N-Channel MOSFET
100V 125A 104W DFN5X6

MFT10N125D56

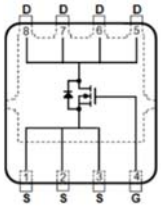
MERITEK

FEATURE

- $R_{DS(ON)}$ <3.7mΩ, V_{GS}=10V, I_D=50A
- High Power and Current Handling Capability
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$

MECHANICAL DATA

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



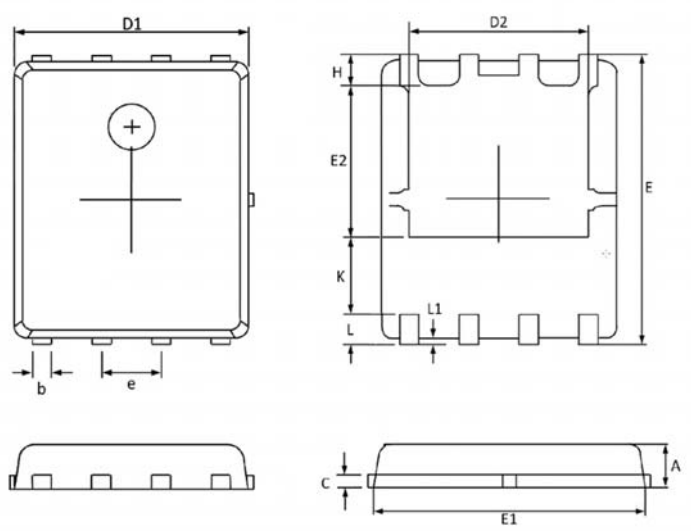
RoHS

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current – Continuous	at $R_{\theta JA}$	I_D	30	A
	at $R_{\theta JC}$		125	A
Drain Current – Pulsed	at $R_{\theta JA}$	I_{DM}	120	A
	at $R_{\theta JC}$		500	A
Avalanche Current		I_{AS}	30	A
Avalanche Energy		E_{AS}	450	mJ
Power Dissipation		P_D	104	W
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	20	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.2	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.80	1.10
b	0.33	0.51
C	0.20	0.30
D1	4.80	5.10
D2	3.61	4.10
E	5.90	6.20
E1	5.70	5.90
E2	3.35	3.78
e	1.27 BSC	
H	0.41	0.70
K	1.10	1.50
L	0.51	0.71
θ	0°	12°

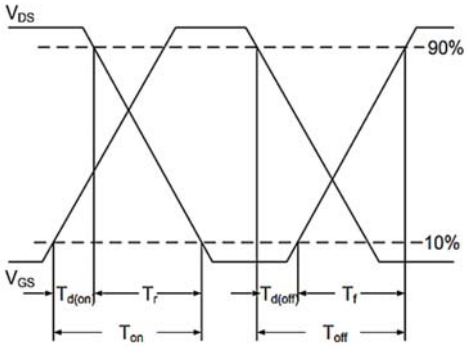


ELECTRICAL CHARACTERISTICS

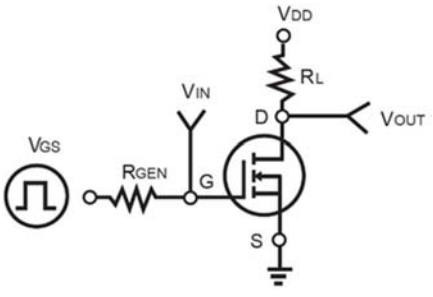
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 10mA	BV_{DSS}	100	--	--	V
Drain-Source Leakage Current	V_{DS} = 100V, V_{GS} = 0V	I_{DSS}	--	--	10	μA
Gate Leakage Current, Forward	V_{GS} = 20V, V_{DS} = 0V	I_{GSSF}	--	--	100	nA
Gate Leakage Current, Reverse	V_{GS} = -20V, V_{DS} = 0V	I_{GSSR}	--	--	-100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 50A	$R_{DS(ON)}$	--	3.1	3.7	mΩ
Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	$V_{GS(th)}$	2	--	4	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS} = 50V, V_{GS} = 10V, I_D = 20A	Q_g	-	107	-	nC
Gate-Source Charge		Q_{gs}	-	23	-	nC
Gate-Drain Charge		Q_{gd}	-	45	-	nC
Turn-On Delay Time	V_{DS} = 50V, V_{GS} = 10V, R_G = 3.6Ω, I_D = 20A	$T_{d(on)}$	-	43	-	ns
Rise Time		T_r	-	30	-	ns
Turn-Off Delay Time		$T_{d(off)}$	-	71	-	ns
Fall Time		T_f	-	33	-	ns
Input Capacitance	V_{DS} = 50V, V_{GS} = 0V, f = 1MHz	C_{iss}	-	3875	-	pF
Output Capacitance		C_{oss}	-	725	-	pF
Reverse Transfer Capacitance		C_{rss}	-	50	-	pF
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Diode Forward Current-Continuous	--	I_S	--	--	80	A
Diode Forward Voltage	V_{GS} = 0V, I_S = 50A	V_{SD}	--	--	1.3	V

Note:
1. Repeitive Rating: Pulse width limited by maximum junction temperature
2. Surface Mounted on FR4 Board, t ≤10 sec.
3. Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
4. Guaranteed by design, not subject to production testing
5. L = 1mH, I_{AS} = 30A, V_{DD} = 24V, R_G = 25Ω, Starting T_J = 25°C

Switching Time Waveform

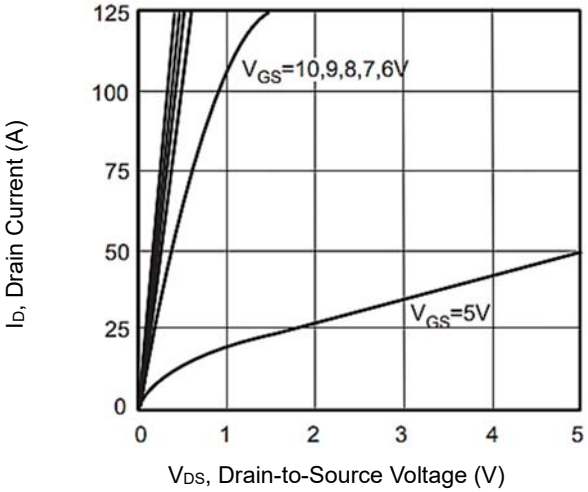


Switching Test Circuit

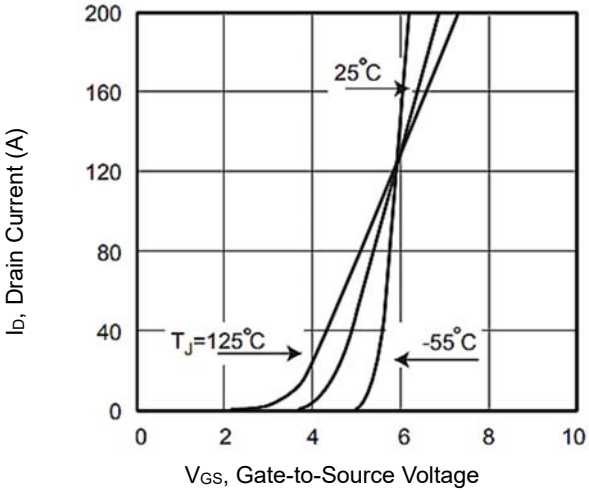


CHARACTERISTICS CURVES

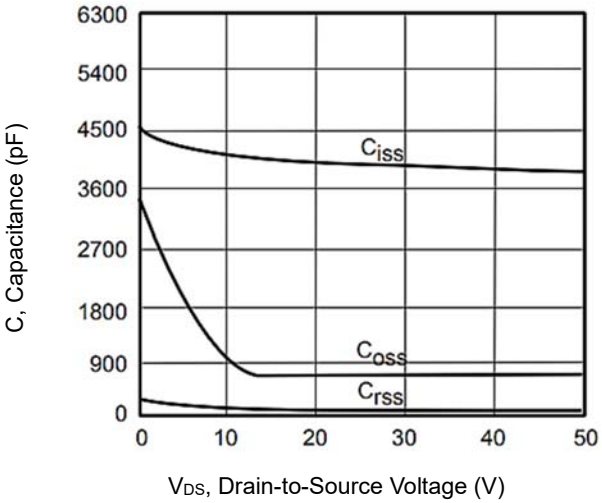
Output Characteristics



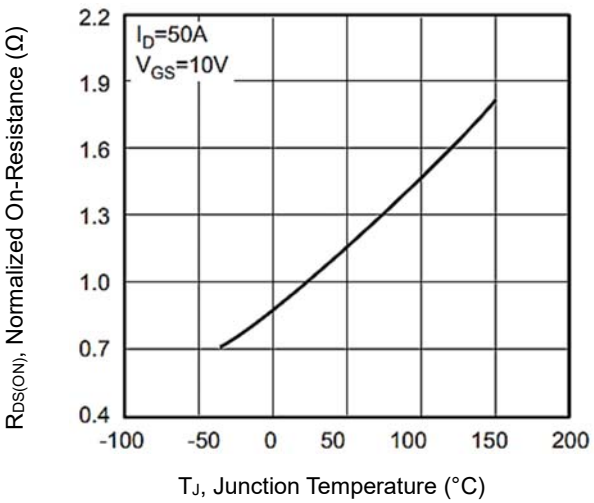
Transfer Characteristics



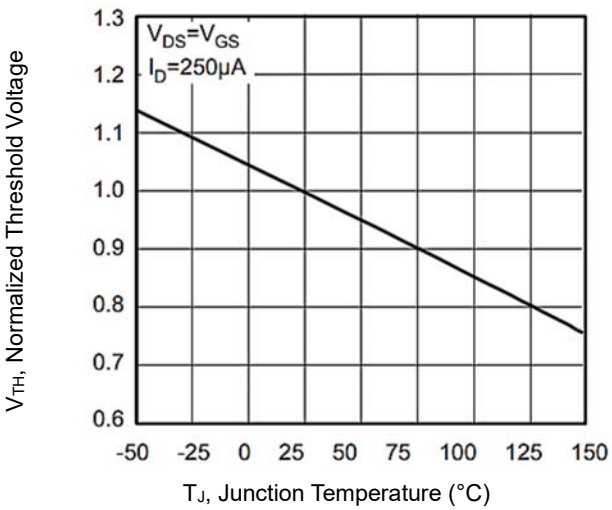
Capacitance



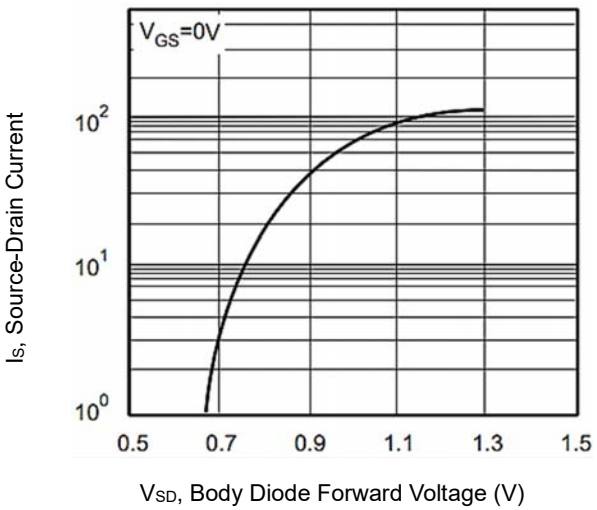
On-Resistance Variation with Temperature



Gate Threshold Voltage with Temperature

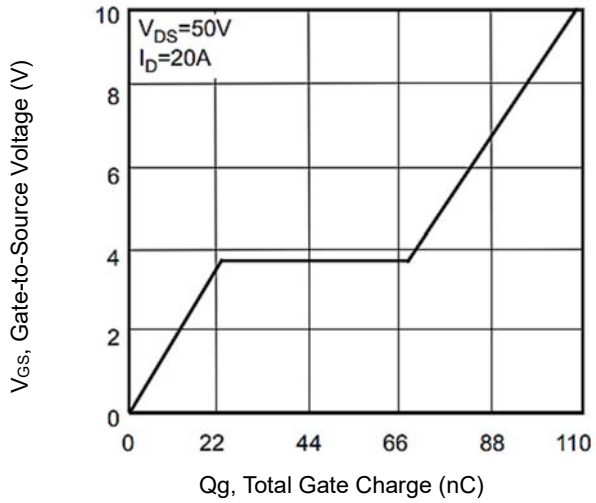


Body Diode Charcacteristics

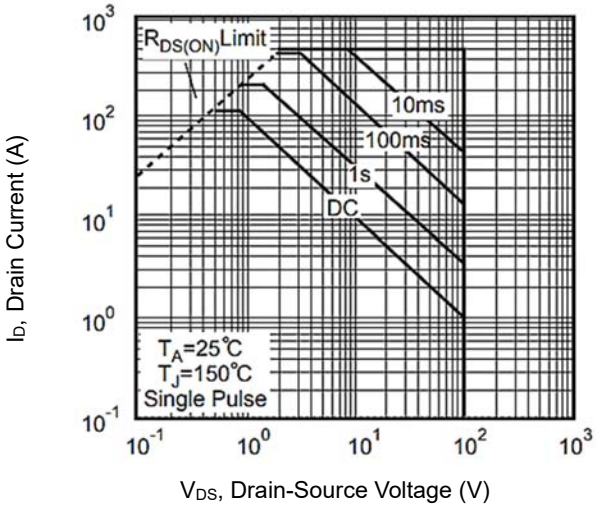


CHARACTERISTICS CURVES

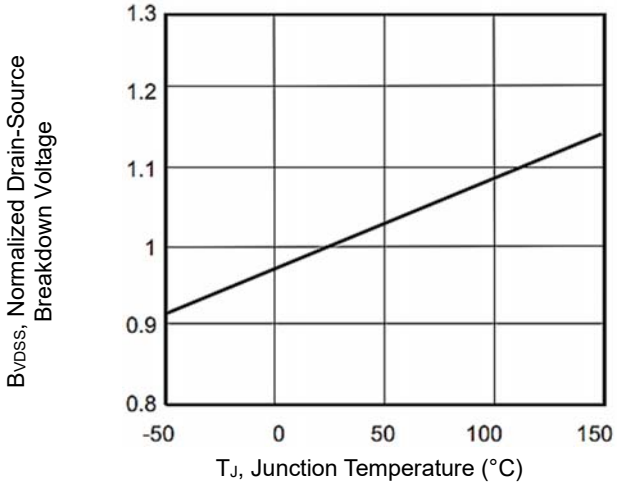
Gate Charge



Maximum Safe Operating Area



Breakdown Voltage Variation with Temperature



Transient Thermal Response Curves