

N-Channel MOSFET

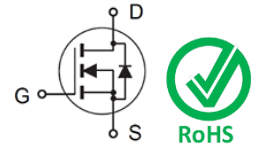
100V 320A 390.6W TOLL

MFT10N320TOLL

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FEATURE

- $R_{DS(ON)} \leq 1.6m\Omega$ at $V_{GS}=10V$
- Low Gate Charge
- Excellent Low $R_{DS(ON)}$
- Application: DC/DC Converter, LED Backlighting, Power Management Switches



MECHANICAL DATA

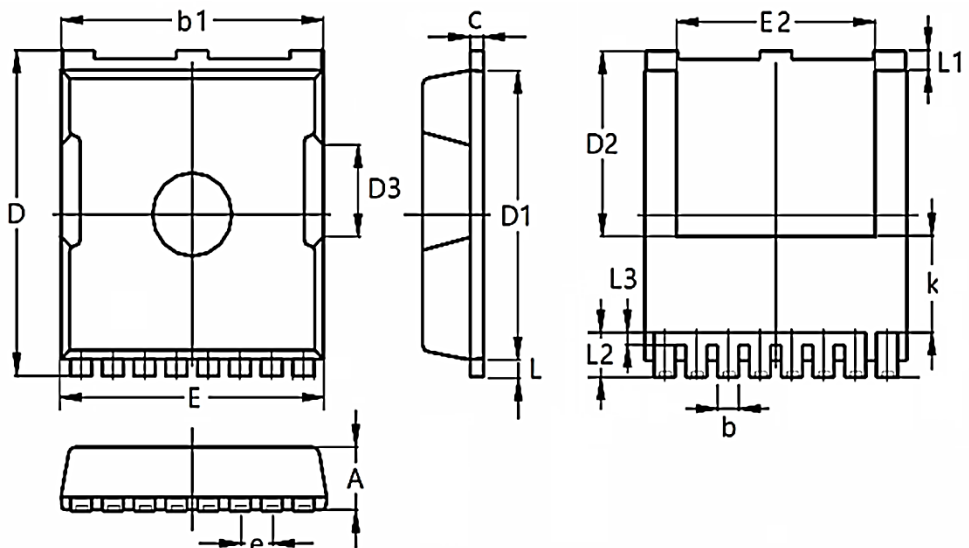
- Case: TOLL Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$V_{GS}=10V, T_C= 25^{\circ}C$	I_D	320	A
	$V_{GS}=10V, T_C= 100^{\circ}C$		210	
Drain Current – Pulsed		I_{DM}	1248	A
Single Pulse Avalanche Energy		E_{AS}	2340	mJ
Power Dissipation		P_D	390.6	W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.38	$^{\circ}C / W$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^{\circ}C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.20	2.40
b	0.60	0.80
b1	9.70	9.90
c	0.40	0.60
D	11.60	11.80
D1	10.30	10.50
D2	6.95	
D3	3.20	3.40
e	1.20	
E	9.80	10.00
E2	8.00	8.20
K	3.10	
L	0.50	0.70
L1	0.60	0.80
L2	1.55	1.75
L3	0.40	0.60



Note:
Pin Layout: Tab: Drain(D), 1: Gate(G),
2,3,4,5,6,7,8: Source(S)

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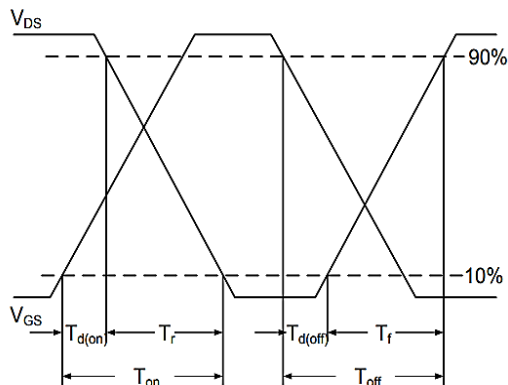
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	100	--	--	V
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	2	3	4	V
Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	--	--	± 0.1	μA
Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	--	--	1.0	μA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	--	1.3	1.6	$m\Omega$
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1.0MHz$	C_{iss}	--	14300	--	pF
Output Capacitance		C_{oss}	--	2120	--	
Reverse Transfer Capacitance		C_{rss}	--	50	--	
Turn-On Delay Time	$V_{DS}=50V, I_D=20A, V_{GS}=10V, R_G=3\Omega$	$T_{d(on)}$	--	41	--	nS
Rise Time		T_r	--	88	--	
Turn-Off Delay Time		$T_{d(off)}$	--	163	--	
Fall Time		T_f	--	98	--	
Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=20A$	Q_g	--	250	--	nC
Gate-Source Charge		Q_{gs}	--	53	--	
Gate-Drain Charge		Q_{gd}	--	77	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Voltage	$I_S=20A, V_{GS}=0V$	V_{SD}	--	--	1.2	V
Diode Forward Current	--	I_S	--	--	320	A
Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s$	t_{rr}	--	106	--	ns
Reverse Recovery Charge		Q_{rr}	--	245	--	nC

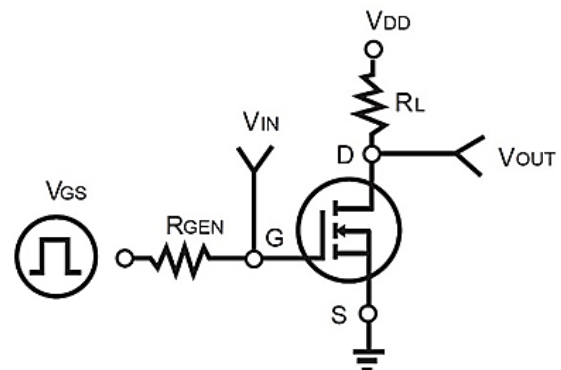
Note:

1. $T_A = 25^\circ C$ unless otherwise noted.
2. Pulse test: Pulse width < 300 μs , Duty cycle < 2%.
3. The E_{AS} data shows Max. rating. The test condition is $L=0.1mH, I_{AS}=50A, V_{GS}=10V, V_{DD}=90V$.
4. Device mounted on 1 inch square FR-4 board with 2oz copper.
5. Power dissipation is limited by maximum junction temperature $T_{J(MAX)}=175^\circ C$.

Switching Time Waveform

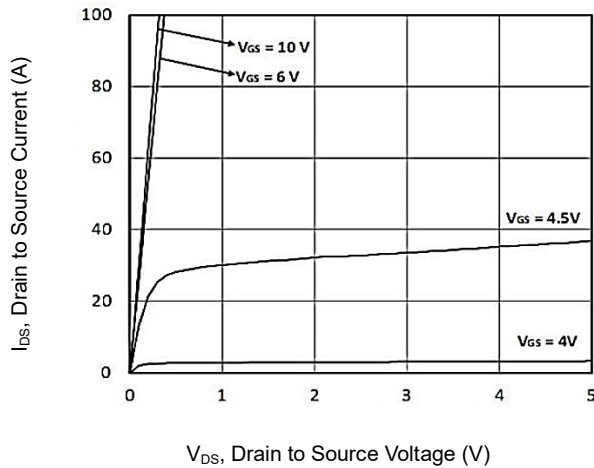


Switching Test Circuit

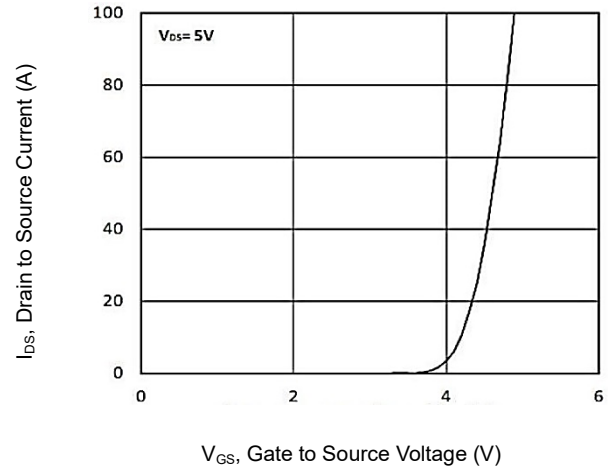


CHARACTERISTIC CURVES

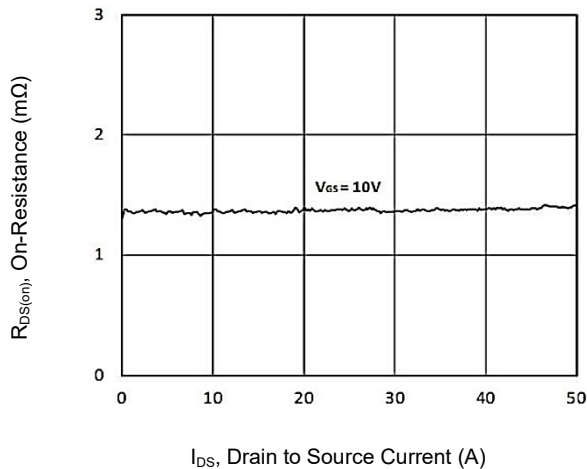
On-Region Characteristic



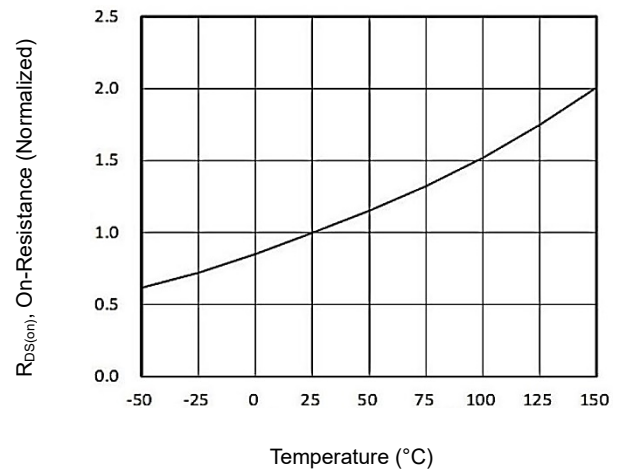
Transfer Characteristics



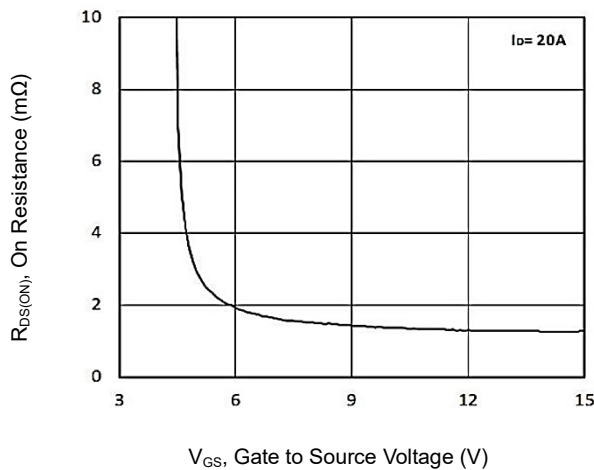
On-Resistance vs. Drain Current



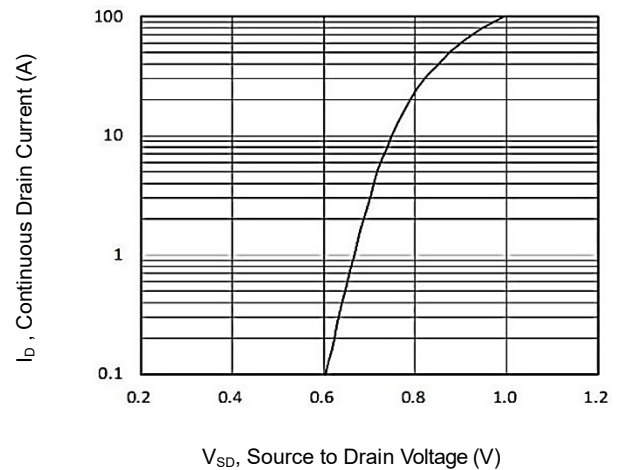
On-Resistance vs. Junction Temperature



On-Resistance Variation with V_{GS}



Source-Drain Diode Forward Voltage



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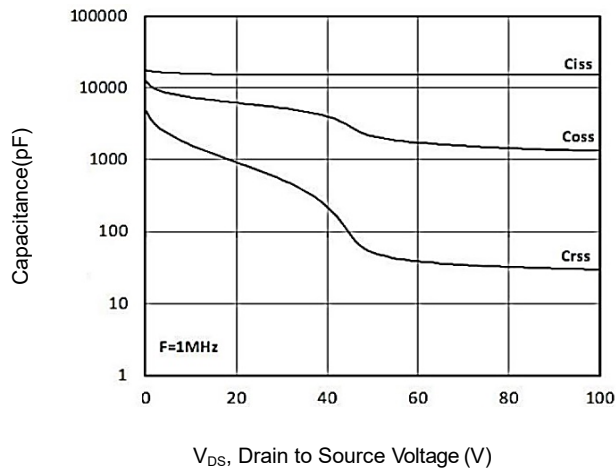
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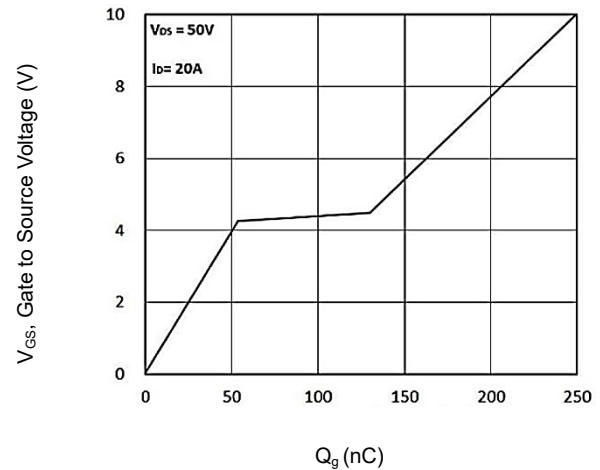
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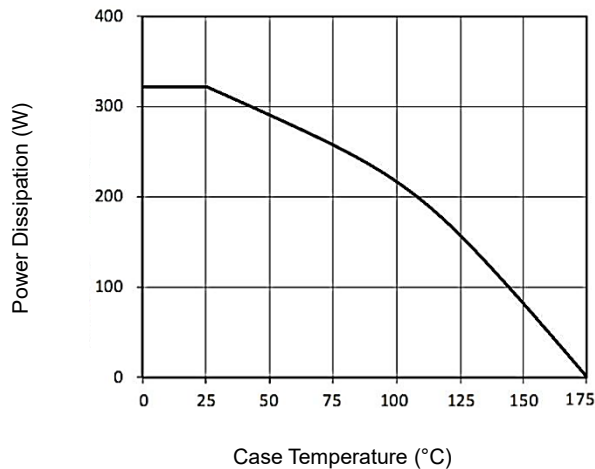
Capacitance vs. Drain-Source Voltage



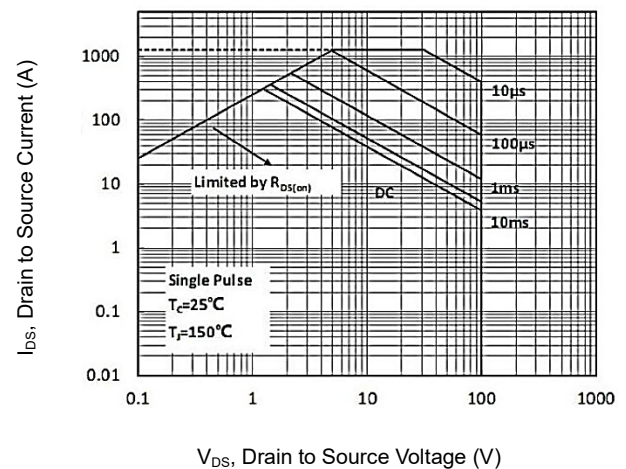
Gate-Charge Characteristics



Power Dissipation



Maximum Safe Operating Area



Normalized Transient Thermal Impedance

