

N-Channel MOSFET

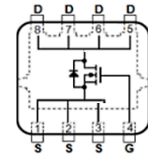
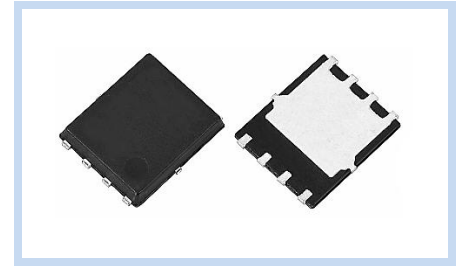
40V 290A DFN5x6-8L

MFT4N290D56

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FEATURE

- $R_{DS(ON)} < 1.0m\Omega$ at $V_{GS}=10V$
- $R_{DS(ON)} < 1.6m\Omega$ at $V_{GS}=4.5V$
- Low $R_{DS(ON)}$
- Application: DC/DC Converter, Secondary Side Synchronous Rectifier, Motor Control



MECHANICAL DATA

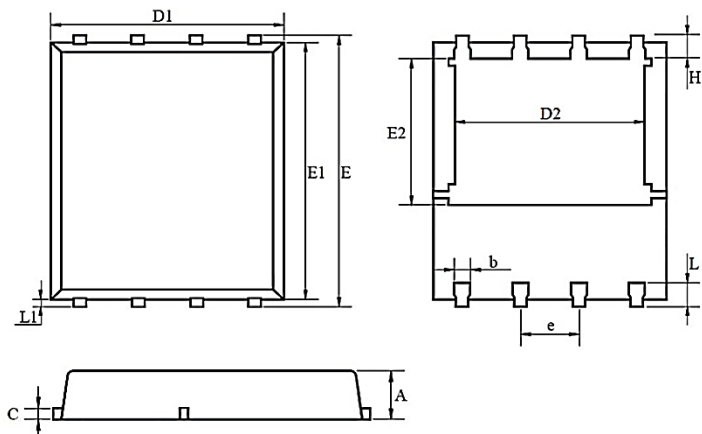
- Case: Molded Plastic, DFN5x6-8L
- Terminal: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C=25^{\circ}C$	I_D	290	A
	$T_C=100^{\circ}C$		205	
Drain Current – Pulsed	$T_C=25^{\circ}C$	I_{DM}	800	A
Single Pulse Avalanche Current	$L=0.1mH$	I_{AS}	64	A
	$L=0.5mH$		34	
Single Pulse Avalanche Energy	$L=0.1mH$	E_{AS}	204	mJ
	$L=0.5mH$		290	
Power Dissipation	$T_C=25^{\circ}C$	P_D	115	W
	$T_C=100^{\circ}C$		58	
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	60	$^{\circ}C/W$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.3	$^{\circ}C/W$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 ~ 175	$^{\circ}C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.90	1.10
b	0.33	0.51
c	0.20	0.30
D1	4.80	5.00
D2	3.61	3.96
e	1.27 BSC	
E	5.90	6.10
E1	5.70	5.80
E2	3.38	3.78
H	0.41	0.61
L	0.51	0.71
L1	0.06	0.20



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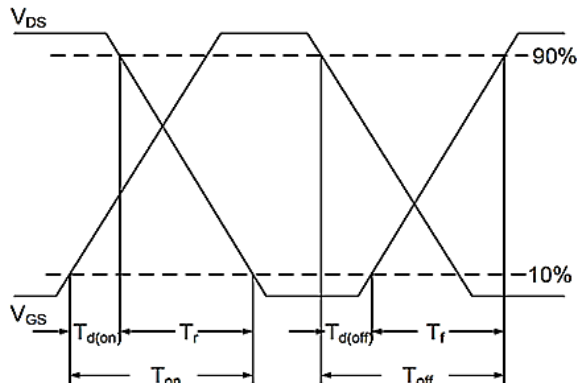
ELECTRICAL CHARACTERISTICS

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	$V_{DS}=32V, V_{GS}=0V$	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	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	--	0.80	1.00	m Ω
	$V_{GS}=4.5V, I_D=10A$		--	1.25	1.60	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.7	2.3	V
Forward Transconductance	$V_{DS}=5V, I_D=10A$	g_{FS}	--	45	--	S
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, F=1MHz$	R_g	--	1.2	--	Ω
	$V_{DS}=20V, V_{GS}=4.5V, I_D=10A$		--	33	--	
Total Gate Charge	$V_{DS}=20V, V_{GS}=10V, I_D=20A$	Q_g	--	69.0	--	nC
Gate-Source Charge		Q_{gs}	--	16.5	--	
Gate-Drain Charge		Q_{gd}	--	10.0	--	
Turn-On Delay Time	$V_{DS}=20V, V_{GS}=10V, R_G=3\Omega, I_D=20A$	$T_{d(on)}$	--	10.7	--	ns
Rise Time		T_r	--	25.3	--	
Turn-Off Delay Time		$T_{d(off)}$	--	65.2	--	
Fall Time		T_f	--	53.6	--	
Input Capacitance	$V_{DS}=20V, V_{GS}=0V, F=1MHz$	C_{iss}	--	4928	--	pF
Output Capacitance		C_{oss}	--	2000	--	
Reverse Transfer Capacitance		C_{rss}	--	65	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	V_{SD}	--	0.72	1.10	V
Reverse Recovery Time	$I_F=20A, V_R=20V, dI_F/dt=100A/\mu s$	t_{rr}	--	48.6	--	Ns
Reverse Recovery Charge		Q_{rr}	--	35.5	--	nC

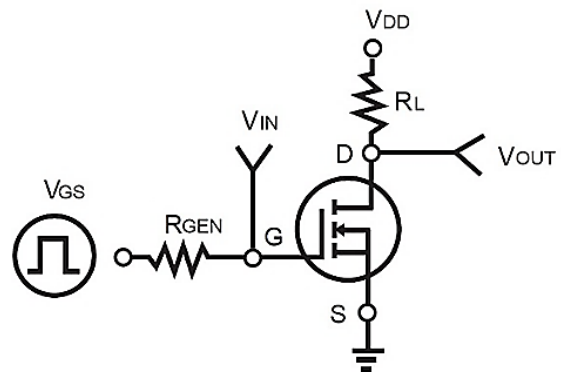
Note:

1. Max. current is limited by bonding wire
2. UIS tested and pulse width are limited by maximum Junction Temperature $T_{J(MAX)}=150^\circ C$.
3. Device mounted on 1 in² FR-4 board with 1oz copper
4. Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

Switching Time Waveform

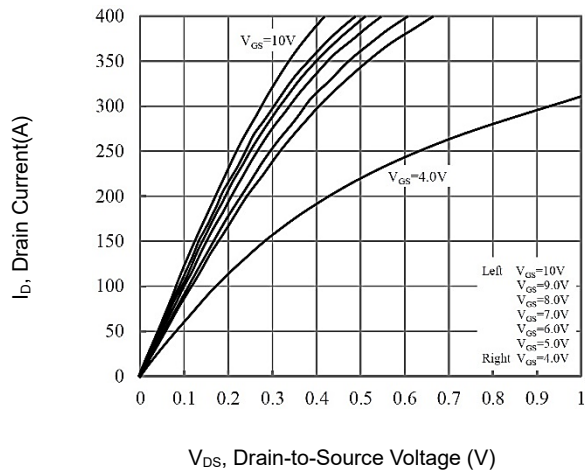


Switching Test Circuit

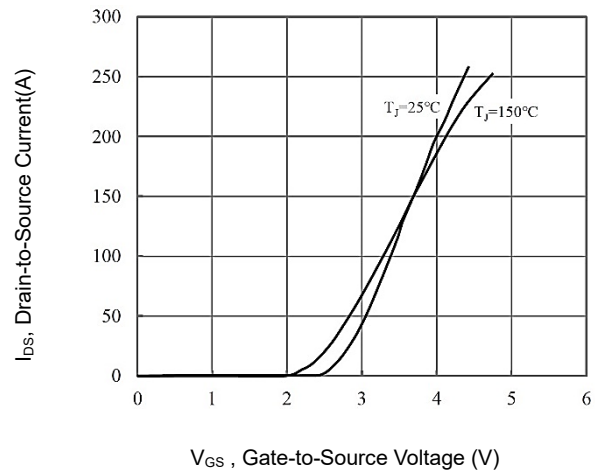


CHARACTERISTICS CURVES

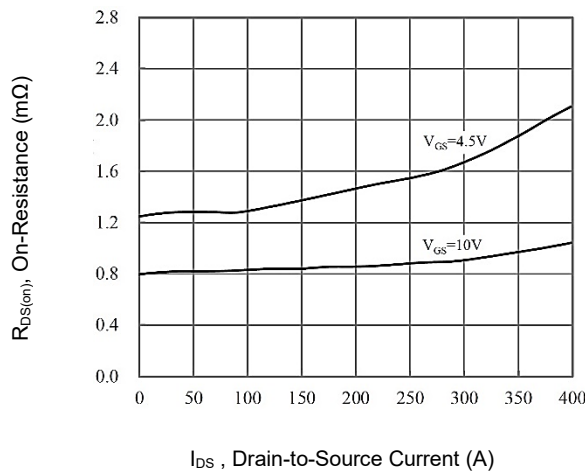
Output Characteristics



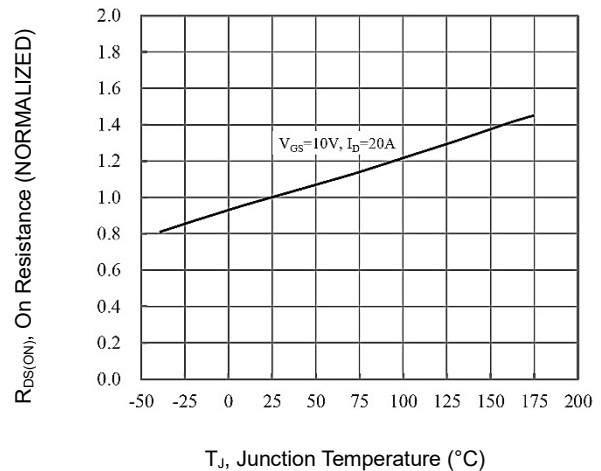
Transfer Characteristics



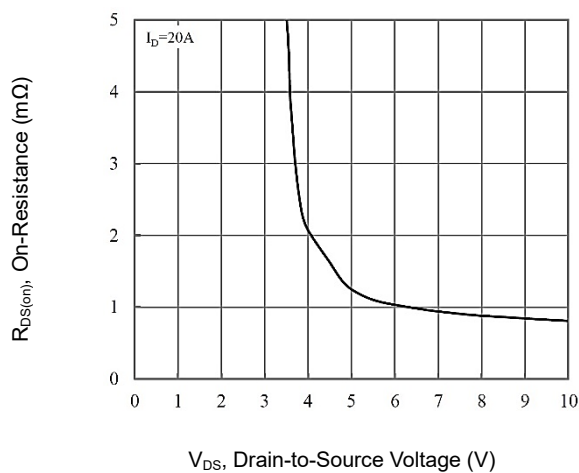
On-Resistance vs Drain Current



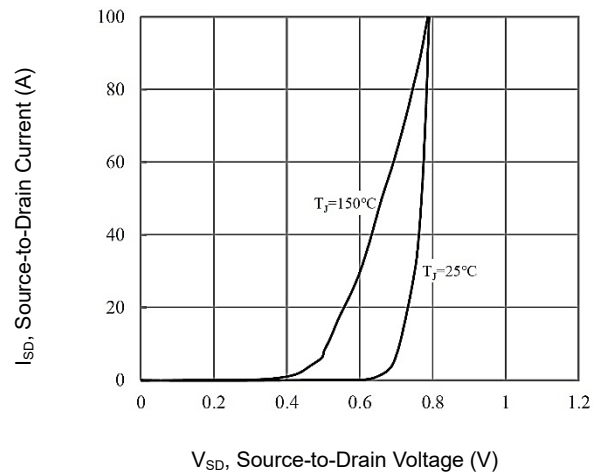
On-Resistance vs Junction Temperature



On-Resistance vs Gate-Source Voltage



Source-Drain Diode Forward Voltage



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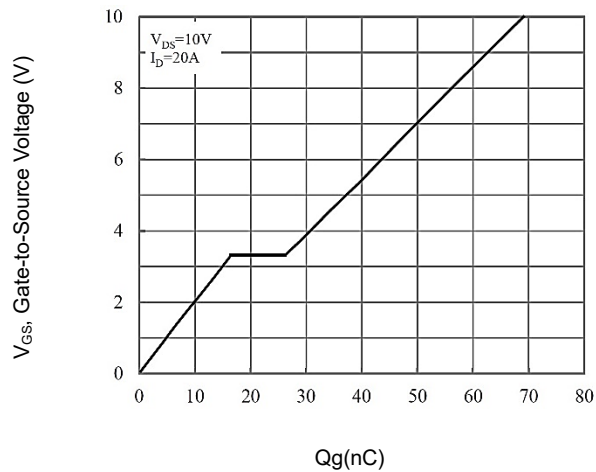
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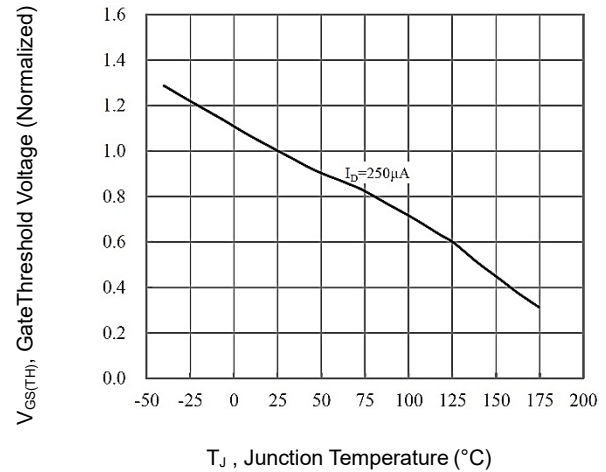
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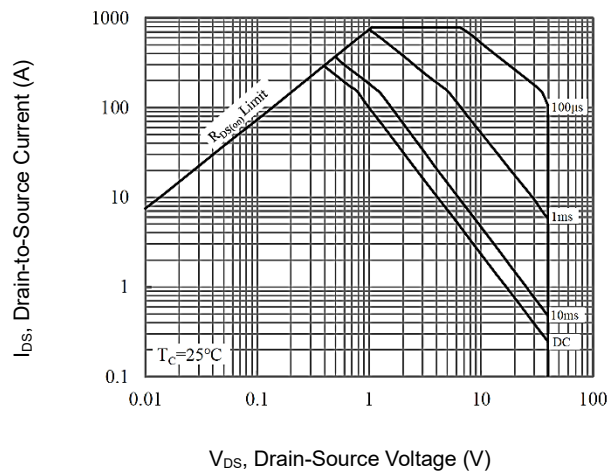
Gate-Charge Characteristics



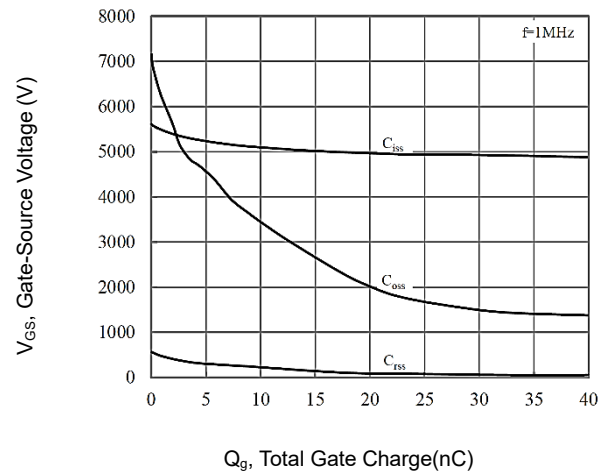
Gate Threshold Voltage vs Junction Temperature



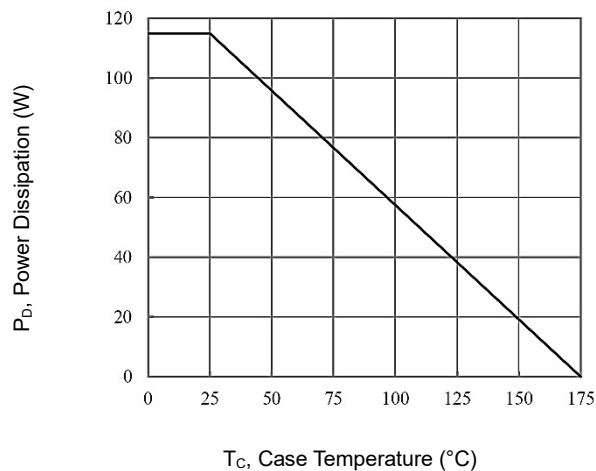
Maximum Safe Operating Area



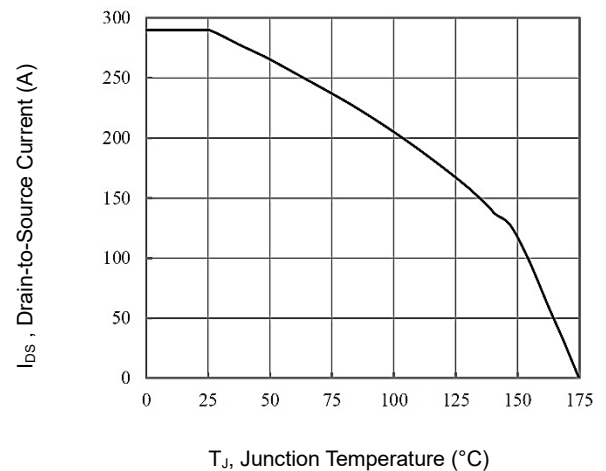
Capacitance vs Drain-Source Voltage



Power Dissipation



Drain Current



CHARACTERISTICS CURVES

Maximum Normalized Transient Thermal Impedance Curves

