

N-Channel MOSFET

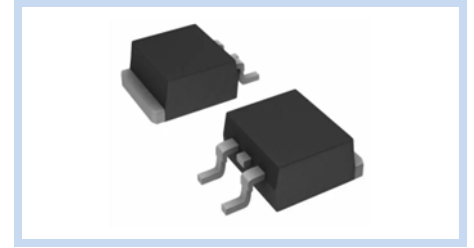
650V 20A TO-263

MFT65N20T263

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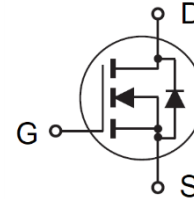
FEATURE

- $R_{DS(ON)}=0.18\Omega$ at $V_{GS}=10V$, $I_D=20A$
- High Power and Current Handling Capability
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$



MECHANICAL DATA

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



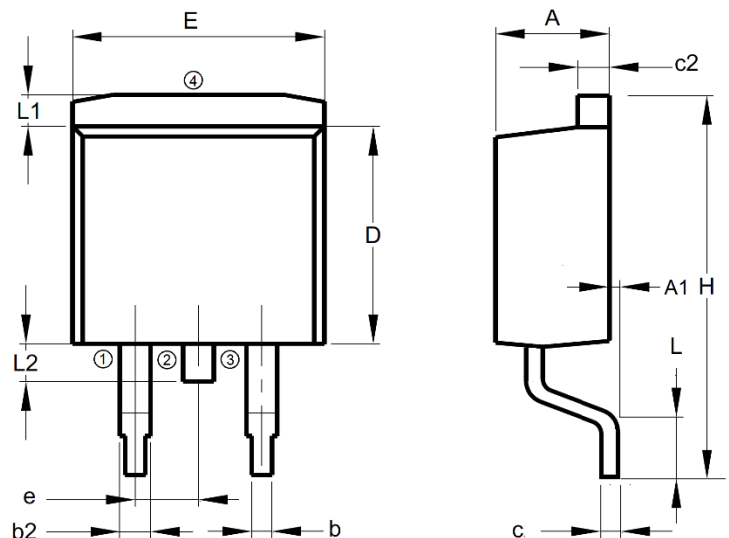
MAXIMUM RATINGS

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	650	V	
Gate-Source Voltage	V_{GS}	± 30	V	
Drain Current – Continuous	I_D	$T_C=25^\circ C$	20	A
		$T_C=100^\circ C$	13	A
Drain Current – Pulsed	I_{DM}	80	A	
Power Dissipation	P_D	$T_C=25^\circ C$	205	W
		Derate above $25^\circ C$	1.64	W/ $^\circ C$
Single Pulsed Avalanche Energy	E_{AS}	600	mJ	
Single Pulsed Avalanche Current	I_{AS}	5	A	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.61	$^\circ C/W$	
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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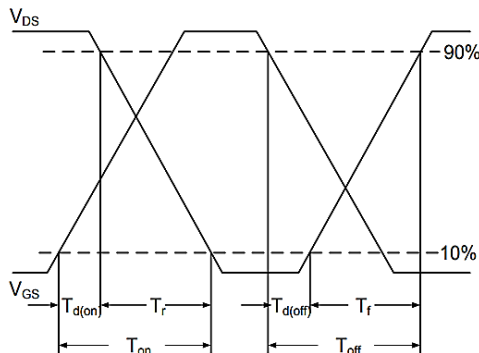
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	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	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	--	0.15	0.18	Ω
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	2.5	--	4.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=520V, V_{GS}=10V, I_D=20A$	Q_g	--	35	--	nC
Gate-Source Charge		Q_{gs}	--	8	--	nC
Gate-Drain Charge		Q_{gd}	--	13	--	nC
Turn-On Delay Time	$V_{DD}=520V, V_{GS}=10V, R_G=6\Omega, I_D=20A$	$T_{d(on)}$	--	31	--	ns
Rise Time		T_r	--	13	--	ns
Turn-Off Delay Time		$T_{d(off)}$	--	65	--	ns
Fall Time		T_f	--	8	--	ns
Input Capacitance	$V_{DS}=150V, V_{GS}=0V, F=1MHz$	C_{iss}	--	1475	--	pF
Output Capacitance		C_{oss}	--	635	--	pF
Reverse Transfer Capacitance		C_{rss}	--	20	--	pF
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Current	--	I_S	--	--	20	A
Diode Forward Voltage	$V_{GS}=0V, I_S=20A, T_J=25^\circ C$	V_{SD}	--	--	1.2	V

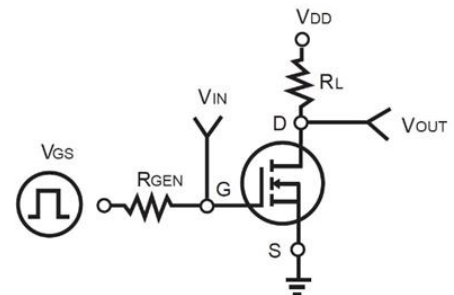
Note:

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. Limited only by maximum temperature allowed.
5. Pulse Width Limited by safe operating area.
6. Full Package $I_{S(MAX)}=19A$
7. Full Package V_{SD} test condition $I_S = 19A$
8. $L=30mH, I_{AS} = 7A, V_{DD}= 60V, R_G=25\Omega$, Starting $T_J=25^\circ C$

Switching Time Waveform

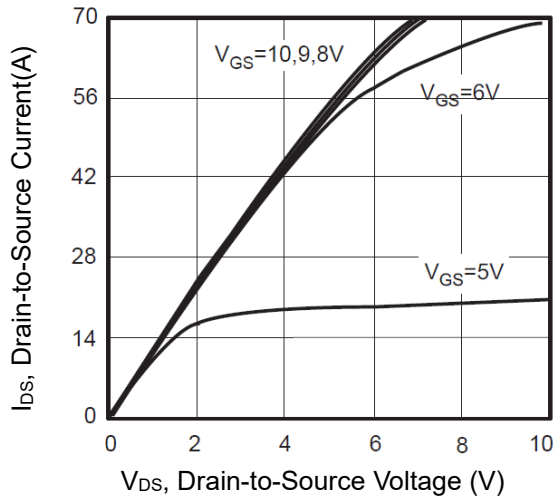


Switching Test Circuit

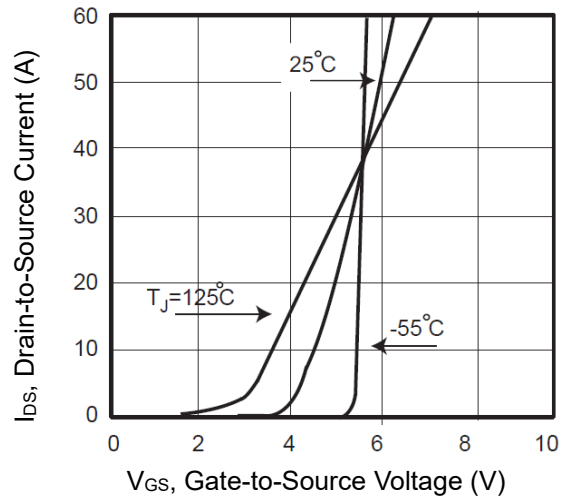


CHARACTERISTIC CURVES

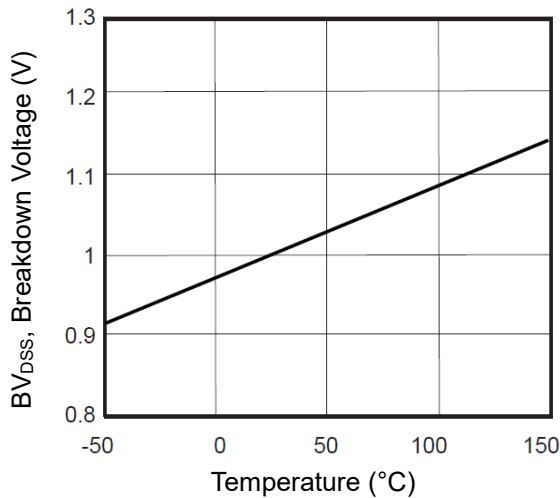
Output Characteristics



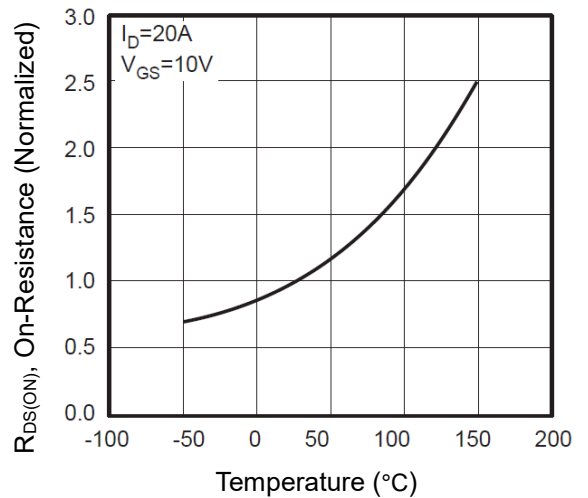
Transfer Characteristics



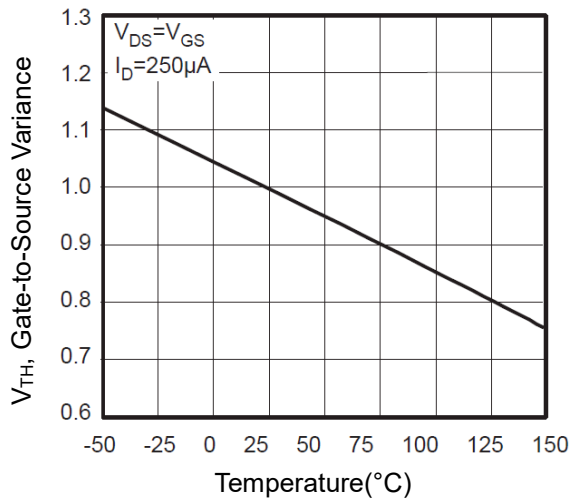
Breakdown Voltage vs. Temperature



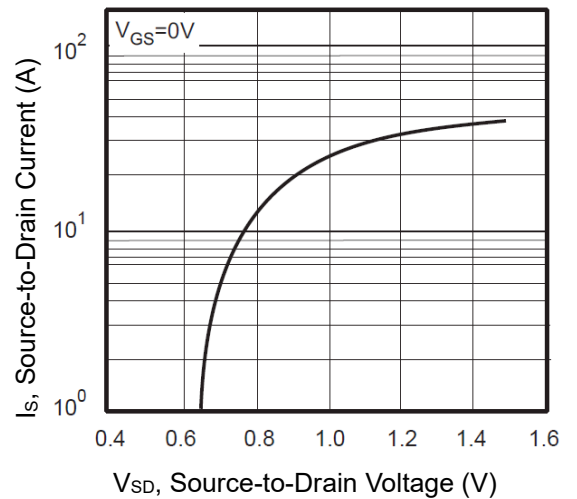
On-Resistance vs. Junction temperature



Threshold Voltage Variation with Temperature



Body Diode Characteristics



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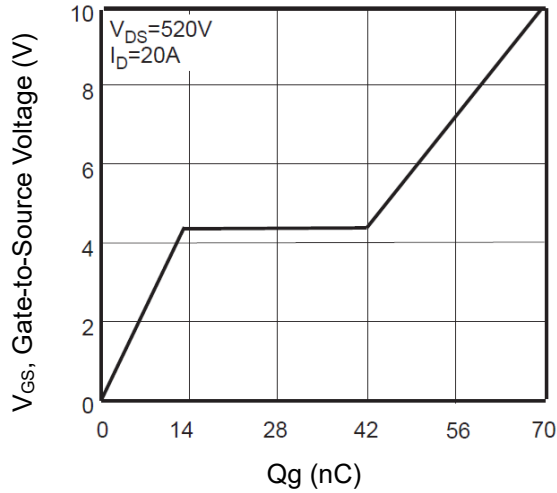
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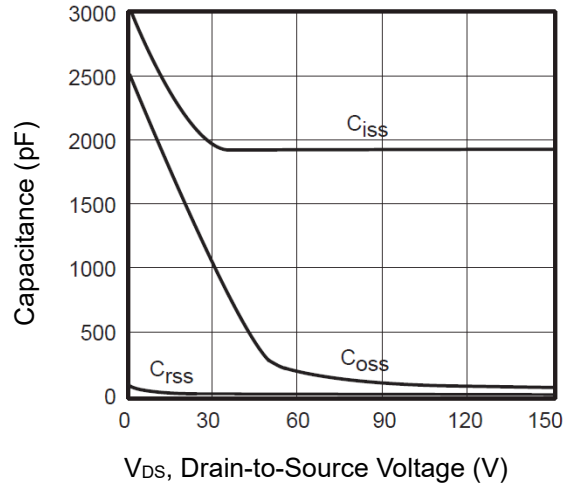
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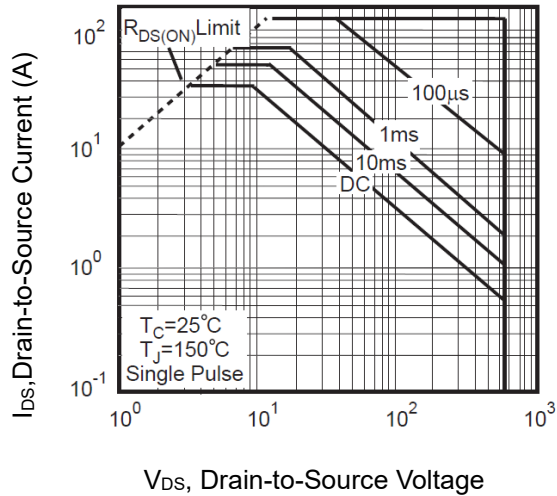
Gate-Charge Characteristics



Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area



Normalized Transient Thermal Impedance vs Pulse Width

