

N-Channel MOSFET

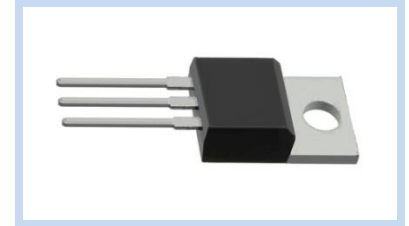
40V 200A 166W TO-220

MFT4N200T220

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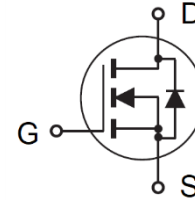
FEATURE

- $R_{DS(ON)} = 2.3m\Omega$, $V_{GS} = 10V$, $I_D = 200A$
- $R_{DS(ON)} = 2.5m\Omega$, $V_{GS} = 9V$, $I_D = 200A$
- Super High Dense Cell Design For Extremely Low $R_{DS(ON)}$
- High Power and Current Handling Capability



MECHANICAL DATA

- Case: TO-220 Package
- Terminal: Solderable per MIL-STD-750, Method 2026

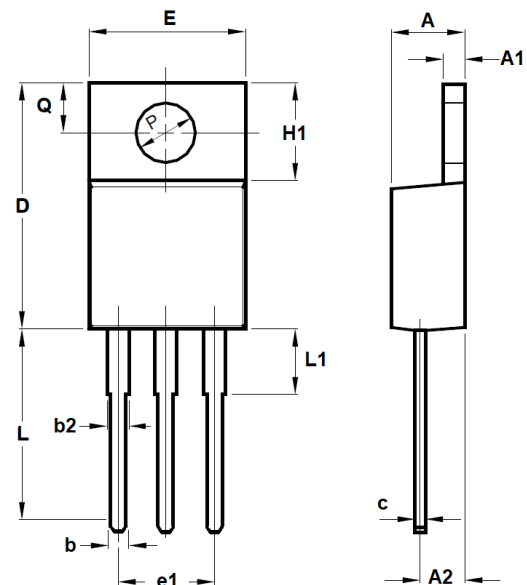


MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous	I_D	$T_C = 25^\circ C$	200
		$T_C = 100^\circ C$	126
Drain Current – Pulsed	I_{DM}	800	A
Single Pulse Avalanche Energy	E_{AS}	760	mJ
Single Pulse Avalanche Current	I_{AS}	39	A
Power Dissipation	P_D	$T_C = 25^\circ C$	166
		Derate above $25^\circ C$	1.32
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.75	$^\circ C/W$
Operating Junction and Storage Temperature	T_J, T_{STG}	-55 ~ 150	$^\circ C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	4.320	4.826
A1	1.220	1.397
A2	2.032	2.921
b	0.610	0.910
b2	1.143	1.778
c	0.356	0.530
D	14.224	16.510
E	9.652	10.668
e1	5.080	5.080
H1	5.842	6.858
L	12.700	14.732
L1	3.400	4.000
Q	2.540	3.429



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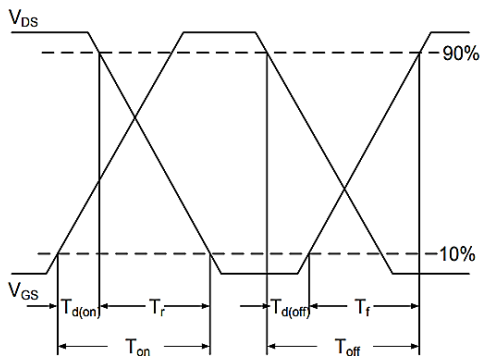
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	40	--	--	V
Drain-Source Leakage Current	$V_{DS}=40V, V_{GS}=0V$	I_{DSS}	--	--	1	μA
Gate Leakage Current, Forward	$V_{GS}=20V, V_{DS}=0V$	I_{GSSF}	--	--	± 100	nA
Gate Leakage Current, Reverse	$V_{GS}= -20V, V_{DS}=0V$	I_{GSSR}	--	--	-100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=30A$	$R_{DS(ON)}$	--	1.8	2.3	m Ω
	$V_{GS}=9V, I_D=30A$		--	1.9	2.5	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	2	--	4	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_D=50A$	Q_g	--	235	--	nC
Gate-Source Charge		Q_{gs}	--	47	--	
Gate-Drain Charge		Q_{gd}	--	88	--	
Turn-On Delay Time	$V_{DD}=15V, R_G=1\Omega$ $I_D=15A, V_{GS}=10V$	$T_{d(on)}$	--	44	--	ns
Rise Time		T_r	--	35	--	
Turn-Off Delay Time		$T_{d(off)}$	--	79	--	
Fall Time		T_f	--	33	--	
Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1MHz$	C_{iss}	--	6120	--	pF
Output Capacitance		C_{oss}	--	1715	--	
Reverse Transfer Capacitance		C_{rss}	--	1330	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current-Continuous	--	I_S	--	--	138	A
Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	V_{SD}	--	--	1.2	V

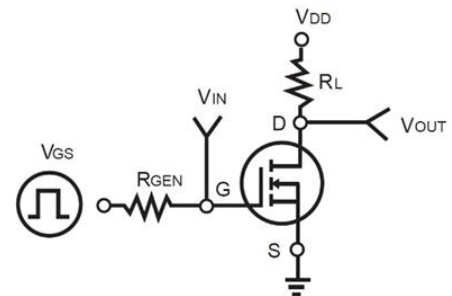
Note:

1. $L=1mH, I_{AS}=39A, V_{DD}=24V, R_G=25\Omega$, Starting $T_J=25^\circ C$
2. Pulse Width $\leq 300\mu S$, Duty Cycle $\leq 2\%$
3. Essentially Independent of operating temperature typical characteristics.
4. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



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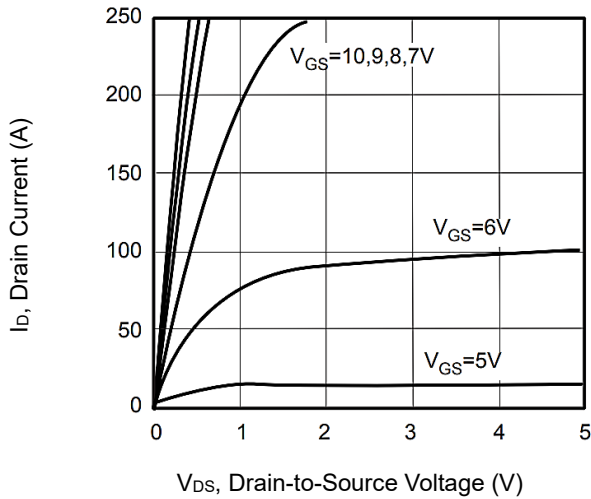
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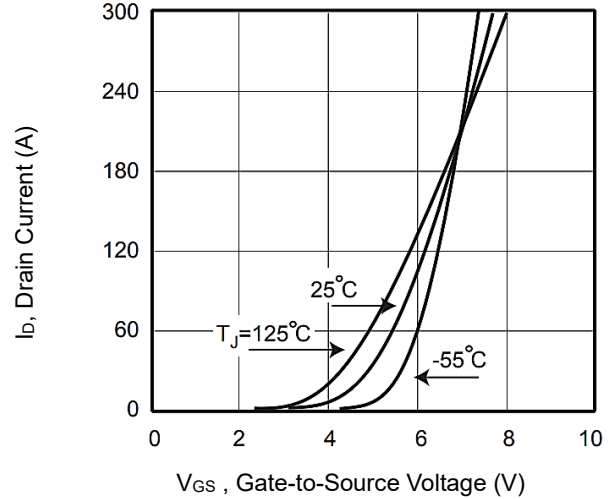
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CHARACTERISTICS CURVES

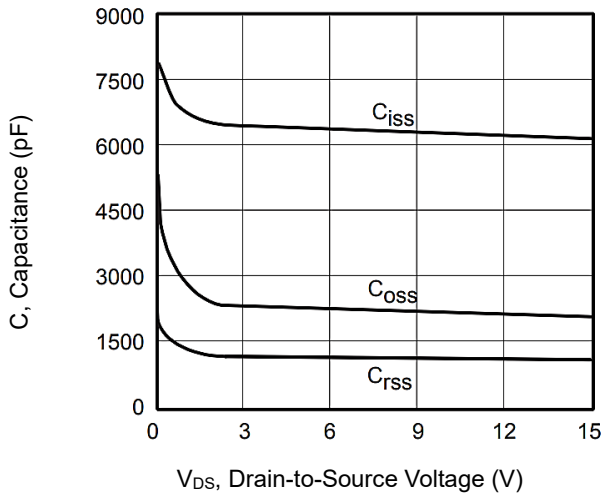
Output Characteristics



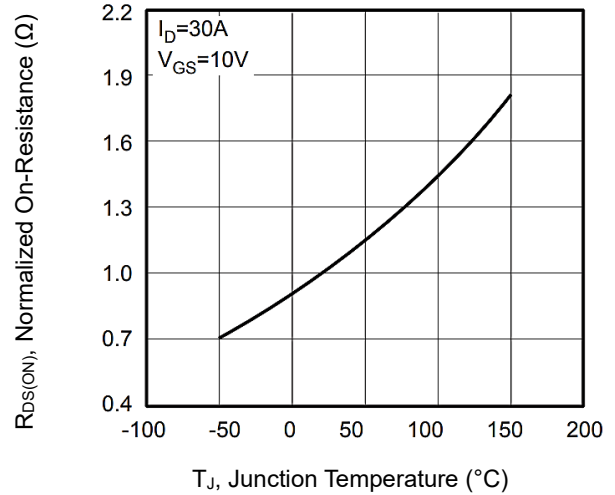
Transfer Characteristics



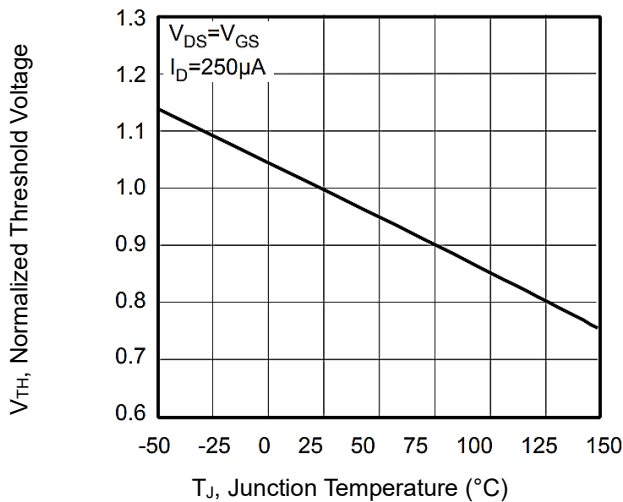
Capacitance



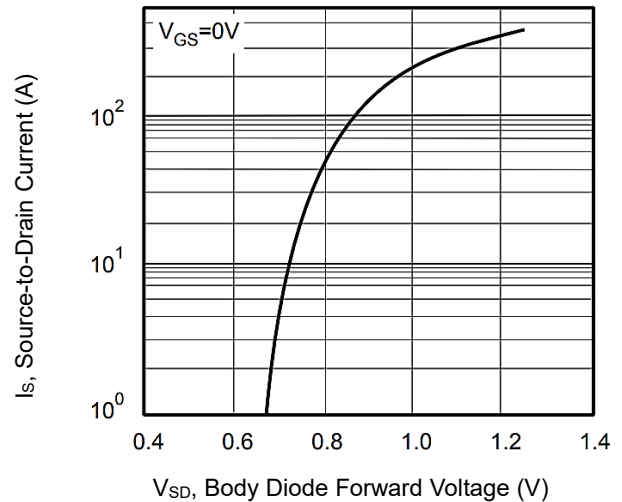
On-Resistance vs Junction Temperature



Gate Threshold Variation with Temperature



Body Diode Forward Voltage



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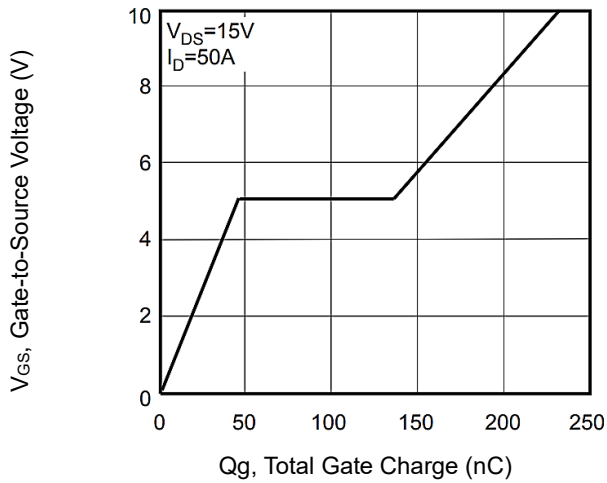
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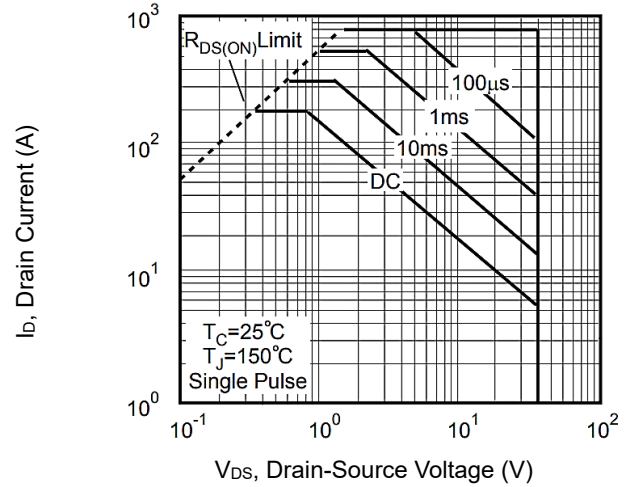
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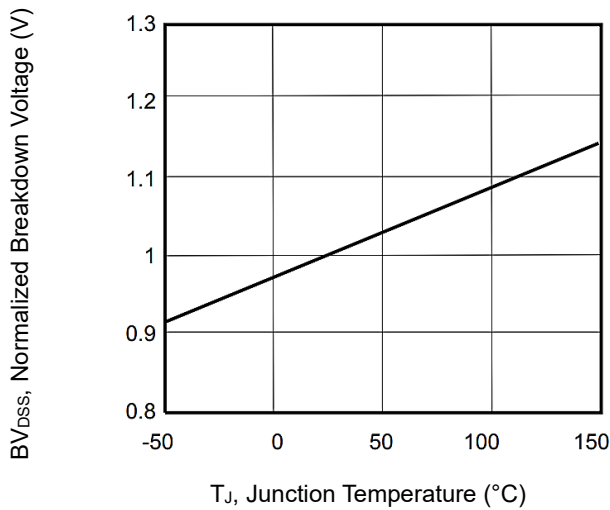
Gate Charge



Maximum Safe Operating Area



Breakdown Voltage Variation vs Temperature



Normalized Transient Thermal Impedance Curves

