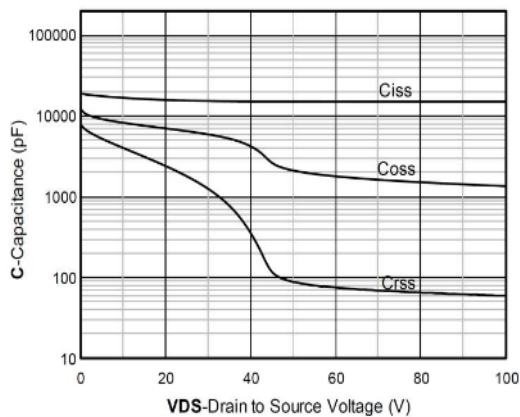
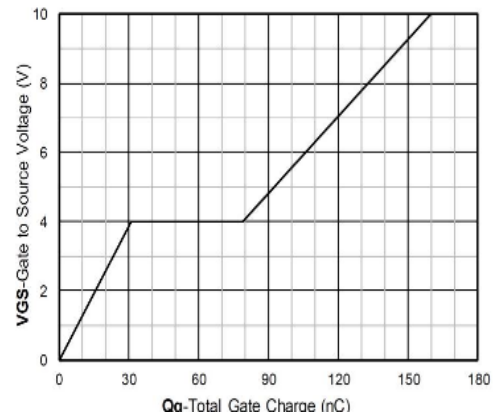
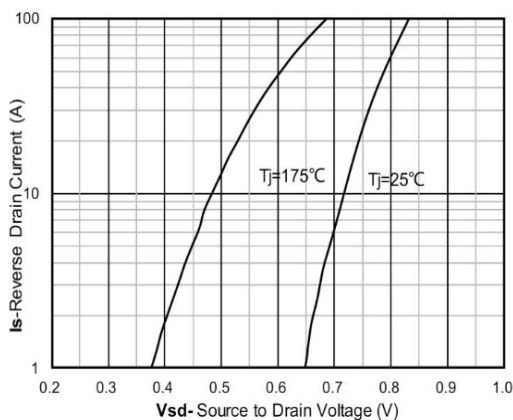
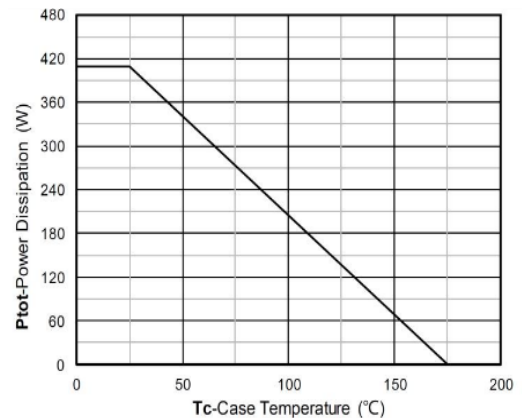
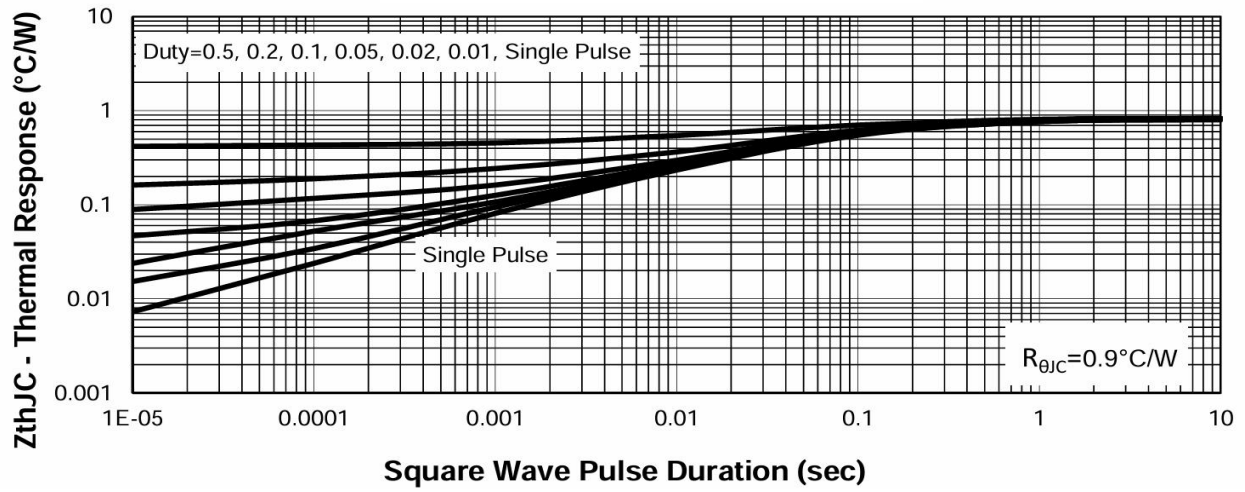
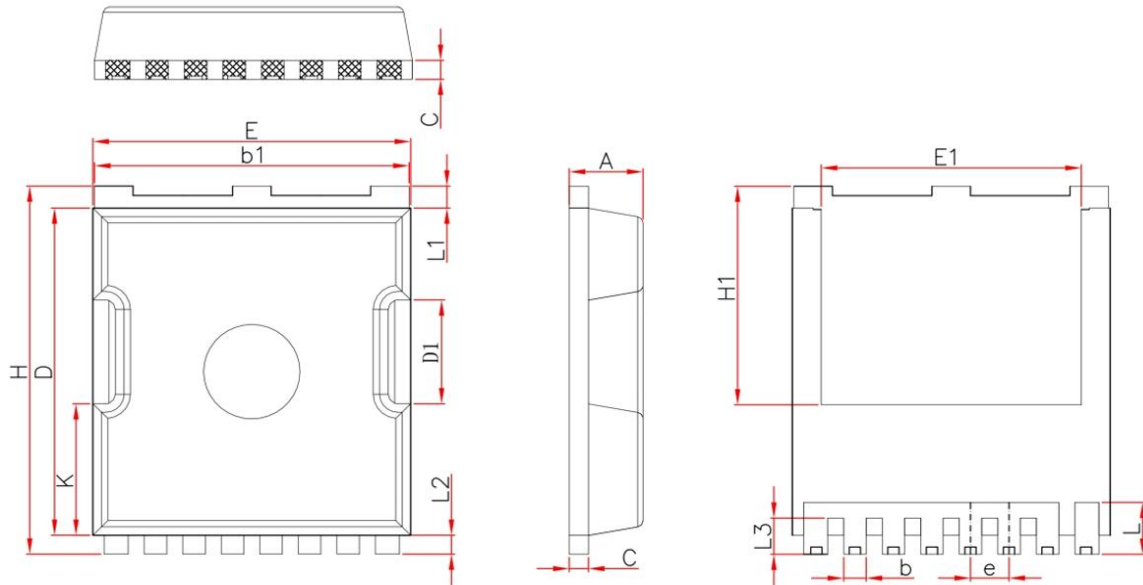
Figure.5 Drain-Source On Resistance

Figure.6 Safe Operating Area

Figure.7 Typical capacitance vs Drain to Source voltage

Figure.8 Typical Gate Charge vs Gate to Source Voltage

Figure.9 Typical Body Diode Characteristics

Figure.10 Maximum power Dissipation Derating vs Case Temperature


Figure.11 Transient Thermal Impedance (Junction-Case)



Package Outline: TOLL


Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	2.20	2.30	2.40
b	0.65	0.75	0.85
b1	9.70	9.80	9.90
C	0.50	0.60	0.70
D	10.30	10.40	10.50
D1	3.15	3.3	3.45
E	9.70	9.90	10.10
E1	8.00	8.10	8.20
e	1.10	1.20	1.30
H	11.6	11.7	11.8
H1	6.85	6.95	7.05
K	4.08	4.18	4.28
L	1.60	1.65	2.10
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	1.05	1.20	1.30