

P-Channel MOSFET

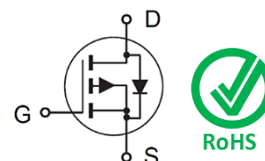
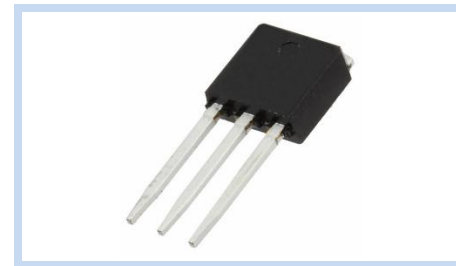
60V 14A TO-251

MFT6P14T251

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FEATURE

- $R_{DS(ON)} \leq 86m\Omega$ at $V_{GS} = -10V$
- $R_{DS(ON)} \leq 110m\Omega$ at $V_{GS} = -10V$
- Low $R_{DS(ON)}$
- Low Gate Charge
- Applications: Motor Control, Backlighting



MECHANICAL DATA

- Case: TO-251 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	
Drain Current – Continuous	$V_{GS} = -10V, T_C = 25^\circ C$	I_D	-14	A
	$V_{GS} = -10V, T_C = 100^\circ C$		-8.8	
	$V_{GS} = -10V, T_A = 25^\circ C$		-4.4	
	$V_{GS} = -10V, T_A = 70^\circ C$		-3.5	
Drain Current – Pulsed		I_{DM}	-56	
Body Diode Forward Current – Continuous	$T_C = 25^\circ C$	I_S	-14	W
Body Diode Forward Current – Pulsed	$T_C = 100^\circ C$	I_{SM}	-56	
Power Dissipation	$T_C = 25^\circ C$	P_D	34	
	$T_C = 100^\circ C$		14	
	$T_A = 25^\circ C$		3.2	
	$T_A = 70^\circ C$		2	
Single Pulsed Avalanche Energy	$L = 0.5mH$	E_{AS}	6	mJ
Single Pulsed Avalanche Current	$L = 0.1mH$	I_{AS}	-14	A
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	39	$^\circ C/W$
Thermal Resistance Junction to Case		$R_{\theta JC}$	3.7	$^\circ C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ C$

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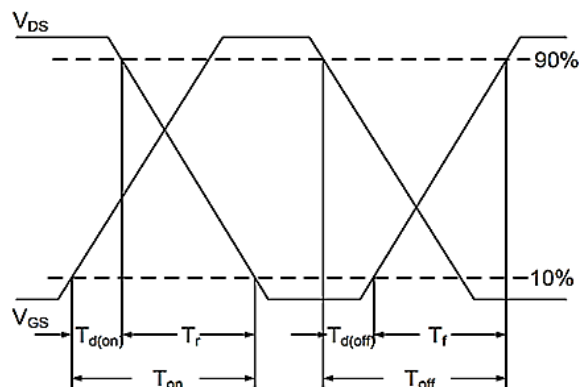
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-60	--	--	V
Drain-Source Leakage Current	$V_{DS}=-48V, V_{GS}=0V$	I_{DSS}	--	--	-1	μA
Gate-Body 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	$V_{GS}=-10V, I_D=-4A$	$R_{DS(ON)}$	--	66	86	m Ω
	$V_{GS}=-4.5V, I_D=-3A$		--	80	110	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-1.0	--	-2.5	V
Forward Transfer Admittance	$V_{DS}=-10V, I_D=-4A$	G_{FS}	--	8	--	S
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-30V, V_{GS}=-10V, I_D=-4A$	Q_g	--	25	--	nC
Gate-Source Charge		Q_{gs}	--	3.7	--	
Gate-Drain Charge		Q_{gd}	--	4	--	
Turn-On Delay Time	$V_{DD}=-30V, V_{GS}=-10V, R_G=6\Omega, I_D=-4A$	$T_{d(on)}$	--	7	--	ns
Rise Time		T_r	--	22	--	
Turn-Off Delay Time		$T_{d(off)}$	--	120	--	
Fall Time		T_f	--	50	--	
Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, F=1MHz$	C_{iss}	--	1400	--	pF
Output Capacitance		C_{oss}	--	65	--	
Reverse Transfer Capacitance		C_{rss}	--	50	--	
Gate Resistance	$F=1MHz$	R_g	24	50	--	Ω
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Voltage	$V_{GS}=0V, I_S=-4A$	V_{SD}	--	-0.83	-1.2	V
Reverse Recovery Time	$I_D=-4A, di_f/dt = 100A/\mu s$	T_{rr}	--	12	--	ns
Reverse Recovery Charge		Q_{rr}	--	8	--	nC

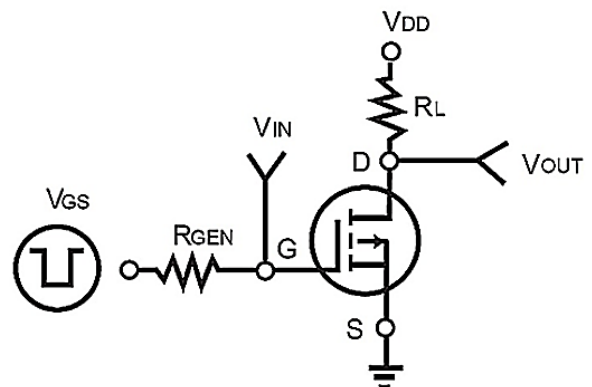
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature $T_{J(MAX)}=150^{\circ}C$.
2. Ratings are based on low frequency and low duty cycles to keep initial $T_J=25^{\circ}$.
3. The power dissipation P_D is based on $T_{J(MAX)}=150^{\circ}C$, using junction junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with $T_A=25^{\circ}C$. The power dissipation P_D is based on $R_{\theta JA}$ and the maximum allowed junction temperature of $150^{\circ}C$. The value in any given application depends on the user's specific board design.
5. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
6. Independent of operating temperature

Switching Time Waveform

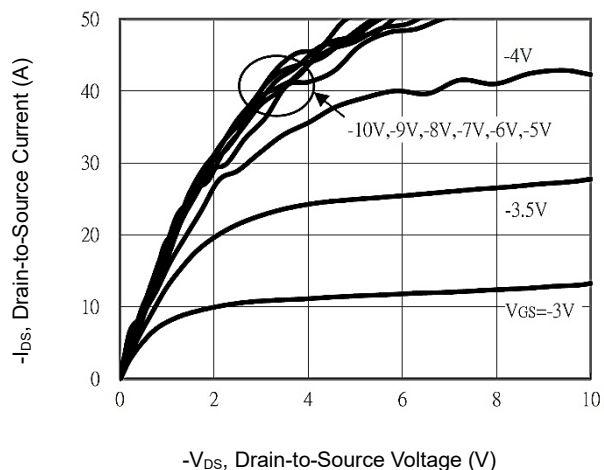


Switching Test Circuit

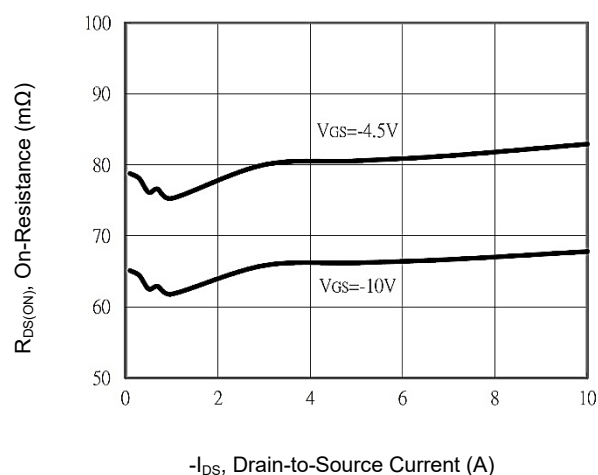


CHARACTERISTIC CURVES

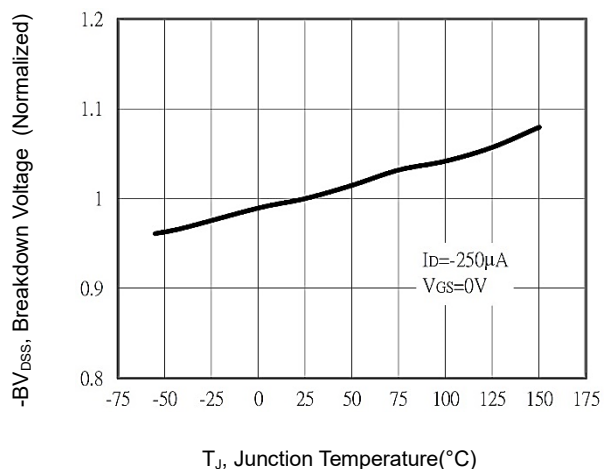
Output Characteristics



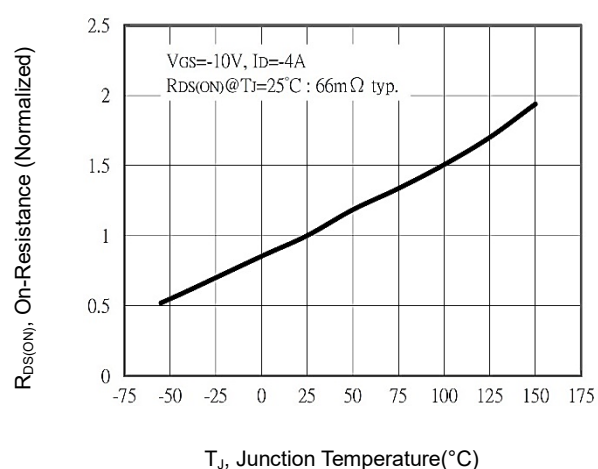
On-Resistance vs Drain Current



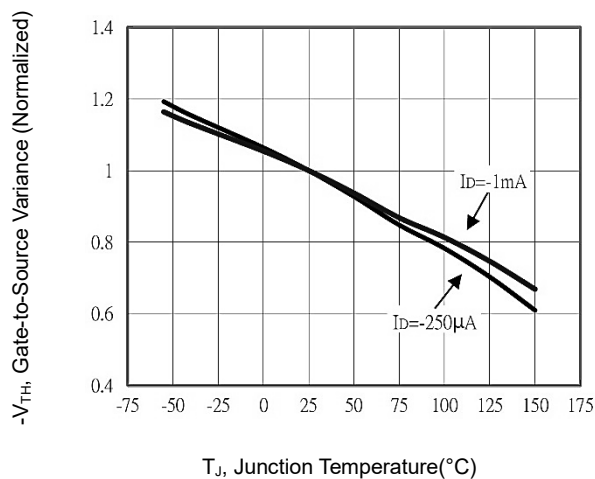
Breakdown Voltage vs. Temperature



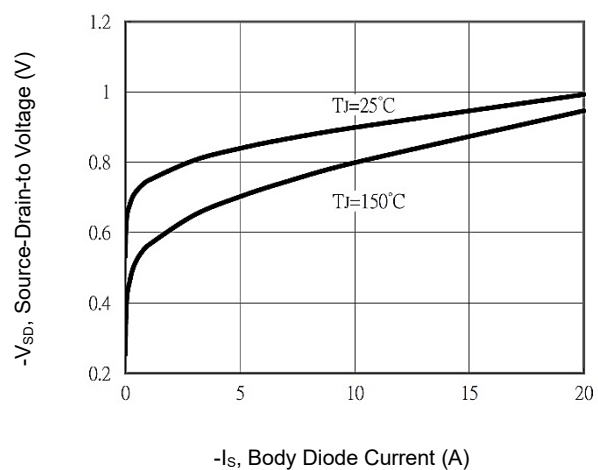
On-Resistance vs. Junction temperature



Threshold Voltage Variance vs. Temperature



Body Diode Characteristics



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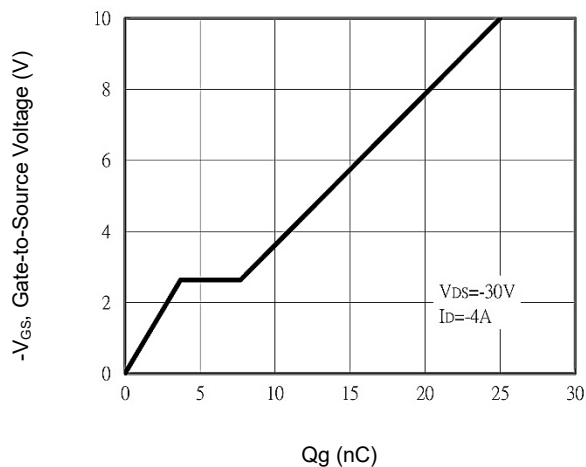
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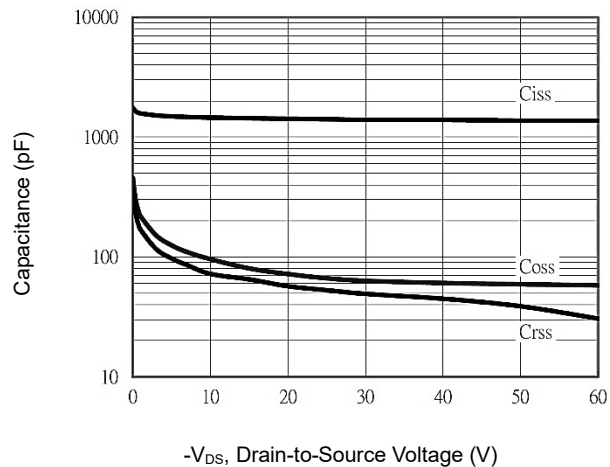
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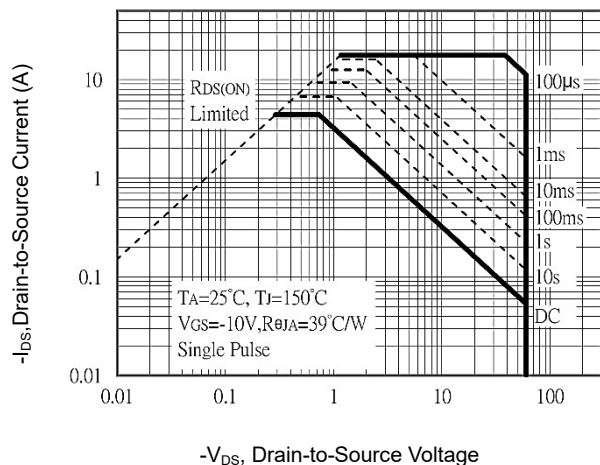
Gate-Charge Characteristics



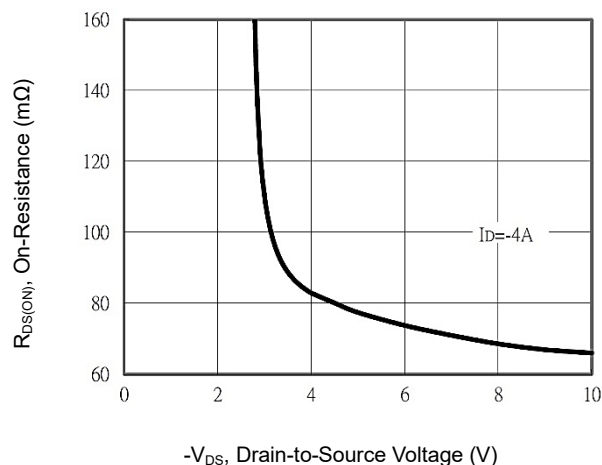
Capacitance vs. Drain-Source Voltage



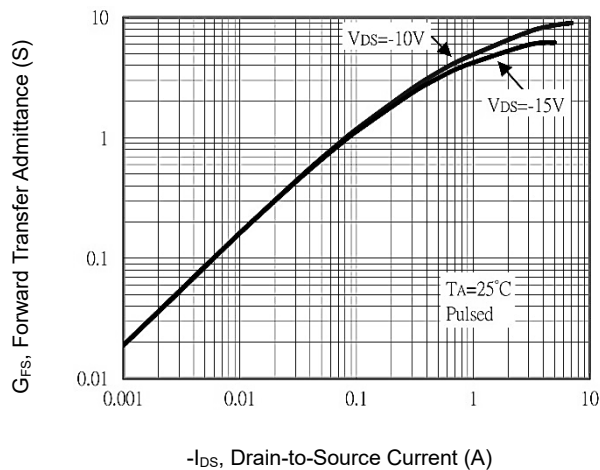
Maximum Safe Operating Area



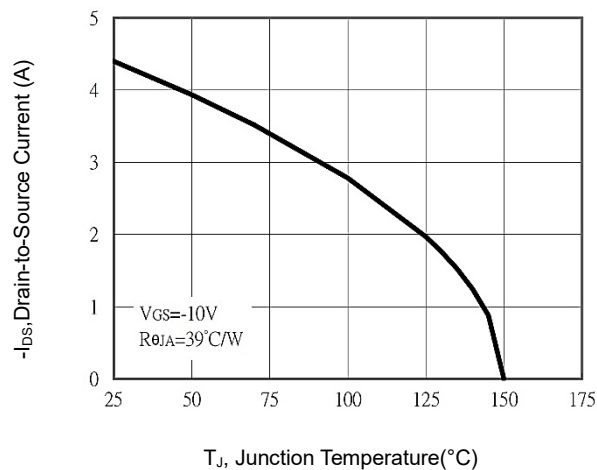
On-Resistance vs. Drain-Source Voltage



Forward Transfer Admittance vs Drain Current



Maximum Drain Current vs Junction Temperature



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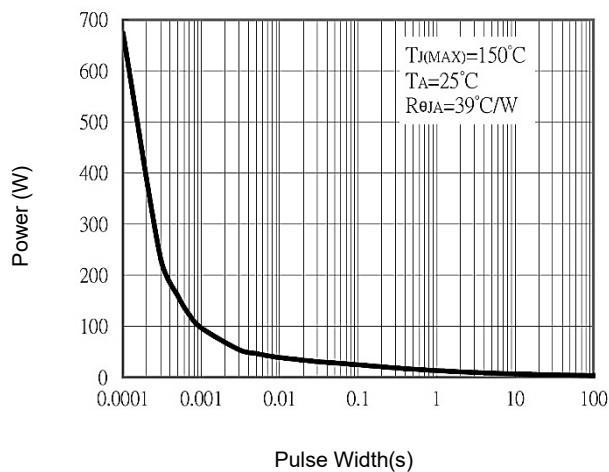
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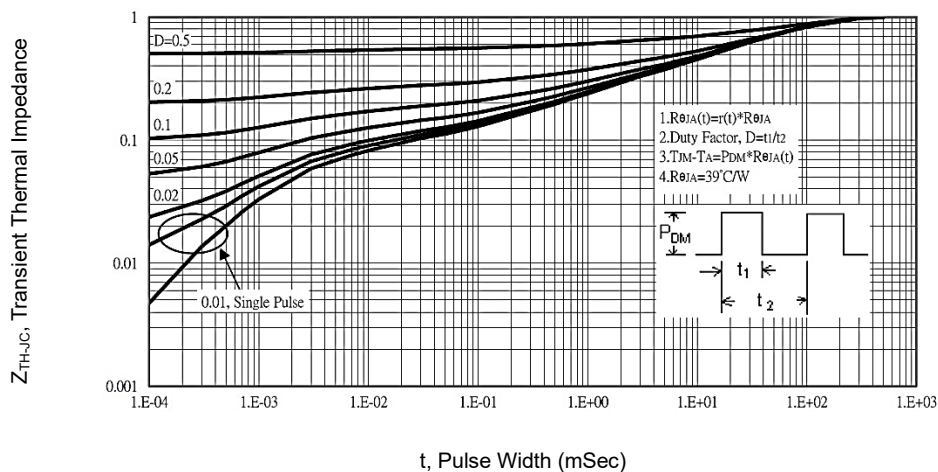
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CHARACTERISTIC CURVES

Single Pulse Power Rating



Normalized Transient Thermal Impedance vs Pulse Width



DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.20	2.40
A1	1.02	1.27
b	0.50	0.70
b1	0.70	0.90
c	0.43	0.58
c1	0.43	0.58
D	5.40	5.70
E	6.35	6.65
E1	5.20	5.40
e	2.30	
e1	4.50	4.70
L	7.50	7.90
L1	1.20	1.60
L2	1.35	1.65

