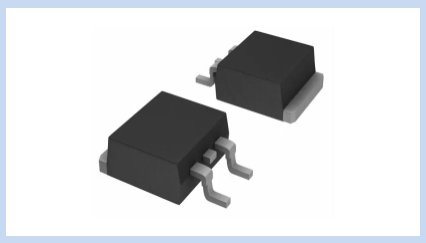
P-Channel MOSFET
-60V -56A 125W TO-252

MFT6P56T252

MERITEK

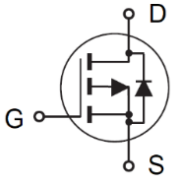
FEATURE

- $R_{DS(ON)}$ < 15mΩ at V_{GS}=-10V, I_D=10A
- Super High Dense Cell Design for Low $R_{DS(ON)}$
- Low Gate Charge
- Fast Switching Characteristic



MECHANICAL DATA

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



RoHS

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 (silicon limit)	I_D	-70	A
	V_{GS}=10V,T_C=25°C (package limit)		-56	
	V_{GS}=10V,T_C=100°C		-45	
	V_{GS}=10V,T_A=25°C		-12	
	V_{GS}=10V,T_A=100°C		-9.7	
Drain Current – Pulsed		I_{DM}	-224	A
Power Dissipation	T_C=25°C	P_D	125	W
	T_C=100°C		50	
	T_A=25°C		3.5	
	T_A=70°C		2.2	W
Single Pulse Avalanche Energy @L=0.5mH		E_{AS}	162	mJ
Single Pulse Avalanche Current @L=0.1mH		I_{AS}	-38	A
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	36	°C/W
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.0	°C/W
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	°C

Note:

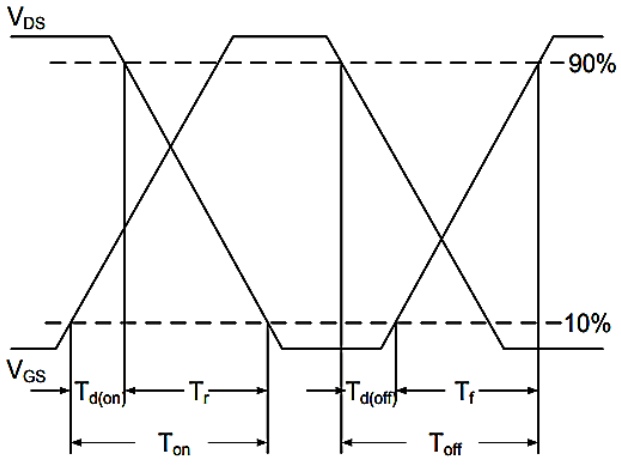
1. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction junction-to -case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. copper, in a still air environment with T_A=25°C. The power dissipation P_D is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

ELECTRICAL CHARACTERISTICS

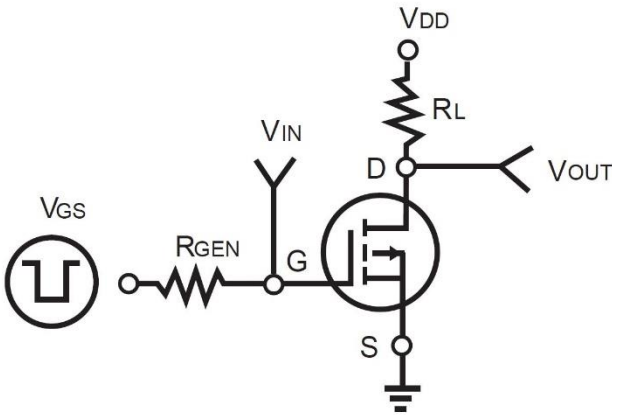
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	BV_{DSS}	-60	--	--	V
Drain-Source Leakage Current	V_{DS}=-48V, V_{GS}=0V	I_{DSS}	--	--	-1	μA
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-10A	$R_{DS(ON)}$	--	11.5	15	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}=-30V, V_{GS}=-10V, I_D=-10A	Q_g	--	64	--	nC
Gate-Source Charge		Q_{gs}	--	12	--	nC
Gate-Drain Charge		Q_{gd}	--	22	--	nC
Turn-On Delay Time	V_{DS}=-30V, V_{GS}=-10V, R_G=1Ω I_D=-10A	$T_{d(on)}$	--	28	--	ns
Rise Time		T_r	--	23	--	ns
Turn-Off Delay Time		$T_{d(off)}$	--	61	--	ns
Fall Time		T_f	--	16	--	ns
Input Capacitance	V_{DS}=-30V, V_{GS}=0V, F=1MHz	C_{iss}	--	3465	--	pF
Output Capacitance		C_{oss}	--	375	--	pF
Reverse Transfer Capacitance		C_{rss}	--	229	--	pF
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Forward Transconductance	V_{DS}=-10V, I_D=-20A	G_{FS}	--	21	--	S
Drain-Source Diode Forward Current	T_C=25°C	I_S	--	--	-56	A
Diode Forward Voltage	V_{GS}=0V, I_S=20A, T_J=25°C	V_{SD}	--	-0.8	-1.2	V
Reverse Recovery Time	I_F=-10A, dI_F/dt=100A/μs	t_{rr}	--	21	--	ns
Reverse Recovery Charge		Q_{rr}	--	19	--	nC

Note:
4. Pulse Width≤300uS, Duty Cycle≤2%
5. Independent of operating temperature.

Switching Time Waveform

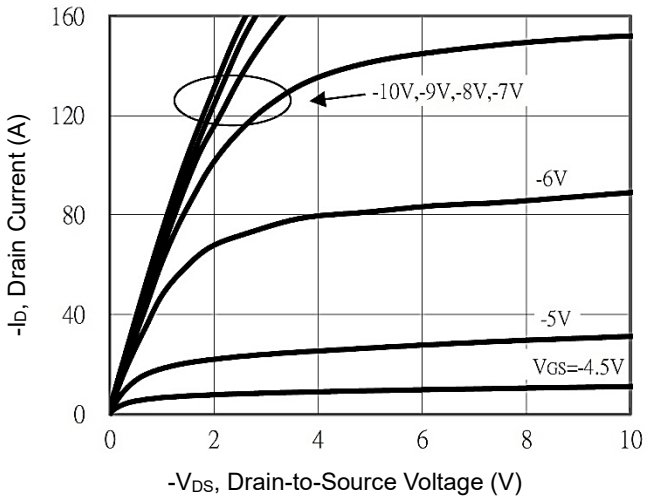


Switching Test Circuit

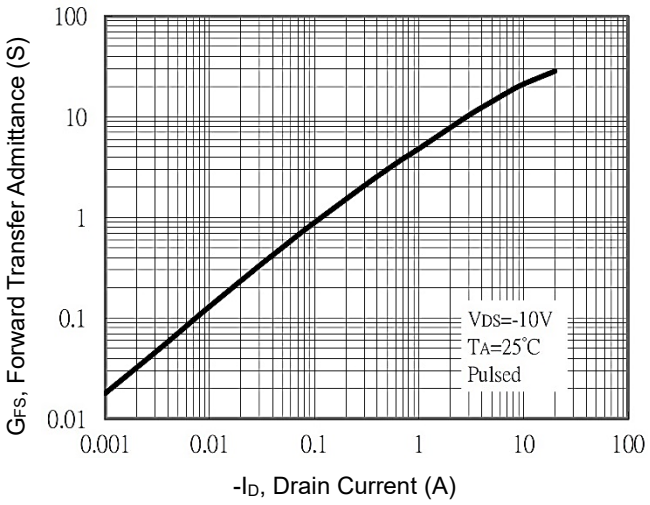


CHARACTERISTICS CURVES

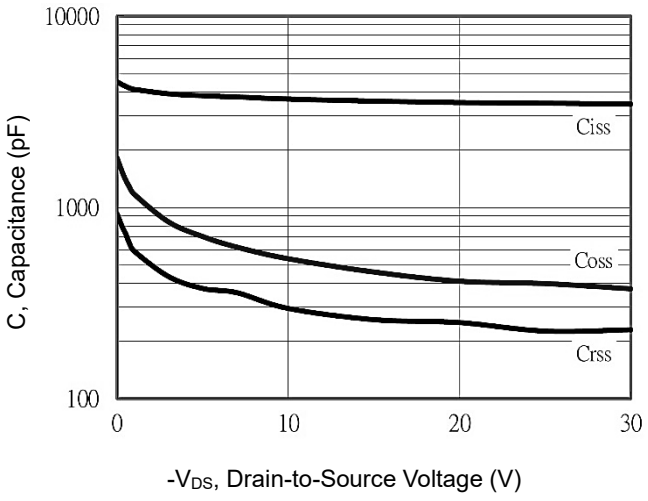
Output Characteristics



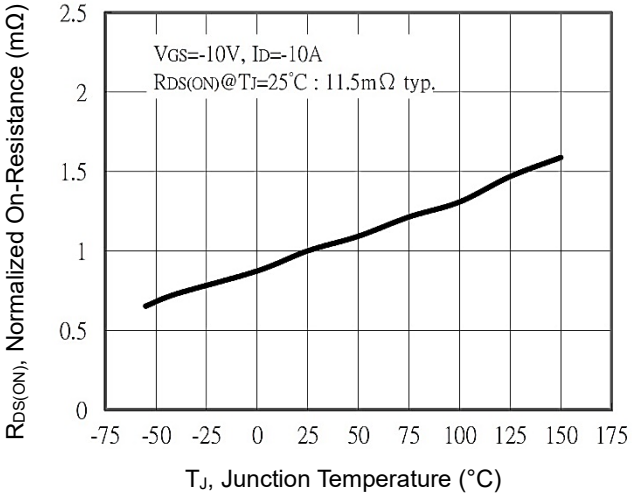
Forward Transfer Admittance vs Drain Current



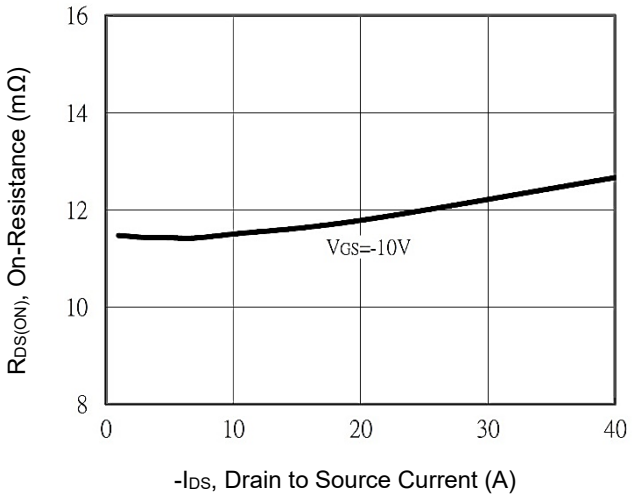
Capacitance



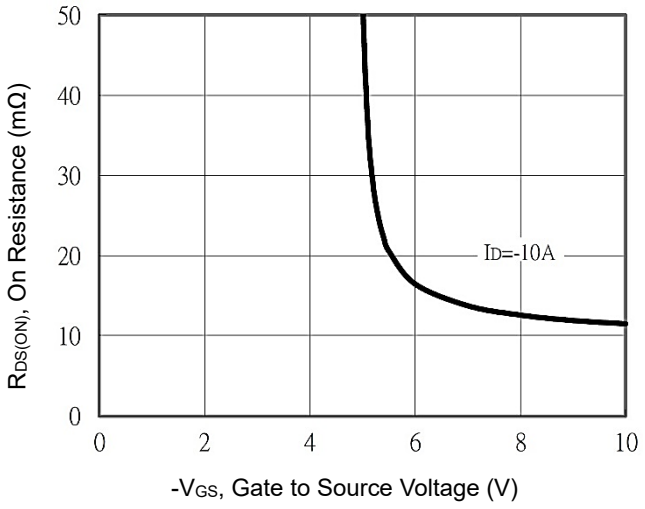
On-Resistance vs Junction Temperature



On-Resistance vs. Drain Current

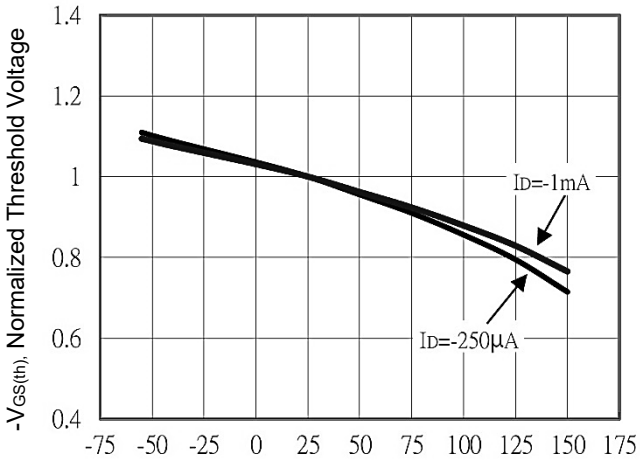


On-Resistance Variation with VGS

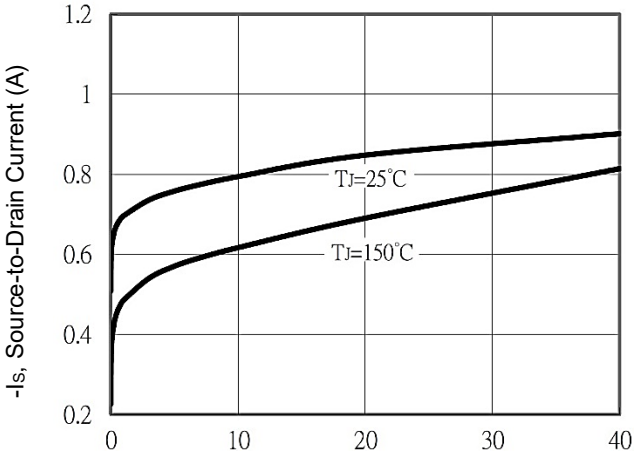


CHARACTERISTICS CURVES

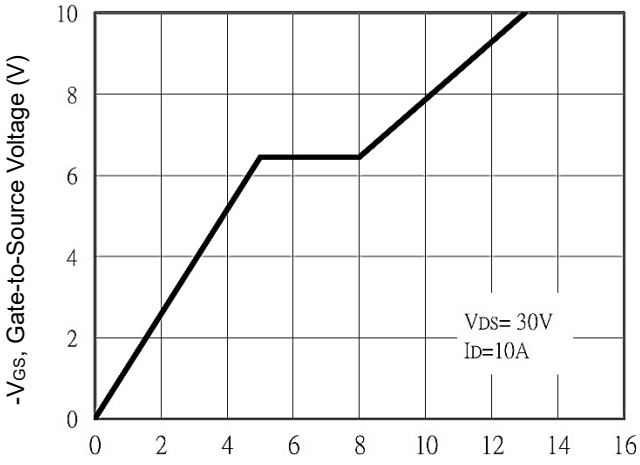
Gate Threshold Variation with Temperature



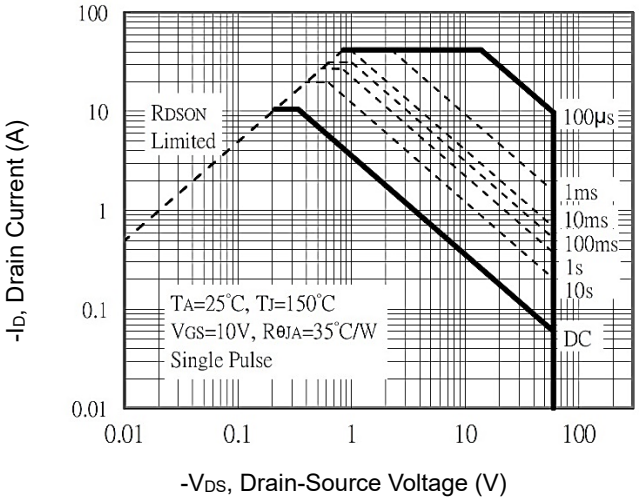
Body Diode Forward Voltage



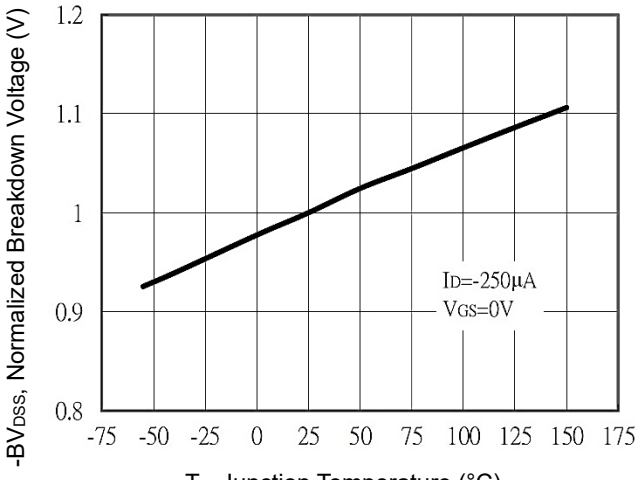
Gate Charge



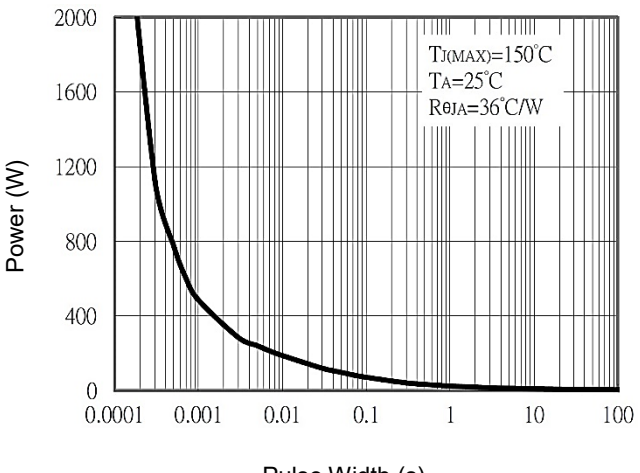
Maximum Safe Operating Area



Breakdown Voltage Variation vs Temperature

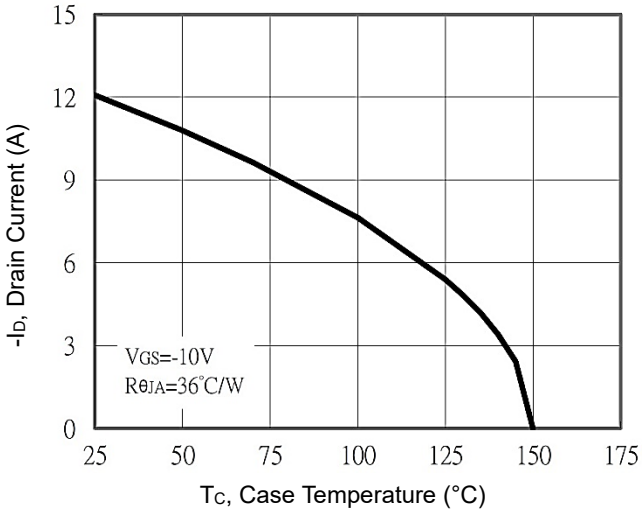


Single Pulse Power Rating, Junction to Case

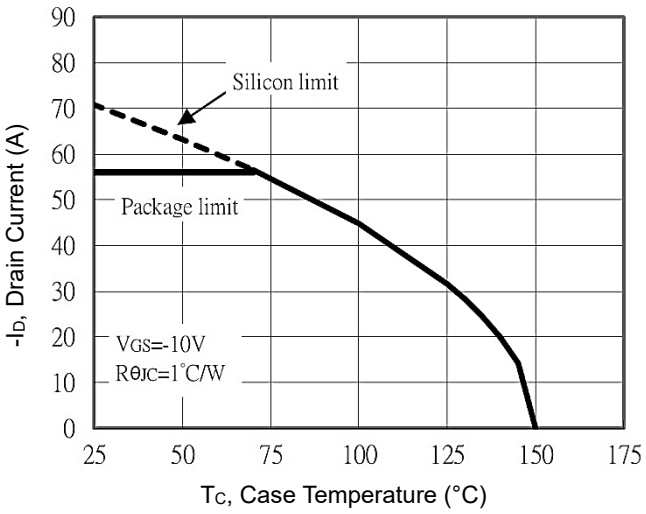


CHARACTERISTICS CURVES

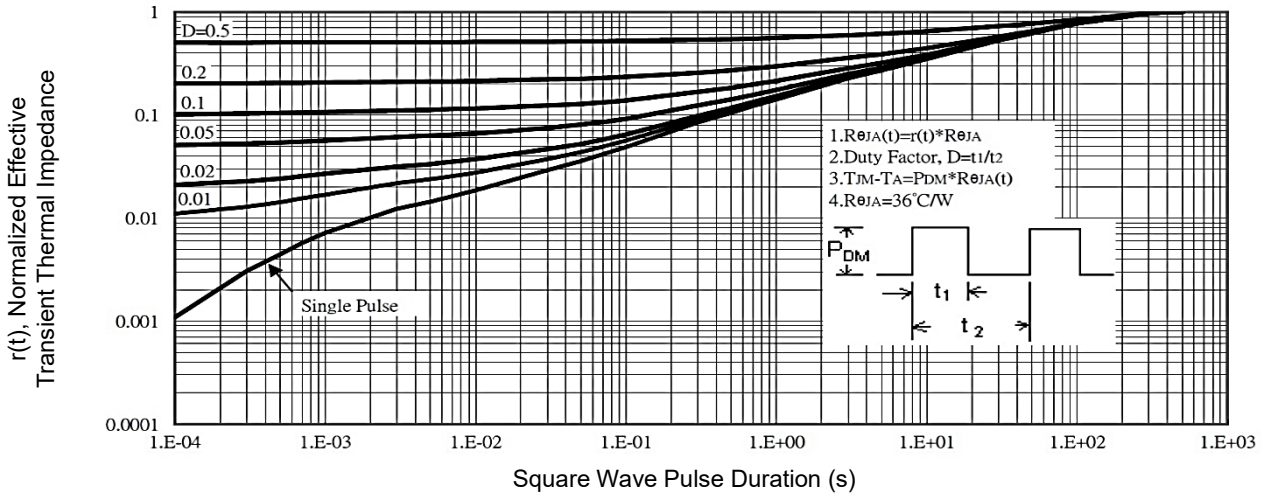
Maximum Drain Current vs Case Temperature



Maximum Drain Current vs Case Temperature



Normalized Transient Thermal Impedance Curves



DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	2.20	2.40
A1	--	0.13
b	0.50	0.90
b2	0.76	1.14
b3	4.95	5.59
c	0.40	0.61
c2	0.45	0.89
D	5.40	6.63
E	6.05	7.10
e	1.98	2.59
H	8.80	10.60
L	0.25	--
L1	0.70	1.78
L2	0.50	1.20

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