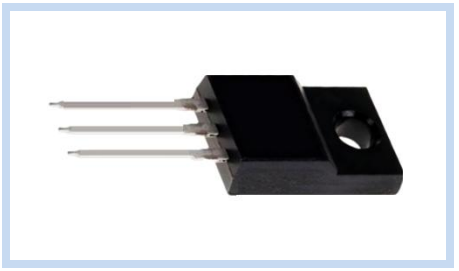
N-Channel MOSFET
650V 38A 36W TO-220F

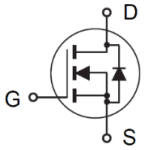
MFT65N38T220F

MERITEK

FEATURE



- $R_{DS(ON)}$≤109mΩ at V_{GS}=10V
- 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



RoHS

MECHANICAL DATA

- Case: TO-220F Package
- Terminals: Solderable per MIL-STD-750, Method 2026

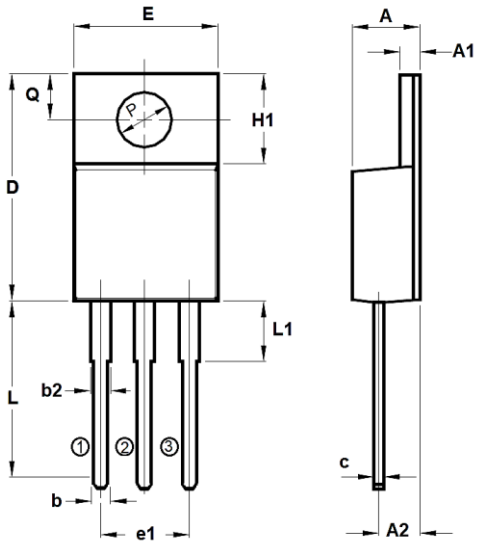
MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±40	V
Drain Current – Continuous	T_C=25°C	I_D	38	A
	T_C=100°C		24	
Drain Current – Pulsed		I_{DM}	152	A
Power Dissipation		P_D	36	W
Single Pulsed Avalanche Energy		E_{AS}	841	mJ
Thermal Resistance Junction to Case		$R_{\theta JC}$	3.47	°C/W
Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to +150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A	4.50	4.90
A1	2.34	2.74
A2	2.56	2.96
b	0.70	0.90
b2	1.18	1.58
c	0.40	0.60
D	15.67	15.97
E	9.96	10.36
e1	5.08 TYP	
H1	6.50	6.90
L	12.64	13.24
L1	3.03	3.43
P	3.08	3.28
Q	2.90	3.60

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

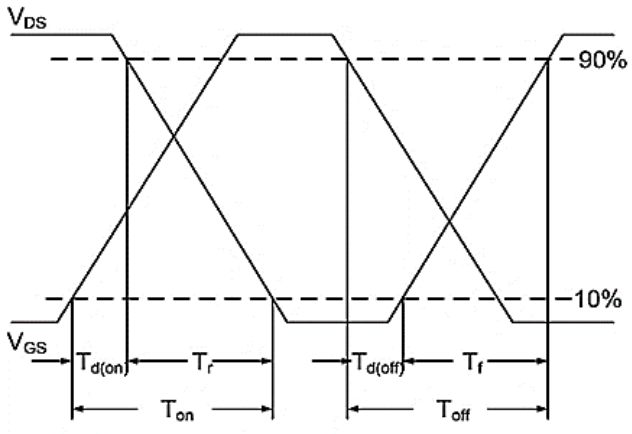


ELECTRICAL CHARACTERISTICS

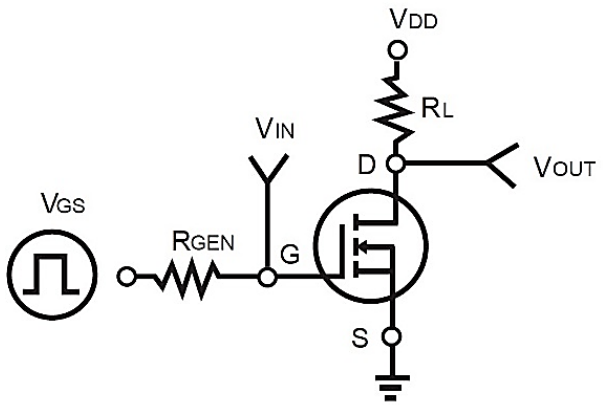
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=500μA	BV_{DSS}	650	--	--	V
Drain-Source Leakage Current	V_{DS}=650V, V_{GS}=0V	I_{DSS}	--	--	3	μA
Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=10V, I_D=19A	$R_{DS(ON)}$	--	89	109	mΩ
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	$V_{GS(th)}$	2.6	3.5	4.3	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=480V, V_{GS}=10V, I_D=38A	Q_g	--	45	--	nC
Gate-Source Charge		Q_{gs}	--	15	--	
Gate-Drain Charge		Q_{gd}	--	11.5	--	
Turn-On Delay Time	V_{DD}=380V, V_{GS}=10V, R_G=1.7Ω, I_D=19A	$T_{d(on)}$	--	16	--	ns
Rise Time		T_r	--	13	--	
Turn-Off Delay Time		$T_{d(off)}$	--	71	--	
Fall Time		T_f	--	13	--	
Input Capacitance	V_{DS}=50V, V_{GS}=0V, F=1MHz	C_{iss}	--	2800	--	pF
Output Capacitance		C_{oss}	--	97	--	
Reverse Transfer Capacitance		C_{rss}	--	1.5	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Drain-Source Diode Forward Current	T_C=25°C	I_S	--	--	38	A
Diode Forward Voltage	V_{GS}=0V, I_S=28A, T_J=25°C	V_{SD}	--	0.9	1.2	V
Reverse Recovery Time	I_F=19A, T_J=25°C di/dt=100A/μs	T_{rr}	--	180	--	ns
Reverse Recovery Charge		Q_{rr}	--	1.6	--	μC
Peak Reverse Recovery Current		I_{rrm}	--	18	--	A

Note:
1. T_A=25°C unless otherwise noted
2. T_J=25°C, VDD=50V, VG=10V, R_G=25Ω
3. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

Switching Time Waveform

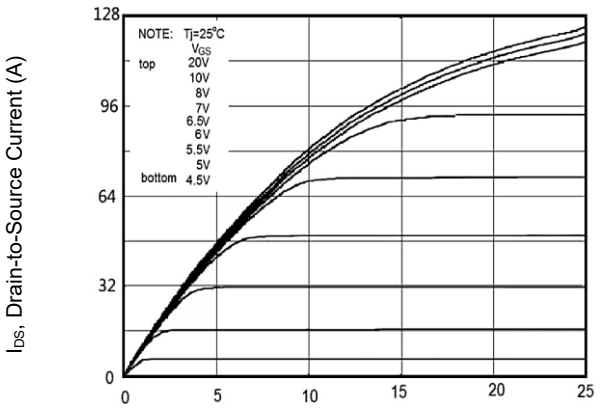


Switching Test Circuit

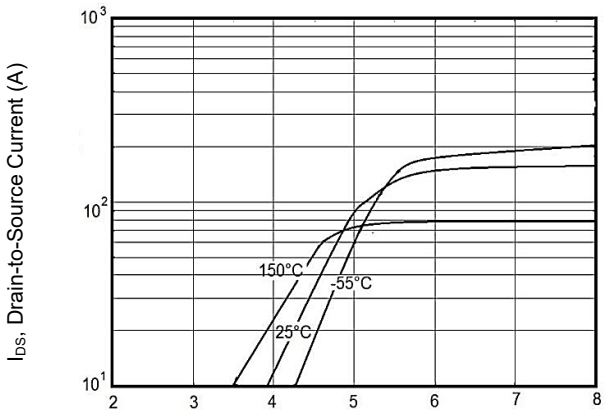


CHARACTERISTIC CURVES

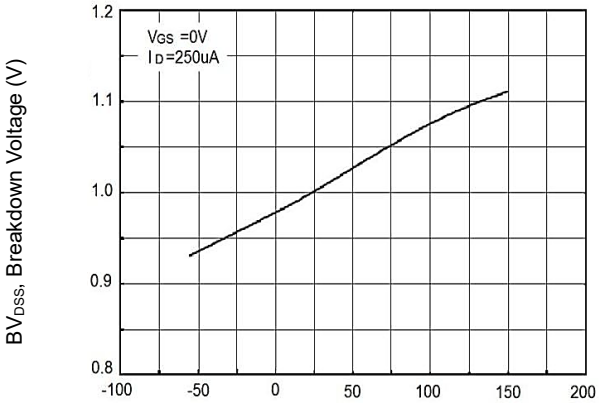
Output Characteristics



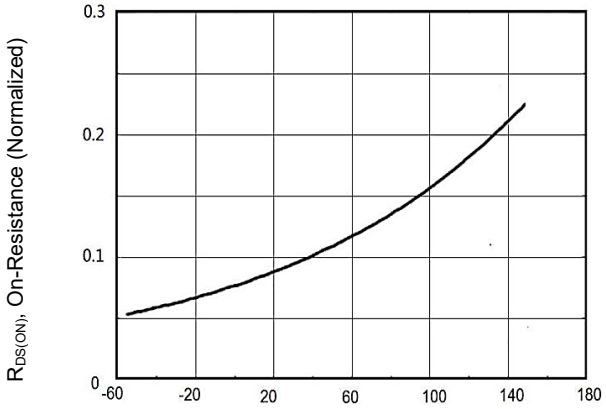
Transfer Characteristics



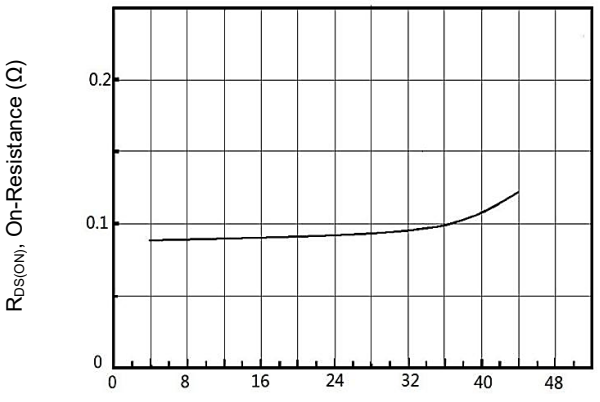
Breakdown Voltage vs. Temperature



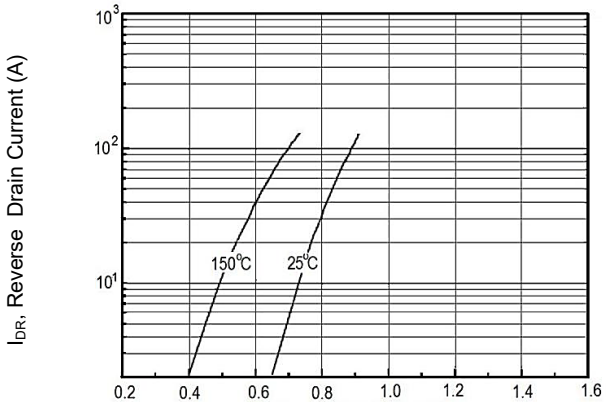
On-Resistance Vs. Junction Temperature



On-Resistance vs Drain Current

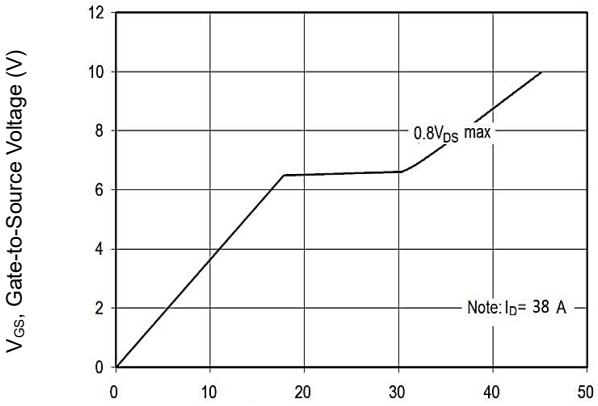


Body Diode Characteristics

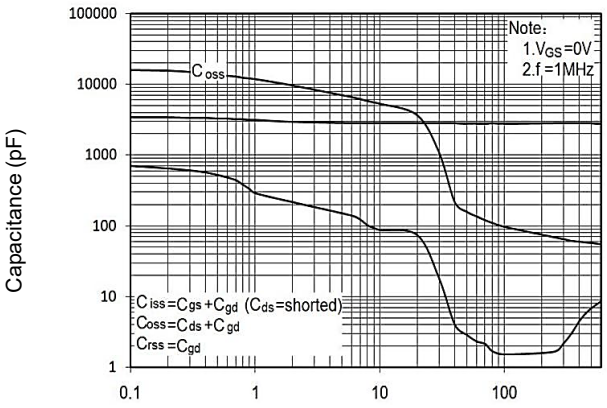


CHARACTERISTIC CURVES

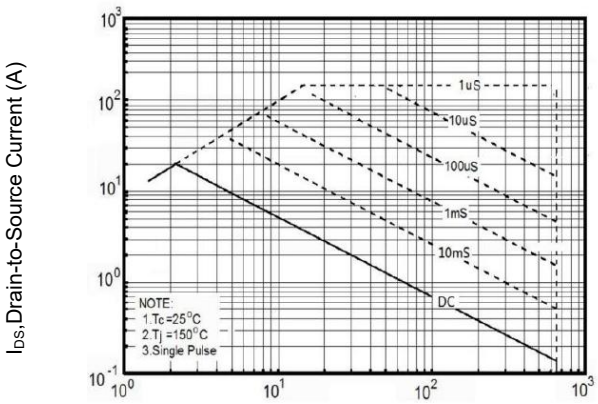
Gate-Charge Characteristics



Capacitance



Maximum Safe Operating Area



Maximum I_D vs. Junction Temperature