

N-Channel MOSFET

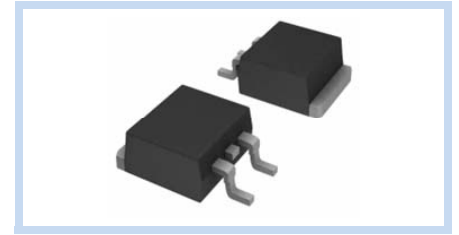
650V 3.1A 66W TO-252

MFT65N3A1T252

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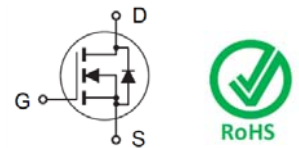
FEATURE

- $R_{DS(ON)} < 2.8\Omega$ at $V_{GS}=10V, I_D=3.1A$
- High Power and Current Handling Capability
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$



MECHANICAL DATA

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

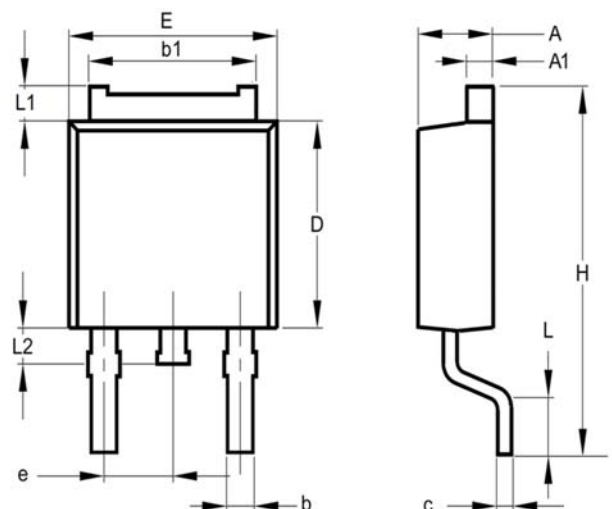


MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current – Continuous	I_D	$T_C=25^\circ C$	3.1
		$T_C=100^\circ C$	1.9
Drain Current – Pulsed	I_{DM}	12.4	A
Power Dissipation	P_D	$T_C=25^\circ C$	66
		Derate above $25^\circ C$	0.53
Single Pulsed Avalanche Energy	E_{AS}	112	mJ
Single Pulsed Avalanche Current	I_{AS}	3	A
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.9	$^\circ C/W$
Operating Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.20	2.40
A1	0.45	0.89
b	0.50	0.90
b1	4.95	5.59
c	0.40	0.61
D	5.40	6.63
E	6.05	7.10
e	1.98	2.59
H	8.80	10.6
L	0.25	--
L1	0.70	1.78
L2	0.50	1.20



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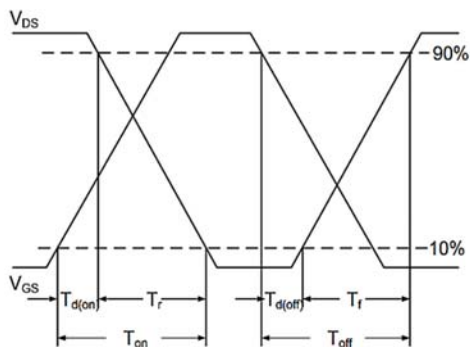
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	650	--	--	V
Drain-Source Leakage Current	$V_{DS}=650V, V_{GS}=0V$	I_{DSS}	--	--	1	μA
Gate-Body Leakage Current, Forward	$V_{GS}=30V, V_{DS}=0V$	I_{GSSF}	--	--	100	nA
Gate-Body Leakage Current, Reverse	$V_{GS}=-30V, V_{DS}=0V$	I_{GSSR}	--	--	-100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=1A$	$R_{DS(ON)}$	--	2.4	2.8	Ω
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	2.0	--	4.0	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=480V, V_{GS}=10V, I_D=3A$	Q_g	--	11	--	nC
Gate-Source Charge		Q_{gs}	--	3	--	
Gate-Drain Charge		Q_{gd}	--	4	--	
Turn-On Delay Time	$V_{DD}=300V, V_{GS}=10V, R_G=25\Omega, I_D=3A$	$T_{d(on)}$	--	26	--	ns
Rise Time		T_r	--	17	--	
Turn-Off Delay Time		$T_{d(off)}$	--	42	--	
Fall Time		T_f	--	18	--	
Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	C_{iss}	--	600	--	pF
Output Capacitance		C_{oss}	--	75	--	
Reverse Transfer Capacitance		C_{rss}	--	15	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Current	--	I_S	--	--	3.1	A
Diode Forward Voltage	$V_{GS}=0V, I_S=3.1A$	V_{SD}	--	--	1.4	V

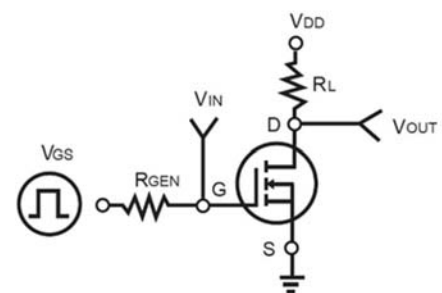
Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
3. Guaranteed by design, not subject to production testing.
4. $L=25mH, I_{AS}=3A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^\circ C$

Switching Time Waveform



Switching Test Circuit



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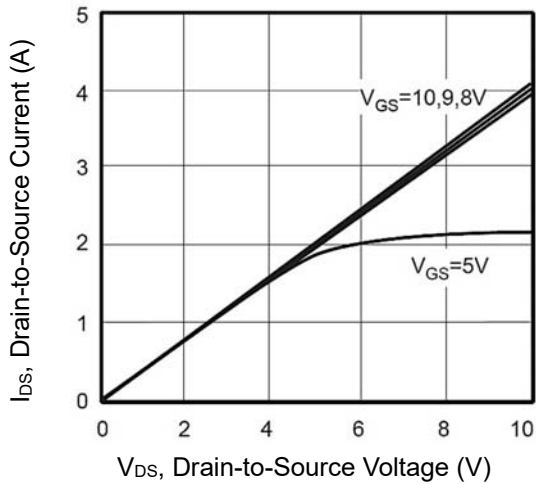
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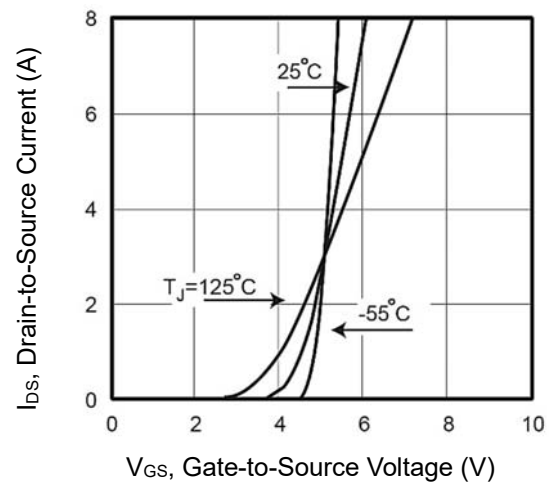
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CHARACTERISTIC CURVES

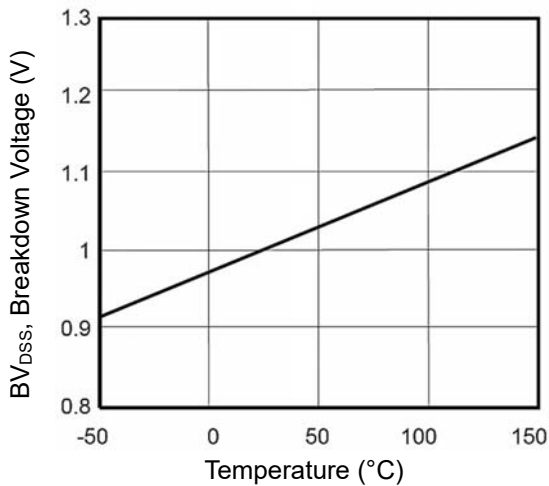
Output Characteristics



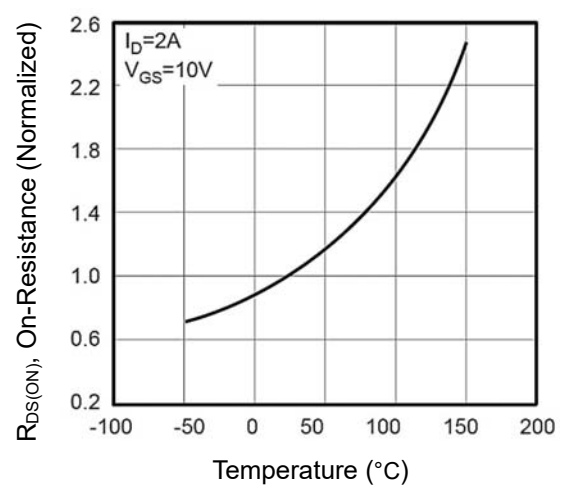
Transfer Characteristics



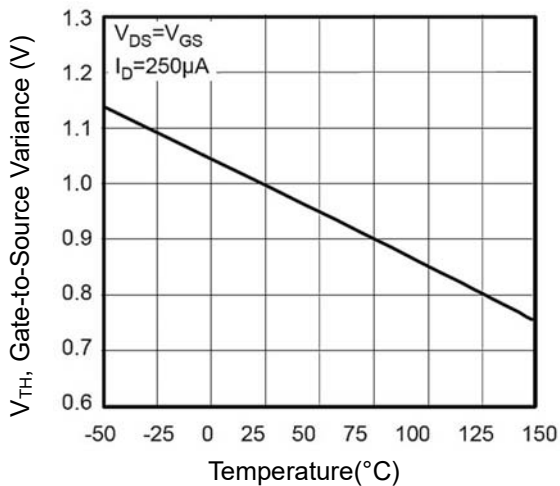
Breakdown Voltage vs. Temperature



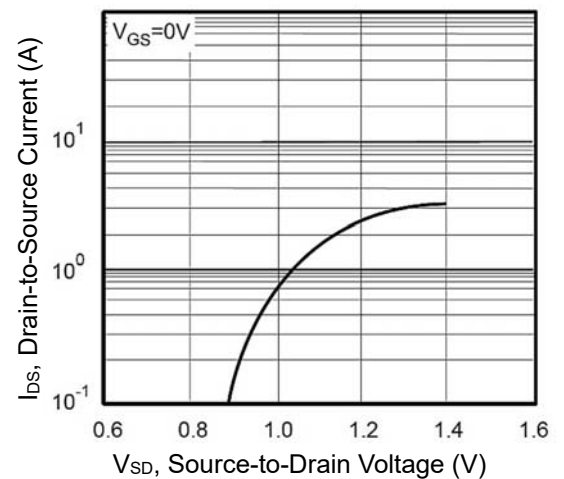
On-Resistance vs. Junction temperature



Threshold Voltage Variation with Temperature



Body Diode Characteristics



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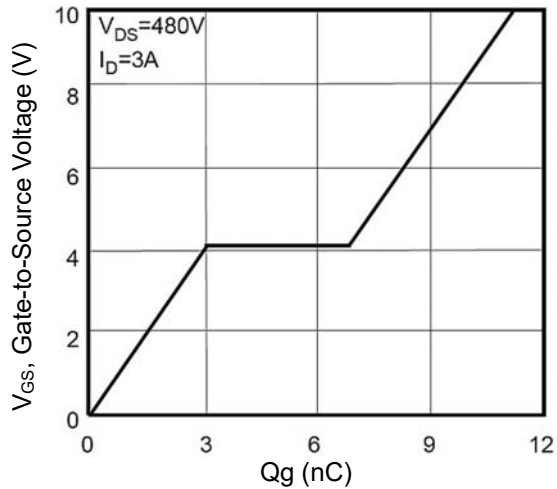
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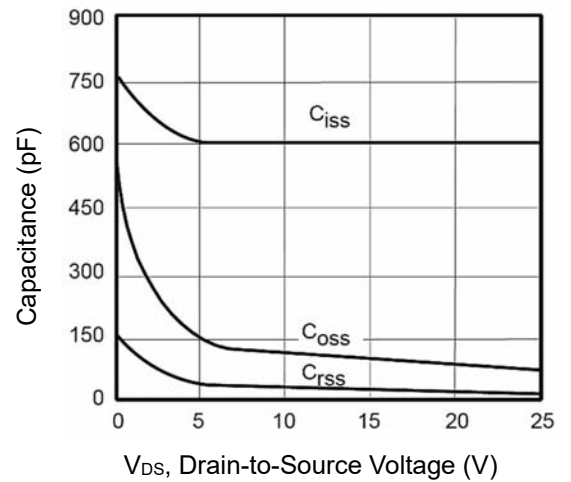
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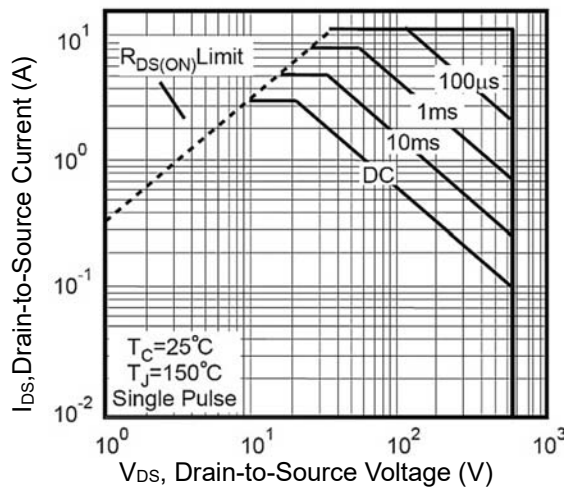
Gate-Charge Characteristics



Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area



Normalized Transient Thermal Impedance vs Pulse Width

