

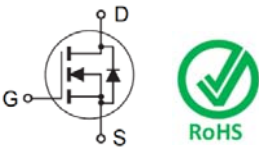
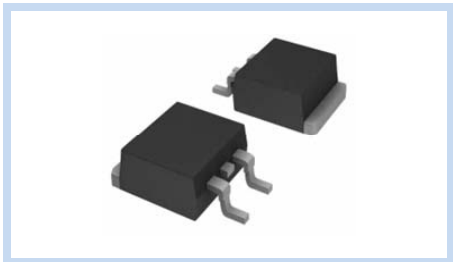
N-Channel MOSFET
100V 42A 83W TO-252

MFT10N42T252

MERITEK

FEATURE

- $R_{DS(ON)} < 25m\Omega$, $V_{GS}=10V$, $I_D=20A$
- $R_{DS(ON)} < 28.5m\Omega$, $V_{GS}=4.5V$, $I_D=15A$
- High density cell design for ultra-low on-resistance
- Advanced Trench Process Technology



MECHANICAL DATA

- Case: TO-252 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

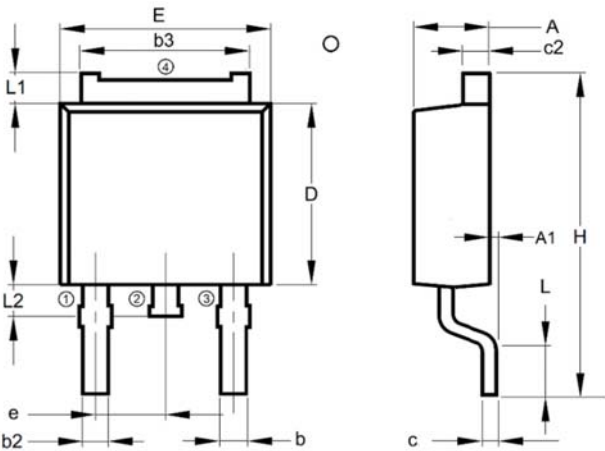
MAXIMUM RATINGS

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	42	A
	$T_C=100^{\circ}C$		26	A
Drain Current – Pulsed	$T_C=25^{\circ}C$	I_{DM}	150	A
Power Dissipation	$T_C=25^{\circ}C$	P_D	83	W
	$T_C=100^{\circ}C$		33	W
Drain Current – Continuous	$T_A=25^{\circ}C$	I_D	6.3	A
	$T_A=70^{\circ}C$		5.1	A
Power Dissipation	$T_A=25^{\circ}C$	P_D	2.0	W
	$T_A=70^{\circ}C$		1.3	W
Single Pulse Avalanche Energy		E_{AS}	63.4	mJ
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		T_J, T_{STG}	-55 to 150	$^{\circ}C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.18	2.39
A1	--	0.13
b	0.64	0.89
b2	0.64	0.89
b3	4.95	5.46
c	--	0.508
c2	0.46	0.89
D	5.97	6.22
E	6.35	6.73
e	--	2.29
H	8.80	10.60
L	1.40	1.78
L1	0.89	1.27
L2	0.64	0.89

Note: 1: Gate, 2, 4: Drain, 3: Source



N-Channel MOSFET

100V 42A 83W TO-252

MFT10N42T252

MERITEK

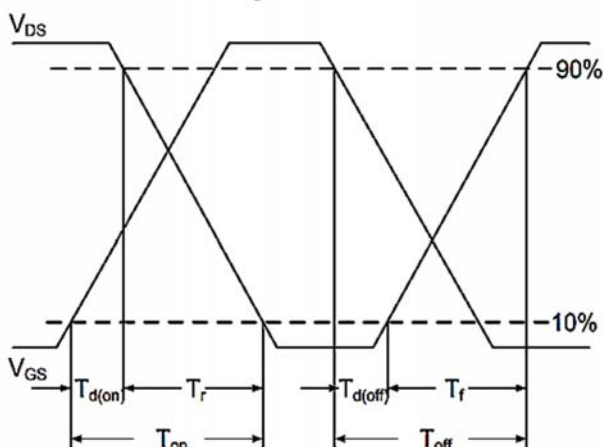
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	100	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=80V, V_{GS}=0V$	I_{DSS}	--	--	1.0	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	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.8	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	--	29	--	nC
Gate-Source Charge		Q_{gs}	--	4.5	--	nC
Gate-Drain Charge		Q_{gd}	--	6.4	--	nC
Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3\Omega, I_D=10A$	$T_{d(on)}$	--	7.8	--	ns
Rise Time		T_r	--	30	--	ns
Turn-Off Delay Time		$T_{d(off)}$	--	35	--	ns
Fall Time		T_f	--	14	--	ns
Input Capacitance	$V_{DS}=30V, V_{GS}=0V, F=1MHz$	C_{iss}	--	1485	--	pF
Output Capacitance		C_{oss}	--	135	--	pF
Reverse Transfer Capacitance		C_{rss}	--	67	--	pF
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	42	A
Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	V_{SD}	--	0.7	1.2	V

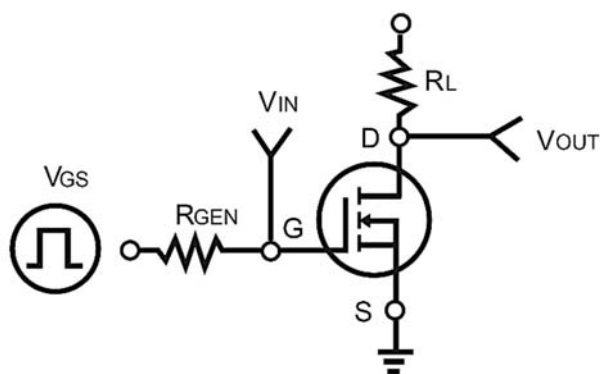
Note:

1. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature $T_{J(Max)}=150^\circ C$. Ratings 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 2oz square pad of copper
6. The test condition is $L=3mH, I_{AS}=1A, V_{DD}=50V, V_{GS}=10V$.
7. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



N-Channel MOSFET

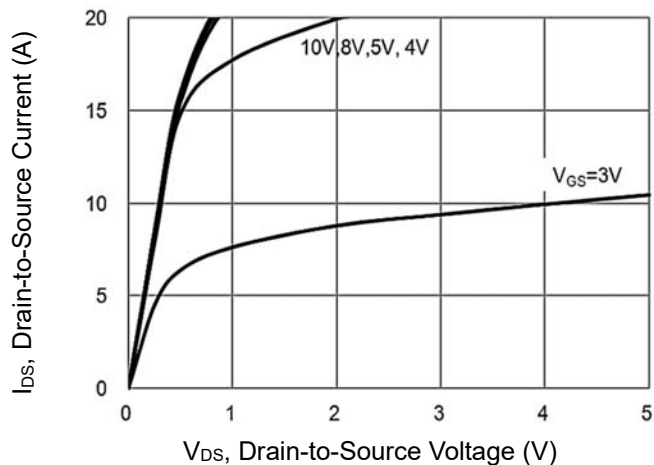
100V 42A 83W TO-252

MFT10N42T252

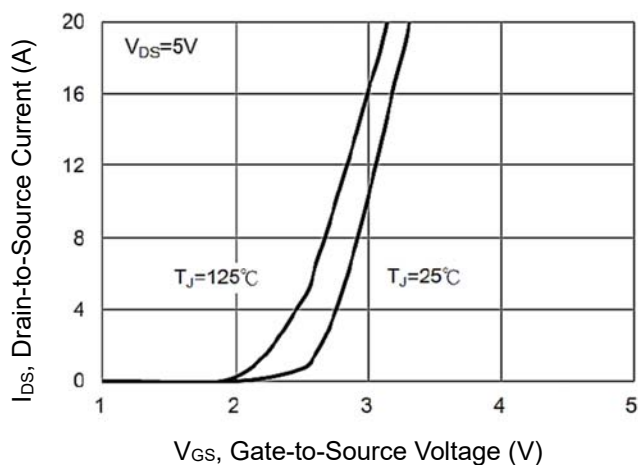
MERITEK

CHARACTERISTIC CURVES

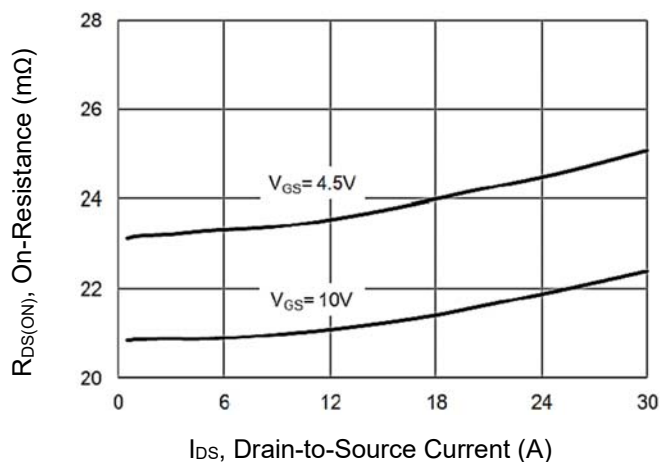
Output Characteristics



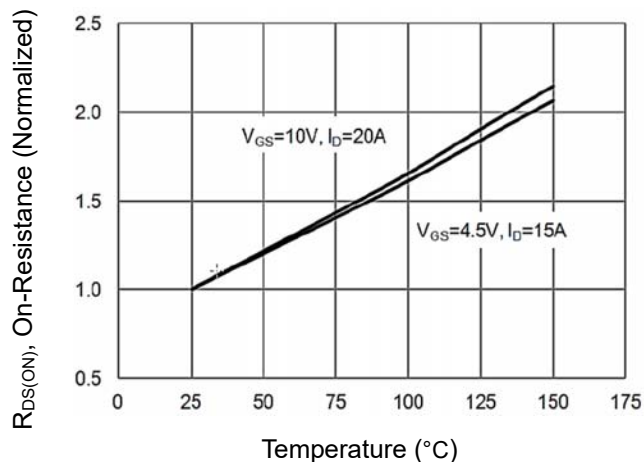
Transfer Characteristics



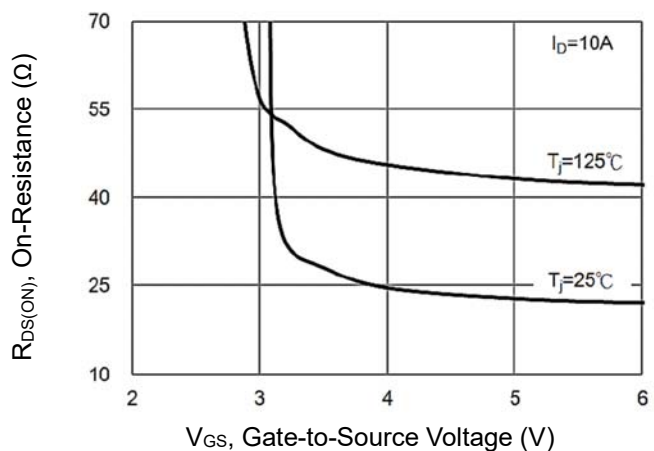
On-Resistance vs. Drain Current



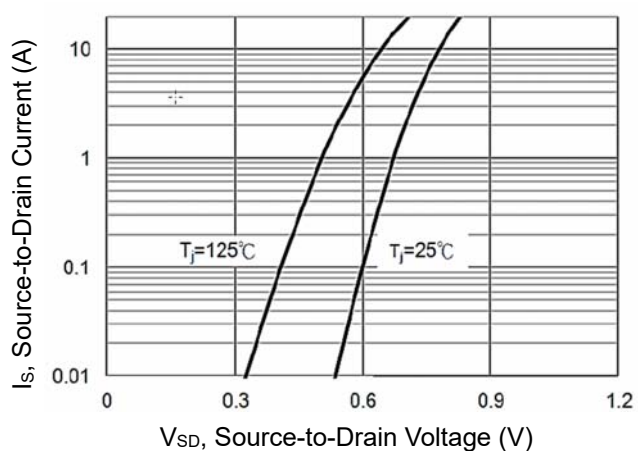
On-Resistance vs. Junction temperature



On-Resistance Variation with VGS



Body Diode Characteristics



N-Channel MOSFET

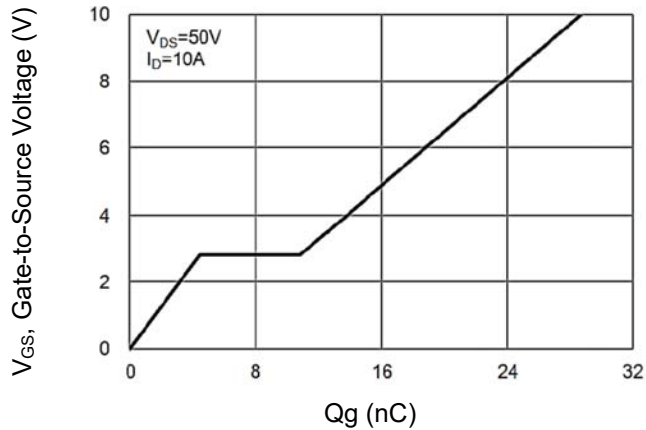
100V 42A 83W TO-252

MFT10N42T252

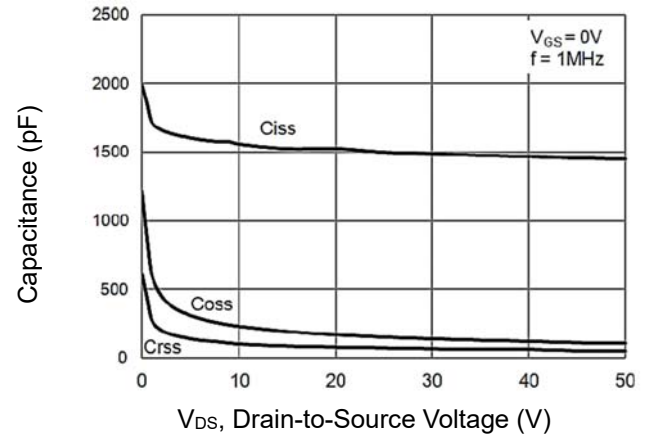
MERITEK

CHARACTERISTIC CURVES

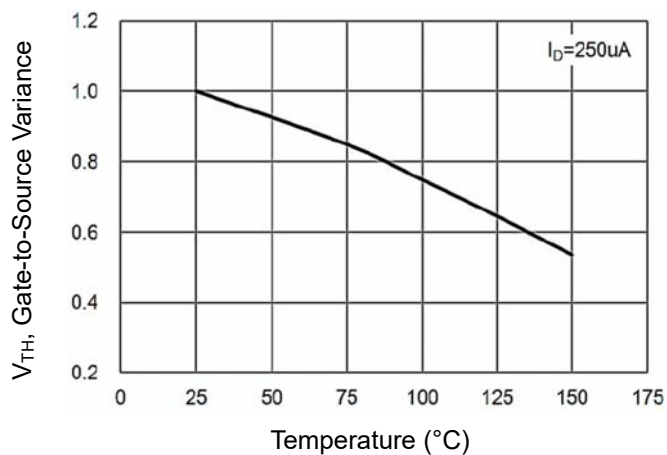
Gate-Charge Characteristics



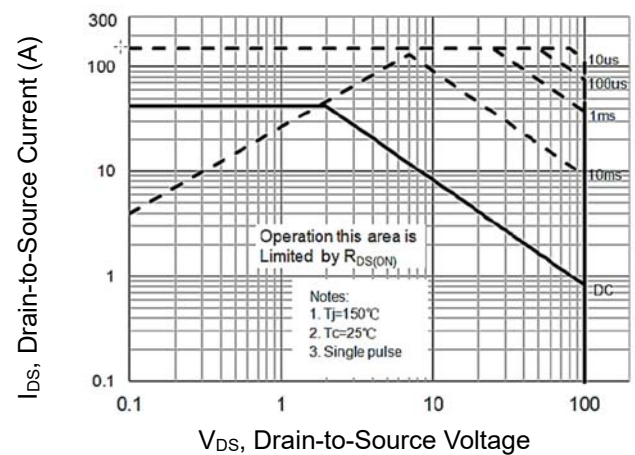
Capacitance vs. Drain-Source Voltage



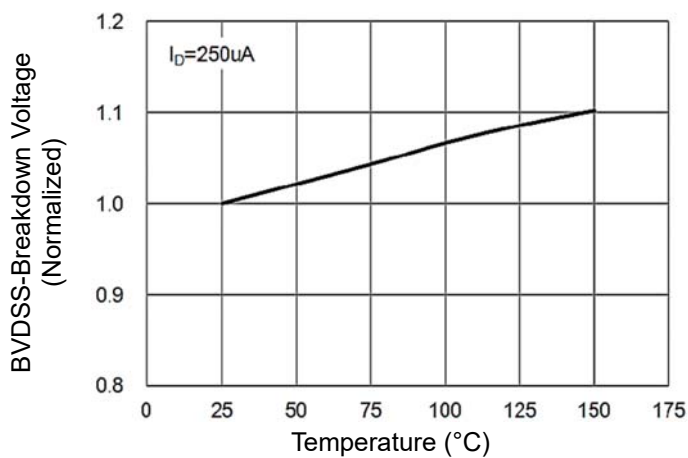
Threshold Voltage Variation with Temperature



Maximum Safe Operating Area



Threshold Voltage Variation vs. Temperature



N-Channel MOSFET
100V 42A 83W TO-252

MFT10N42T252

MERITEK

CHARACTERISTIC CURVES

