

N Channel MOSFET

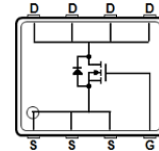
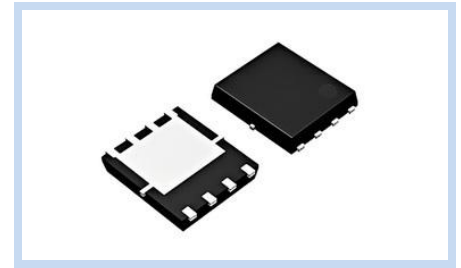
100V 45A 69W DFN5×6-8L

MFT10N45D56

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FEATURE

- $R_{DS(ON)} < 18.5m\Omega$, $V_{GS}=10V$, $I_D=10A$
- Super High Dense Cell Design For Low $R_{DS(ON)}$.
- Application: DC/DC Converter, Uninterruptible Power Supply, Power Switching Application



MECHANICAL DATA

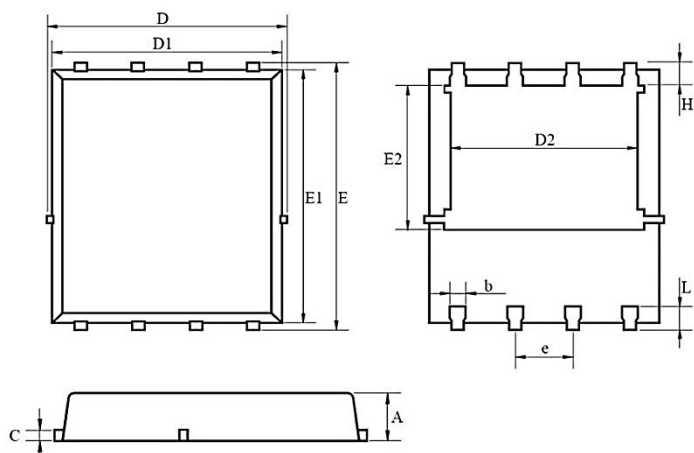
- Case: DFN5×6-8L Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C=25^\circ C$	I_D	45	A
	$T_C=100^\circ C$		28	
	$T_A=25^\circ C$		9.0	
	$T_A=70^\circ C$		7.2	
Drain Current – Pulsed		I_{DM}	120	A
Avalanche Current		$L=0.1mH$	I_{AS}	A
Single Pulse Avalanche Energy		$L=0.5mH$	E_{AS}	mJ
Power Dissipation	$T_C=25^\circ C$	P_D	69	W
	$T_C=100^\circ C$		28	
	$T_A=25^\circ C$		2.8	
	$T_A=70^\circ C$		1.8	
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.8	$^\circ C/W$
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	45	$^\circ C/W$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.900	1.100
b	0.350	0.450
c	0.254 REF	
D	4.994	5.096
D1	4.824	4.976
D2	3.910	4.110
E	5.974	6.126
E1	5.674	5.826
E2	3.375	3.575
e	1.27 TYP	
L	0.559	0.711
H	0.424	0.576



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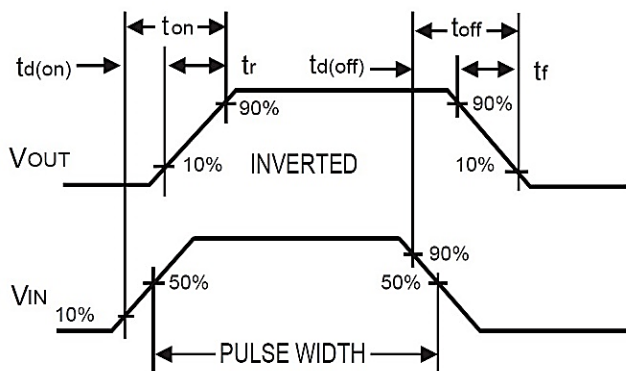
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	100	--	--	V
Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V$	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	$V_{GS}=10V, I_D=10A$	$R_{DS(ON)}$	--	14.5	18.5	m Ω
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	2.0	--	4.0	V
Forward Transconductance	$V_{DS}=10V, I_D=10A$	g_{FS}	--	8.5	--	S
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Gate Resistance	$F=1MHz$	R_g	--	1.4	--	Ω
Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=10A$	Q_g	--	21	--	nC
Gate-Source Charge		Q_{GS}	--	8	--	
Gate-Drain Charge		Q_{GD}	--	4.5	--	
Turn-On Delay Time	$V_{DS}=50V, V_{GS}=10V, R_G=1\Omega, I_D=10A$	$T_{d(on)}$	--	18	--	nS
Rise Time		T_r	--	17	--	
Turn-Off Delay Time		$T_{d(off)}$	--	27	--	
Fall Time		T_f	--	8	--	
Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1MHz$	C_{iss}	--	1289	--	pF
Output Capacitance		C_{oss}	--	171	--	
Reverse Transfer Capacitance		C_{rss}	--	30	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	$T_C=25^\circ C$	I_S	--	--	45	A
Diode Pulse Forward Current		I_{SM}	--	--	120	A
Diode Forward Voltage	$V_{GS}=0V, I_S=10A$	V_{SD}	--	0.84	1.2	V
Reverse Recovery Time	$I_F=10A, di/dt=100A/\mu s$	T_{rr}	--	30	--	nS
Reverse Recovery Charge		Q_{rr}	--	37	--	nC

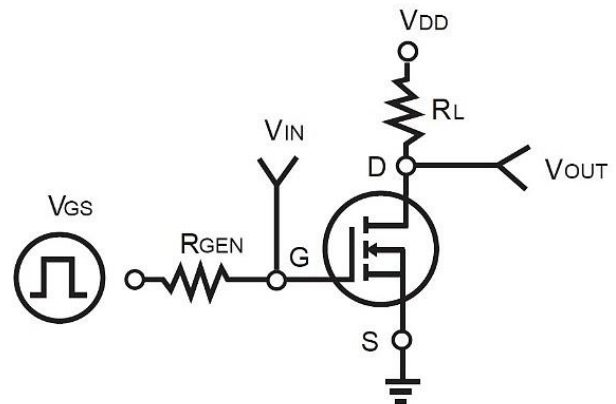
Note:

1. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ C$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz copper, in a still air environment with $T_A=25^\circ C$. The power dissipation P_D is based on $R_{\theta JA}$ and the maximum allowed junction temperature of $150^\circ C$. The value in any given application depends the user's specific board design.
3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$. Ratings are based on low frequency and low duty cycles to keep initial $T_J=25^\circ C$.
4. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
5. Independent of operating temperature

Switching Time Waveform



Switching Test Circuit



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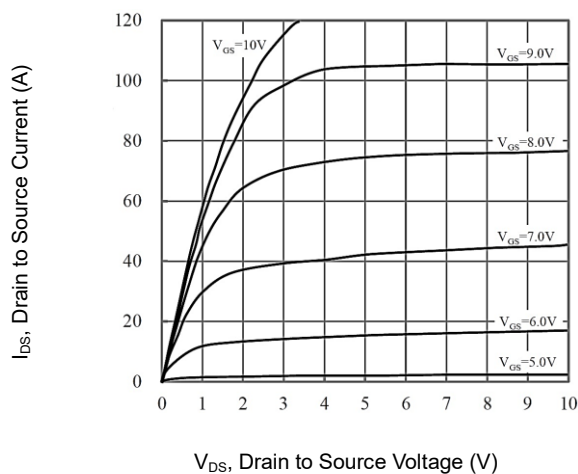
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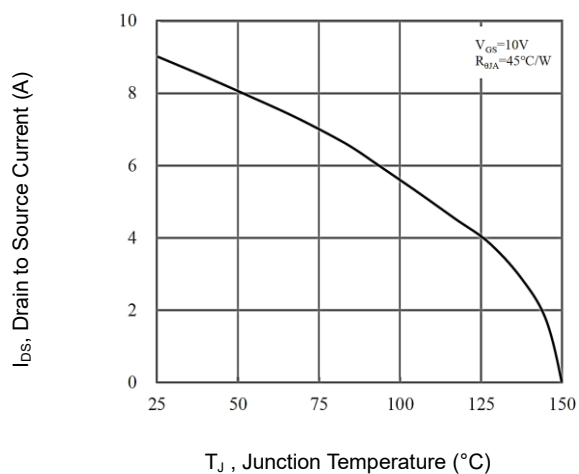
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CHARACTERISTIC CURVES

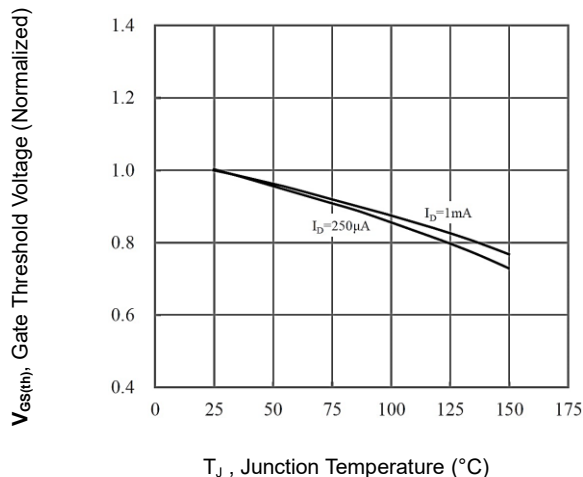
On-Region Characteristics



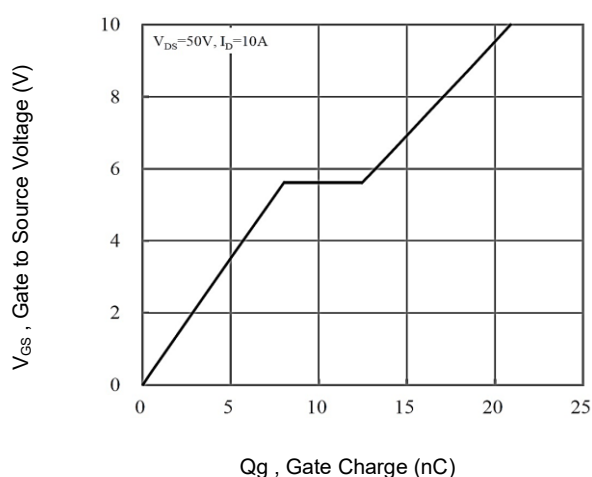
Maximum Drain Current vs Temperature



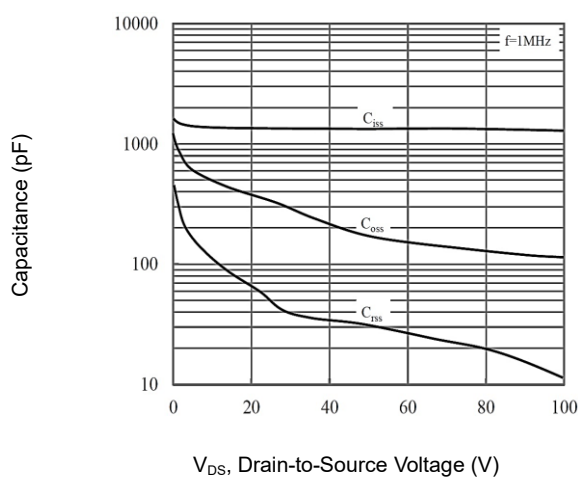
Gate Threshold Voltage vs Temperature



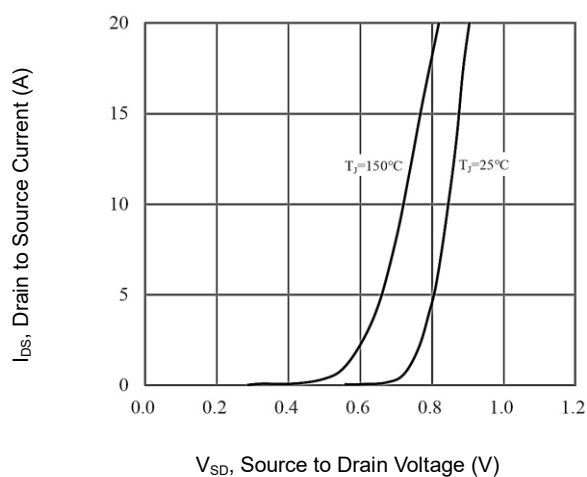
Gate Charge Waveform



Capacitance vs. Drain-Source Voltage



Body Diode Forward Voltage



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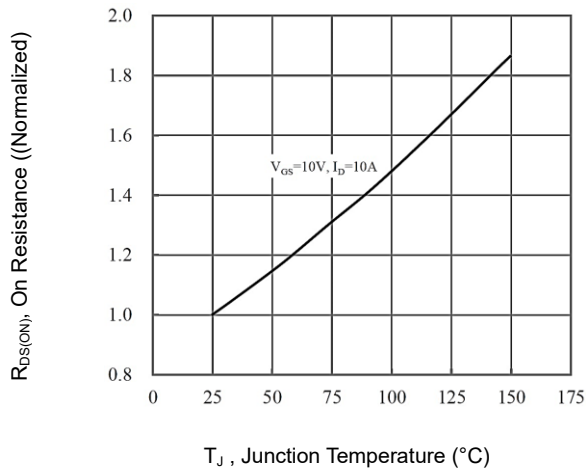
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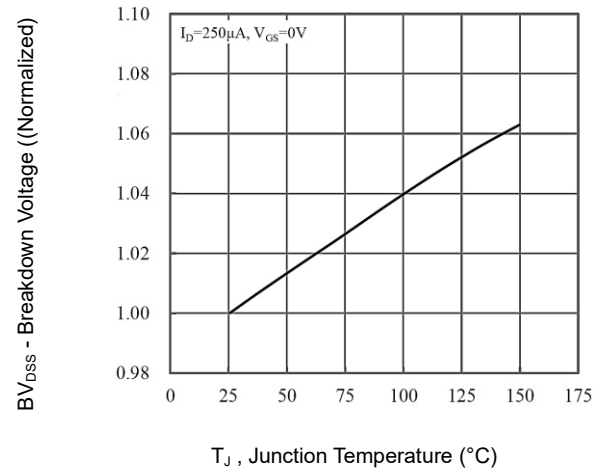
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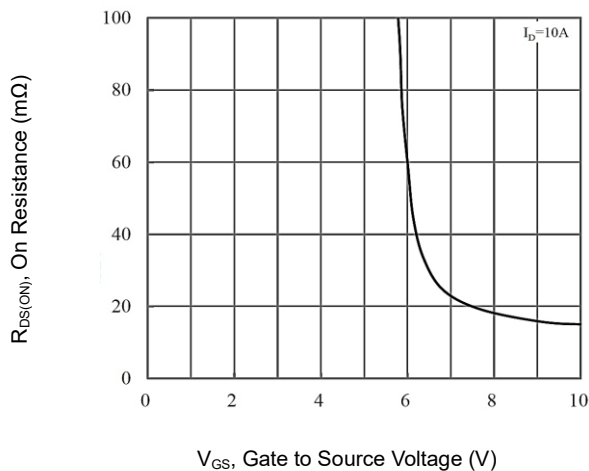
On-Resistance Variation with Temperature



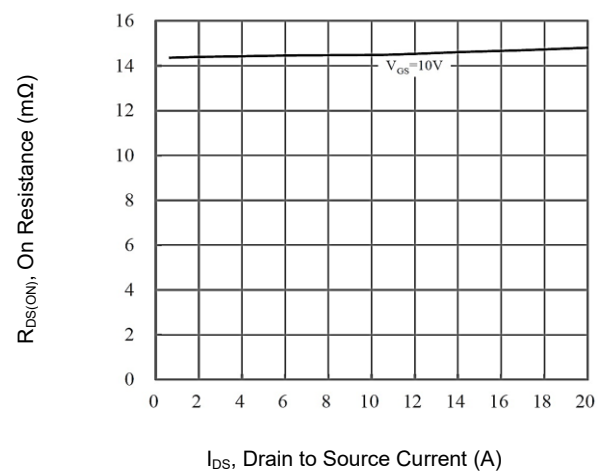
Breakdown Voltage vs Temperature



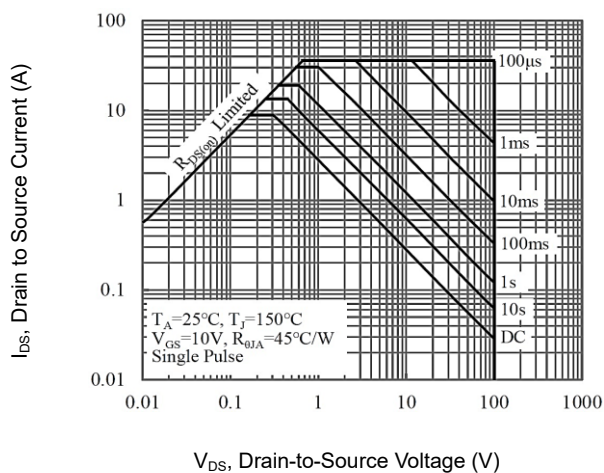
On-Resistance Variation with Gate-Source Voltage



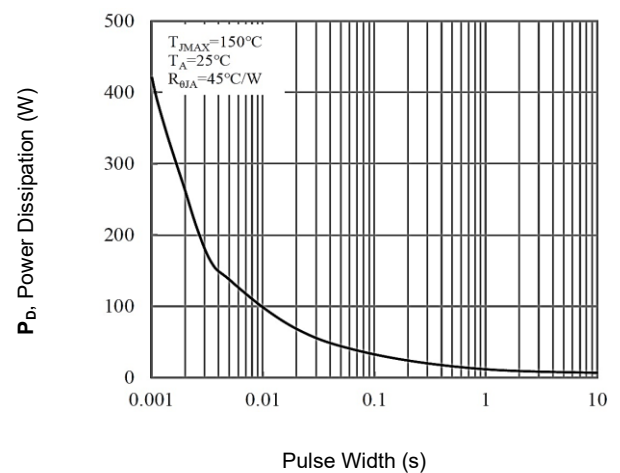
On-Resistance Variation with Drain Current



Maximum Safe Operating Area



Single Pulse Power Rating



CHARACTERISTIC CURVES

Normalized Transient Thermal Impedance

