

N-Channel MOSFET

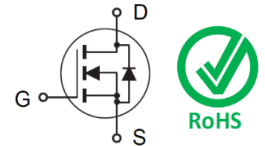
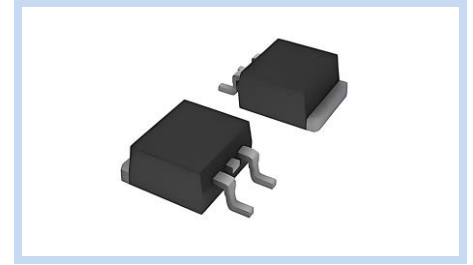
150V 40A 140W TO-252

MFT15N40T252

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FEATURE

- $R_{DS(ON)} < 45m\Omega$, $V_{GS}=10V$, $I_D=18A$
- Optimized Body Diode Reverse Recovery Performance
- Low On-Resistance and Low Conduction Losses
- Ultra Low Gate Charge Cause Lower Driving Requirements
- Application: Power Switching, Power Factor Correction, Uninterruptible Power Supply, LLC Half-Bridge



MECHANICAL DATA

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

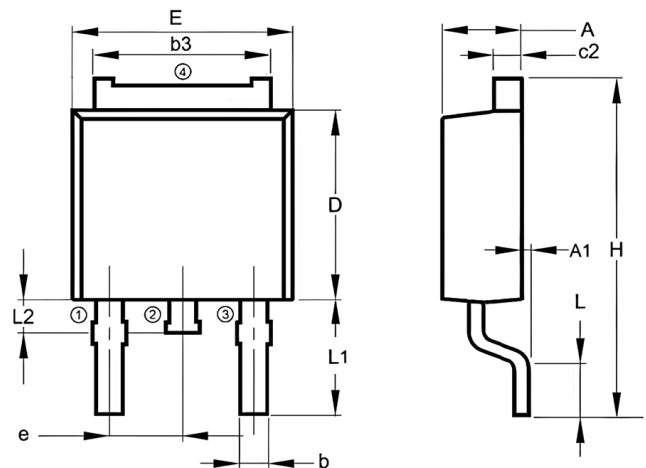
MAXIMUM RATINGS

Parameter, $T_A=25^\circ\text{C}$	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous	I_D	40	A
Drain Current – Pulsed	I_{DM}	160	A
Power Dissipation	P_D	140	W
Single Pulse Avalanche Energy	E_{AS}	310	mJ
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.07	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	2.200	2.400
A1	--	0.127
b	0.660	0.860
b3	5.100	5.460
c2	0.460	0.580
D	6.000	6.200
E	6.500	6.700
e	2.186	2.386
H	9.800	10.40
L	1.400	1.700
L1	2.90 TYP	
L2	0.60	1.00

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



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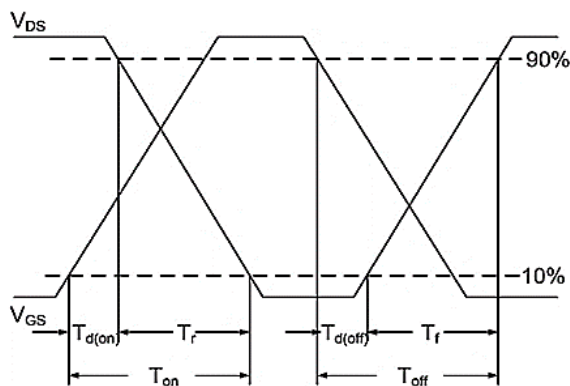
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ELECTRICAL CHARACTERISTICS

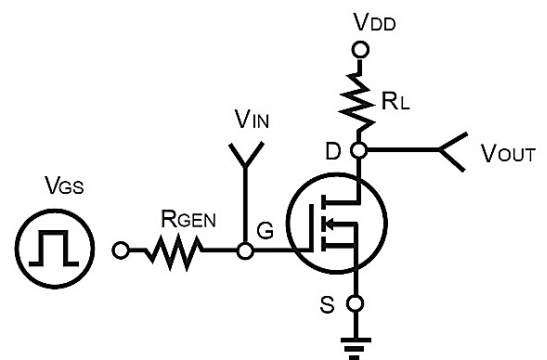
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	150	--	--	V
Drain-Source Leakage Current	$V_{DS}=150V, V_{GS}=0V, T_C=25^\circ C$	I_{DSS}	--	--	1	μA
Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	--	--	± 100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=18A$	$R_{DS(ON)}$	--	35	45	m Ω
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	2.5	--	4.5	V
Forward transconductance	$V_{DS}=15V, I_D=18A$	g_{FS}	38	--	--	S
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=30V, V_{GS}=10V, I_D=30A$	Q_g	--	105	--	nC
Gate-Source Charge		Q_{gs}	--	21	--	
Gate-Drain Charge		Q_{gd}	--	31.5	--	
Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_L=15\Omega, R_G=2.5\Omega, I_D=2A$	$T_{d(on)}$	--	17.8	--	nS
Rise Time		T_r	--	11.8	--	
Turn-Off Delay Time		$T_{d(off)}$	--	56	--	
Fall Time		T_f	--	14.6	--	
Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	C_{iss}	--	4200	--	pF
Output Capacitance		C_{oss}	--	203	--	
Reverse Transfer Capacitance		C_{rss}	--	96	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Current	$T_C=25^\circ C$	I_S	--	--	40	A
Diode Forward Voltage	$V_{GS}=0V, I_S=18A, T_J=25^\circ C$	V_{SD}	--	--	1.2	V
Reverse Recovery Time	$I_F=18A, T_J=25^\circ C$	T_{rr}	--	70	--	nS
Reverse Recovery Charge	$di/dt=100A/\mu s$	Q_{rr}	--	230	--	nC

Note: Pulse Test: Pulse Width < 300 μs , Duty Cycle $\leq 2\%$.

Switching Time Waveform



Switching Test Circuit



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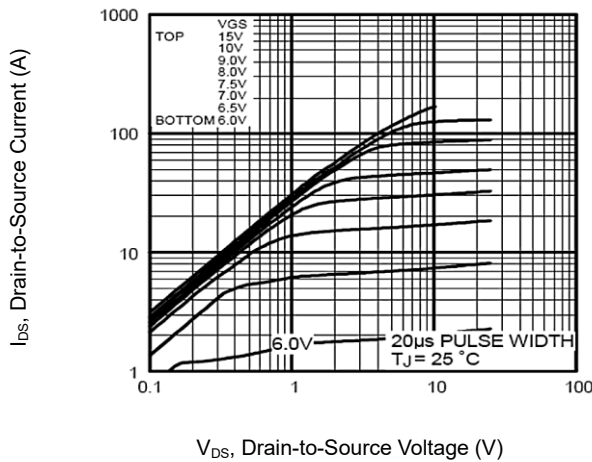
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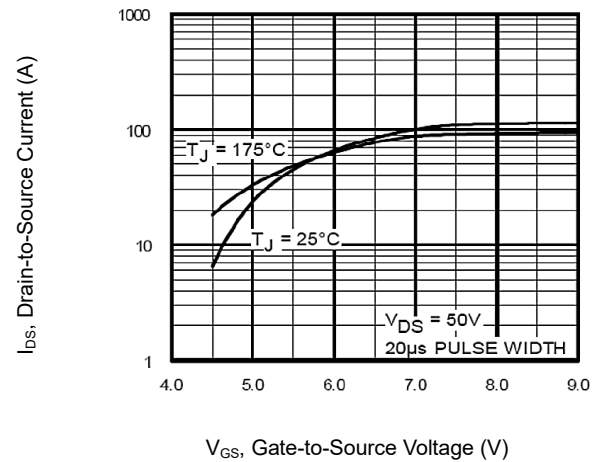
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CHARACTERISTIC CURVES

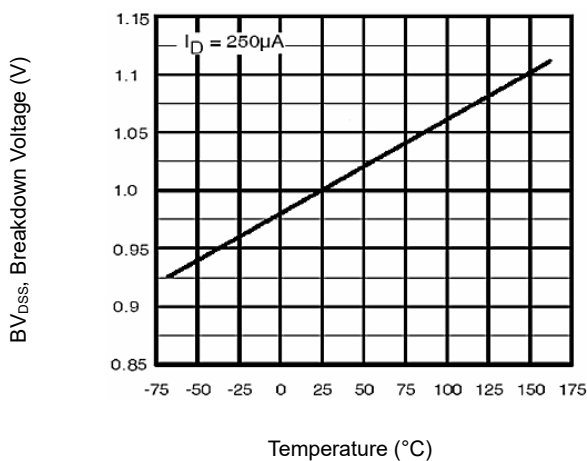
Output Characteristics



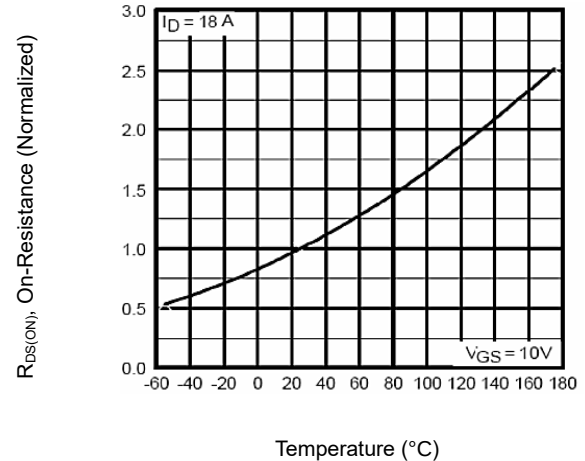
Transfer Characteristics



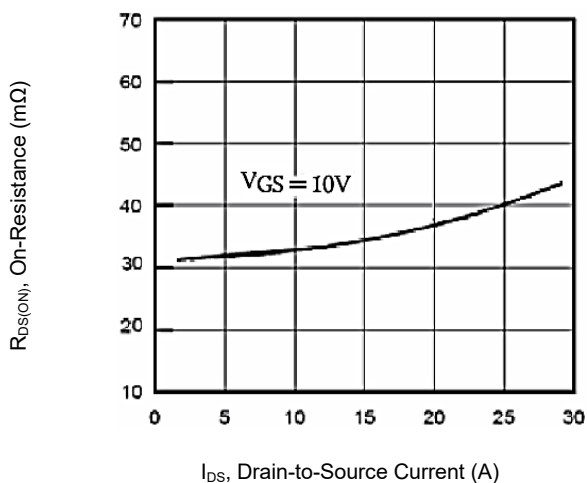
Breakdown Voltage vs. Temperature



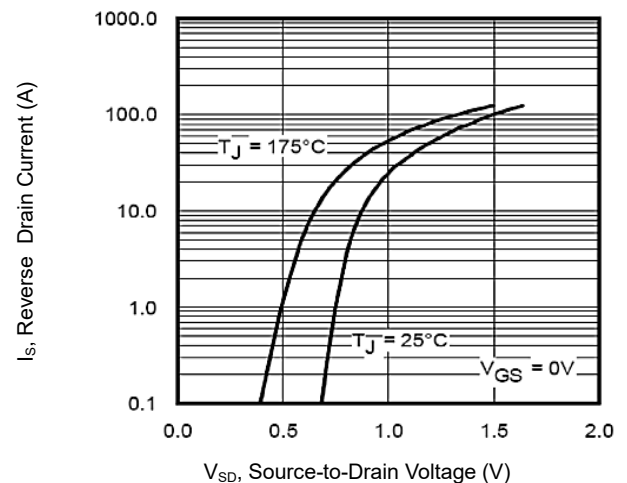
On-Resistance Vs. Junction Temperature



On-Resistance vs Drain Current



BODY DIODE



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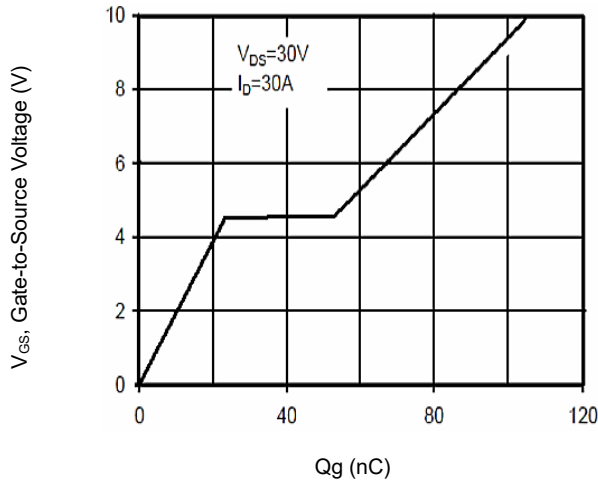
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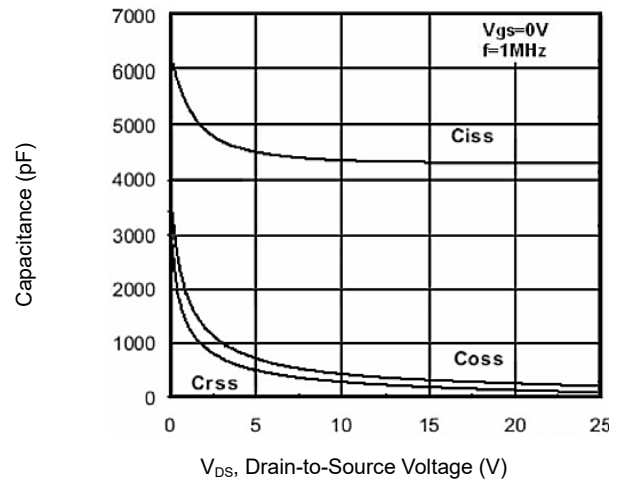
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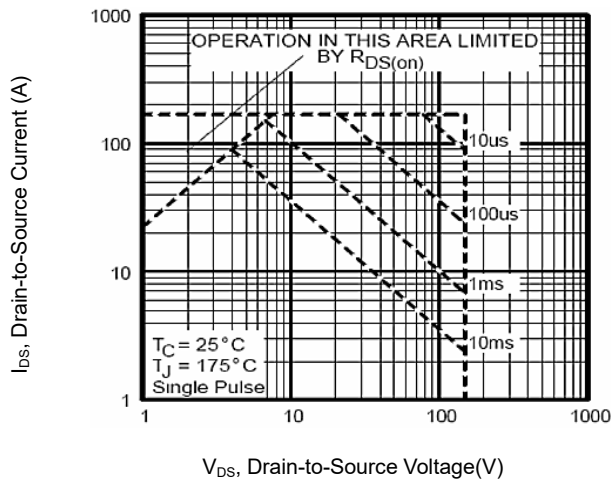
Gate-Charge Characteristics



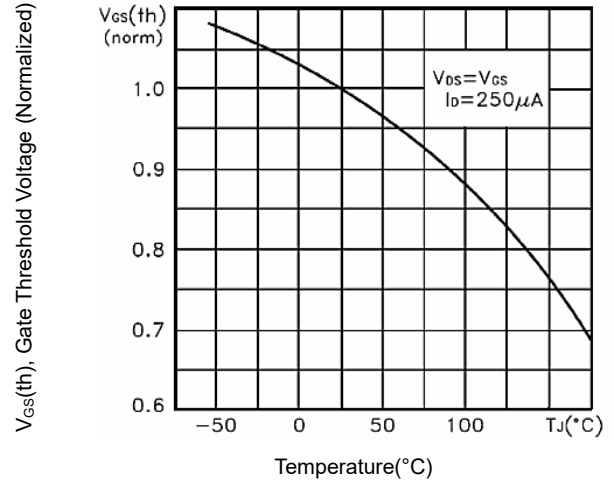
Capacitance



Maximum Safe Operating Area



Threshold Voltage vs. Junction Temperature



Normalized Transient Thermal Impedance

