

N-Channel MOSFET

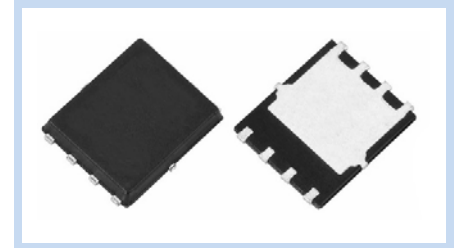
100V 53A 52W DFN5×6-8L

MFT10N53D56

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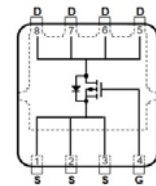
FEATURE

- $R_{DS(ON)} < 8.3m\Omega$ at $V_{GS}=10V$, $I_D=12A$
- Super High Dense Cell Design for Low $R_{DS(ON)}$
- Fast Switching Characteristic
- Low Gate Charge



MECHANICAL DATA

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

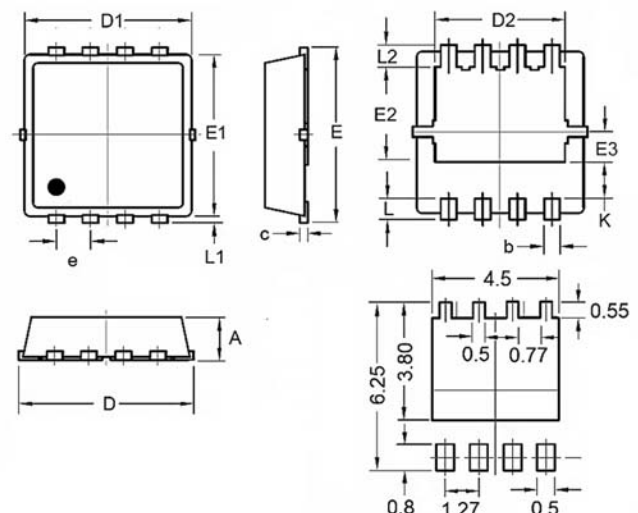


MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$V_{GS}=10V$, $T_C=25^\circ C$	I_D	53	A
	$V_{GS}=10V$, $T_C=100^\circ C$		34	
	$V_{GS}=10V$, $T_A=25^\circ C$		12	
	$V_{GS}=10V$, $T_A=70^\circ C$		9.6	
Drain Current – Pulsed		I_{DM}	212	A
Power Dissipation	$T_C=25^\circ C$	P_D	52	W
	$T_C=100^\circ C$		21	
	$T_A=25^\circ C$		2.6	
	$T_A=70^\circ C$		1.7	
Single Pulse Avalanche Energy	$L=0.5mH$	E_{AS}	64	mJ
Single Pulse Avalanche Current	$L=0.1mH$	I_{AS}	16	A
Thermal Resistance Junction to Case		$R_{\theta JC}$	2.4	$^\circ C/W$
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	48	$^\circ C/W$
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
D	4.80	5.20
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
E3	0.15	0.36
e	1.27	
L	0.38	0.75
L1	0.05	0.25
L2	0.38	0.62



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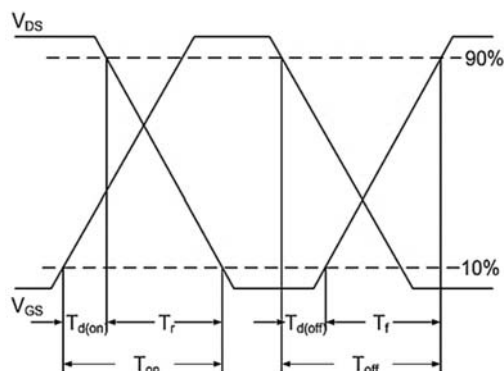
ELECTRICAL CHARACTERISTICS

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	$V_{GS}=10V$, $I_D=12A$	$R_{DS(ON)}$	--	6.4	8.3	m Ω
	$V_{GS}=4.5V$, $I_D=9A$		--	9.0	13.5	
Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	$V_{GS(th)}$	1	--	2.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=50V$, $V_{GS}=10V$, $I_D=10A$	Q_g	--	42	--	nC
Gate-Source Charge		Q_{gs}	--	8.4	--	
Gate-Drain Charge		Q_{gd}	--	8.2	--	
Turn-On Delay Time	$V_{DS}=50V$, $V_{GS}=10V$, $R_{GS}=6\Omega$, $I_D=10A$	$T_{d(on)}$	--	21	--	nS
Rise Time		T_r	--	13	--	
Turn-Off Delay Time		$T_{d(off)}$	--	62	--	
Fall Time		T_f	--	13	--	
Input Capacitance	$V_{DS}=50V$, $V_{GS}=0V$, $F=1MHz$	C_{iss}	--	2600	--	pF
Output Capacitance		C_{oss}	--	327	--	
Reverse Transfer Capacitance		C_{rss}	--	33	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	43	A
Diode Forward Voltage	$V_{GS}=0V$, $I_S=12A$	V_{SD}	--	0.8	1.2	V
Reverse Recovery Time	$I_F=10A$, $di/dt=100A/\mu s$	T_{rr}	--	39	--	ns
Reverse Recovery Charge		Q_{rr}	--	56	--	nC

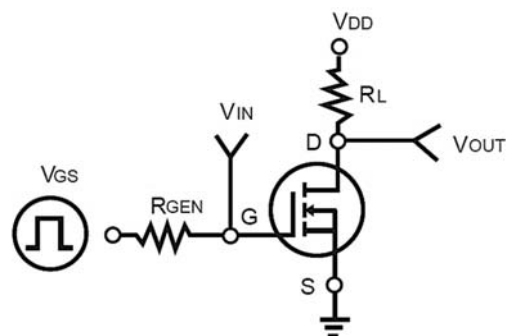
Note:

1. Pulse width $\leq 300\mu s$, duty cycles $\leq 2\%$
2. 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 limit for cases where additional heatsinking is used.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. 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 on the user's specific board design.
4. 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 $T_J=25^\circ C$.

Switching Time Waveform



Switching Test Circuit



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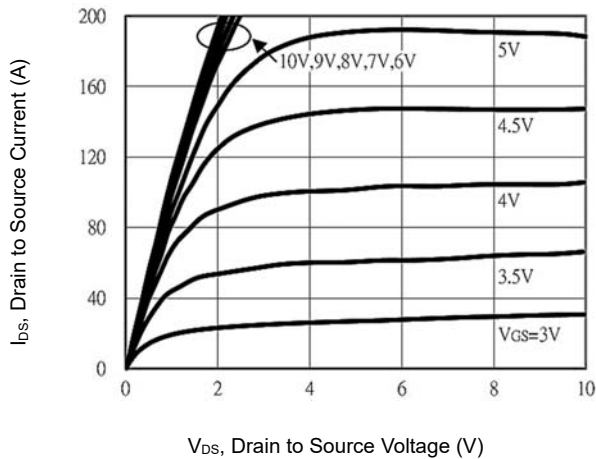
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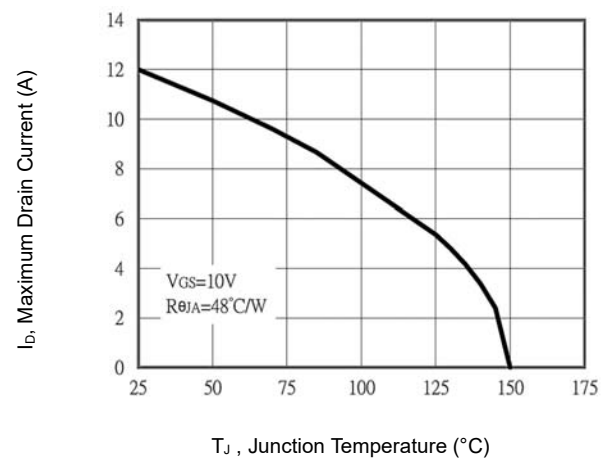
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CHARACTERISTIC CURVES

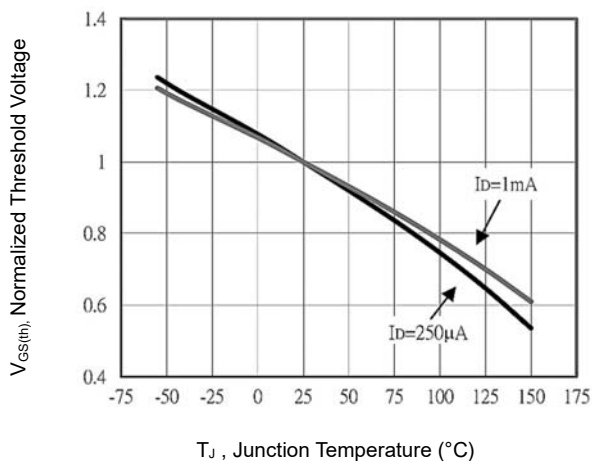
On-Region Characteristics



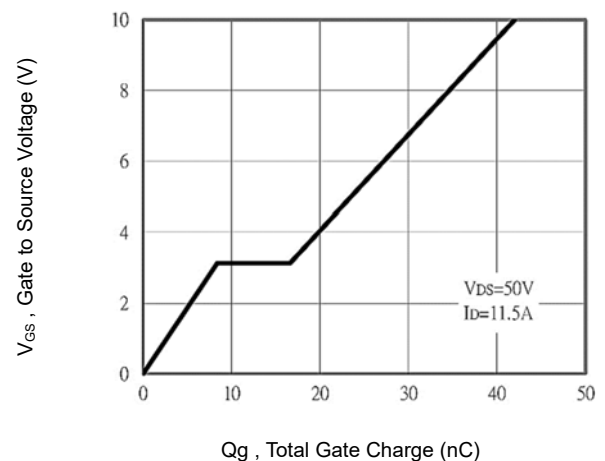
Maximum Drain Current vs. Junction Temperature



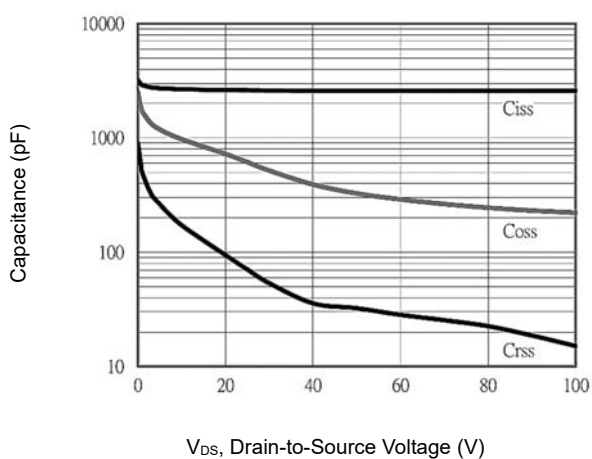
Threshold Voltage vs. Junction Temperature



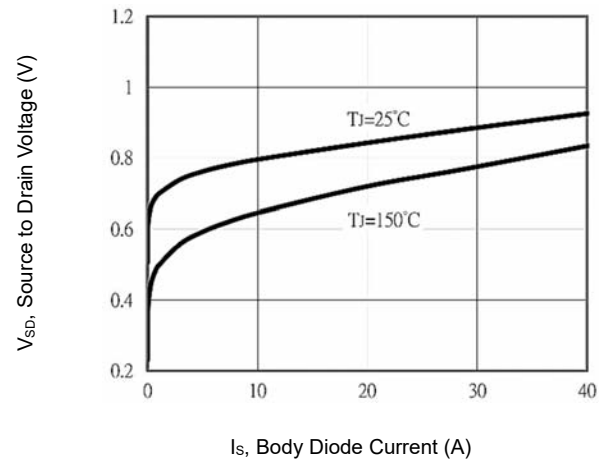
Gate Charge Waveform



Capacitance vs. Drain-Source Voltage



Body Diode Forward Voltage



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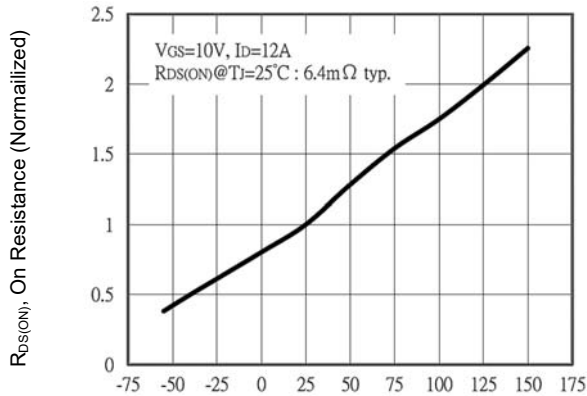
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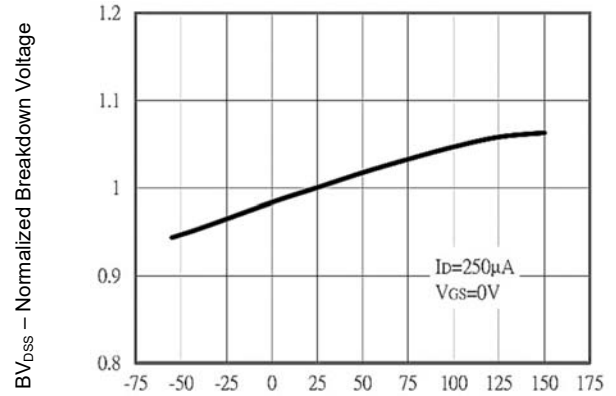
CHARACTERISTIC CURVES

On-Resistance Variation with Temperature



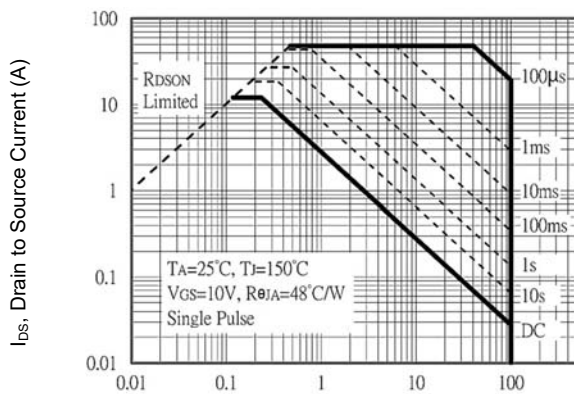
T_J , Junction Temperature ($^{\circ}C$)

Breakdown Voltage vs Temperature



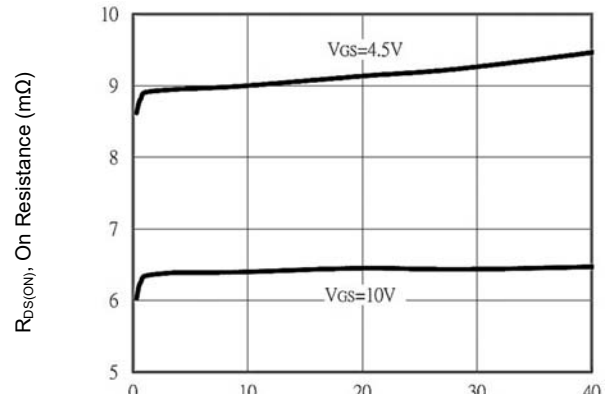
T_J , Junction Temperature ($^{\circ}C$)

Maximum Safe Operating Area



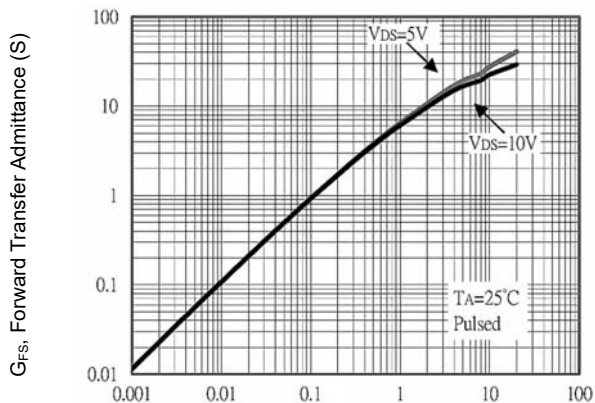
V_{DS} , Drain-to-Source Voltage (V)

On-Resistance Variation with Drain Current



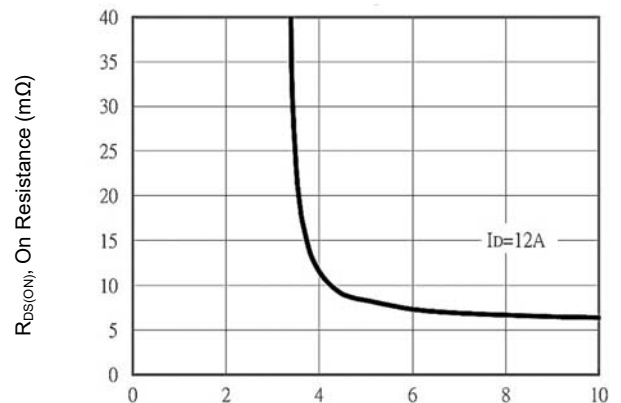
I_D , Drain Current (A)

Forward Transfer Admittance vs Drain Current



I_D , Drain Current (A)

On-Resistance Variation with Gate-Source Voltage



V_{GS} , Gate to Source Voltage (V)

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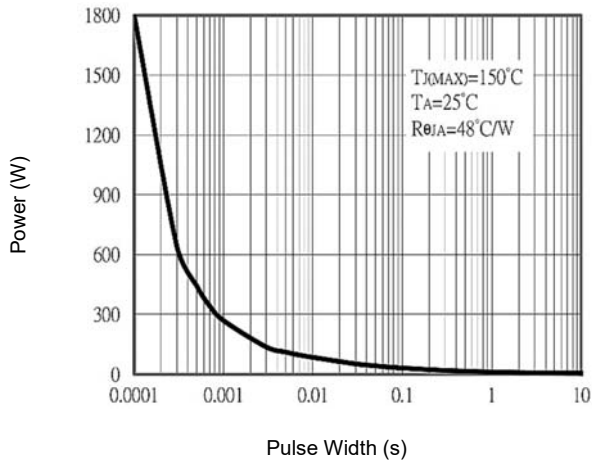
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CHARACTERISTIC CURVES

Single Pulse Power Rating



Normalized Transient Thermal Response Curves

