

N-Channel MOSFET

100V 42A DFN5060 AEC-Q101

MFT10N42D56A

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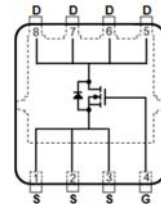
FEATURE

- $R_{DS(ON)} < 25m\Omega$, $V_{GS}=10V$, $I_D=20A$
- $R_{DS(ON)} < 28.5m\Omega$, $V_{GS}=4.5V$, $I_D=15A$
- Improved dv/dt capability
- AEC-Q101 Qualified



MECHANICAL DATA

- Case: Molded Plastic, DFN5060-8L
- Terminal: Solderable per MIL-STD-750, Method 2026

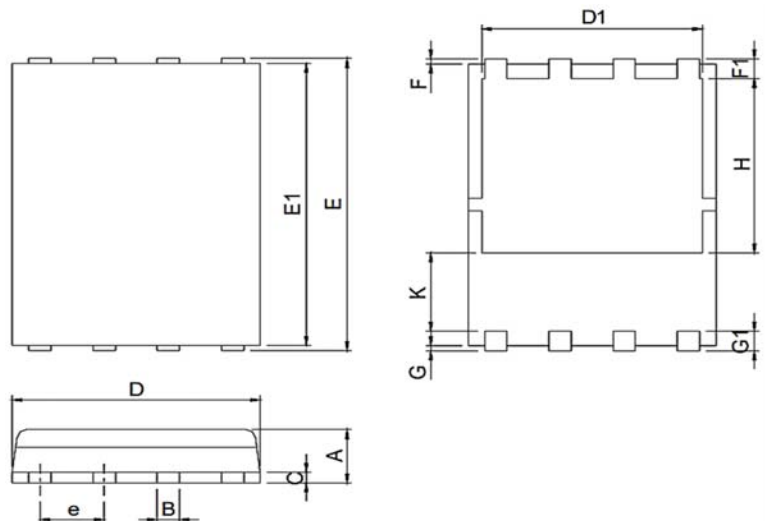


MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous	I_D	$T_C=25^\circ C$	42
		$T_C=100^\circ C$	26.6
Drain Current – Continuous	I_D	$T_A=25^\circ C$	6.5
		$T_A=70^\circ C$	5.2
Drain Current – Pulsed	I_{DM}	150	A
Single Pulse Avalanche Energy	E_{AS}	63.4	mJ
Power Dissipation	P_D	$T_C=25^\circ C$	83
		$T_C=100^\circ C$	33
Power Dissipation	P_D	$T_A=25^\circ C$	2
		$T_A=70^\circ C$	1.3
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	$^\circ C/W$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ 150	$^\circ C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.90	1.10
B	0.33	0.51
C	0.20	0.30
D	4.80	5.00
D1	4.00	4.40
E	5.90	6.10
E1	5.70	5.80
F	0.06	0.20
F1	0.41	0.61
G	0.06	0.20
G1	0.51	0.71
H	3.38	3.78
K	1.10	-



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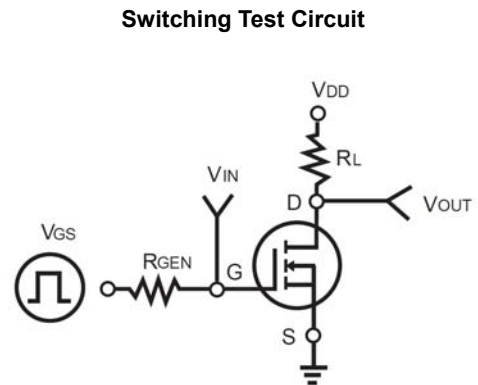
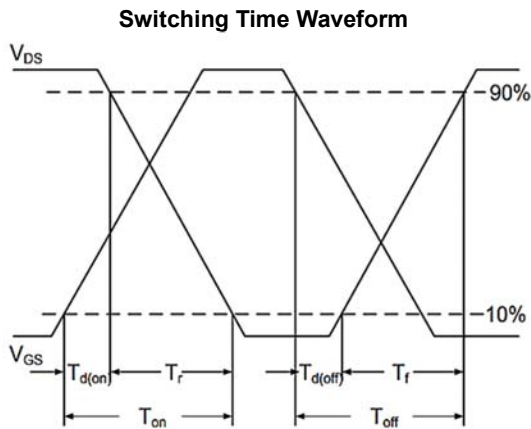
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ELECTRICAL CHARACTERISTICS

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	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	--	20	25	m Ω
	$V_{GS}=4.5V, I_D=15A$		--	22	28.5	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1	1.8	2.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=50V, I_D=10A$ $V_{GS}=10V$	Q_g	--	31	--	nC
Gate-Source Charge		Q_{gs}	--	5.1	--	
Gate-Drain Charge		Q_{gd}	--	7.3	--	
Turn-On Delay Time	$V_{DD}=50V, I_D=10A,$ $V_{GS}=10V,$ $R_G=3\Omega$	$T_{d(on)}$	--	11	--	ns
Rise Time		T_r	--	42	--	
Turn-Off Delay Time		$T_{d(off)}$	--	40	--	
Fall Time		T_f	--	19	--	
Input Capacitance	$V_{DS}=30V, V_{GS}=0V,$ $F=1MHz$	C_{iss}	--	1519	--	pF
Output Capacitance		C_{oss}	--	132	--	
Reverse Transfer Capacitance		C_{rss}	--	66	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current-Continuous	--	I_S	--	--	42	A
Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	V_{SD}	--	0.7	1.2	V

- Note:
1. Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$
 2. Essentially Independent of Operating Temperature Typical Characteristics
 3. Repetitive Rating, Pulse Width Limited by Junction Temperature $T_{J(MAX)}=150^\circ C$.
Rating are based on low frequency and duty cycles to keep initial $T_J=25^\circ C$
 4. The Maximum Current Rating is Package Limited
 5. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.
Mounted on a 1 inch² with 2 oz. square pad of copper.
 6. EAS test conditions: $L=3mH, I_{AS}=6.5A, V_{GS}=10V, V_{DD}=50V$, starting $T_J=25^\circ C$
 7. Guaranteed by design, not subject to production testing.



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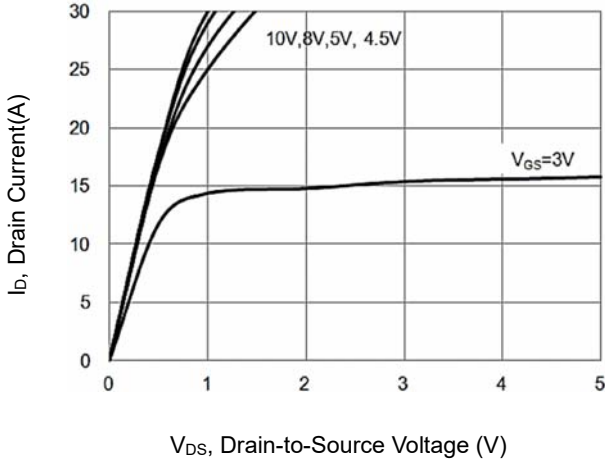
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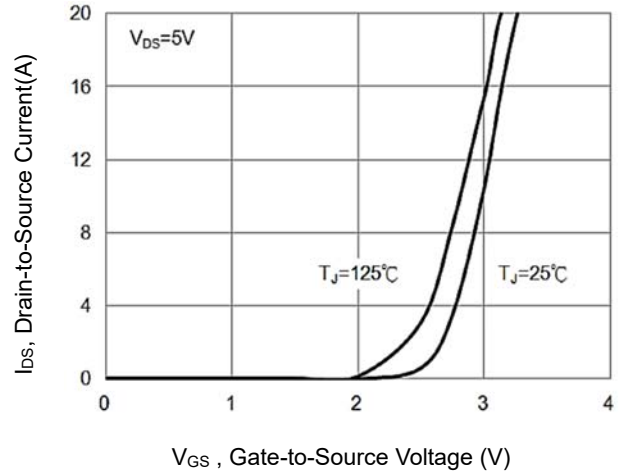
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CHARACTERISTICS CURVES

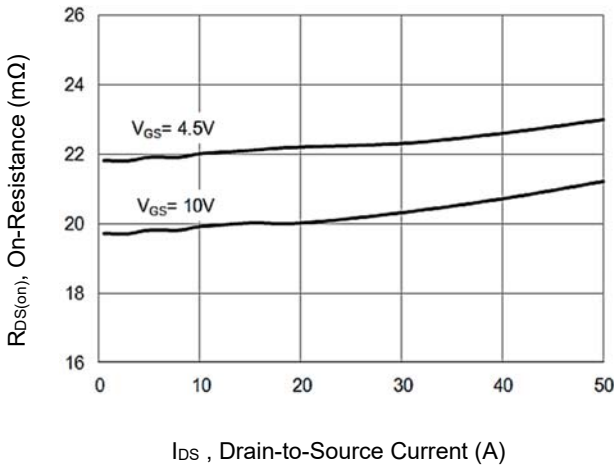
Output Characteristics



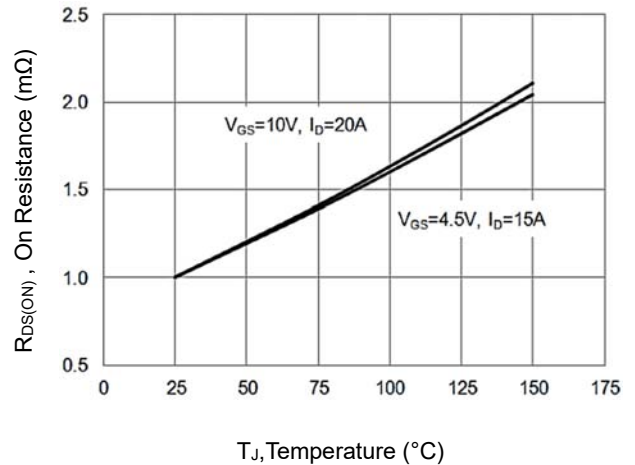
Transfer Characteristics



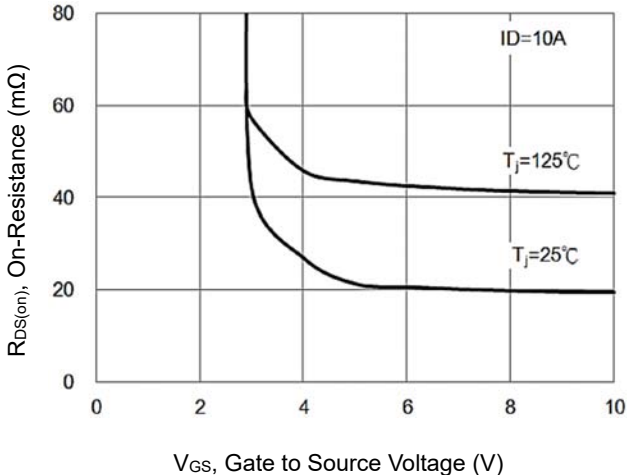
$R_{DS(ON)}$ vs Drain Current



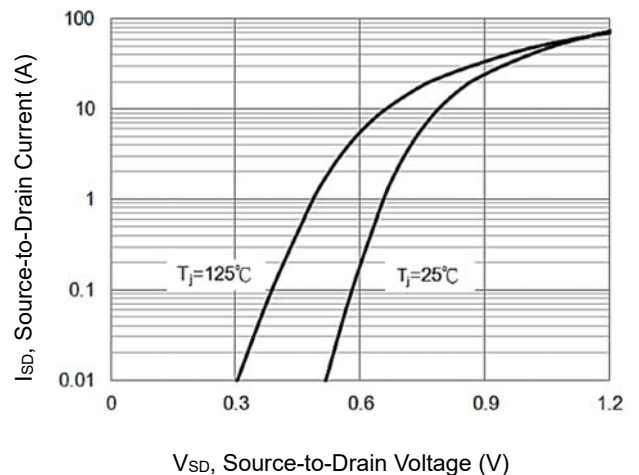
On-Resistance vs Junction Temperature



$R_{DS(ON)}$ vs Gate-Source Voltage



Source-Drain Diode Forward Voltage



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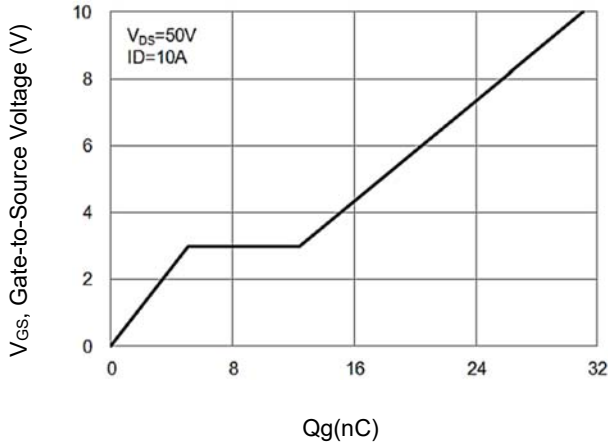
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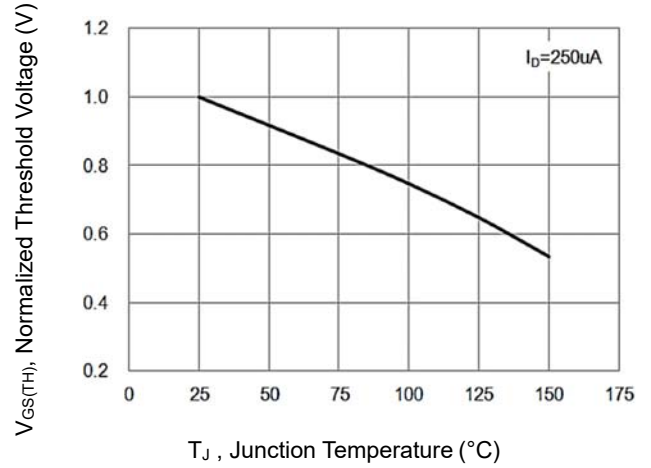
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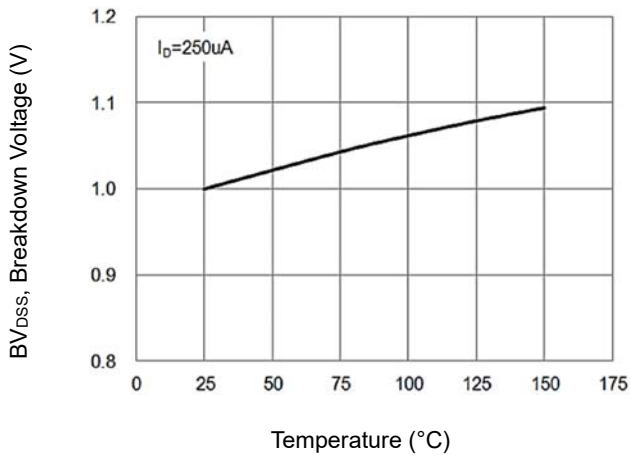
Gate-Charge Characteristics



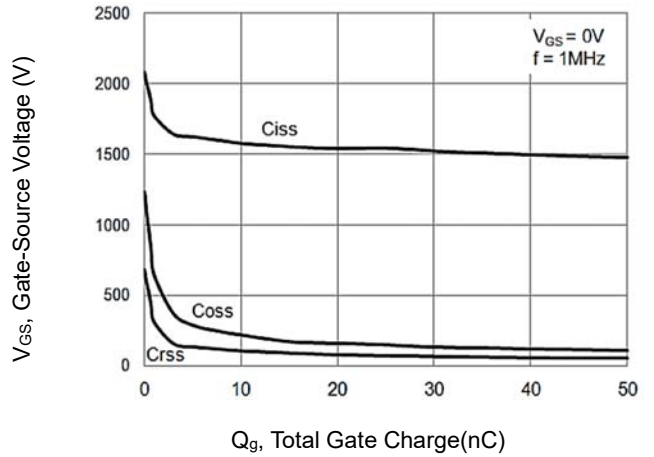
Threshold Voltage vs Junction Temperature



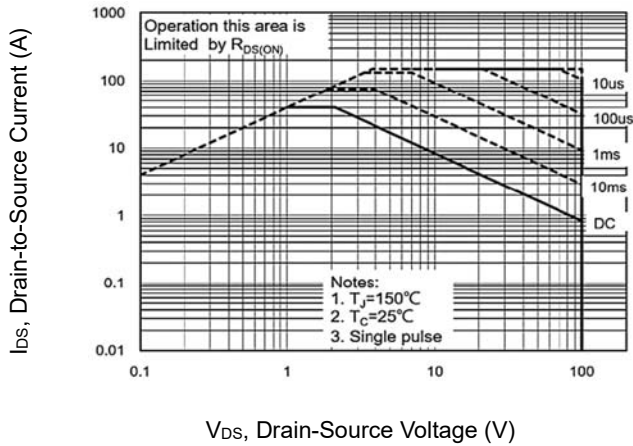
Breakdown Voltage Variation vs Temperature



Capacitance vs Drain-Source Voltage



Maximum Safe Operating Area



Transient Thermal Response Curves

