

N-Channel MOSFET

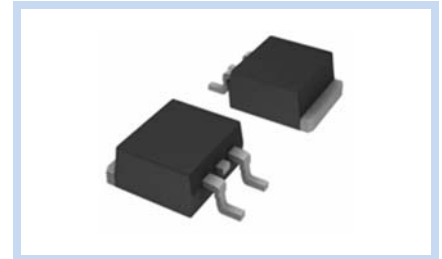
100V 120A 138W TO-263

MFT10N120T263

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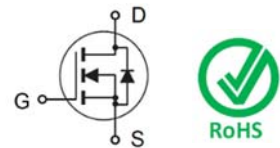
FEATURE

- $R_{DS(ON)} < 5m\Omega$, $V_{GS}=10V$, $I_D=50A$
- $R_{DS(ON)} < 7m\Omega$, $V_{GS}=6V$, $I_D=25A$
- High Switch Speed
- Low Reverse Transfer Capacitance



MECHANICAL DATA

- Case: TO-263 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



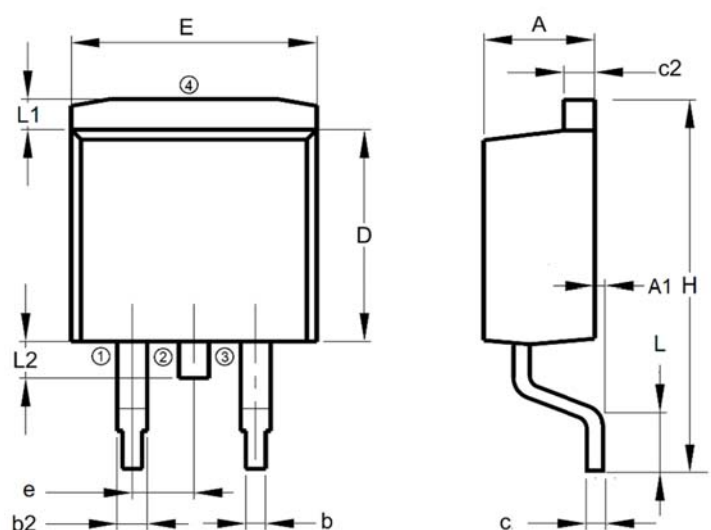
MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C=25^\circ C$	I_D	120	A
	$T_C=100^\circ C$		76	
Drain Current – Pulsed	$T_C=25^\circ C$	I_{DM}	480	A
Power Dissipation	$T_C=25^\circ C$	P_D	138	W
	$T_C=100^\circ C$		55	
Single Pulsed Avalanche Energy		E_{AS}	318	mJ
Single Pulsed Avalanche Current		I_{AS}	50	A
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	60	$^\circ C/W$
Thermal Resistance Junction to Case		$R_{\theta JC}$	0.9	$^\circ C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	4.29	4.70
A1	--	0.25
b	0.69	0.94
b2	1.22	1.40
c	0.36	0.56
c2	1.22	1.40
D	8.64	9.65
E	9.70	10.54
e	2.29	2.79
H	14.61	15.88
L	2.24	2.84
L1	--	1.40
L2	0.96	1.78

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



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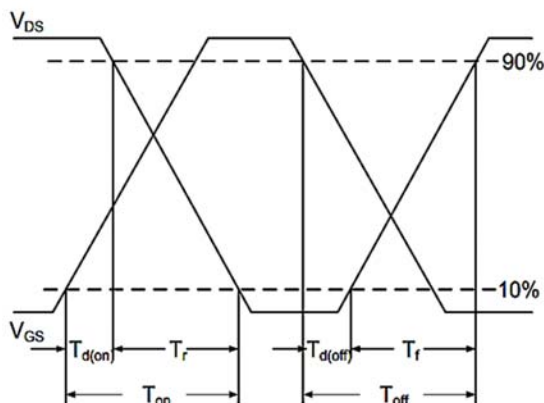
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	100	-	-	V
Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate-Body Leakage Current, Forward	$V_{GS}=20V, V_{DS}=0V$	I_{GSSF}	-	-	100	nA
Gate-Body Leakage Current, Reverse	$V_{GS}=-20V, V_{DS}=0V$	I_{GSSR}	-	-	-100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=50A$	$R_{DS(ON)}$	-	4.3	5.0	m Ω
	$V_{GS}=6V, I_D=25A$		-	5.4	7.0	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=270\mu A$	$V_{GS(th)}$	1.8	2.8	3.8	V
Forward Transconductance	$V_{DS}=10V, I_D=50A$	g_{fs}	-	100	-	S
Gate Resistance	$f=1.0MHz$	R_g	-	0.8	1.6	Ω
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=50A$	Q_g	-	40.5	53	nC
Gate-Source Charge		Q_{gs}	-	15	-	
Gate-Drain Charge		Q_{gd}	-	6	-	
Gate Plateau Voltage		$V_{plateau}$	-	5	-	V
Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3.0\Omega, I_D=50A$	$T_{d(on)}$	-	16	-	ns
Rise Time		T_r	-	6	-	
Turn-Off Delay Time		$T_{d(off)}$	-	25	-	
Fall Time		T_f	-	6	-	
Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=250KHz$	C_{iss}	-	3010	3910	pF
Output Capacitance		C_{oss}	-	1080	1400	
Reverse Transfer Capacitance		C_{rss}	-	14	-	
Output Charge	$V_{DS}=50V, V_{GS}=0V$	Q_{OSS}	-	85	110	nC
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Voltage	$V_{GS}=0V, I_S=50A, T_J=25^\circ C$	V_{SD}	-	0.9	1.2	V
Reverse Recovery Time	$V_{DD}=50V, I_D=50A, di/dt=100A/\mu s$	T_{rr}	-	56	112	ns
Reverse Recovery Charge		Q_{rr}	-	85	170	nC

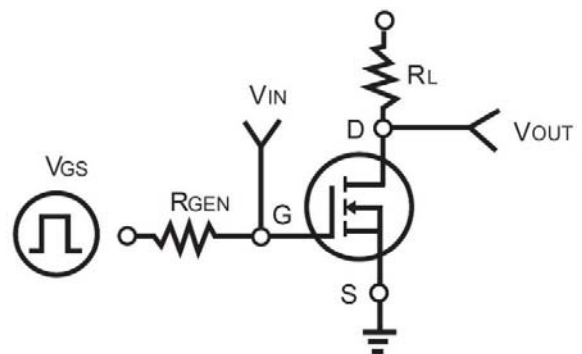
Note:

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. E_{AS} is calculated based on the condition of $L=1.0mH, I_{AS}=25.2A, V_{DD}=50V, V_{GS}=10V$. 100% test at $L=0.1mH, I_{AS}=50A$ in production.
5. $R_{\theta JA}$ is the sum of junction to case by maximum junction temperature and thermal impedance. It can be varied by application and environment.
6. Essentially independent of operating temperature typical characteristics.

Switching Time Waveform



Switching Test Circuit



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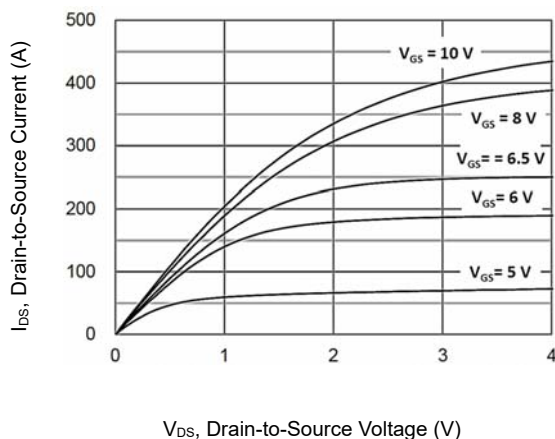
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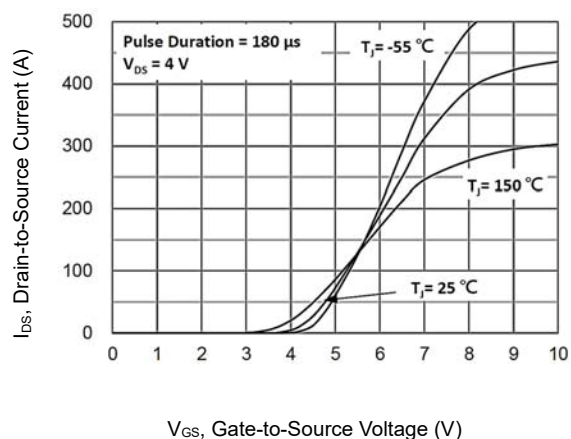
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CHARACTERISTIC CURVES

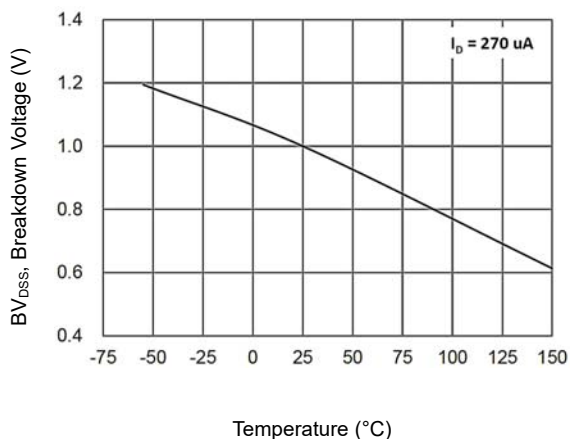
Output Characteristics



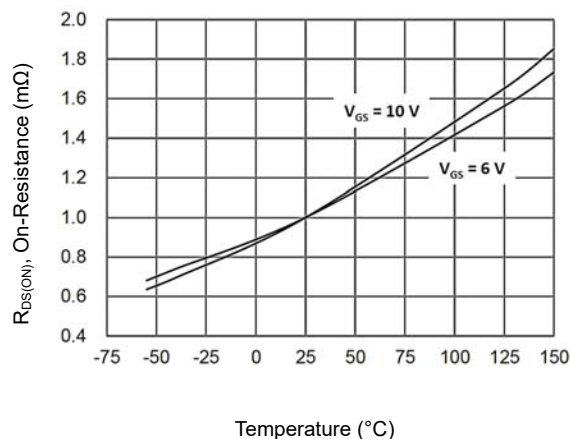
Transfer Characteristics



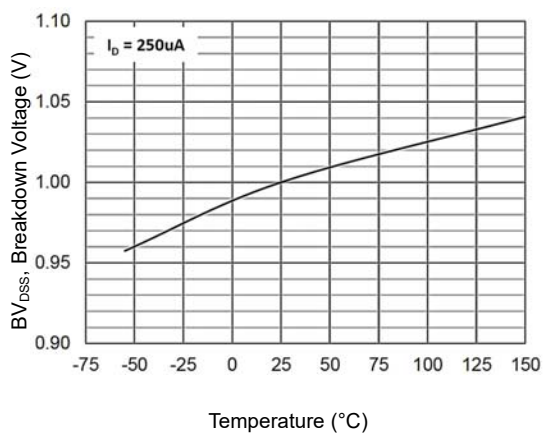
Threshold Voltage Variation with Temperature



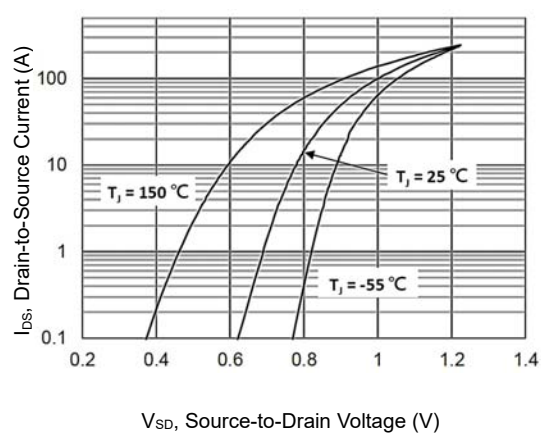
On-Resistance vs. Junction temperature



Breakdown Voltage vs. Temperature



Body Diode Characteristics



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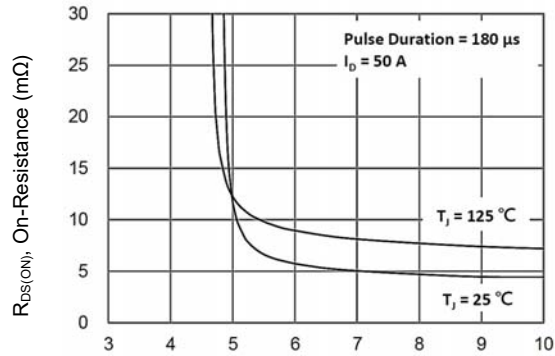
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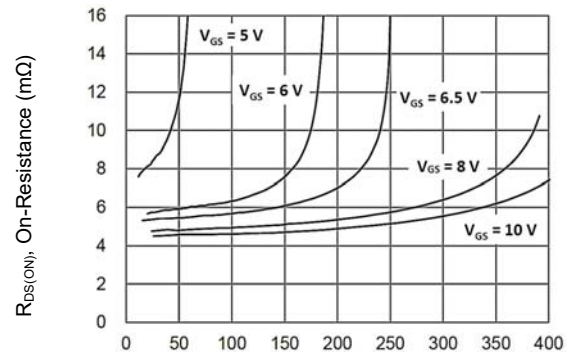
CHARACTERISTIC CURVES

On-Resistance Variation with V_{GS}



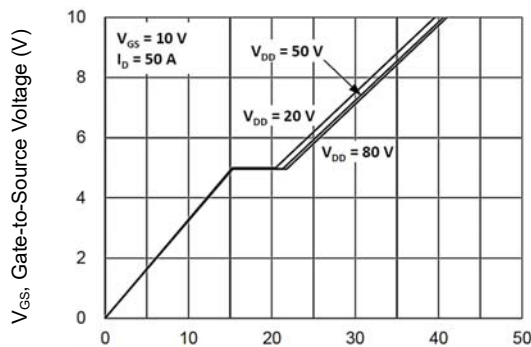
V_{GS} , Gate-to-Source Voltage (V)

On-Resistance vs. Drain Current



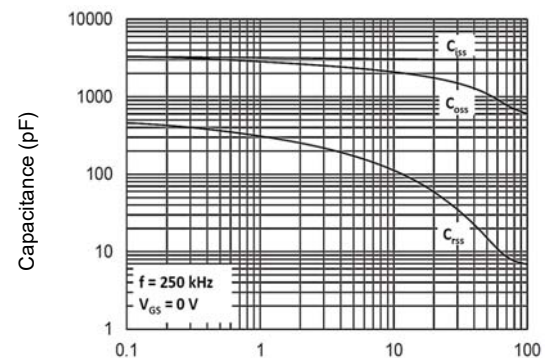
I_{DS} , Drain-to-Source Current (A)

Gate-Charge Characteristics



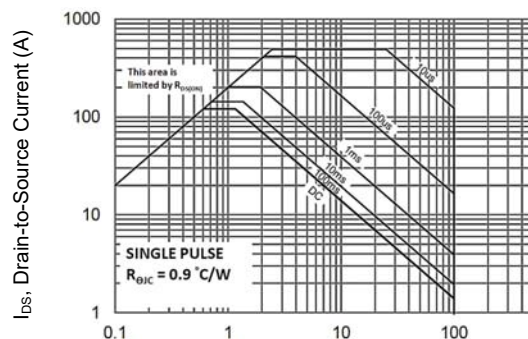
Q_g (nC)

Capacitance vs. Drain-Source Voltage



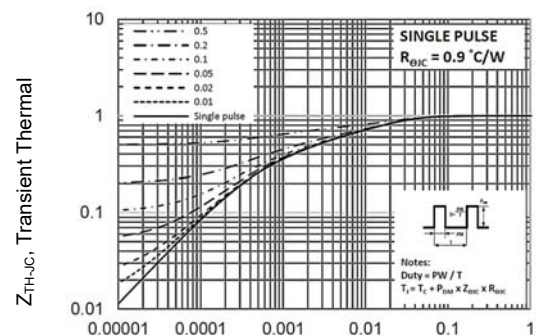
V_{DS} , Drain-to-Source Voltage (V)

Maximum Safe Operating Area



V_{DS} , Drain-to-Source Voltage (V)

Normalized Transient Thermal Impedance vs Pulse Width



t , Pulse Width (Sec)