650V N Channel Super Junction MOSFET

Features

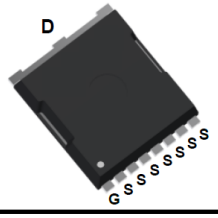
- Low drain-source on-resistance:$R_{DS(ON)}$=88mΩ(typ)
- Easy to control gate switching
- Enhancement mode: V_{th} = 3 to 5V
- 100% avalanche tested
- RoHS compliant

Applications

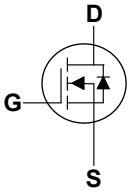
- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Charger,Lighting

Pin Description

TOLL-8L



Symbol



V_{DSS}	650	V
$R_{DS(ON)-Typ}$	88	mΩ
I_D	35	A

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current - Continuous (T_C = 25℃)	35	A
	Drain Current - Continuous (T_C = 100℃)	20	A
I_{DM}[1)]	Drain Current - Pulsed	140	A
E_{AS}[2)]	Single Pulsed Avalanche Energy	480	mJ
I_{AR}	Avalanche Current	3.5	A
dv/dt	MOSFET dv/dt ruggedness, VDS=0…400V	50	V/ns
dv/dt	Reverse diode dv/dt, V_{DS}=0…400V, I_{DS}≤I_D	50	V/ns
P_D	Power Dissipation (T_C = 25℃)	270	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃

Thermal Resistance Characteristics

Symbol	Parameter	Value	Unit
$R_{θJC}$	Thermal Resistance, Junction-to-Case, Max.	0.46	℃/W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient , Max.	62	℃/W

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Electrical Characteristics T_J=25 °C unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
On Characteristics						
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	3.0	-	5.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 17 A	-	88	99	mΩ
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250uA	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V	-	-	5	μA
		V_{DS} = 650 V, T_C = 150℃	-	-	1000	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±30 V, V_{DS} = 0 V	-	-	±1	μA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 100 V, V_{GS} = 0 V, f = 1.0 MHz	-	2050	-	pF
C_{oss}	Output Capacitance		-	130	-	pF
C_{rss}	Reverse Transfer Capacitance		-	35	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 400V, I_D = 17A, R_G = 27 Ω (Note 3,4)	-	62	-	ns
t_r	Turn-On Rise Time		-	100	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	130	-	ns
t_f	Turn-Off Fall Time		-	30	-	ns
Q_g	Total Gate Charge	V_{DS} = 480 V, I_D = 17A, V_{GS} = 10 V (Note 3,4)	-	56	-	nC
Q_{gs}	Gate-Source Charge		-	19	-	nC
Q_{gd}	Gate-Drain Charge		-	30	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		-	-	35	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	140	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 17A	-	-	1.3	V
trr	Reverse Recovery Time	V_{GS} = 0 V, I_S = 17 A, di_F/dt = 100 A/μs	-	140	-	ns
Qrr	Reverse Recovery Charge		-	0.9	-	μC

Notes :

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=3.6A, V_{DD}=50V, R_G=30Ω, Starting T_J=25°C
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

Typical Characteristics

Fig 1. Output Characteristics (Tj=25℃)

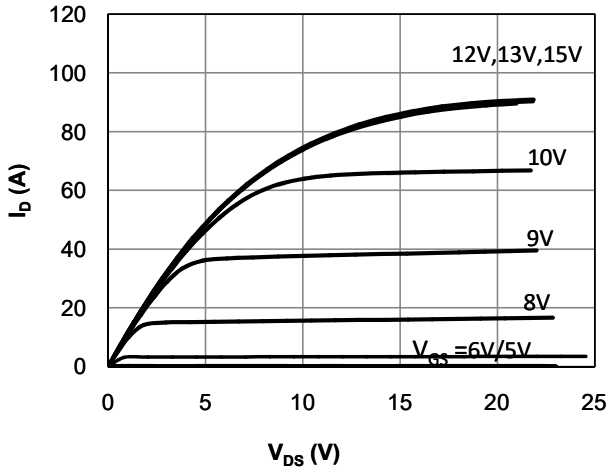


Fig 2. Output Characteristics (Tj=150℃)

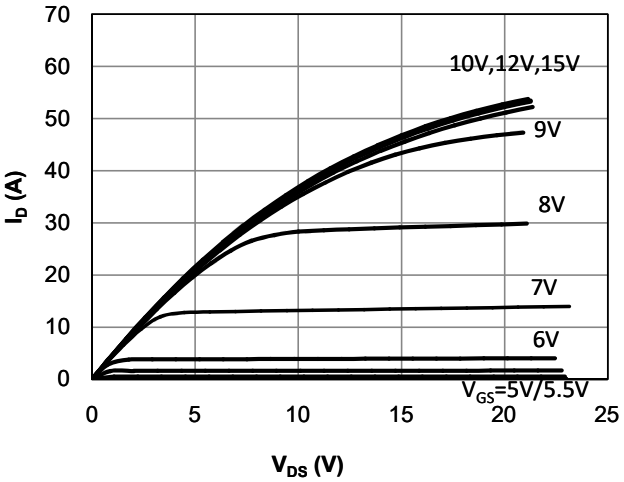


Fig 3: Transfer Characteristics

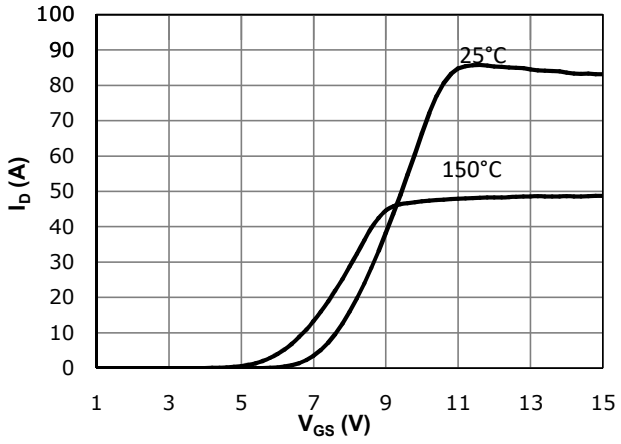


Fig 4: V_{TH} Vs Tj Temperature Characteristics

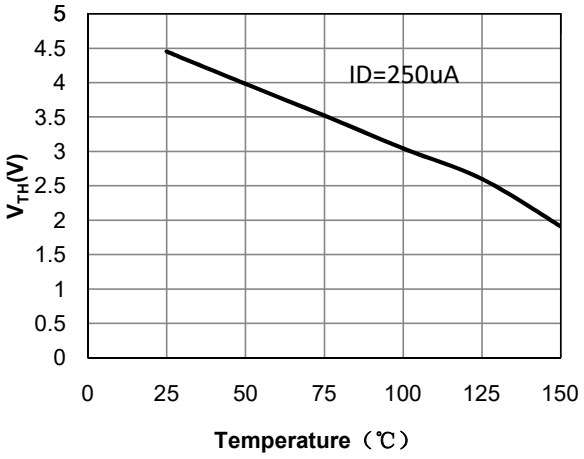


Fig 5: Rdson Vs Ids Characteristics(Tc=25℃)

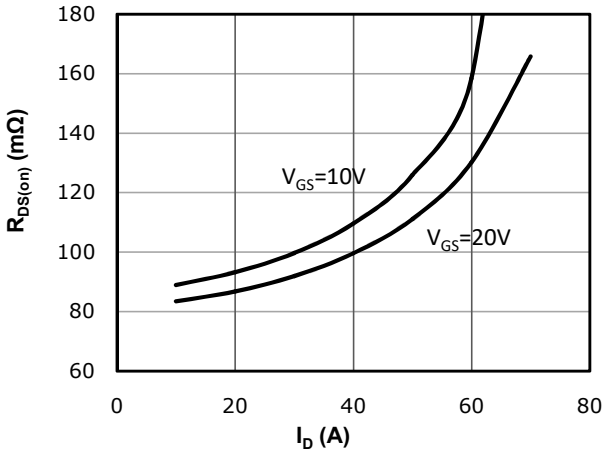


Fig 6: Rds(on) vs. Temperature

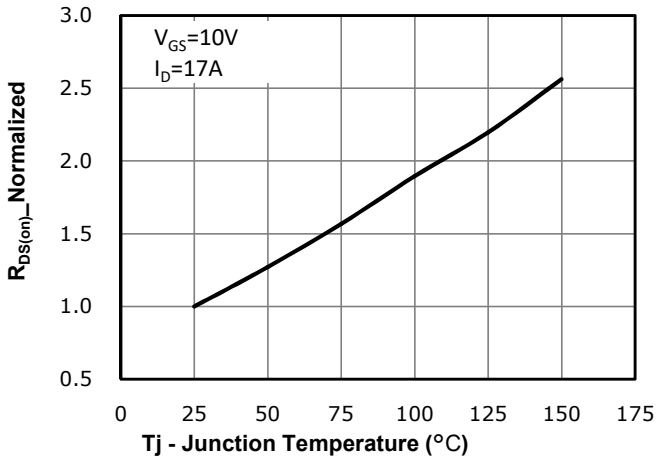


Fig 7: BVDSS vs. Temperature

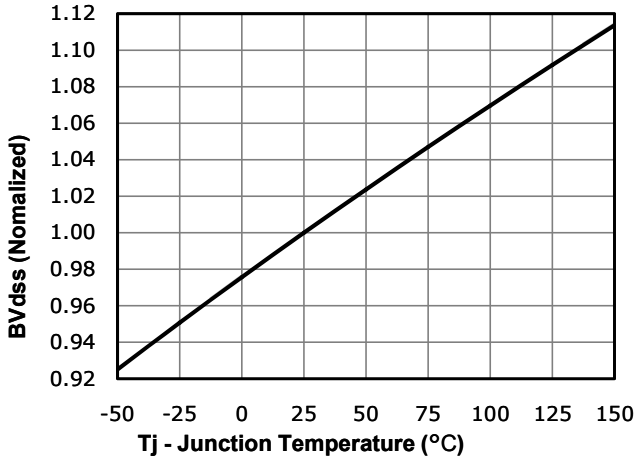


Fig 8: Rds(on) vs Gate Voltage

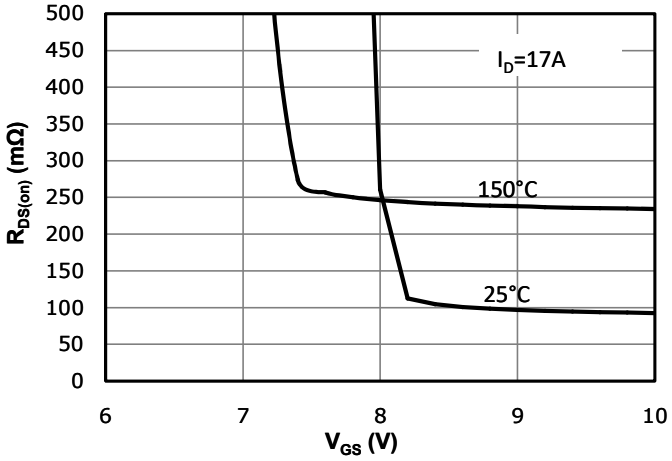


Fig 9: Body-diode Forward Characteristics

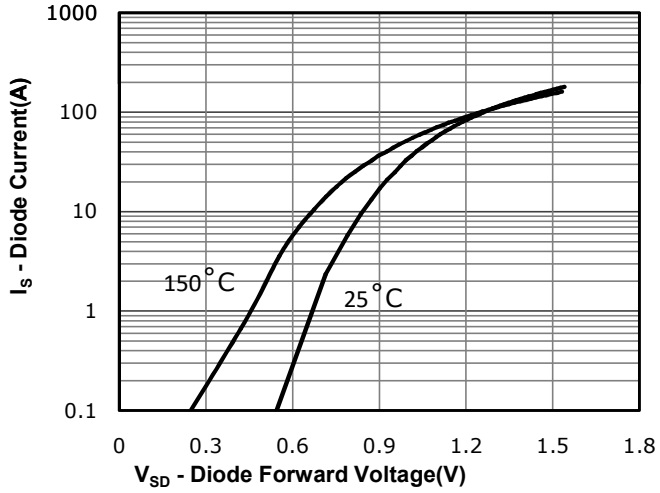


Fig 10: Gate Charge Characteristics

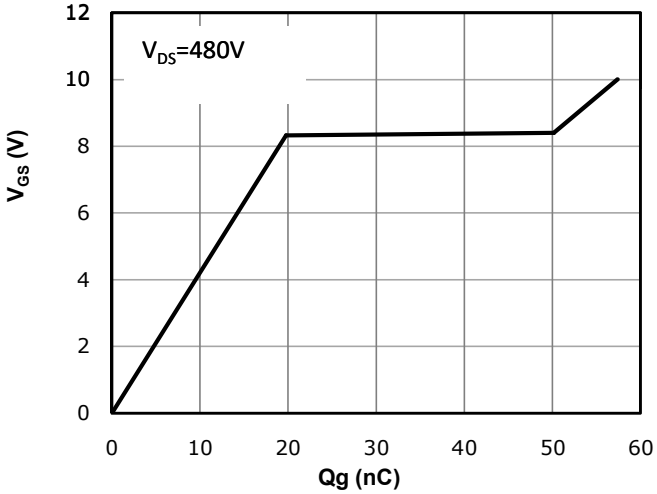


Fig 11: Capacitance Characteristics

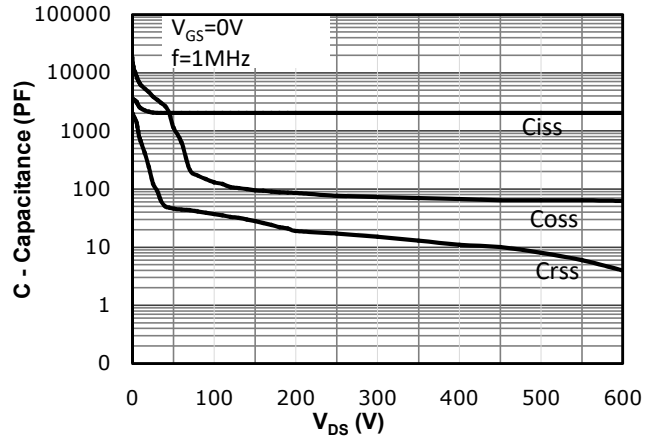
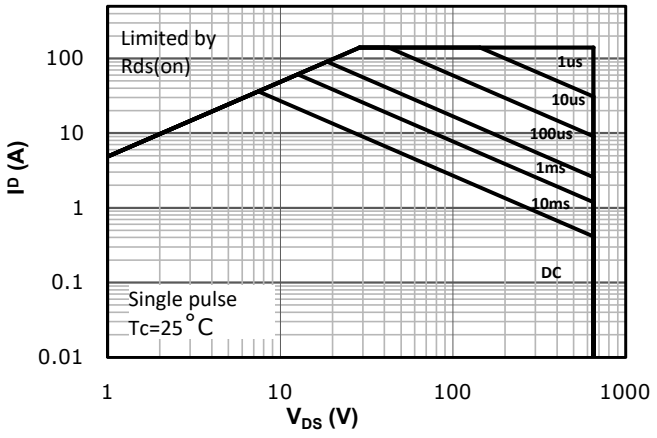
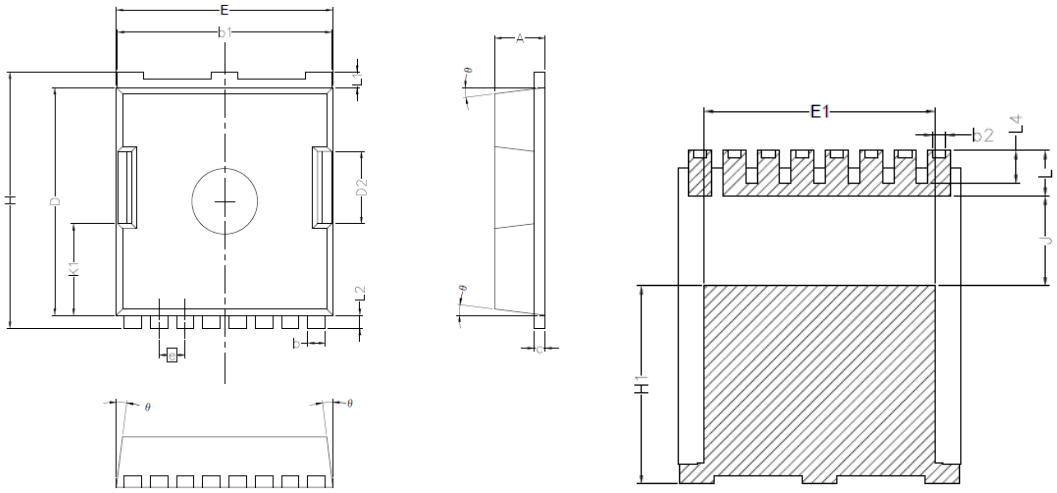


Fig 12: Safe Operating Area



TOLL-8L Package Outline Data



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
θ	4°	10°