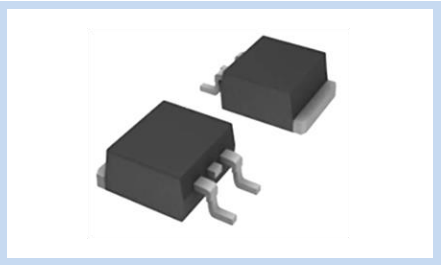
N-Channel MOSFET
40V 163A 125W TO-263

MFT4N163T263

MERITEK

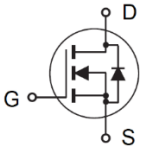
FEATURE

- $R_{DS(ON)} \leq 2.6m\Omega$ at V_{GS}=10V, I_D=20A
- High Power and Current Handing 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



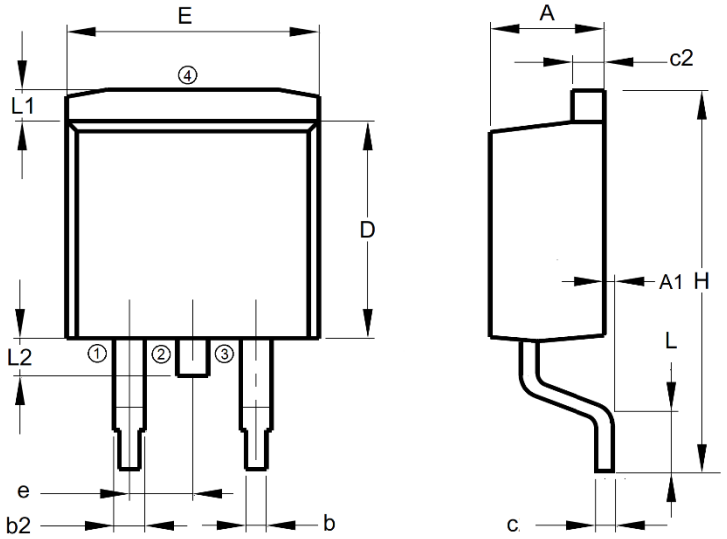
RoHS

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current – Continuous	T_C=25°C	I_D	163	A
	T_C=100°C		103	A
Drain Current – Pulsed		I_{DM}	652	A
Power Dissipation	T_C=25°C	P_D	125	W
	Derate above 25°C		1	W/°C
Single Pulsed Avalanche Energy		E_{AS}	378	mJ
Single Pulsed Avalanche Current		I_{AS}	87	A
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	62.5	°C/W
Thermal Resistance Junction to Case		$R_{\theta JC}$	1	°C/W
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	°C

DIMENSIONS

TO-263	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	2.82
L1	--	1.40
L2	1.19	1.78

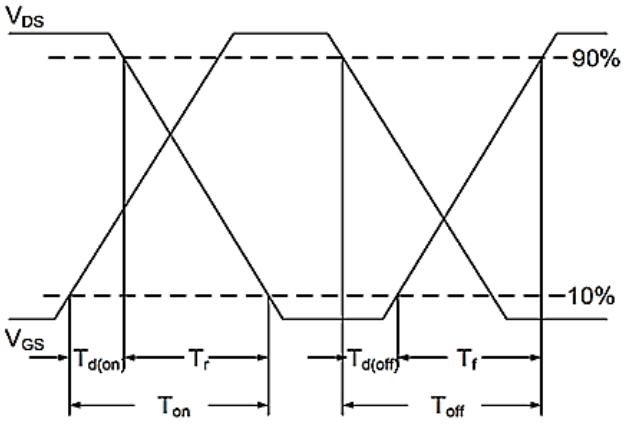


ELECTRICAL CHARACTERISTICS

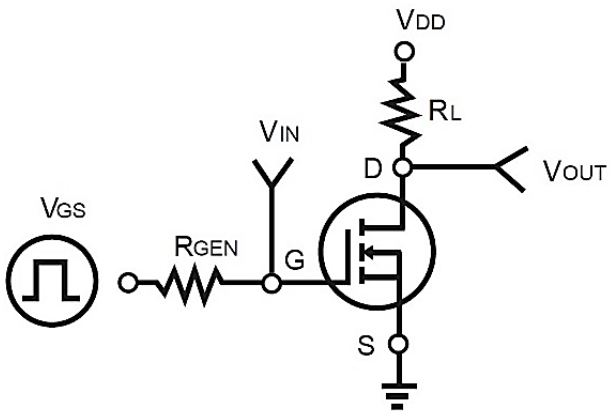
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	BV_{DSS}	40	--	--	V
Drain-Source Leakage Current	V_{DS}=40V, V_{GS}=0V	I_{DSS}	--	--	1	μA
Gate-Body Leakage Current, Forward	V_{GS}=20V, V_{DS}=0V	I_{GSSF}	--	--	100	nA
Gate-Body Leakage Current, 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=30A	$R_{DS(ON)}$	--	2.2	2.6	mΩ
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	$V_{GS(th)}$	2	--	4	V
Gate Input Resistance	f=1MHz, Open Drain	R_G	--	1	--	Ω
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=32V, V_{GS}=10V, I_D=20A	Q_g	--	139	--	nC
Gate-Source Charge		Q_{gs}	--	29	--	
Gate-Drain Charge		Q_{gd}	--	48	--	
Turn-On Delay Time	V_{DD}=28V, V_{GS}=10V, R_G=4.5Ω I_D=10A	$T_{d(on)}$	--	41	--	ns
Rise Time		T_r	--	17	--	
Turn-Off Delay Time		$T_{d(off)}$	--	88	--	
Fall Time		T_f	--	30	--	
Input Capacitance	V_{DS}=25V, V_{GS}=0V, F=1MHz	C_{iss}	--	8700	--	pF
Output Capacitance		C_{oss}	--	695	--	
Reverse Transfer Capacitance		C_{rss}	--	480	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Drain-Source Diode Forward Current	--	I_S	--	--	104	A
Diode Forward Voltage	V_{GS}=0V, I_S=10A	V_{SD}	--	--	1.2	V

Note:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
3. Guaranteed by design, not subject to production testing.
4. L=0.1mH, I_{AS} = 87A, V_{DD}= 24V, R_G=25Ω, Starting T_J=25°C

Switching Time Waveform

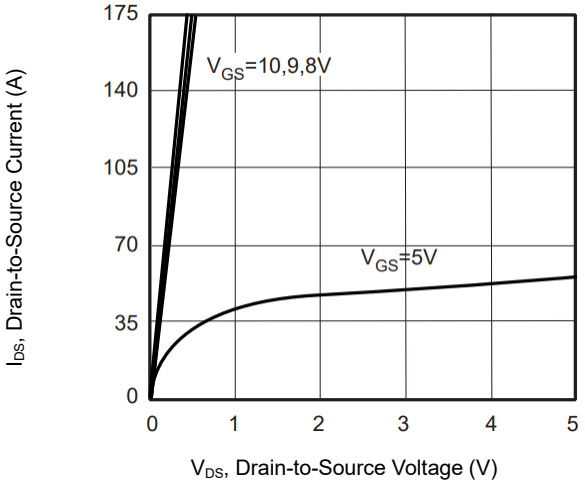


Switching Test Circuit

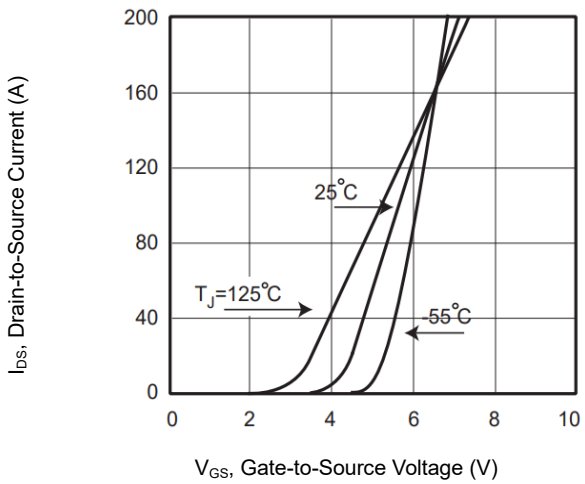


CHARACTERISTIC CURVES

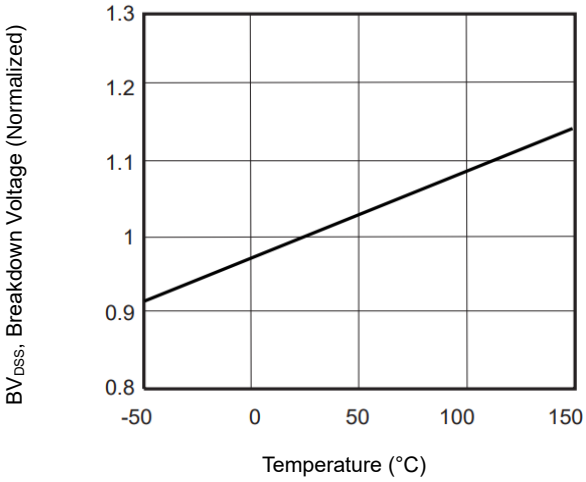
Output Characteristics



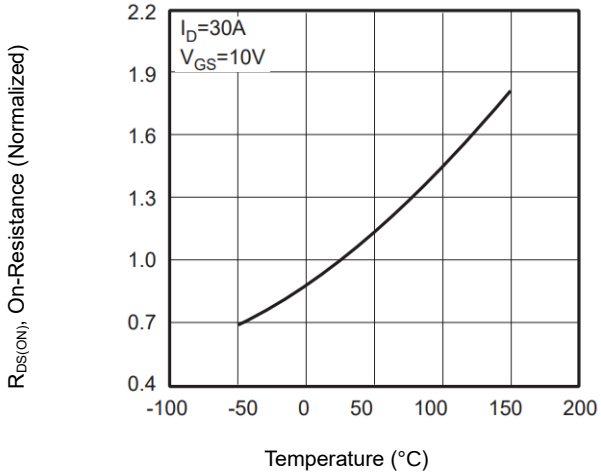
Transfer Characteristics



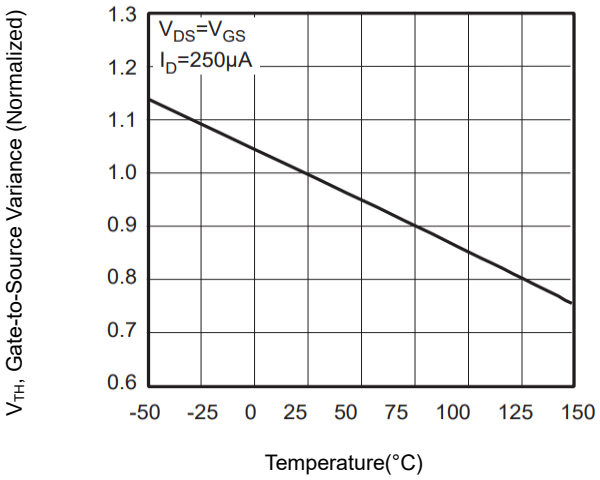
Normalized Breakdown Voltage vs. Temperature



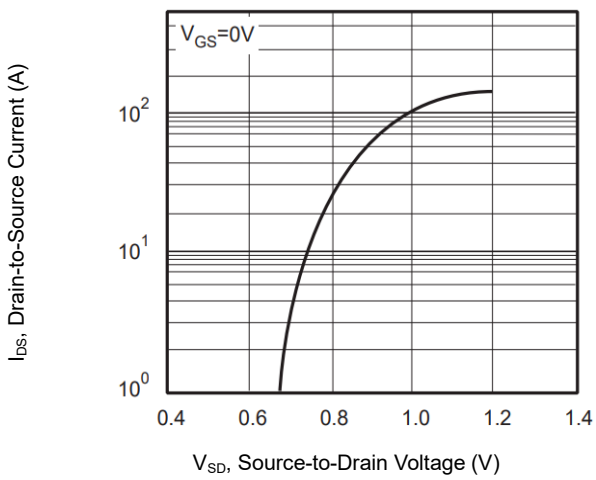
Normalized On-Resistance vs. Temperature



Normalized Threshold Voltage Variance

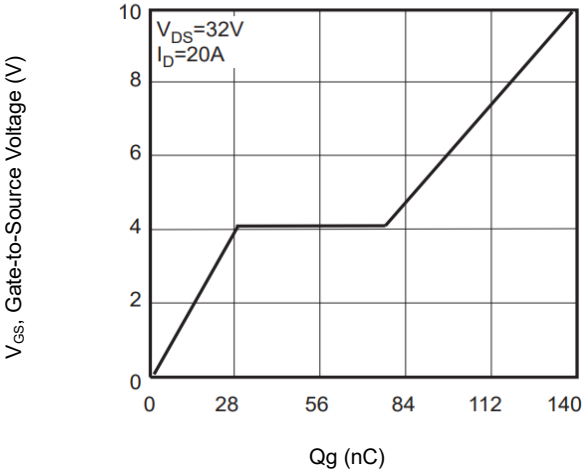


Body Diode Characteristics

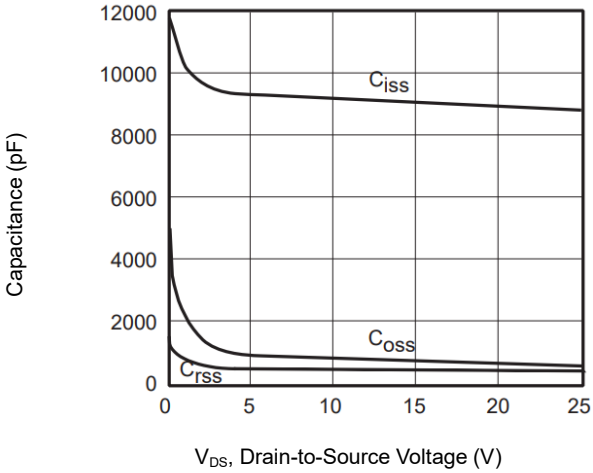


CHARACTERISTIC CURVES

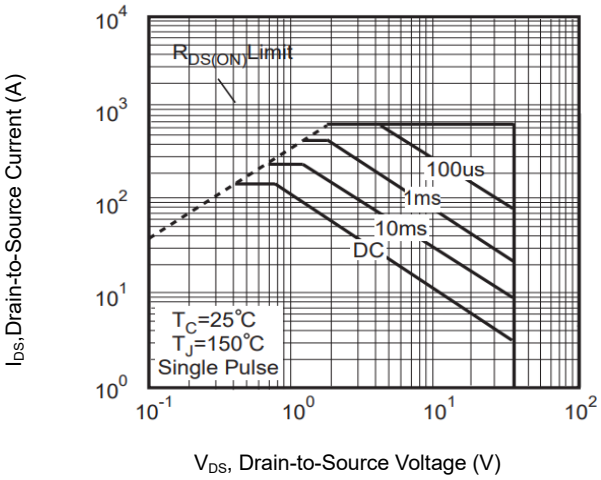
Gate-Charge Characteristics



Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area



Normalized Transient Thermal Impedance vs Pulse Width