

FH3515TL
N-Channel Enhancement Mode MOSFET
Description

The FH3515TL uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

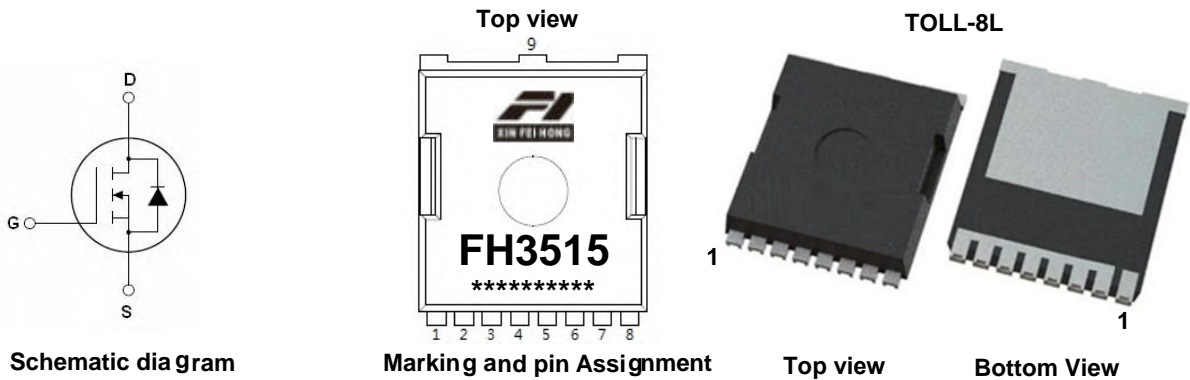
Applications

- Motor Driving in Power Tool, E-vehicle, Robotics
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Power Management in Telecom., Industrial Automation, CE

Product Summary

Parameter	Typ.	Unit
V_{DS}	150	V
$V_{GS(th)}$	3.2	V
I_D (@ $V_{GS} = 10V$)	180	A
$R_{DS(ON)}$ (@ $V_{GS} = 10V$)	3.6	$m\Omega$ (Typ)

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant


Absolute Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	150	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C = 25^\circ C$	180
		$T_C = 100^\circ C$	124
Pulsed Drain Current ⁽²⁾	I_{DM}	540	A
Avalanche Energy ⁽³⁾	E_{AS}	889	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ C$	326
		$T_C = 100^\circ C$	162
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	150			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.5	3.2	4.5	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$		3.6	4.8	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}$, $I_D = 20\text{A}$		65		S
Diode Forward Voltage	V_{SD}	$I_S = 1\text{A}$, $V_{GS} = 0\text{V}$		0.71	1.0	V
Diode Continuous Current	I_S	$T_C = 25^\circ\text{C}$			180	A
DYNAMIC PARAMETERS ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 75\text{V}$, $f = 1\text{MHz}$		6540		pF
Output Capacitance	C_{oss}			2975		pF
Reverse Transfer Capacitance	C_{rss}			45		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$		4.8		Ω
SWITCHING PARAMETERS ⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0$ to 10V $V_{DS} = 75\text{V}$, $I_D = 20\text{A}$		88		nC
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			57		nC
Gate Source Charge	Q_{gs}			32		nC
Gate Drain Charge	Q_{gd}			16		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 75\text{V}$ $R_L = 3.75\Omega$, $R_{GEN} = 6\Omega$		48		ns
Turn-On Rise Time	t_r			90		ns
Turn-Off Delay Time	$t_{D(off)}$			94		ns
Turn-Off Fall Time	t_f			60		ns
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$		122	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$		279		nC
Thermal Performance						
Parameter	Symbol	Typ.	Max.	Unit		
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	38	46	$^\circ\text{C}/\text{W}$		
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.39	0.46	$^\circ\text{C}/\text{W}$		

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 $T_{J_Max} = 175^\circ\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L = 300\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DD} = 75\text{V}$] while its value is limited by $T_{J_Max} = 175^\circ\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max} = 175^\circ\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.
6. Continuous current rating is limited by the package used.

Typical Electrical & Thermal Characteristics

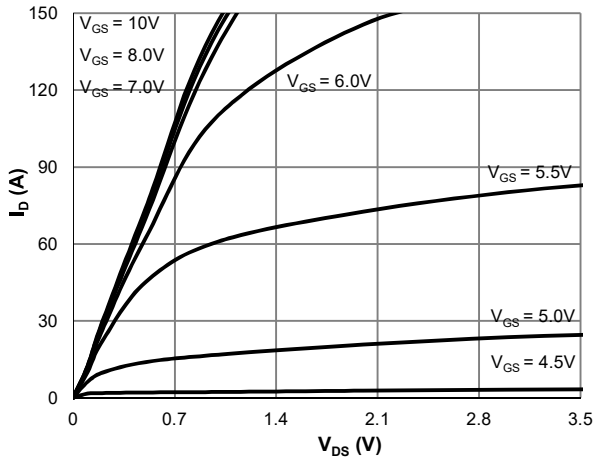


Figure 1: Saturation Characteristics

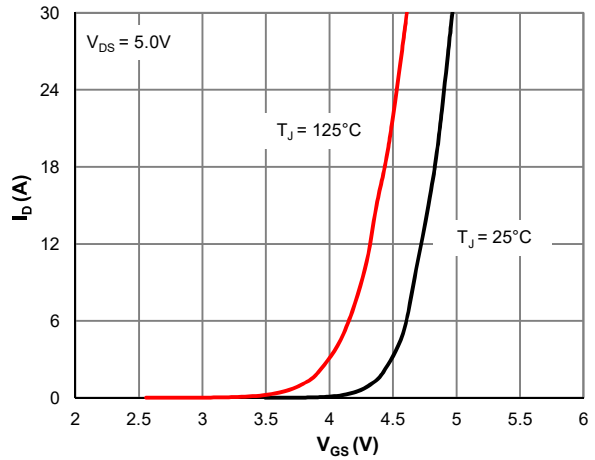


Figure 2: Transfer Characteristics

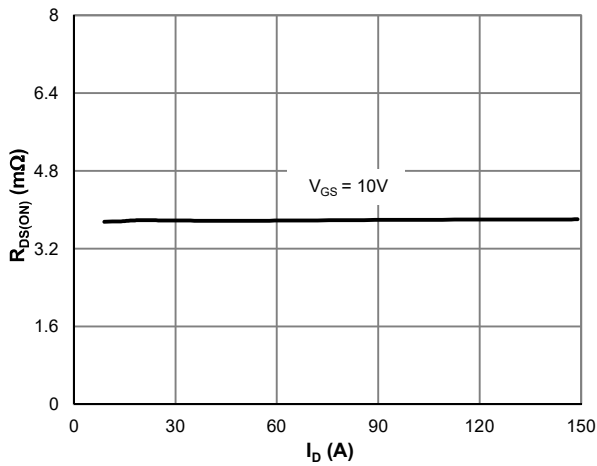


Figure 3: $R_{DS(ON)}$ vs. Drain Current

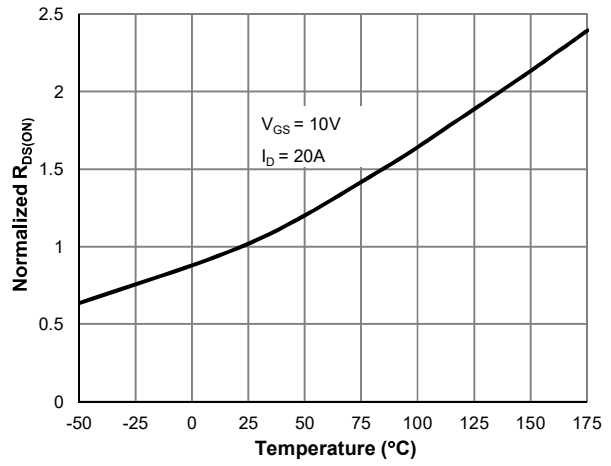


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

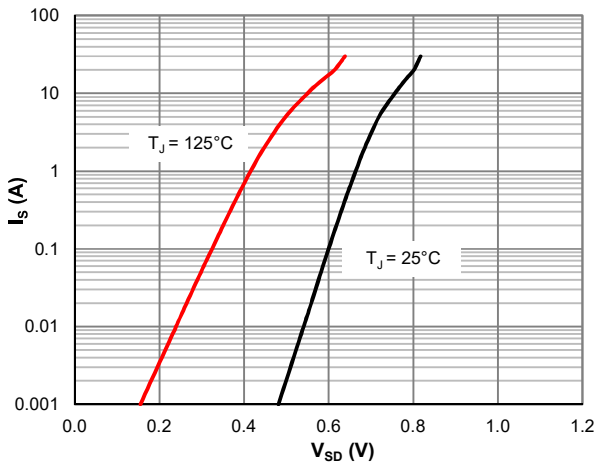


Figure 5: Body-Diode Characteristics

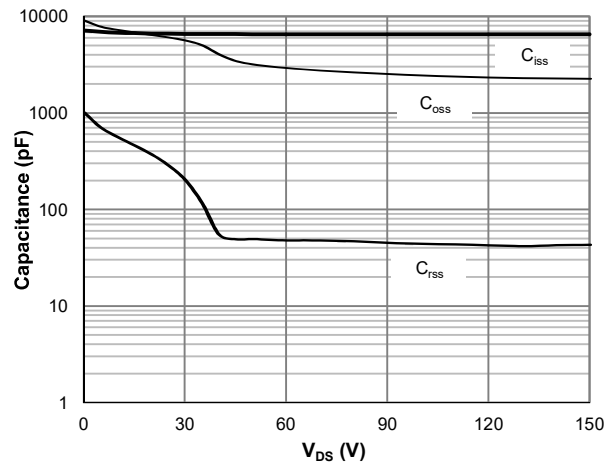


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

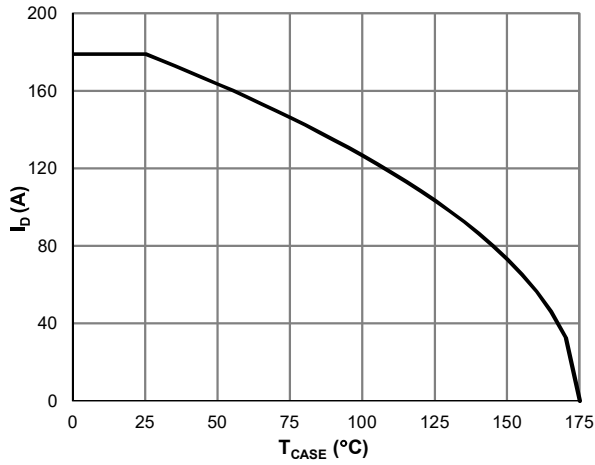


Figure 7: Current De-rating

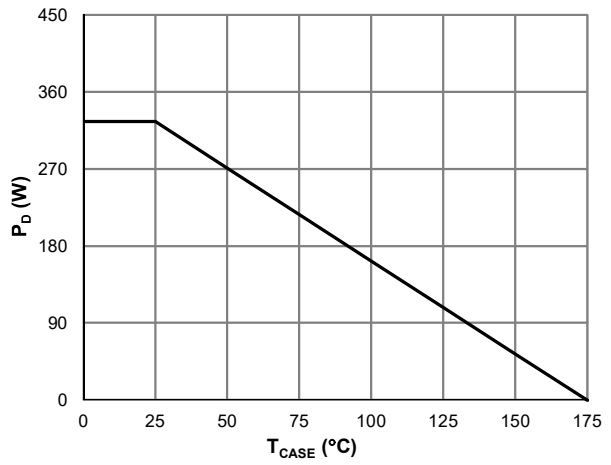


Figure 8: Power De-rating

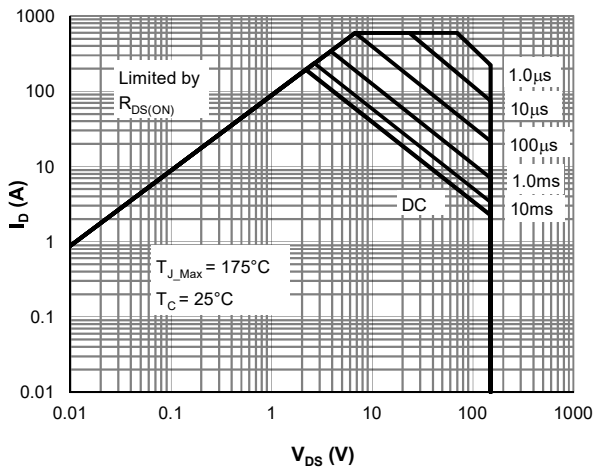


Figure 9: Maximum Safe Operating Area

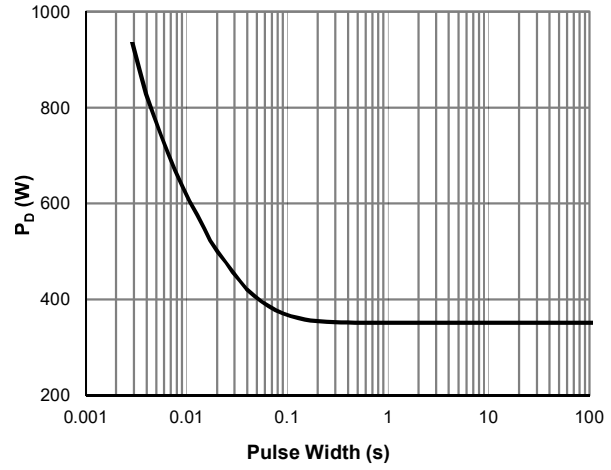


Figure 10: Single Pulse Power Rating, Junction-to-Case

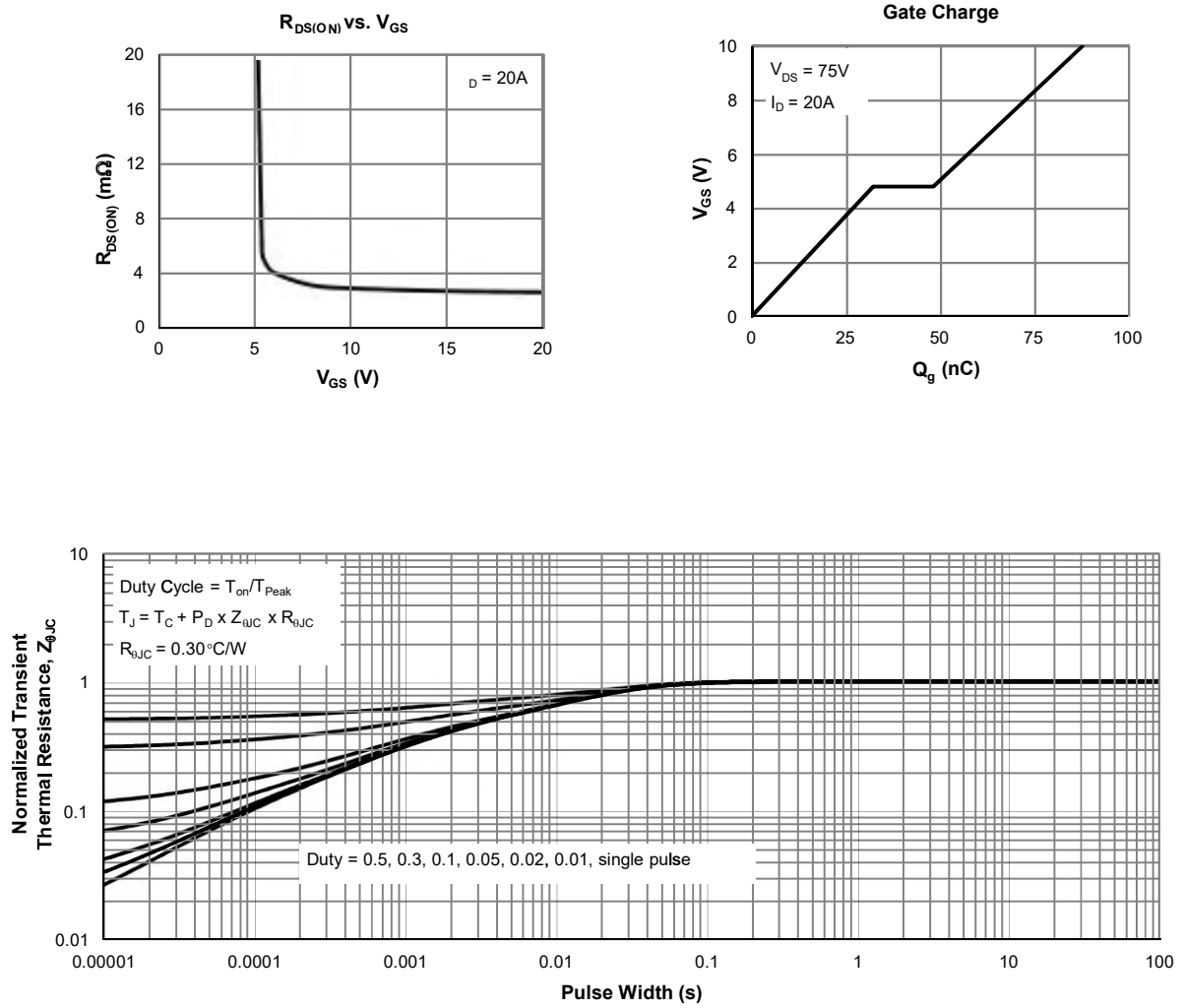
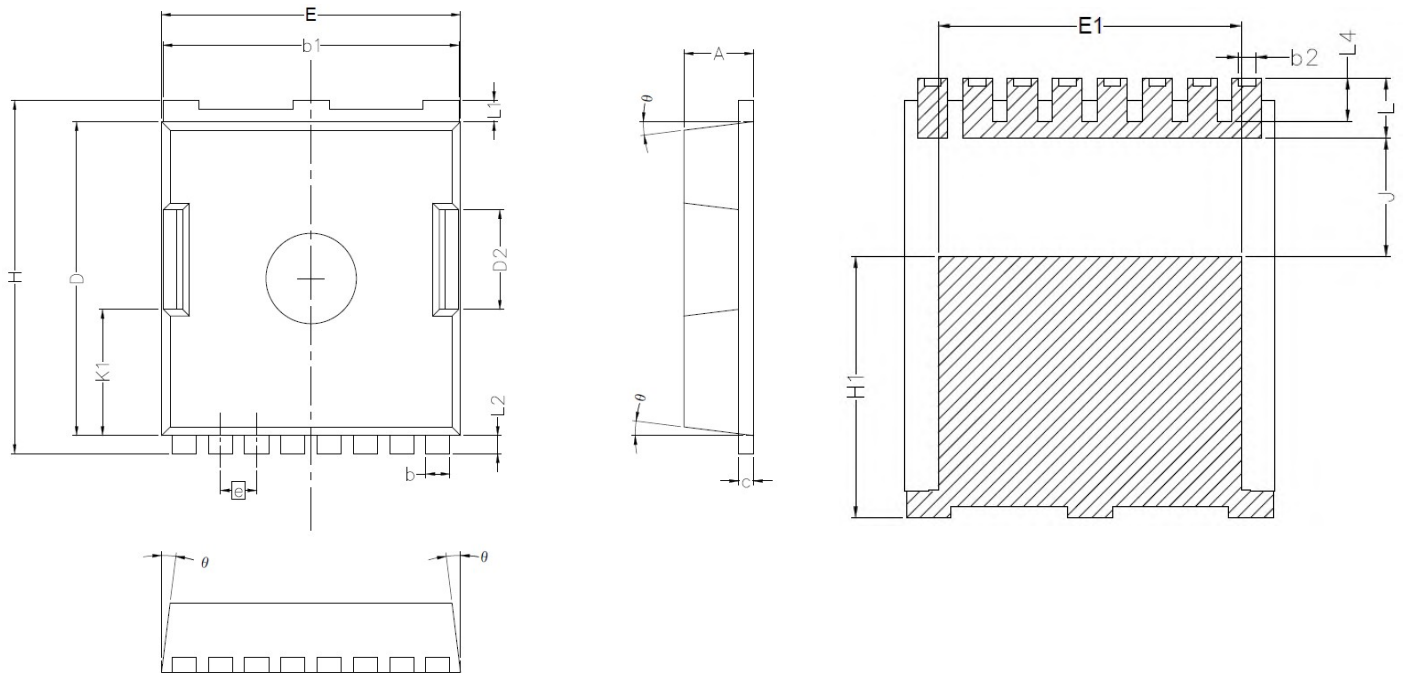


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information : TOLL-8L



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°