

## DESCRIPTION

The MXT02N08TAL uses advanced trench technology to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

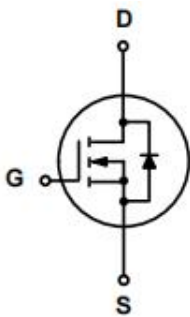
## GENERAL FEATURES

- $V_{DS}=85V$ ,  $I_D=220A$   
 $R_{DS(ON)}(Typ.)=2.4m\Omega$  @  $V_{GS}=10V$
- Advanced trench cell design
- Super-mounted package
- Super Trench
- MSL1

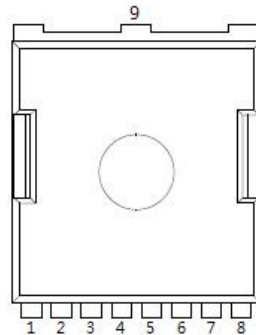
## APPLICATION

- E-Tool appliances
- High power inverter system
- BMS appliances
- Inverter appliances

## PINOUT



Schematic diagram



TOLL-8L top view

Pin	Description
1	Gate(G)
2,3,4,5,6,7,8	Source(S)
9	Drain(D)

## ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MXT02N08TAL	-55°C to 175°C	TOLL-8L	2000

## ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	85	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current ( $V_{GS}=10V$ ) <sup>(Note3)</sup>	$I_D$	220	A
Drain Current ( $T_C=100^\circ C$ , $V_{GS}=10V$ ) <sup>(Note3)</sup>	$I_D$	156	A
Pulsed Drain Current ( $V_{GS}=10V$ ) <sup>(Note1)(Note3)</sup>	$I_{DM}$	800	A
Diode Forward Current	$I_S$	220	A
Drain Power Dissipation	$P_{tot}$	227	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	$^\circ C$
Single Pulsed Avalanche Energy	$E_{AS}$	805	mJ
Thermal Resistance, Junction-to-Ambient <sup>(Note2)</sup>	$R_{\theta JA}$	40	$^\circ C/W$
Thermal Resistance, Junction-to-Case <sup>(Note2)</sup>	$R_{\theta JC}$	0.55	$^\circ C/W$

Note 1. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

Note 2. Surface Mounted on minimum footprint pad area

Note 3. Limited by bonding wire



N-Channel Enhancement Mode Power MOSFET **MXT02N08TA**



**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	85	95	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=85V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=85V, V_{GS}=0V, T_J=85^\circ C$	-	-	30	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
On-State Resistance <sup>(Note1)</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_{DS}=30A$	-	2.4	2.8	m $\Omega$
<b>Dynamic Characteristics</b> <sup>(Note2)</sup>						
Input Capacitance	$C_{iss}$	$V_{DS}=40V, V_{GS}=0V, F=1.0MHz$	-	6234	-	pF
Output Capacitance	$C_{oss}$		-	1180	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	97	-	pF
<b>Switching Characteristics</b> <sup>(Note2)</sup>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=40V, I_{DS}=30A, V_{GEN}=10V, R_G=4.5\Omega, R_L=1.3\Omega,$	-	41	-	nS
Turn-on Rise Time	$t_r$		-	68	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	76	-	nS
Turn-Off Fall Time	$t_f$		-	44	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=40V, I_{DS}=30A, V_{GS}=10V$	-	124	-	nC
Gate-Source Charge	$Q_{gs}$		-	31.2	-	nC
Gate-Drain Charge	$Q_{gd}$		-	39.2	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note1)</sup>	$V_{SD}$	$V_{GS}=0V, I_{SD}=30A$	-	-	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_{DS}=30A, V_{GS}=0V, dI_{SD}/dt=100A/\mu s$	-	78	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	110	-	nC

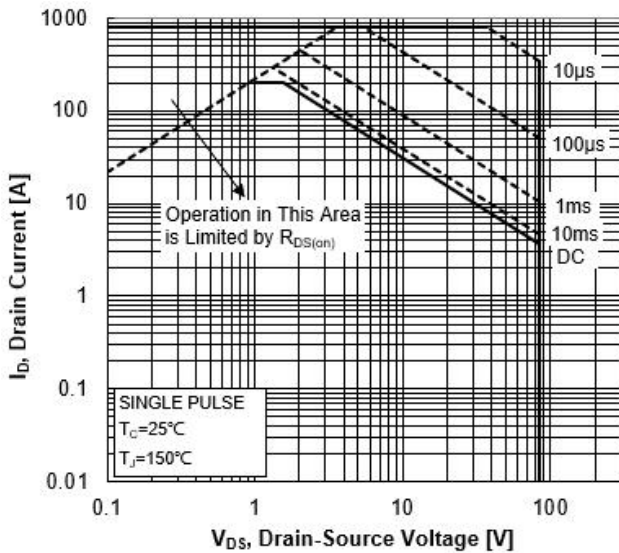
Note 1. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$

Note 2. Guaranteed by design, not subject to production testing

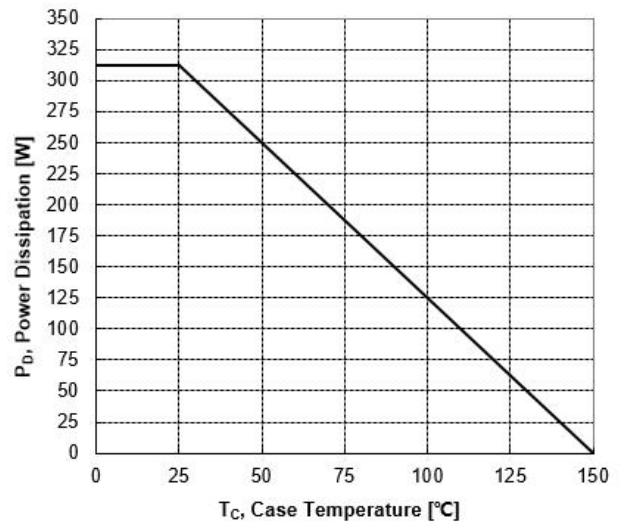


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

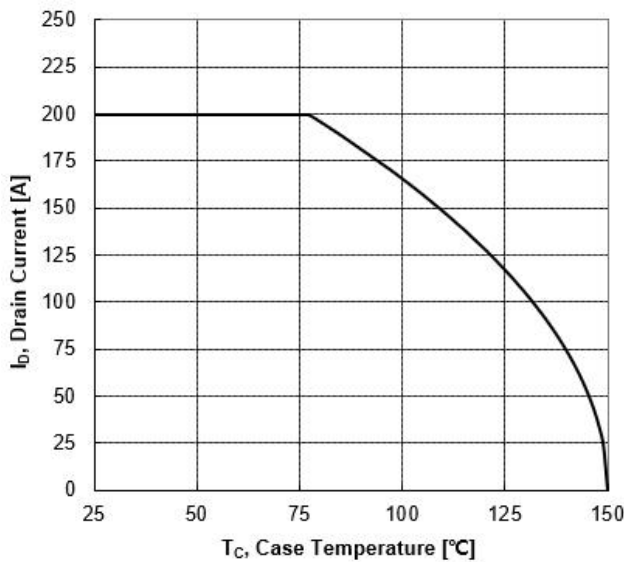
**Figure 1. Safe Operation Area**



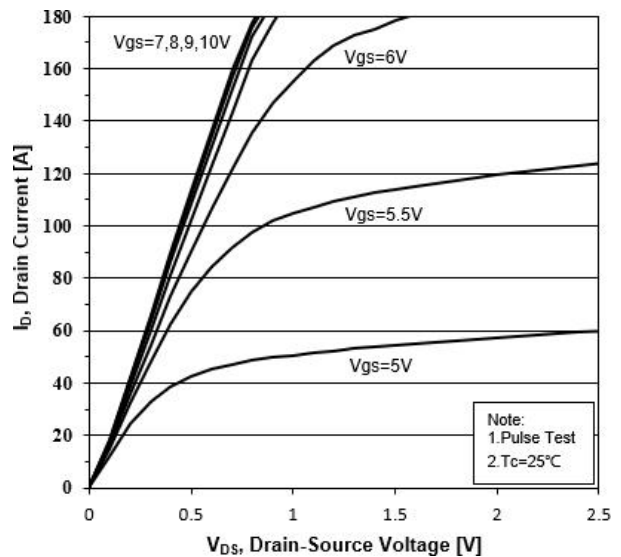
**Figure 2. Maximum Power Dissipation vs Case Temperature**



**Figure 3. Maximum Continuous Drain Current vs Case Temperature**



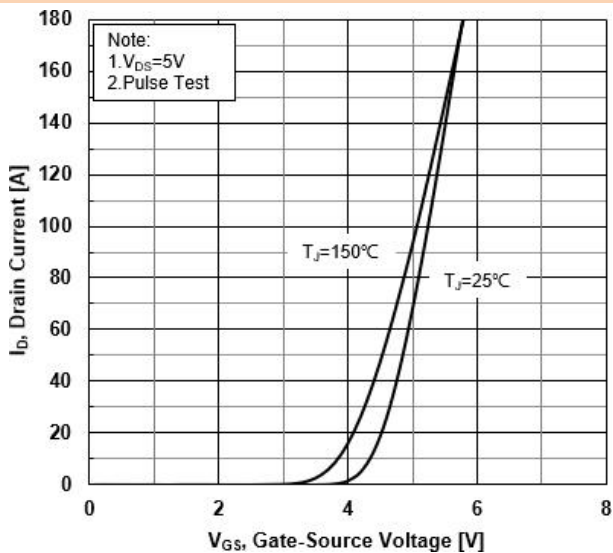
**Figure 4. Typical Output Characteristics**



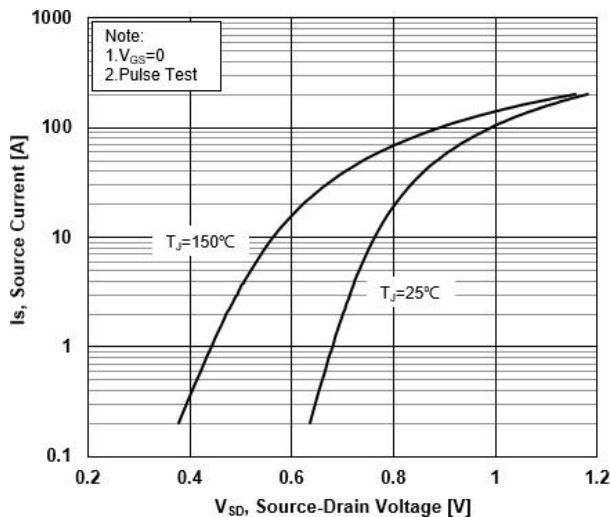


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

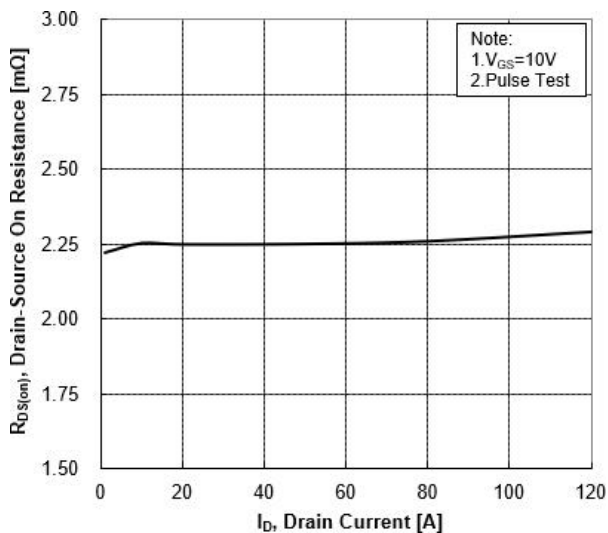
**Figure 5. Typical Transfer Characteristics**



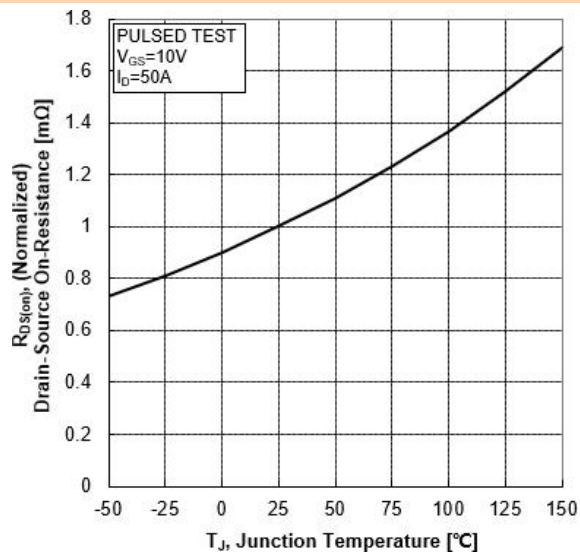
**Figure 6. Source-Drain Diode Forward Characteristics**



**Figure 7. Drain-Source On-Resistance vs Drain Current**

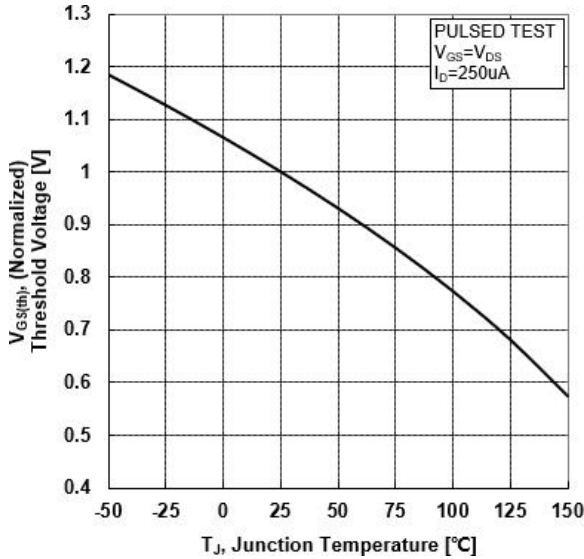


**Figure 8. Normalized On-Resistance vs Junction Temperature**

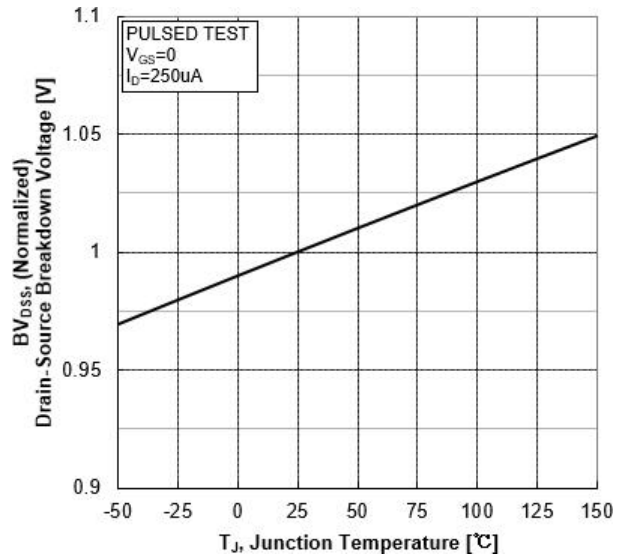


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

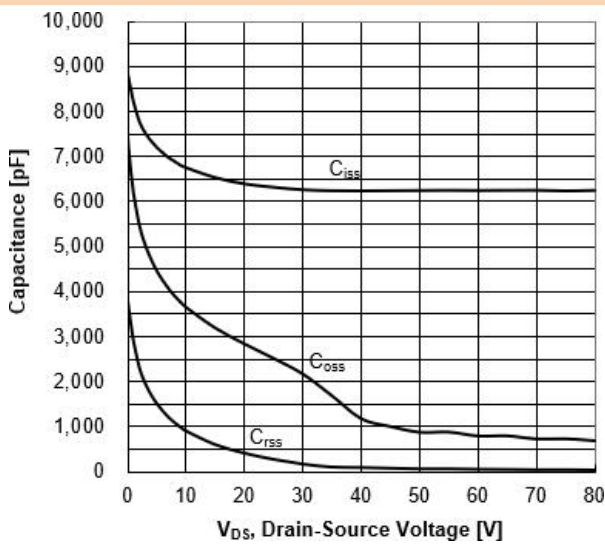
**Figure 9. Normalized Threshold Voltage vs Junction Temperature**



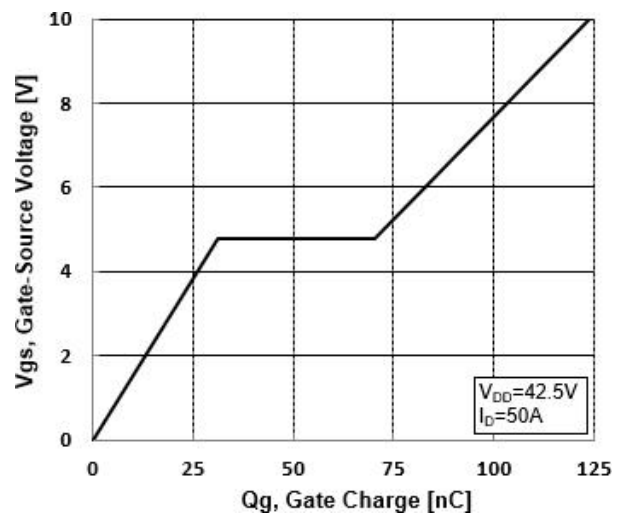
**Figure 10. Normalized Breakdown Voltage vs Junction Temperature**



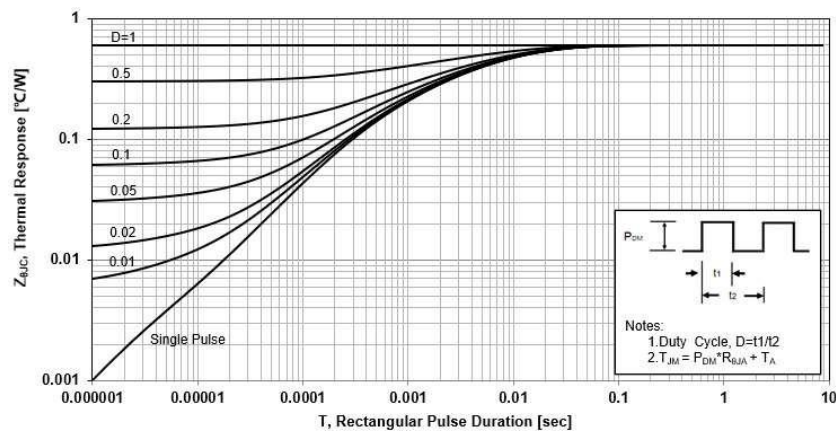
**Figure 11. Capacitance Characteristics**



**Figure 12. Typical Gate Charge vs Gate-Source Voltage**

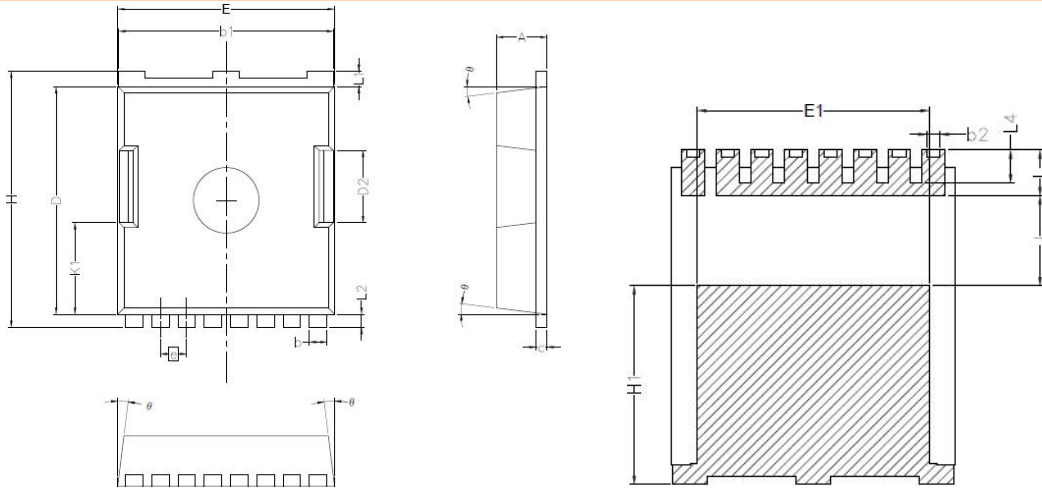


**Figure 13. Transient Thermal Impedance**



 **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°