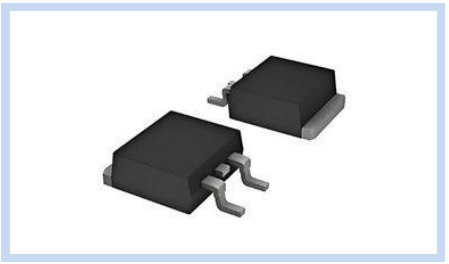
N-Channel MOSFET
100V 140A 167W TO-263

MFT10N140T263

MERITEK

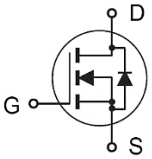
FEATURE

- $R_{DS(ON)}$<5.5mΩ at V_{GS}=10V, I_D=20A
- Super High Dense Cell Design for Low $R_{DS(ON)}$
- Low Gate Charge
- Fast Switching Speed



APPLICATIONS

- Switch Mode Power Supplies (SMPS)
- Battery Management Systems (BMS)
- DC-DC Converters, DC-AC Inverters
- High-side / Low-side Load Switches



RoHS

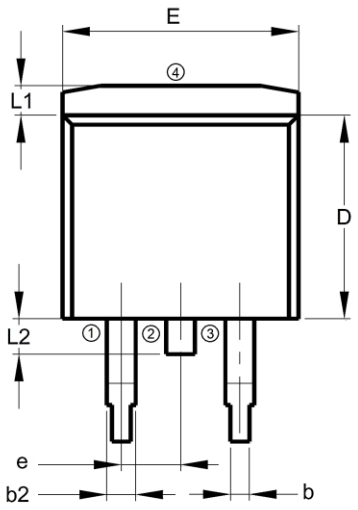
MAXIMUM RATINGS

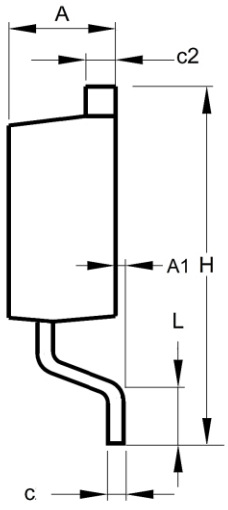
Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current – Continuous	V_{GS}=10V, T_C=25°C	I_D	140	A
	V_{GS}=10V, T_C=100°C		85	
Drain Current – Pulsed		I_{DM}	417	A
Power Dissipation	T_C=25°C	P_D	167	W
Single Pulse Avalanche Energy		E_{AS}	245	mJ
Thermal Resistance Junction to Case		$R_{\theta JC}$	0.75	°C/W
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to +150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A	4.37	4.77
A1	0.00	0.25
b	0.70	0.96
b2	1.17	1.47
c	0.30	0.53
c2	1.22	1.42
D	8.50	8.90
E	9.86	10.36
e	2.54 BSC	
H	15.5	17.7
L	2.00	2.60
L1	1.07	1.47
L2	1.40	1.70

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



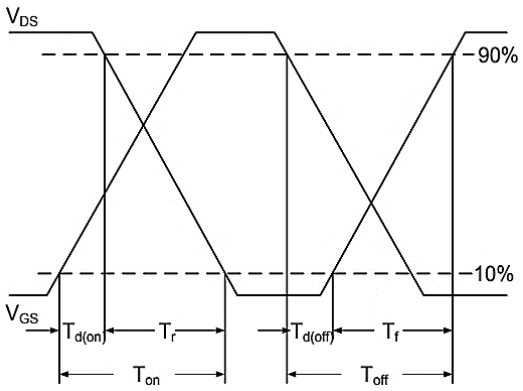


ELECTRICAL CHARACTERISTICS

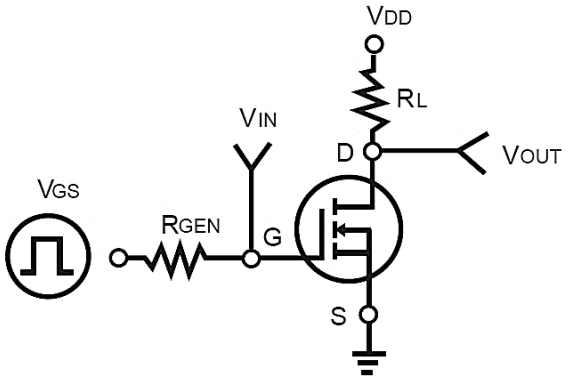
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	BV_{DSS}	100	--	--	V
Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V	I_{DSS}	--	--	1	μA
Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A	$R_{DS(ON)}$	--	4.6	5.5	mΩ
Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	$V_{GS(th)}$	2.0	2.9	4.0	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=50V, V_{GS}=10V, I_D=20A	Q_g	--	42	--	nC
Gate-Source Charge		Q_{gs}	--	9.7	--	
Gate-Drain Charge		Q_{gd}	--	10.6	--	
Turn-On Delay Time	V_{DS}=50V, V_{GS}=10V, R_{GS}=3Ω, I_D=20A	$T_{d(on)}$	--	13	--	nS
Rise Time		T_r	--	25	--	
Turn-Off Delay Time		$T_{d(off)}$	--	43	--	
Fall Time		T_f	--	37	--	
Input Capacitance	V_{DS}=50V, V_{GS}=0V, F=1MHz	C_{iss}	--	2816	--	pF
Output Capacitance		C_{oss}	--	614	--	
Reverse Transfer Capacitance		C_{rss}	--	7.4	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Diode Forward Current	V_D=V_G=0V, Force Current	I_S	--	--	140	A
Diode Forward Voltage	V_{GS}=0V, I_F=20A	V_{SD}	--	--	1.2	V
Reverse Recovery Time	I_F=I_S, di/dt=100A/μs	T_{rr}	--	60	--	nS
Reverse Recovery Charge		Q_{rr}	--	61	--	nC

Note:
1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. The EAS data shows maximum rating. EAS condition: V_{DD}=50V, V_{GS}=10V, L=0.4mH, I_{AS}=42A.
4. The power dissipation P_D is limited by 150°C junction temperature.
5. Guaranteed by design, not subject to production testing.

Switching Time Waveform

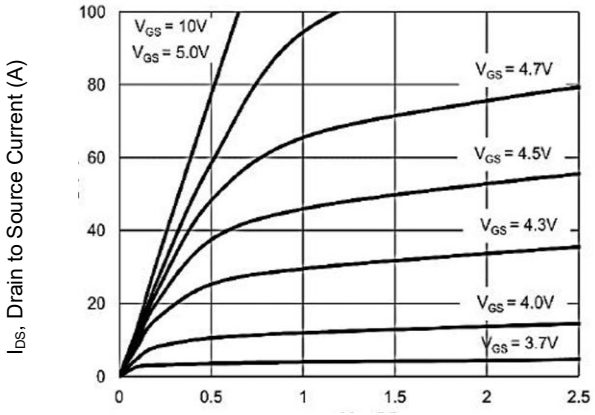


Switching Test Circuit

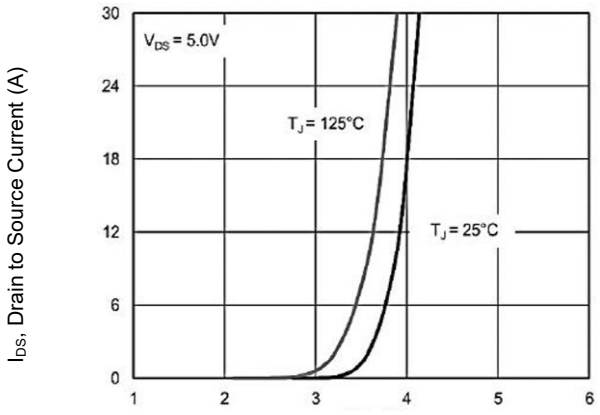


CHARACTERISTIC CURVES

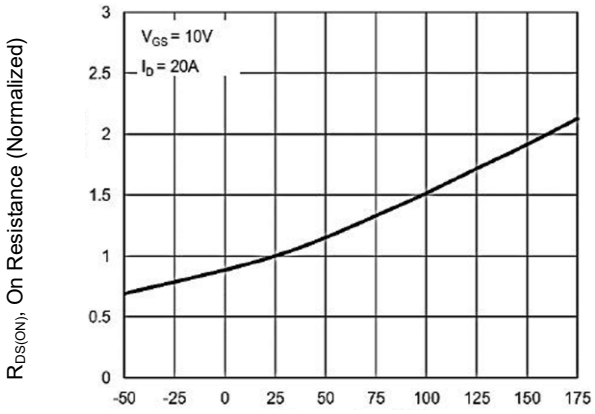
Output Characteristics



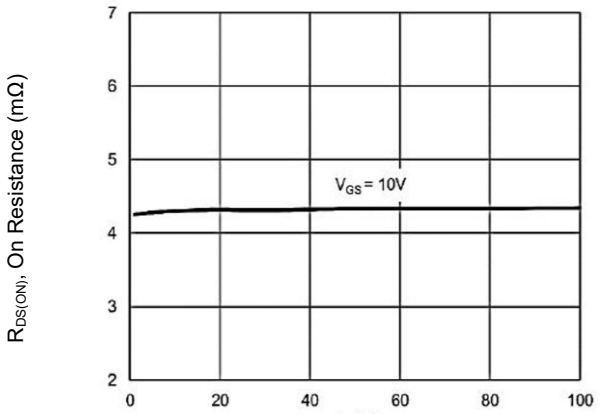
Transfer Characteristics



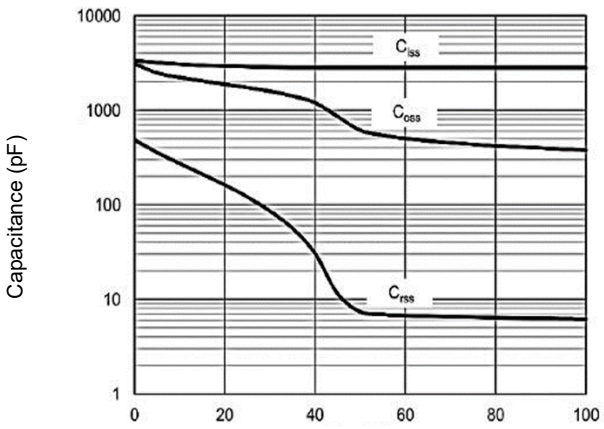
On-Resistance vs. Temperature



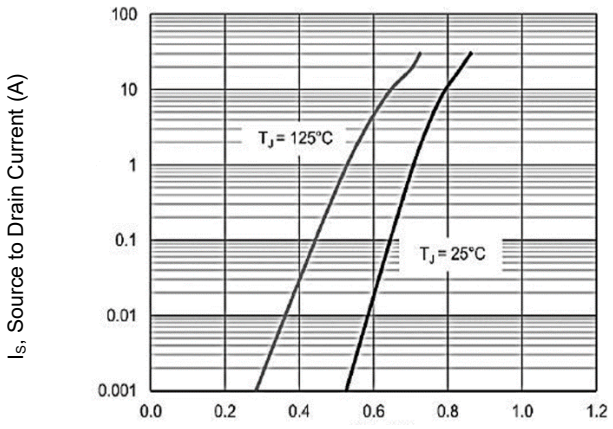
On-Resistance vs. Drain Current



Capacitance

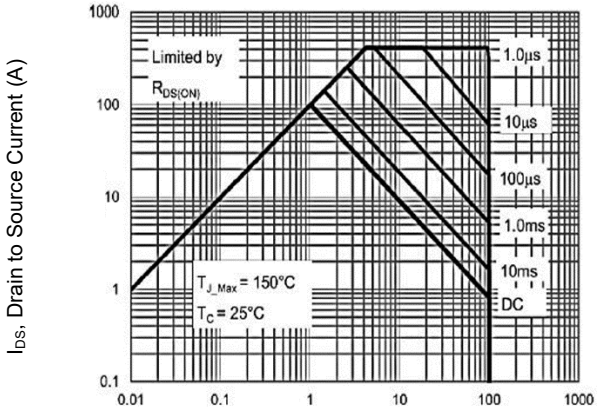


Body Diode Characteristics

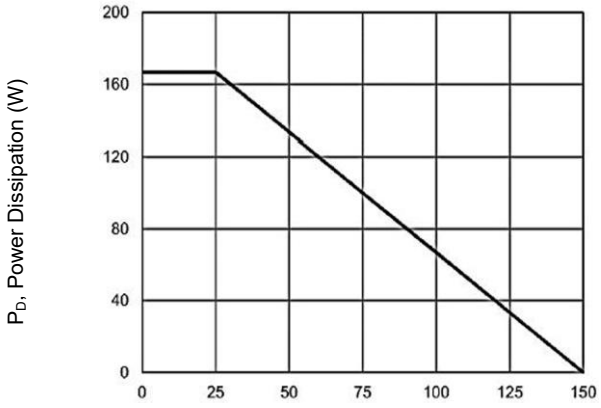


CHARACTERISTIC CURVES

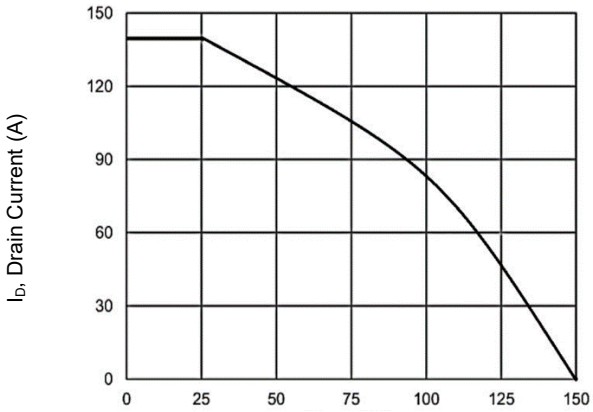
Maximum Safe Operating Area



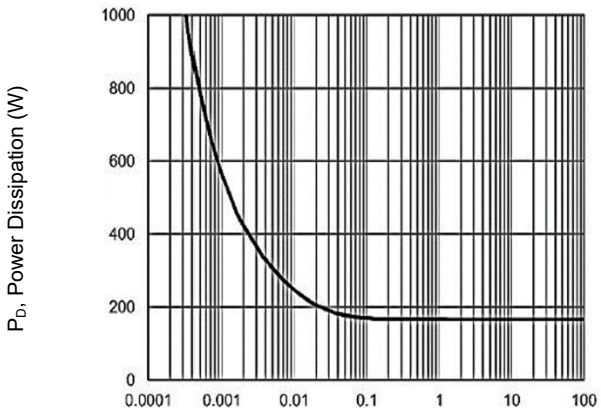
Maximum Power Dissipation vs Temperature



Maximum EAS vs. Channel Temperature



Single Pulse Power Rating, Junction-to-Case



Normalized Transient Thermal Impedance