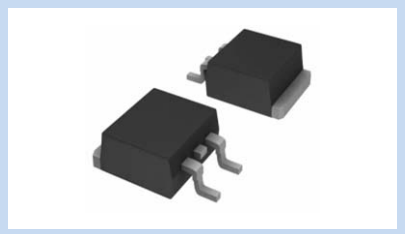
P-Channel MOSFET
60V 42.5A TO-252

MFT6P42A5T252

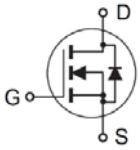
MERITEK

FEATURE



- $R_{DS(ON)}$ <21mΩ at V_{GS}= -10V, I_D= -17A
- High Power and Current Handing Capability
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Fast Switching Characteristics

MECHANICAL DATA



RoHS

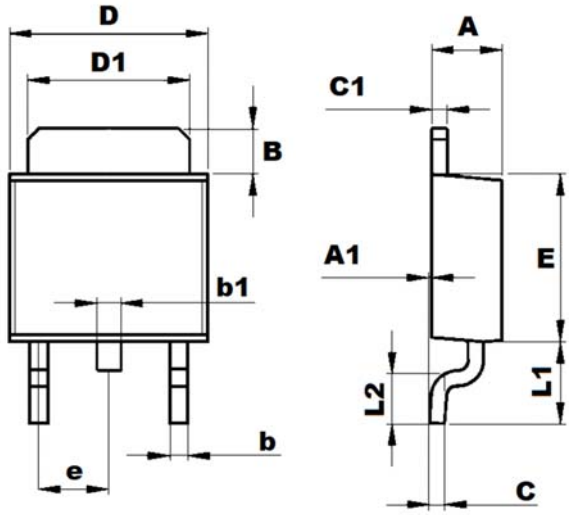
- Case: TO-252 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current – Continuous	V_{GS}=10V, T_C=25°C	I_D	-42.5	A
	V_{GS}=10V, T_C=100°C		-26.9	A
Drain Current – Continuous	V_{GS}=10V, T_A=25°C		-8.5	A
	V_{GS}=10V, T_A=70°C		-5.4	A
Drain Current – Pulsed		I_{DM}	-170	A
Avalanche Current	L=0.1mH	I_{AS}	-60	A
Avalanche Energy	L=0.5mH	E_{AS}	450	mJ
Power Dissipation	T_C=25°C	P_D	62.5	W
	T_C=100°C		25	W
Power Dissipation	T_A=25°C		2.5	W
	T_A=70°C		1.0	W
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	2	°C/W
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.18	2.39
A1	--	0.13
B	0.89	1.27
b	0.64	0.89
C	0.508 BSC	
C1	0.46	0.89
D	6.35	6.73
D1	4.95	5.46
E	5.97	6.22
e	2.29	--
L1	2.74 BSC	
L2	1.40	1.78



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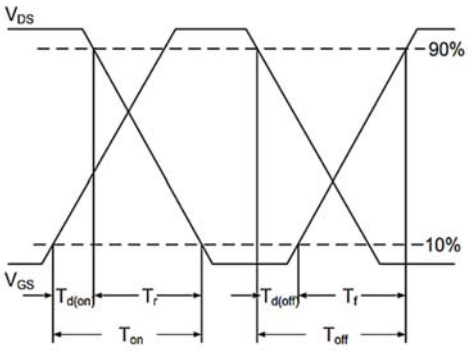
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	BV_{DSS}	-60	--	--	V
Drain-Source Leakage Current	V_{DS}= -60V, V_{GS}=0V	I_{DSS}	--	--	-1	μA
	V_{DS}= -48V, V_{GS}=0V, T_J=70°C		--	--	-25	
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Drain-Source On-Resistance	V_{GS}= -10V, I_D= -17A	$R_{DS(ON)}$	--	15.7	21	mΩ
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D= -250μA	$V_{GS(th)}$	-2	--	-4	V
Forward Transconductance	V_{DS}= -10V, I_D= -20A	G_{FS}	--	22.9	--	S
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}= -48V, V_{GS}= -10V, I_D= -17A	Q_g	--	38.4	--	nC
Gate-Source Charge		Q_{gs}	--	8.1	--	
Gate-Drain Charge		Q_{gd}	--	12.5	--	
Turn-On Delay Time	V_{DS}= -30V, V_{GS}= -10V, R_G=1Ω, I_D= -17A	$T_{d(on)}$	--	15.6	--	ns
Rise Time		T_r	--	25	--	
Turn-Off Delay Time		$T_{d(off)}$	--	54.2	--	
Fall Time		T_f	--	19.6	--	
Input Capacitance	V_{DS}= -30V, V_{GS}=0V, F=1MHz	C_{iss}	--	2071	--	pF
Output Capacitance		C_{oss}	--	276	--	
Reverse Transfer Capacitance		C_{rss}	--	117	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Reverse Recovery Time	I_F=10A, dI_F/dt=100A/μS	t_{rr}	--	24	--	ns
Reverse Recovery Charge		Q_{rr}	--	19	--	nC
Diode Forward Voltage	V_{GS}=0V, I_S=10A, T_J=25°C	V_{SD}	--	0.8	1.2	V
Diode Forward Current - Continuous	-	I_S	--	--	-42.5	A
Diode Forward Current - Pulsed	-	I_{SM}	--	--	-170	

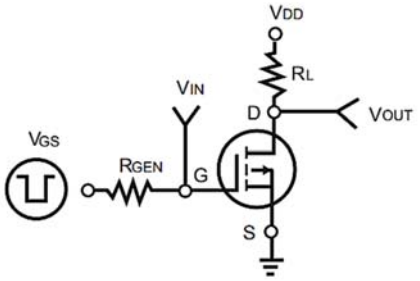
Note:

1. Pulse width limited by safe operating area
2. 100% tested by conditions of V_{DD}=-50V, L=0.5mH, V_{GS}=-10V, I_{AS}=-24A
3. The value of $R_{\theta JA}$ is measured by with the device mounted on 1 in^2 FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.
4. The power dissipation P_D is more useful in setting the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

Switching Time Waveform

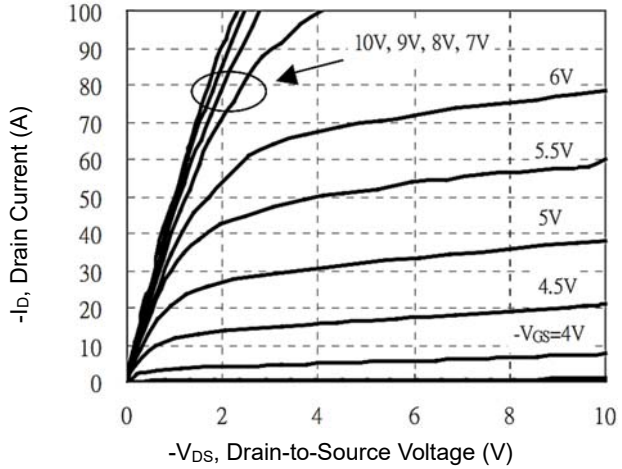


Switching Test Circuit

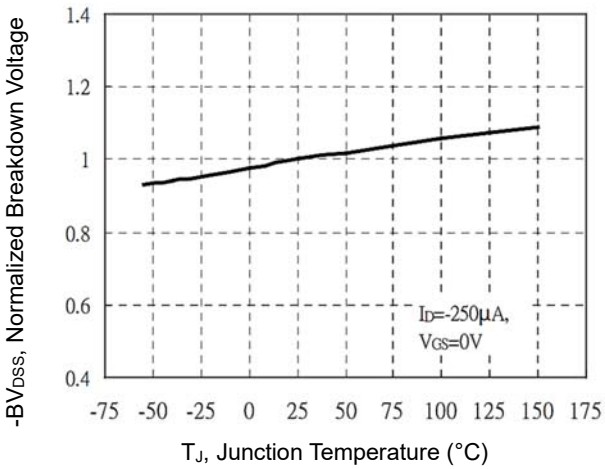


CHARACTERISTICS CURVES

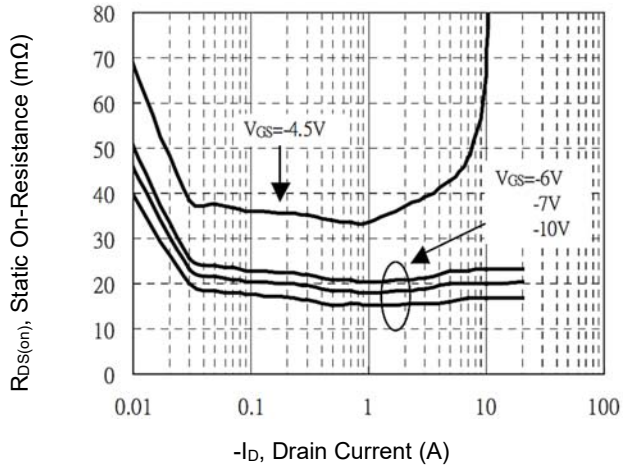
Typical Output Characteristics



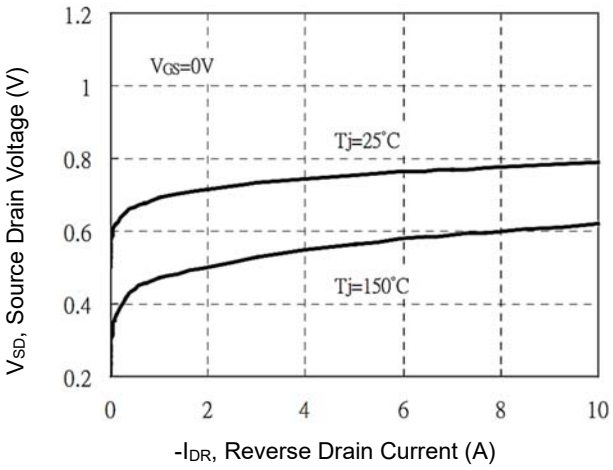
Breakdown vs. Ambient Temperature



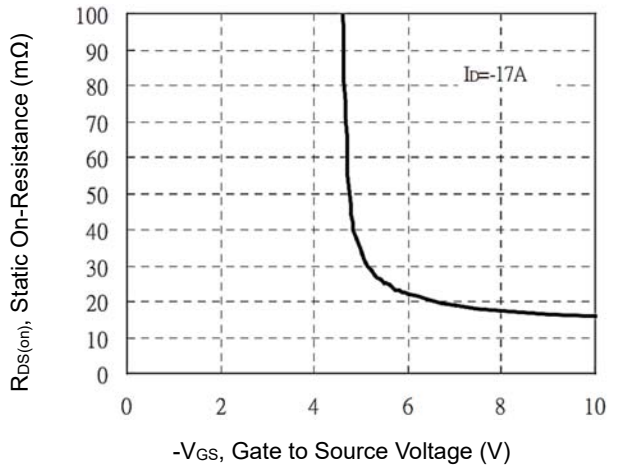
Static On-Resistance vs. Drain Current



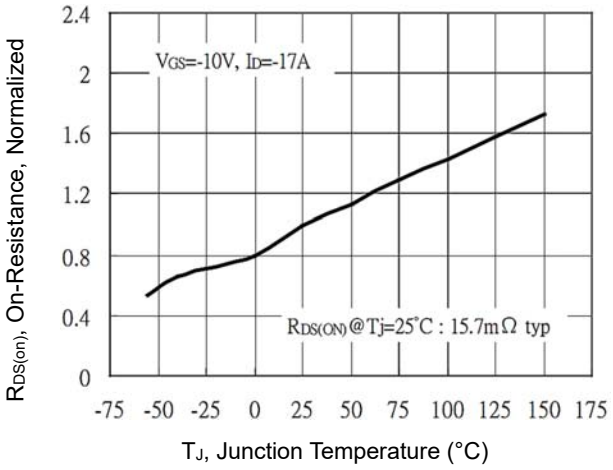
Reverse Drain Current vs. Source-Drain Current



Static On-Resistance vs. Gate-Source Voltage

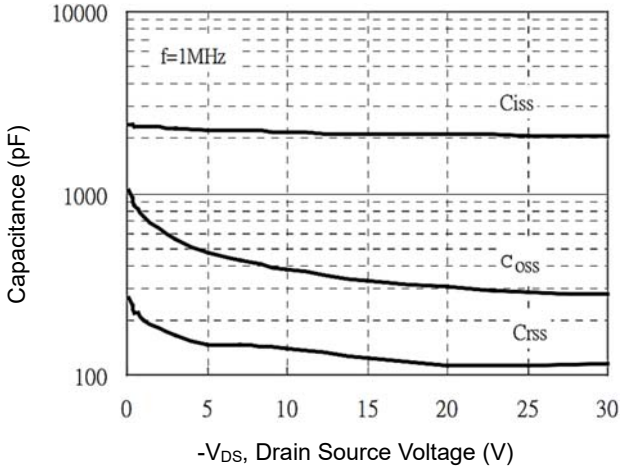


On-Resistance vs. Junction Temperature

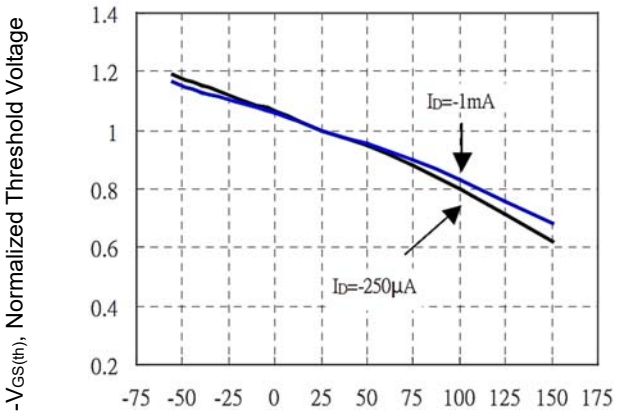


CHARACTERISTICS CURVES

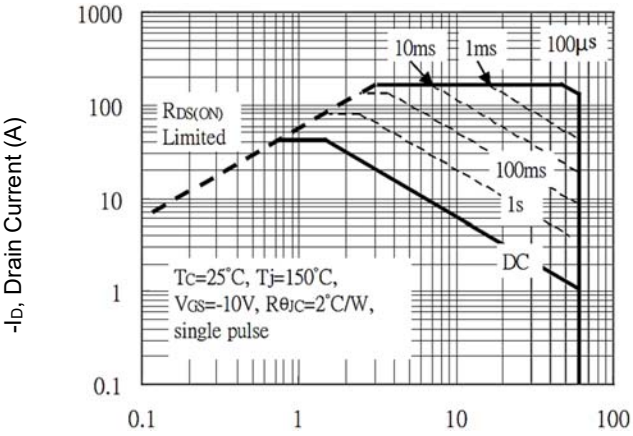
Capacitance vs. Drain-Source Voltage



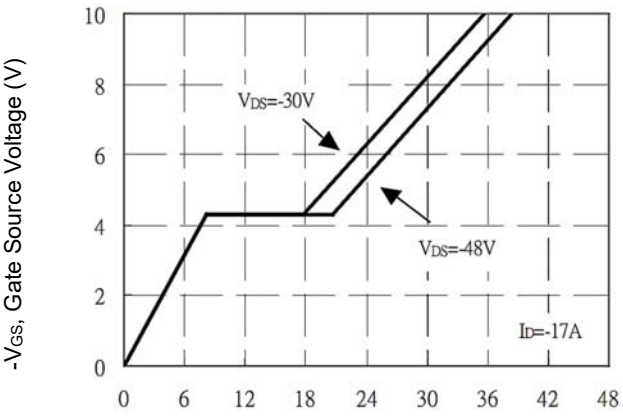
Threshold Voltage vs. Junction Temperature



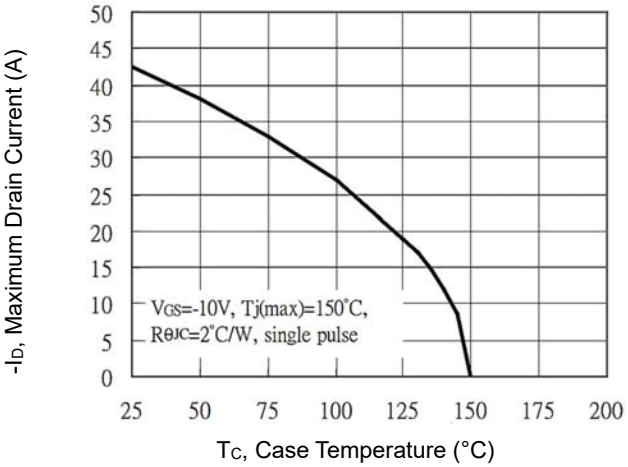
Maximum Safe Operating Area



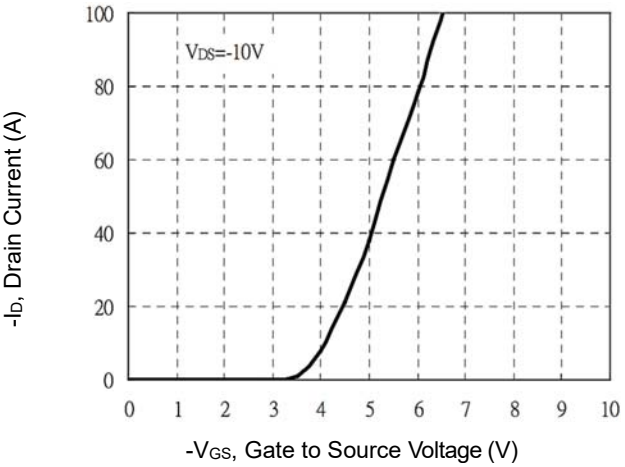
Gate Charge Characteristics



Maximum Drain Current vs Case Temperature

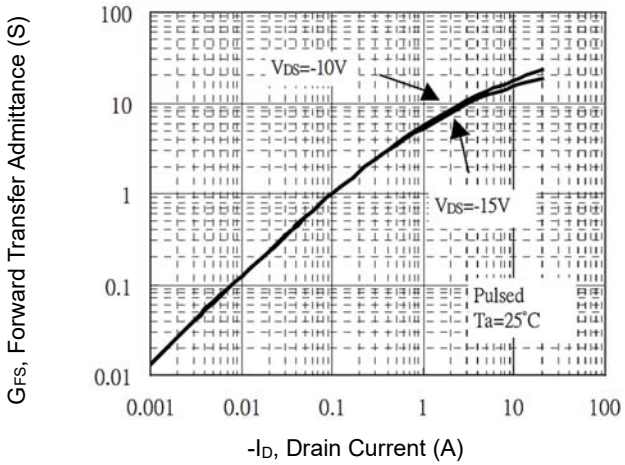


Typical Transfer Characteristics

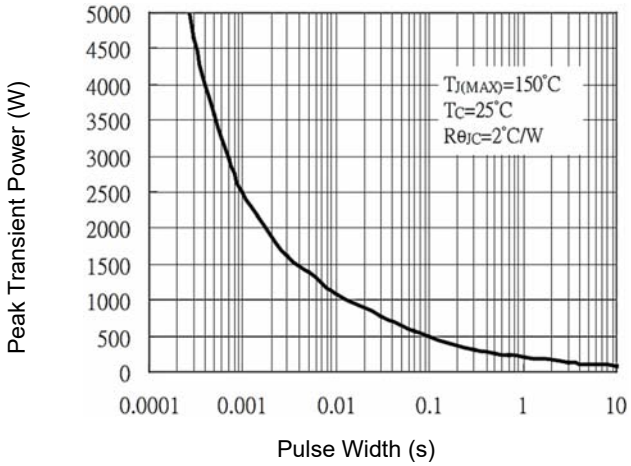


CHARACTERISTICS CURVES

Forward Transfer Admittance vs. Drain Current



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curves