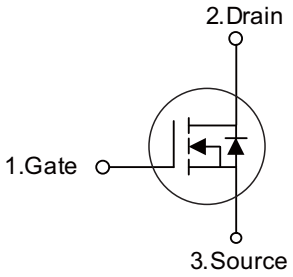
Symbol



■ PRODUCT CHARACTERISTICS

VDSS	650V
R_{DS}(on)Typ(@V_{GS} =10 V)	86mΩ
Qg@type	17.8nC
ID	40A

■ APPLICATIONS

- Power faction correction
- Switched mode power supplies
- Uninterruptible power supply

■ FEATURES

- low $R_{DS(on)}$
- low gate charge
- 100% UIS tested
- RoHS compliant

TO-220F

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT65R099HF	TO-220F	50 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS (T_C=25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	40	A
Pulsed drain current [1]	I_{DM}	120	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	1000	mJ
Power Dissipation TO-220F (T_C = 25°C)	P_D	35	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	40	A
Diode pulse current	$I_{S,pulse}$	120	A

■ THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.6	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=0.25 mA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25 mA	2.0	3.0	4.0	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V, T_j = 25°C	-	-	1	μA
		V_{DS}=650 V, V_{GS}=0 V, T_j = 125°C	-	10	-	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=20 A T_j = 25°C	-	0.086	0.099	Ω
		V_{GS}=10 V, I_D=20 A T_j = 150°C	-	0.22	-	Ω
Gate resistance	R_G	f=1 MHz, open drain	-	2.0	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	-	3000	-	pF
Output capacitance	C_{oss}		-	2500	-	
Reverse transfer capacitance	C_{rss}		-	10	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400 V, I_D = 20 A R_G = 10 Ω, V_{GS}=10 V	-	31.2	-	ns
Rise time	t_r		-	43.8	-	
Turn-off delay time	$t_{d(off)}$		-	151.4	-	
Fall time	t_f		-	12.3	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=400 V, I_D=20 A, V_{GS}=0 to 10 V	-	17.8	-	nC
Gate to drain charge	Q_{gd}		-	25	-	
Gate charge total	Q_g		-	66	-	
Gate plateau voltage	$V_{plateau}$		-	6.0	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=20 A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=20 A, dI_F/dt=100 A/μs	-	198	-	ns
Reverse recovery charge	Q_{rr}		-	3.1	-	μC
Peak reverse recovery current	I_{rrm}		-	14.9	-	A

Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.

2. I_{AS} = 8A, V_{DD} =60V, Starting T_j= 25°C.

■ ELECTRCAL CHARACTERISTICS DIAGRAMS

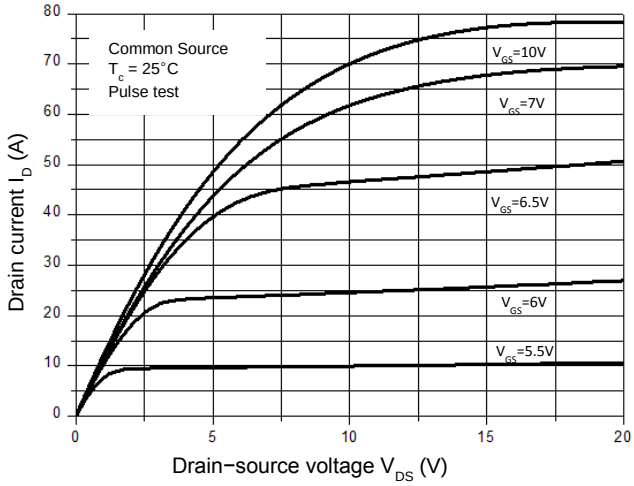


Figure 1. On-Region Characteristics

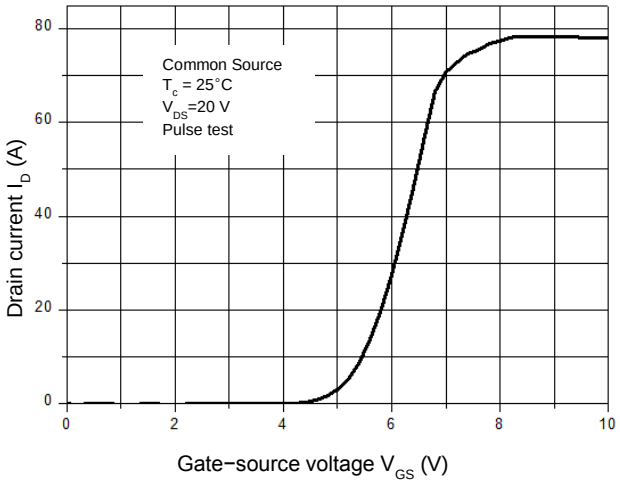


Figure 2. Transfer Characteristics

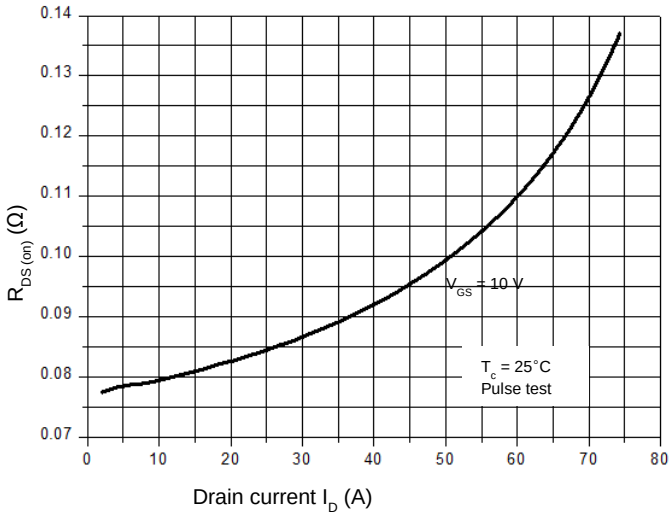


Figure 3. On-Resistance Variation vs. Drain Current

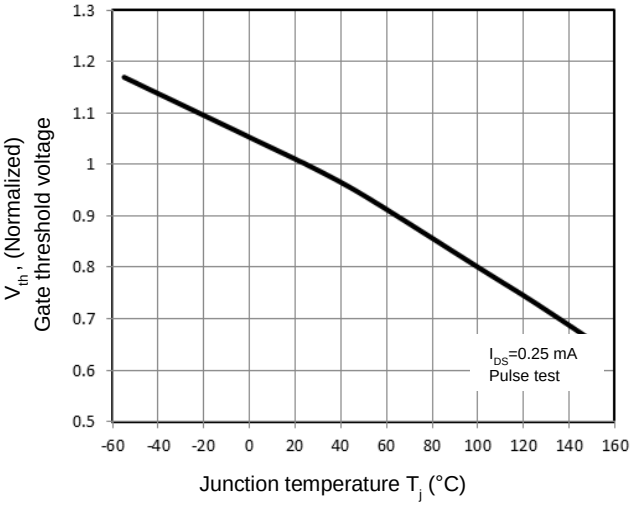


Figure 4. Threshold Voltage vs. Temperature

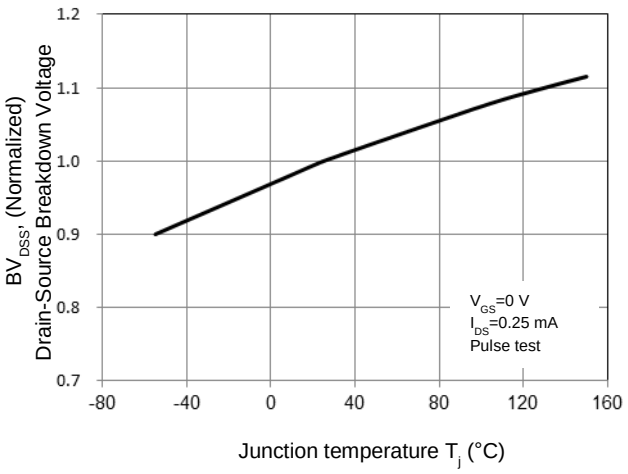


Figure 5. Breakdown Voltage vs. Temperature

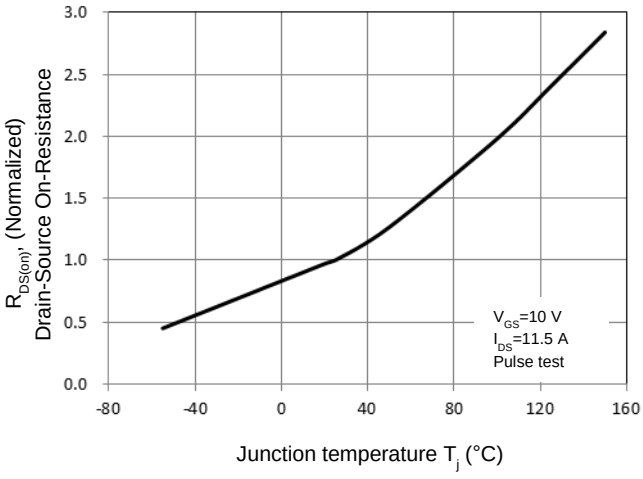


Figure 6. On-Resistance vs. Temperature

■ ELECTRCAL CHARACTERISTICS DIAGRAMS(Cont.)

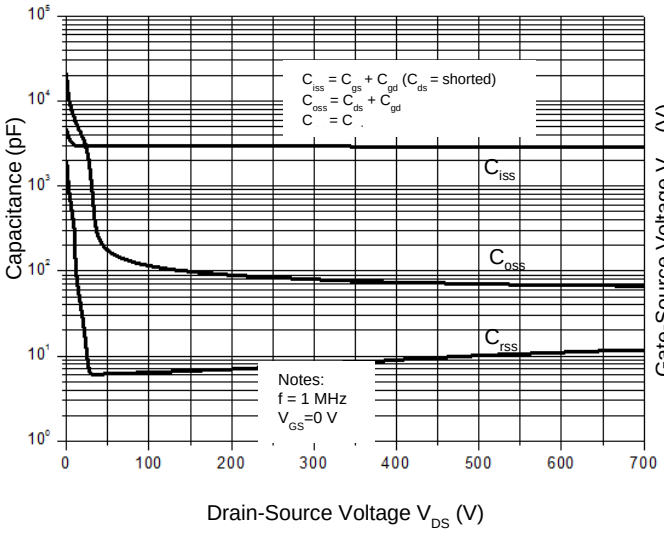


Figure 7. Capacitance Characteristics

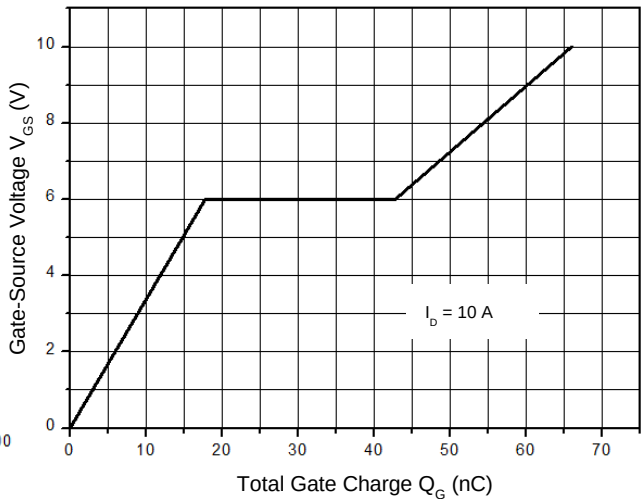


Figure 8. Gate Charge Characterist

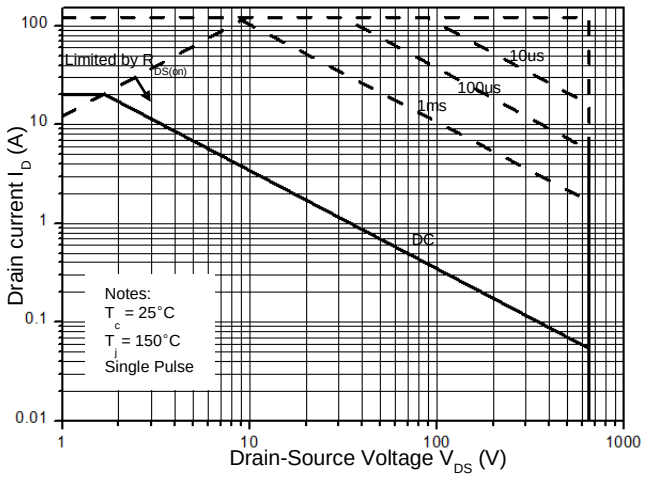


Figure 9. Maximum Safe Operating Area

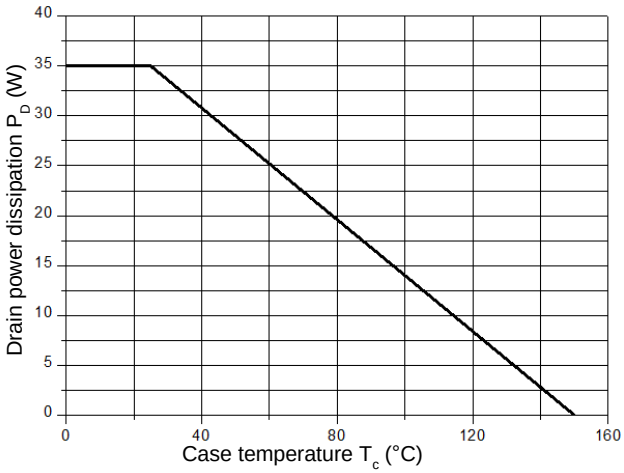
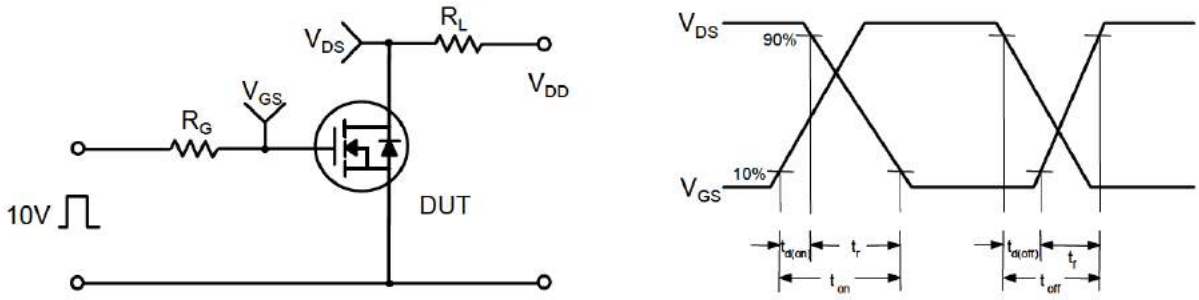
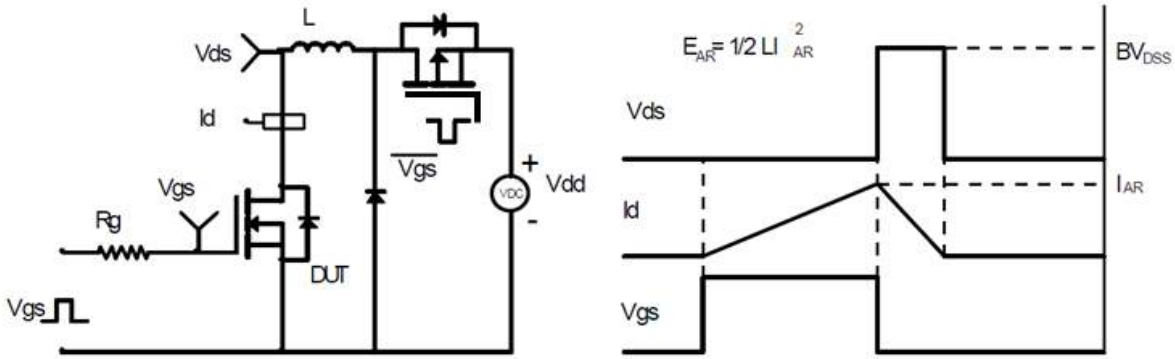


Figure 10. Power Dissipation vs. Temperature

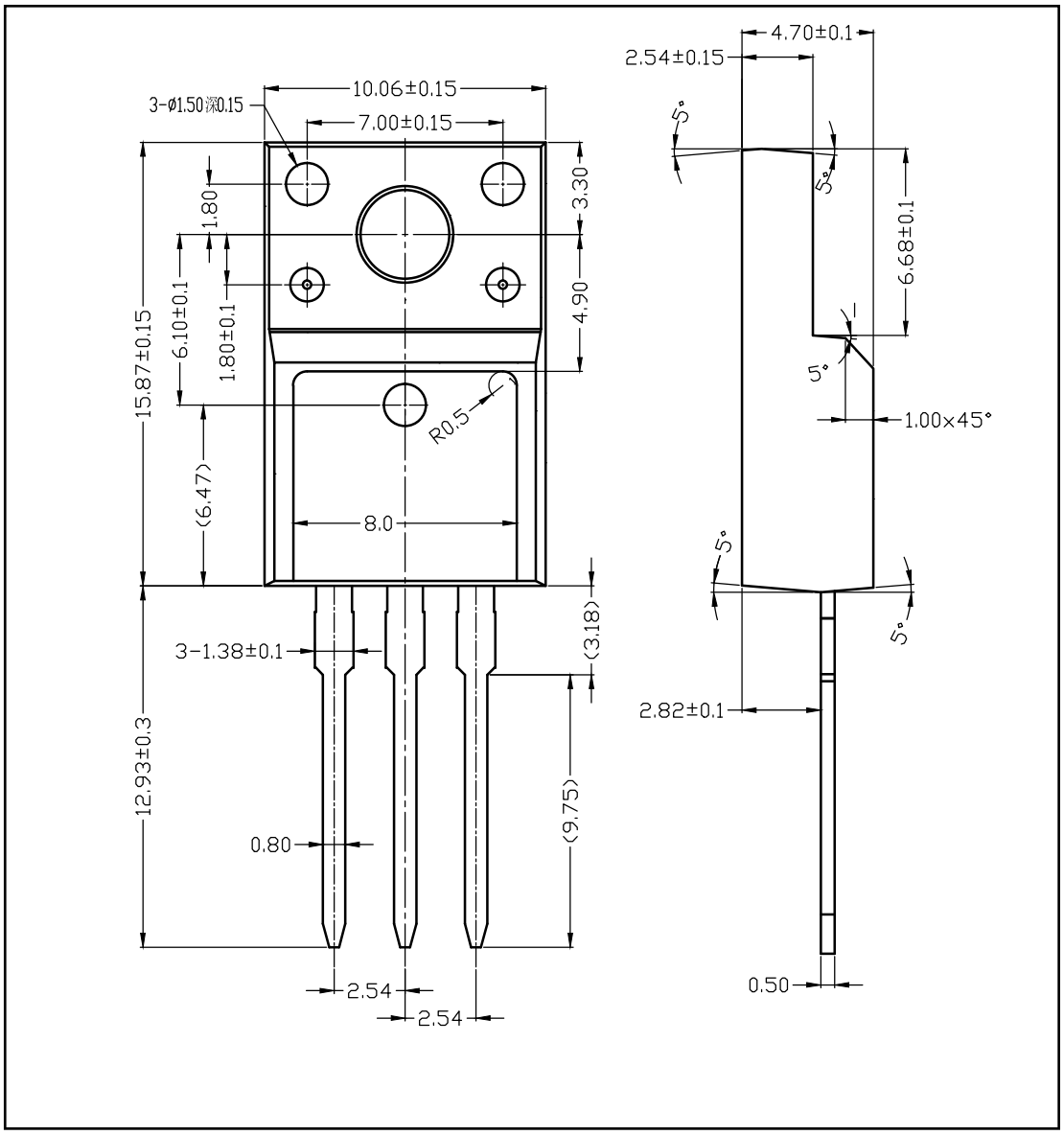
■ TEST CIRCUITS AND WAVEFORMS



Unclamped Inductive Switching Test Circuit & Waveforms



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



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