

N-Channel MOSFET

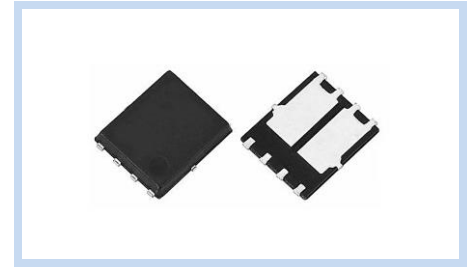
40V 45A 40W DFN5X6-8L

MFT42N45D56

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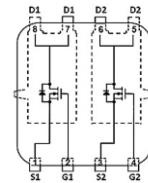
FEATURE

- $R_{DS(ON)} < 10m\Omega$, $V_{GS}=10V$, $I_D=30A$
- $R_{DS(ON)} < 13m\Omega$, $V_{GS}=4.5V$, $I_D=20A$
- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Advanced Split Gate Trench Technology
- Application: DC/DC Converter, Motor Control



MECHANICAL DATA

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

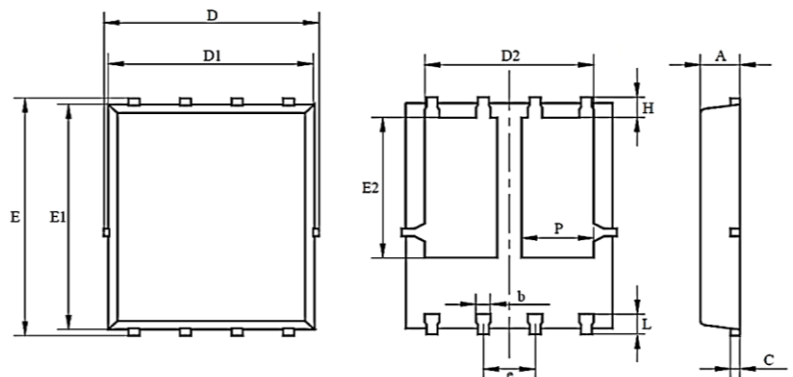


MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C=25^{\circ}C$	I_D	45	A
	$T_C=100^{\circ}C$		30	
Drain Current – Pulsed		I_{DM}	180	A
Power Dissipation		P_D	40	W
Single Pulsed Avalanche Energy		E_{AS}	110	mJ
Thermal Resistance Junction to Case		$R_{\theta JC}$	3.125	$^{\circ}C/W$
Junction Temperature		T_J	150	$^{\circ}C$
Storage Temperature Range		T_{STG}	-55 to +150	$^{\circ}C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.900	1.000
b	0.350	0.450
C	0.254 REF	
D	4.944	5.096
D1	4.824	4.976
D2	3.410	4.610
E	5.974	6.126
E1	5.674	5.826
E2	3.375	3.575
e	1.270 TYP	
H	0.424	0.576
P	1.470	1.870
L	0.559	0.711



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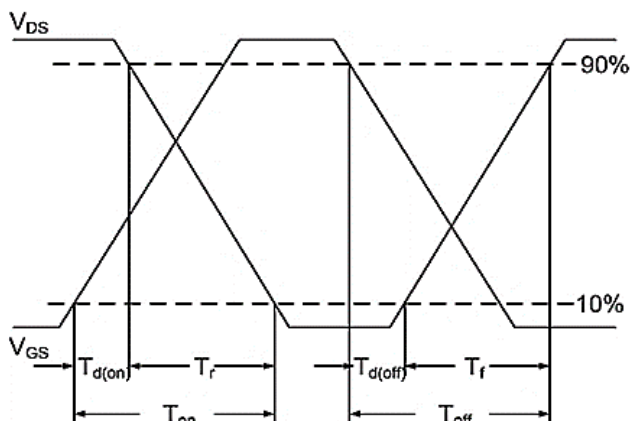
ELECTRICAL CHARACTERISTICS

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	$V_{DS}=32V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	--	--	1	μA
Gate-Body 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	$V_{GS}=10V, I_D=30A$	$R_{DS(ON)}$	--	8	10	m Ω
	$V_{GS}=4.5V, I_D=20A$		--	10	13	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.5	2.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=20V, V_{GS}=10V, I_D=20A$	Q_g	--	17	--	nC
Gate-Source Charge		Q_{gs}	--	4.9	--	
Gate-Drain Charge		Q_{gd}	--	8.6	--	
Turn-On Delay Time	$V_{DD}=20V, V_{GS}=10V, R_G=1.6\Omega, I_D=20A$	$T_{d(on)}$	--	3.5	--	ns
Rise Time		T_r	--	58	--	
Turn-Off Delay Time		$T_{d(off)}$	--	22	--	
Fall Time		T_f	--	2.6	--	
Input Capacitance	$V_{DS}=20V, V_{GS}=0V, f=1MHz$	C_{iss}	--	625	--	pF
Output Capacitance		C_{oss}	--	311	--	
Reverse Transfer Capacitance		C_{rss}	--	21	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Current	--	I_S	--	--	45	A
Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	V_{SD}	--	--	1.2	V
Reverse Recovery Time	$I_S=10A, T_J=25^\circ C$	T_{rr}	--	10	--	ns
Reverse Recovery Charge	$di/dt=300A/\mu s$	Q_{rr}	--	12	--	nC

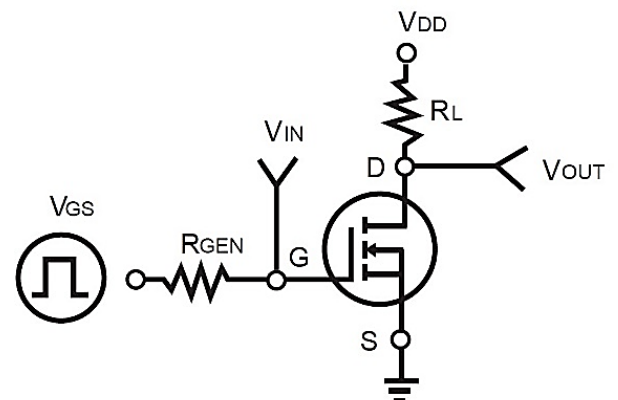
Note:

1. The test condition is $V_{DD}=20V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$.

Switching Time Waveform

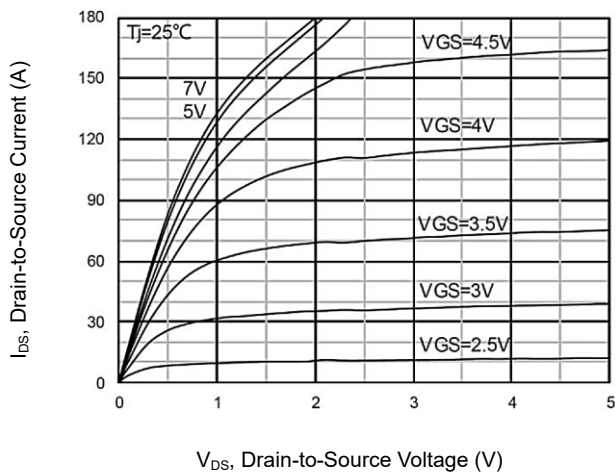


Switching Test Circuit

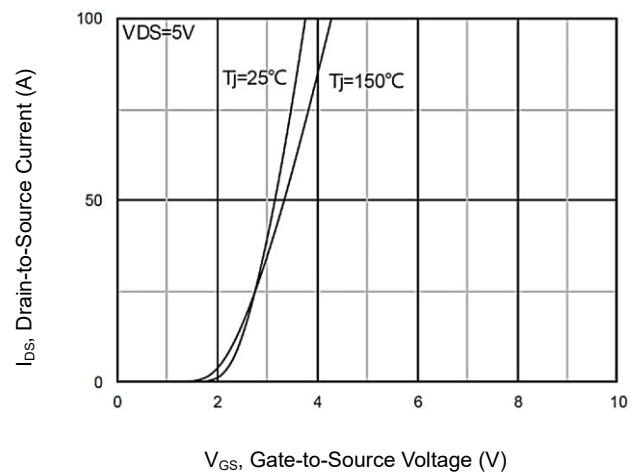


CHARACTERISTIC CURVES

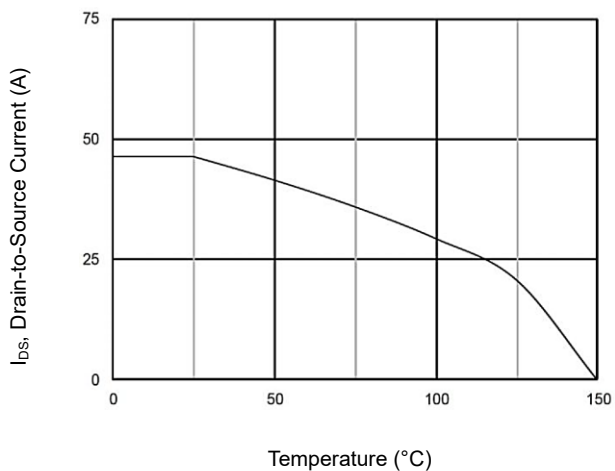
Output Characteristics



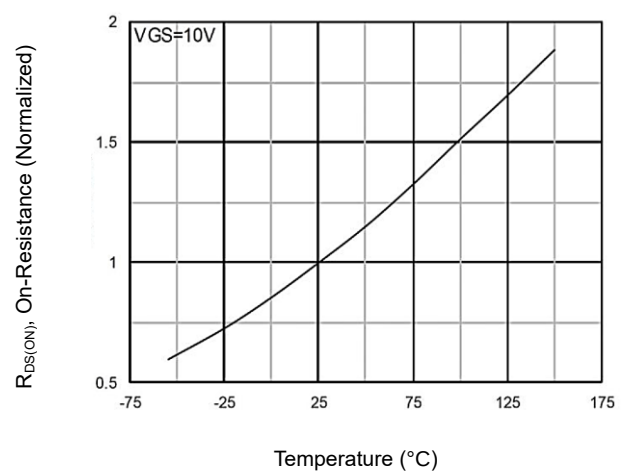
Transfer Characteristics



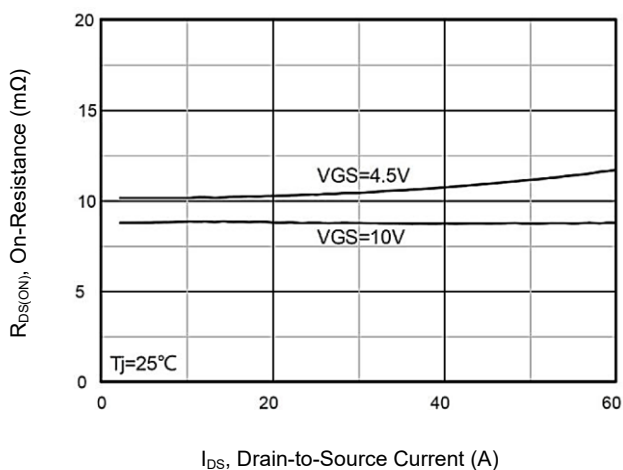
Drain Current Dissipation



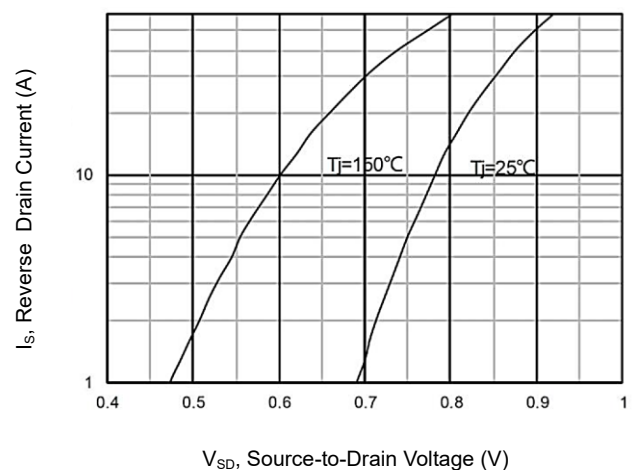
On-Resistance Vs. Junction Temperature



On-Resistance vs Drain Current



Source- Drain Diode Forward



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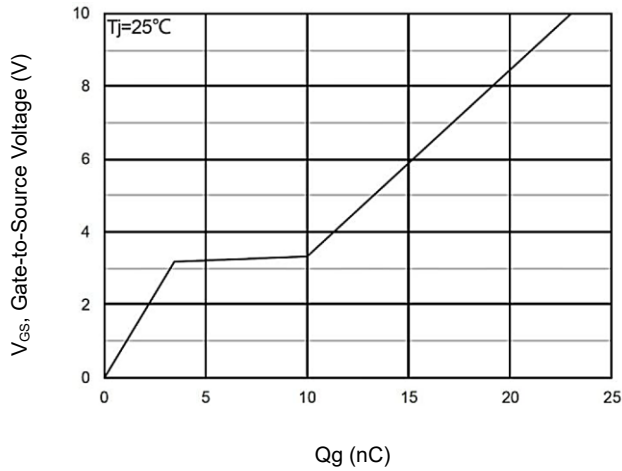
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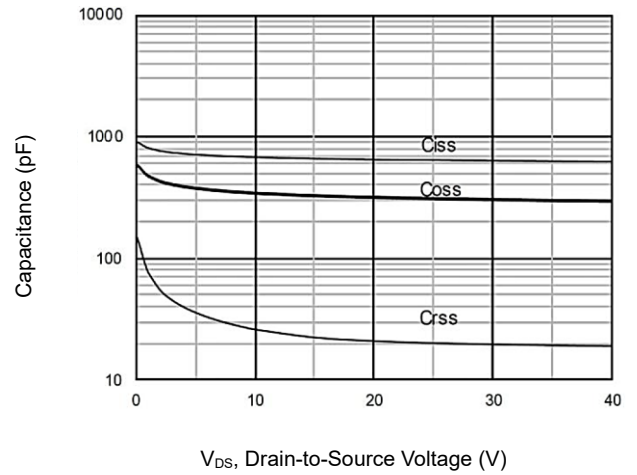
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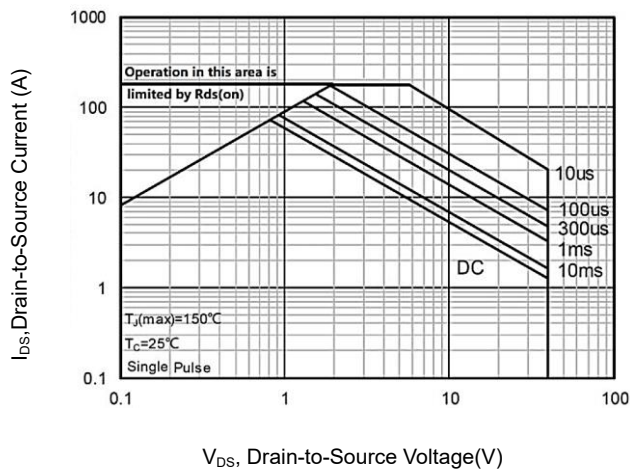
Gate-Charge Characteristics



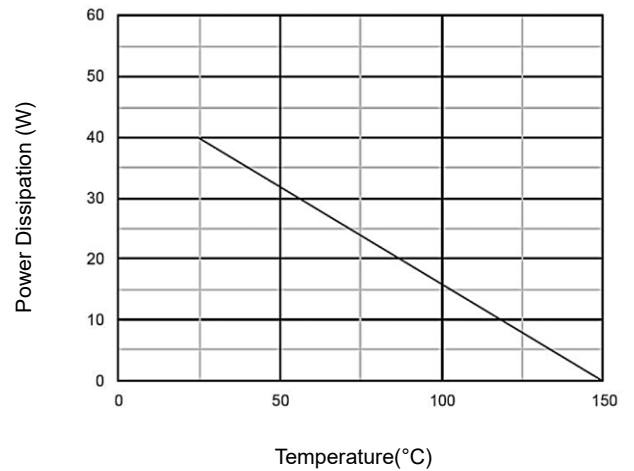
Capacitance



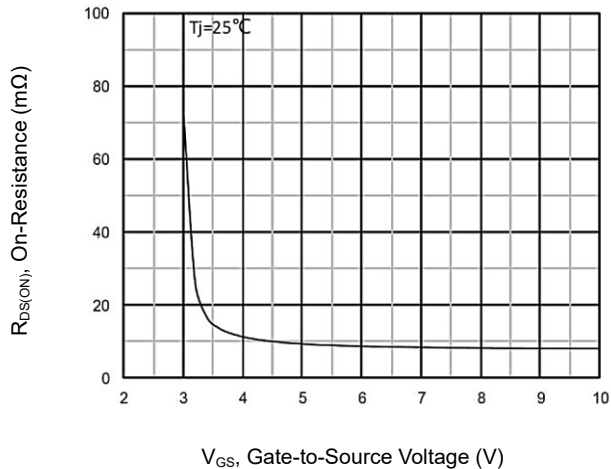
Maximum Safe Operating Area



Power Dissipation



On-Resistance vs Gate-to-Source Voltage



Normalized Transient Thermal Impedance

