

P-Channel MOSFET

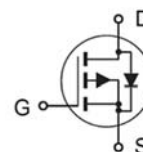
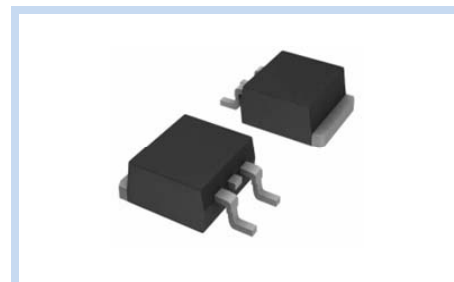
-60V -25.7A 42.9W TO-252

MFT6P20A7T252

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FEATURE

- $R_{DS(ON)} < 45m\Omega$ at $V_{GS} = -10V$, $I_D = -10A$
- $R_{DS(ON)} < 60m\Omega$ at $V_{GS} = -4.5V$, $I_D = -8A$
- High Power and Current handling Capability
- High Density Cell Design for Extremely Low On-Resistance
- Application: Power Management in Note book, Battery Powered System
- RoHS Compliant



MECHANICAL DATA

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

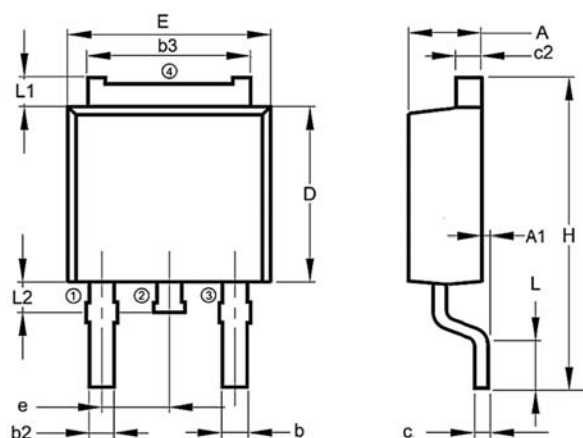
MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous	I_D	$T_c = 25^\circ C$	-25.7
		$T_c = 100^\circ C$	-16.1
Drain Current – Pulsed	I_{DM}	-60	A
Power Dissipation	P_D	42.9	W
Single Pulse Avalanche Energy	E_{AS}	30	mJ
Single Pulse Avalanche Current	I_{AS}	-24.5	A
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	35	$^\circ C/W$
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.9	$^\circ C/W$
Operating Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.10	2.50
A1	0.00	0.15
b	0.50	1.00
b2	0.65	1.15
b3	4.90	5.50
c	0.40	0.65
c2	0.40	0.65
D	5.60	6.20
E	6.10	6.70
e	2.30	
H	9.00	10.70
L	1.40	1.78
L1	0.85	1.20
L2	0.51	1.10

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



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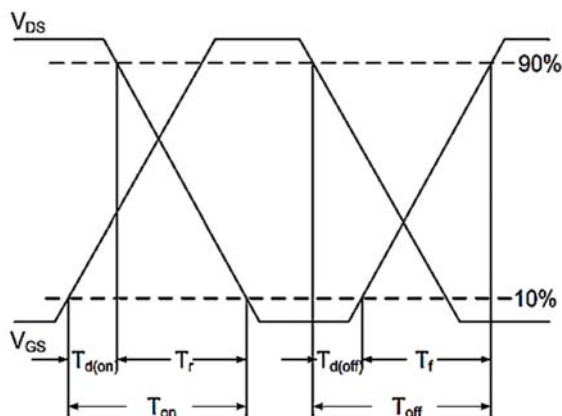
ELECTRICAL CHARACTERISTICS

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	$V_{DS}=-60V, V_{GS}=0V$	I_{DSS}	--	--	-1	μA
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSSF}	--	--	± 100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-10A$	$R_{DS(ON)}$	--	35	45	m Ω
	$V_{GS}=-4.5V, I_D=-8A$		--	--	60	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-1.0	--	-2.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-30V, V_{GS}=-4.5V, I_D=-10A$	Q_g	--	16	--	nC
			--	35	--	
Gate-Source Charge	$V_{DS}=-30V, V_{GS}=-10V, I_D=-10A$	Q_{gs}	--	6	--	nC
Gate-Drain Charge		Q_{gd}	--	4	--	
Turn-On Delay Time		$T_{d(on)}$	--	11	--	
Rise Time	$V_{DD}=-30V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-10A$	T_r	--	19	--	
Turn-Off Delay Time		$T_{d(off)}$	--	25	--	
Fall Time		T_f	--	4	--	
Input Capacitance		C_{iss}	--	2098	--	pF
Output Capacitance	$V_{DS}=-30V, V_{GS}=0V, F=1MHz$	C_{oss}	--	98	--	
Reverse Transfer Capacitance		C_{rss}	--	49	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Current	--	I_S	--	--	-25.7	A
Diode Pulse Current	--	I_{SM}	--	--	-60	
Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	V_{SD}	--	--	-1.3	V
Reverse Recovery Time	$I_S=-10A, di/dt=100A/\mu s$	t_{rr}	--	14.7	--	Ns
Reverse Recovery Charge		Q_{rr}	--	10.9	--	nC

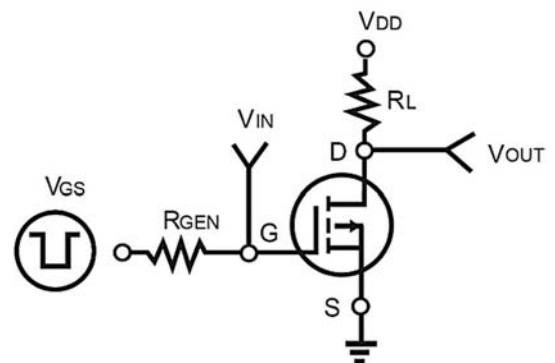
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature $T_{J(MAX)}=150^{\circ}C$.
2. Pulse Test: Pulse Width $\leq 100\mu s$, Duty Cycle $\leq 2\%$.
3. Guaranteed by design, not subject to production testing.
4. Limited $T_{J(MAX)}$, starting $T_J=25^{\circ}C$, $L=0.1mH$, $I_{AS}=-24.5A$, $R_G=25\Omega$, $V_{GS}=-10V$.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 inch square copper plate in still air.

Switching Time Waveform



Switching Test Circuit



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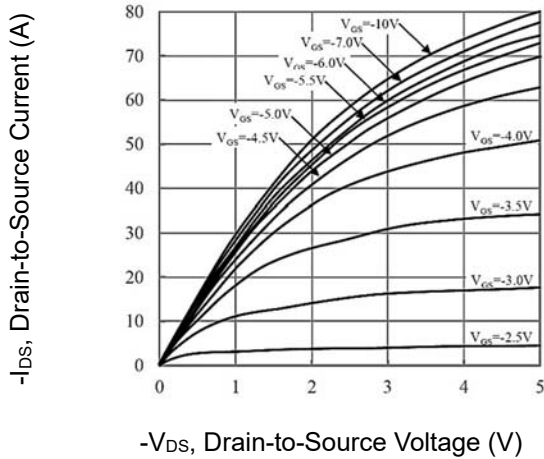
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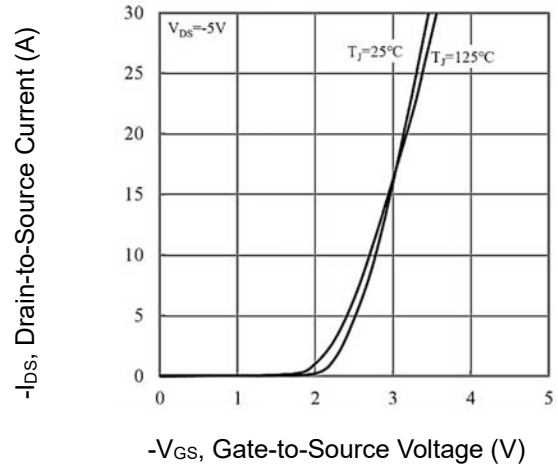
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CHARACTERISTIC CURVES

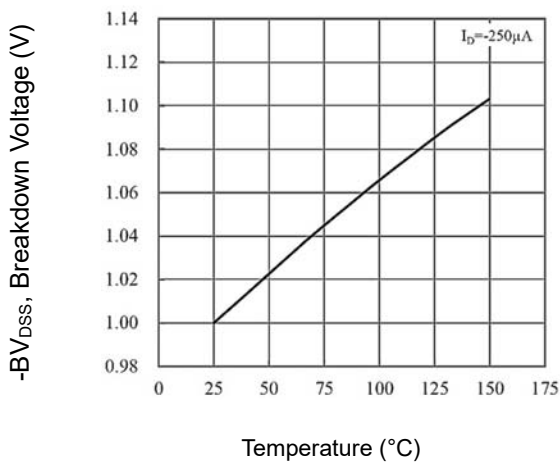
Output Characteristics



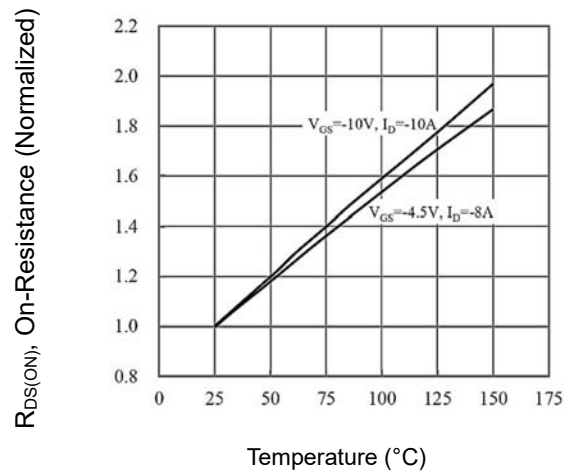
Transfer Characteristics



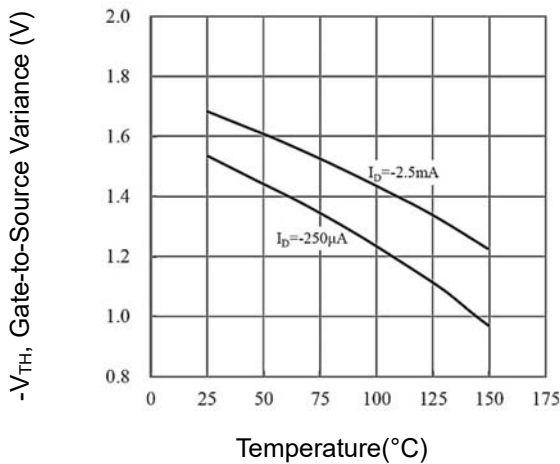
Breakdown Voltage vs. Temperature



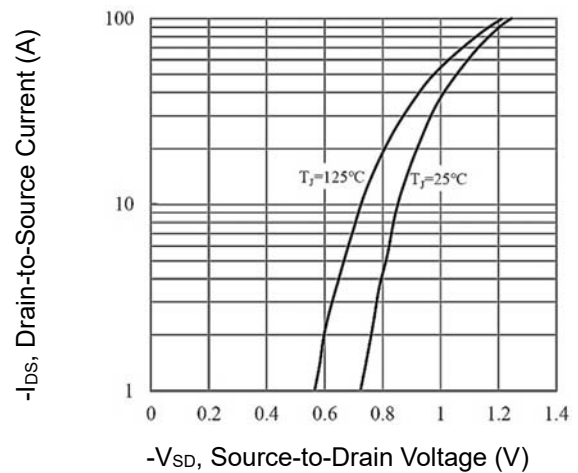
On-Resistance vs. Junction temperature



Threshold Voltage Variation with Temperature



Body Diode Characteristics



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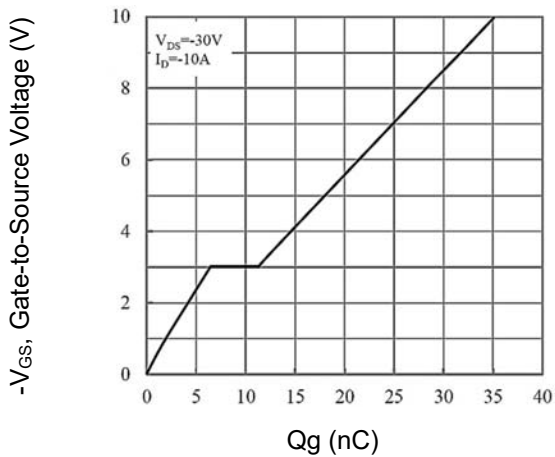
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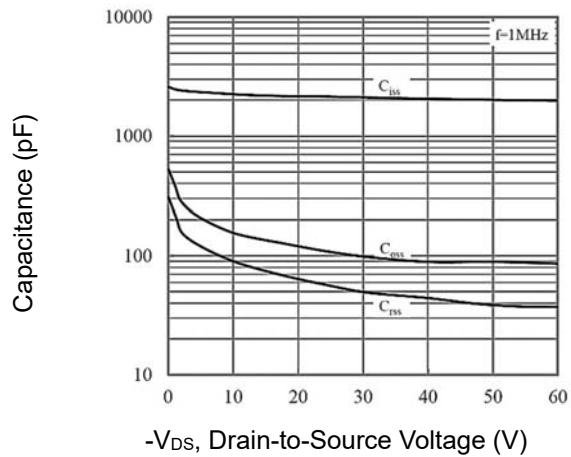
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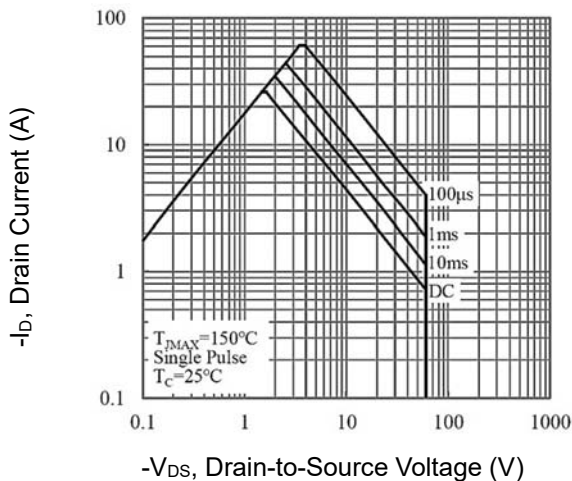
Gate-Charge Characteristics



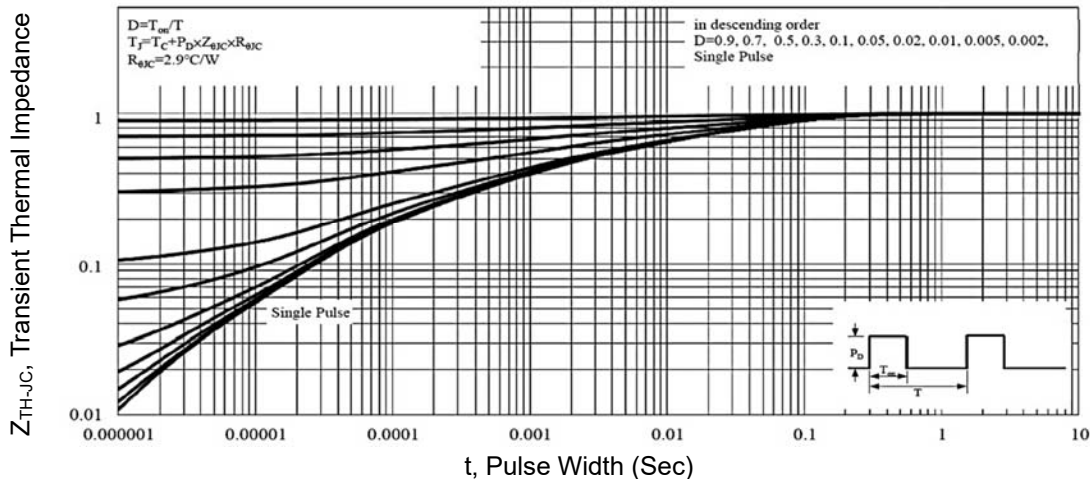
Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area



Normalized Transient Thermal Impedance vs Pulse Width



CHARACTERISTIC CURVES

Normalized Transient Thermal Impedance vs Pulse Width

