

N Channel MOSFET

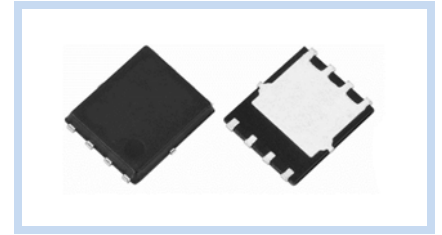
200V 42A 96W DFN5×6-8L

MFT20N42D56

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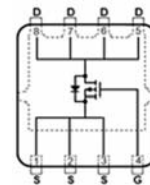
FEATURE

- $R_{DS(ON)} < 32m\Omega$, $V_{GS}=10V$, $I_D=10A$
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability
- Low reverse transfer capacitance



MECHANICAL DATA

- Case: DFN5×6-8L Package
- Terminals: Solderable per MIL-STD-750, Method 2026

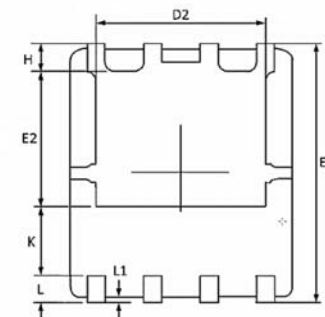
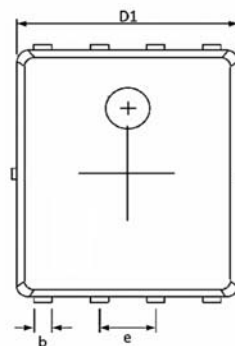


MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	200	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	at $R_{\theta JC}$	I_D	42	A
	at $R_{\theta JA}$		11	
Drain Current – Pulsed	at $R_{\theta JC}$	I_{DM}	168	A
	at $R_{\theta JA}$		44	
Power Dissipation		P_D	96	W
Single Pulse Avalanche Energy		E_{AS}	180	mJ
Single Pulse Avalanche Current		I_{AS}	30	A
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.3	$^{\circ}C/W$
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	20	$^{\circ}C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to +150	$^{\circ}C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.80	1.17
b	0.34	0.49
c	0.20	0.34
D1	4.80	5.10
D2	3.80	4.20
E	5.90	6.15
E1	5.65	5.90
E2	3.18	3.78
e	1.27	
H	0.38	0.62
K	1.20	1.70
L	0.38	0.75
L1	0.05	0.25



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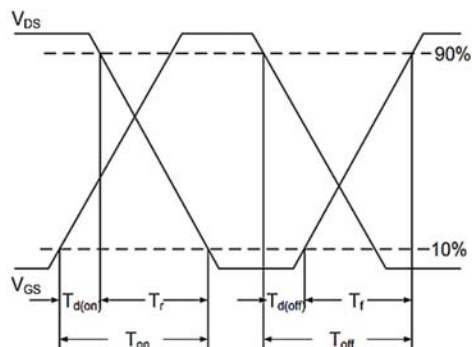
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	BV_{DSS}	200	--	--	V
Drain-Source Leakage Current	$V_{DS}=200V$, $V_{GS}=0V$,	I_{DSS}	--	--	1	μA
Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	I_{GSS}	--	--	± 100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=10A$	$R_{DS(ON)}$	--	26	32	m Ω
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	$V_{DS}=100V$, $V_{GS}=10V$, $I_D=10A$	Q_g	--	22	--	nC
Gate-Source Charge		Q_{gs}	--	7	--	
Gate-Drain Charge		Q_{gd}	--	6	--	
Turn-On Delay Time	$V_{DS}=100V$, $V_{GS}=10V$, $R_G=10\Omega$, $I_D=10A$	$T_{d(on)}$	--	27	--	nS
Rise Time		T_r	--	12	--	
Turn-Off Delay Time		$T_{d(off)}$	--	44	--	
Fall Time		T_f	--	16	--	
Input Capacitance	$V_{DS}=100V$, $V_{GS}=0V$, $F=1MHz$	C_{iss}	--	1470	--	pF
Output Capacitance		C_{oss}	--	170	--	
Reverse Transfer Capacitance		C_{rss}	--	10	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	42	A
Diode Forward Voltage	$V_{GS}=0V$, $I_S=10A$	V_{SD}	--	--	1.2	V
Reverse Recovery Time	$I_F=10A$, $di/dt=100A/\mu s$	T_{rr}	--	93	--	ns
Reverse Recovery Charge		Q_{rr}	--	305	--	μC

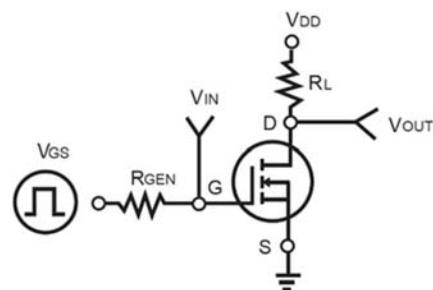
Note:

1. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
2. Guaranteed by design, not subject to production testing
3. The maximum current rating is package limited
4. Surface Mounted on FR4 Board, $t \leq 10$ sec.
5. The test condition is $L=0.4mH$, $I_{AS}=30A$, $V_{DD}=50V$, $R_G=25V$, Starting $T_J=25^\circ C$.
6. Repetitive rating, pulse width limited by junction temperature.

Switching Time Waveform



Switching Test Circuit



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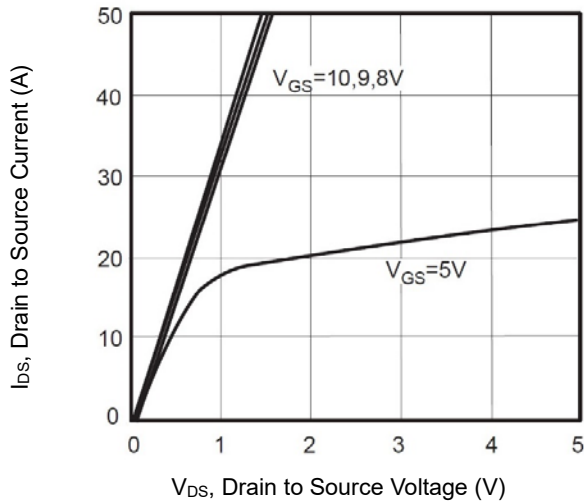
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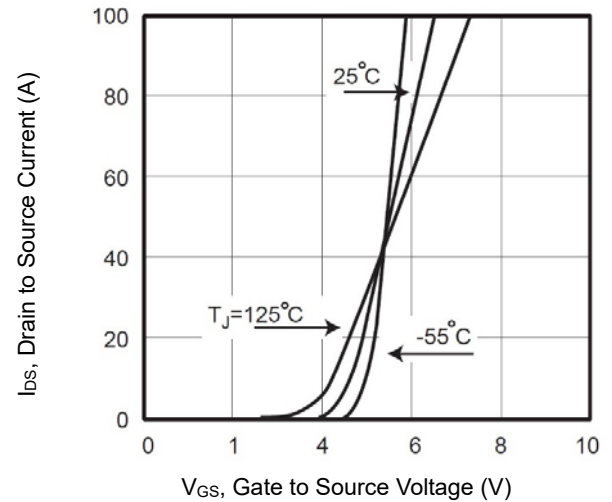
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CHARACTERISTIC CURVES

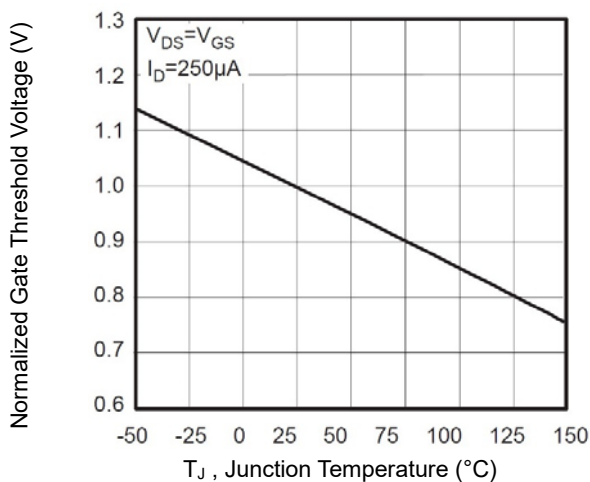
On-Region Characteristics



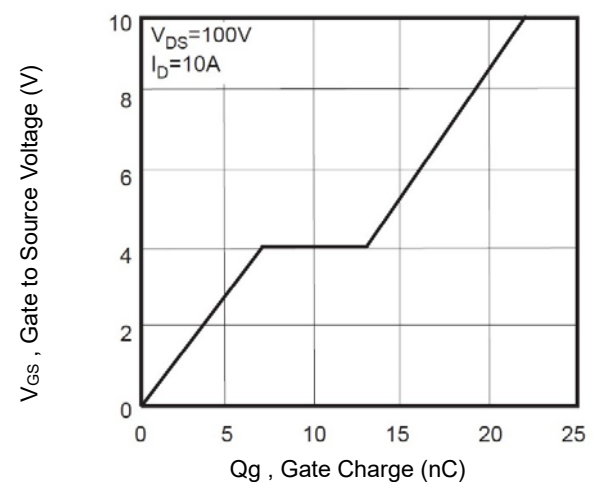
Transfer Characteristics



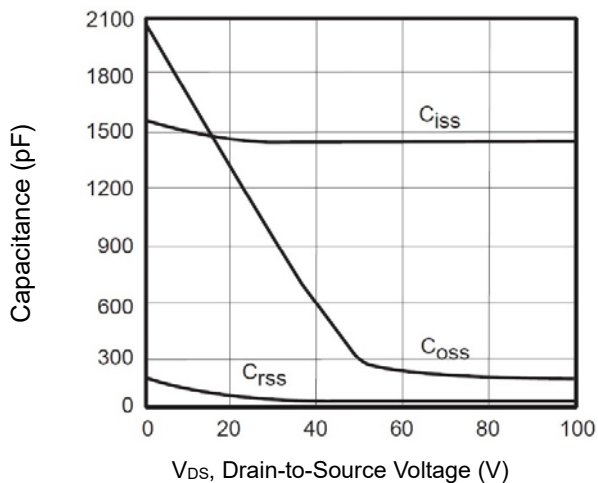
Normalized V_{th} vs. T_J



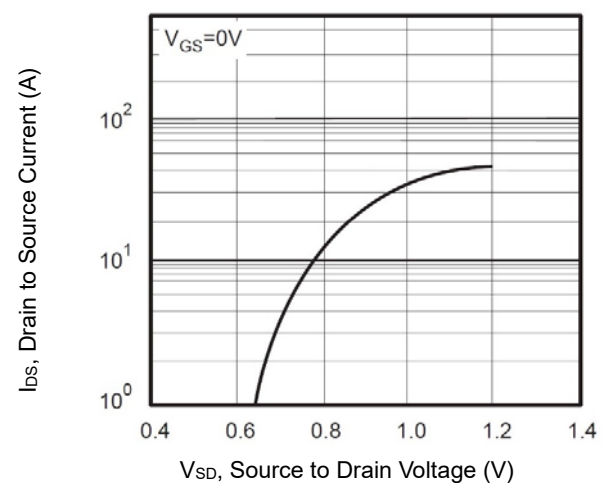
Gate Charge Waveform



Capacitance vs. Drain-Source Voltage



Body Diode Forward Voltage



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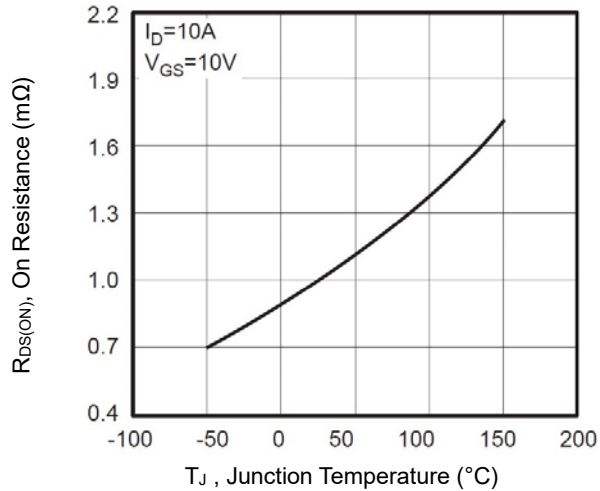
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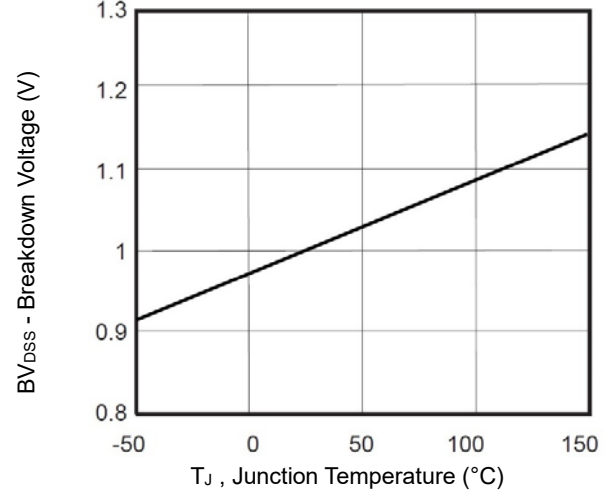
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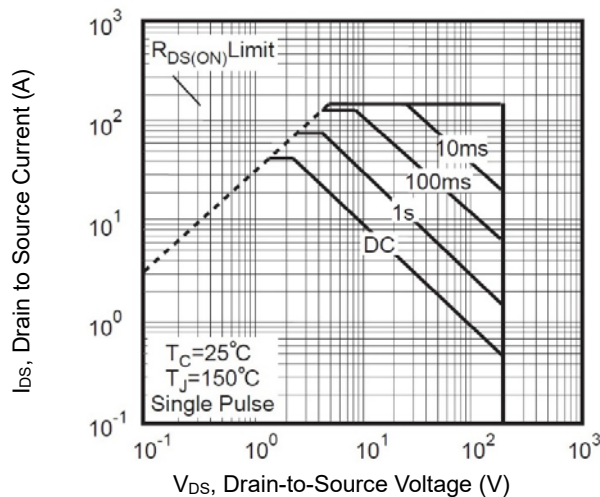
On-Resistance Variation with Temperature



Breakdown Voltage vs Temperature



Maximum Safe Operating Area



Normalized Transient Thermal Impedance Curves

