

■ PRODUCT CHARACTERISTICS

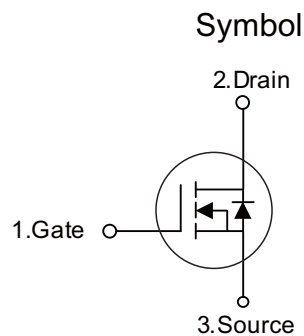
VDSS	650V
$R_{DS(on)}$ Typ(@V _{GS} =10 V)	86mΩ
Qg@type	17.8nC
ID	40A

■ 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°C 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 _{θJC}	3.6	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	°C/W

■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, 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:

- Limited by maximum junction temperature, maximum duty cycle is 0.75.
- $I_{AS} = 8\text{ A}, V_{DD} = 60\text{ V}$, Starting $T_J = 25^\circ\text{C}$.

■ ELECTRICAL CHARACTERISTICS DIAGRAMS

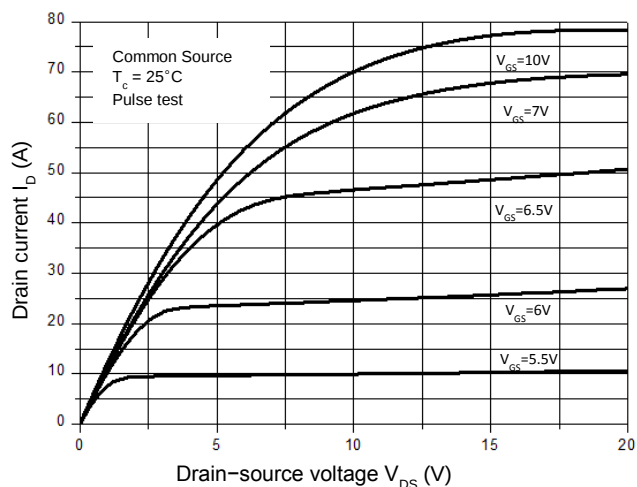


Figure 1. On-Region Characteristics

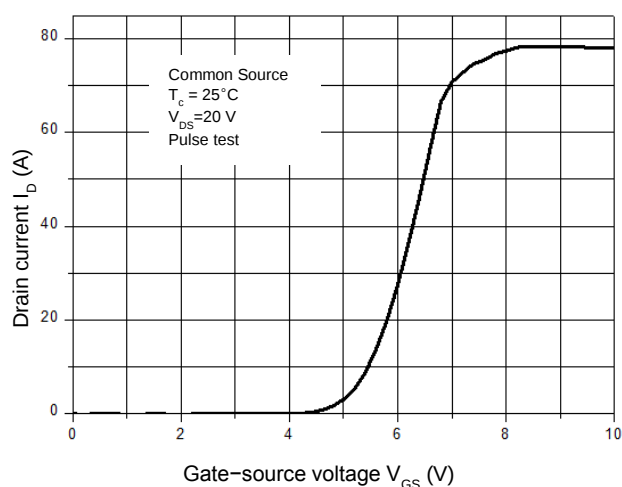


Figure 2. Transfer Characteristics

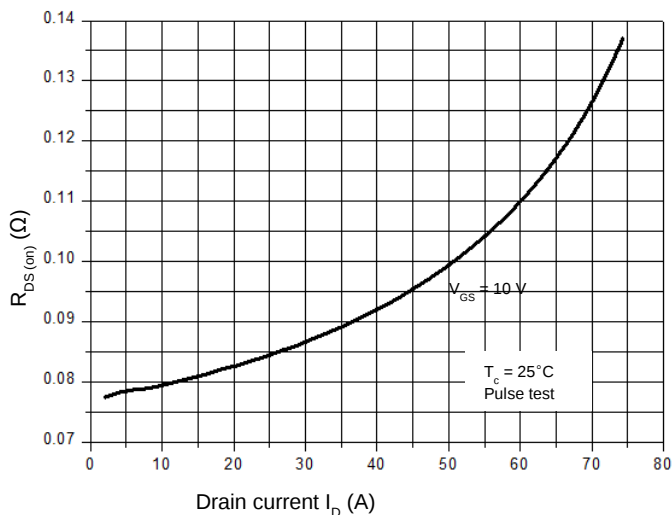


Figure 3. On-Resistance Variation vs. Drain Current

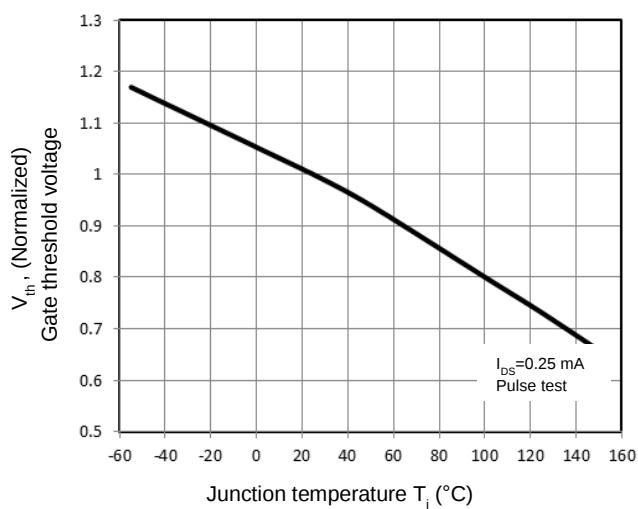


Figure 4. Threshold Voltage vs. Temperature

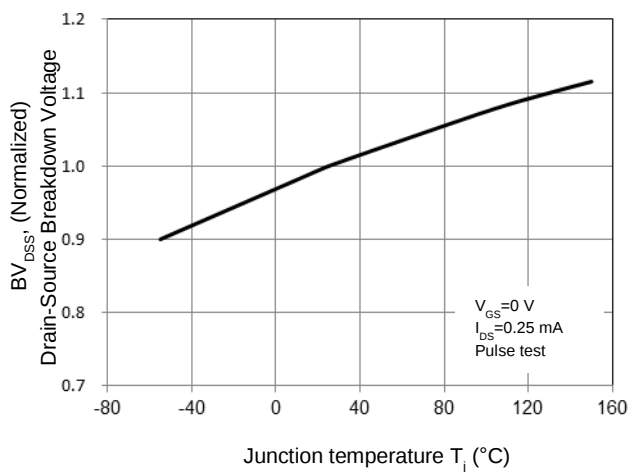


Figure 5. Breakdown Voltage vs. Temperature

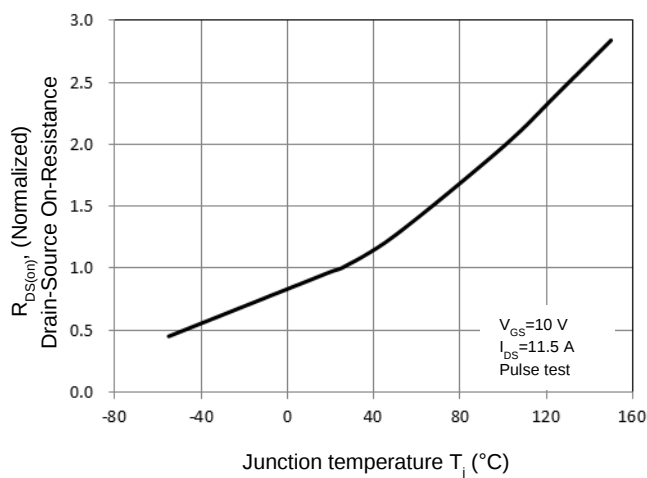


Figure 6. On-Resistance vs. Temperature

■ ELECTRICAL CHARACTERISTICS DIAGRAMS(Cont.)

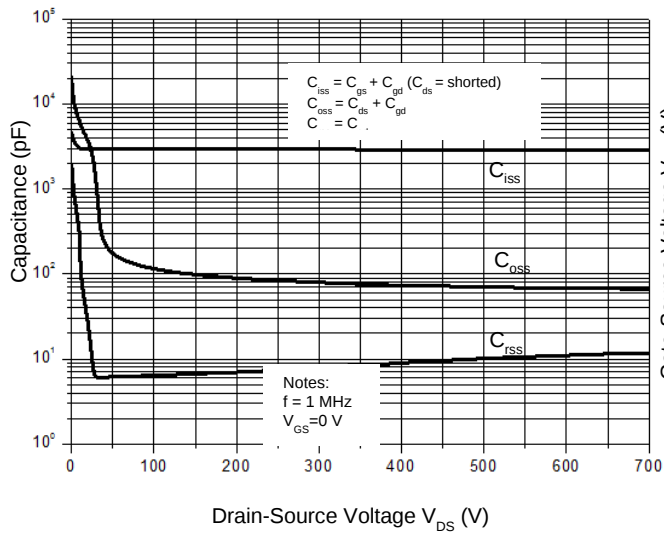


Figure 7. Capacitance Characteristics

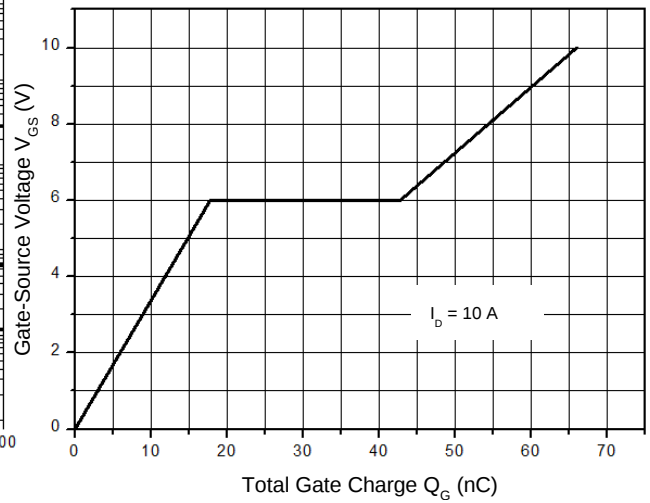


Figure 8. Gate Charge Characterist

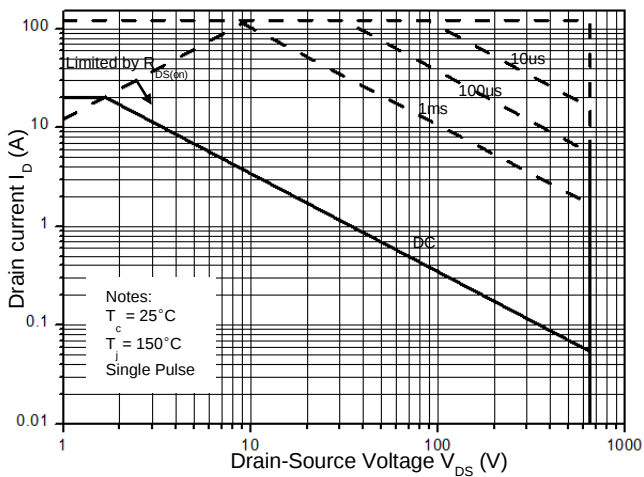


Figure 9. Maximum Safe Operating Area

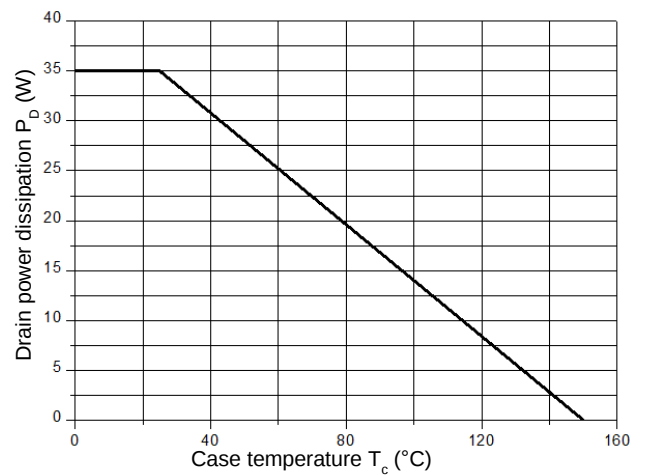
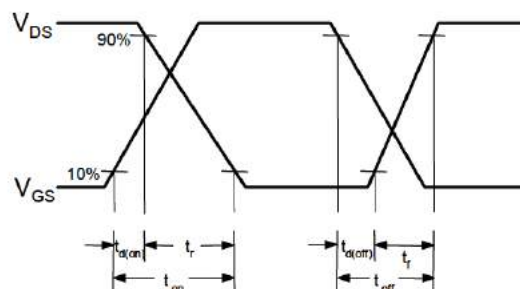
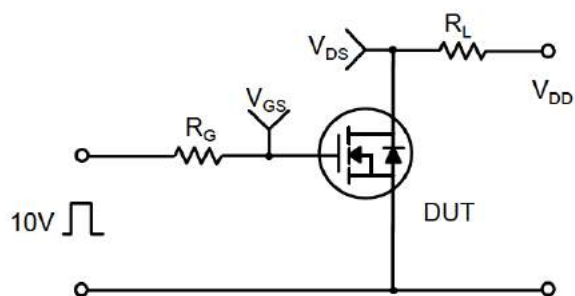
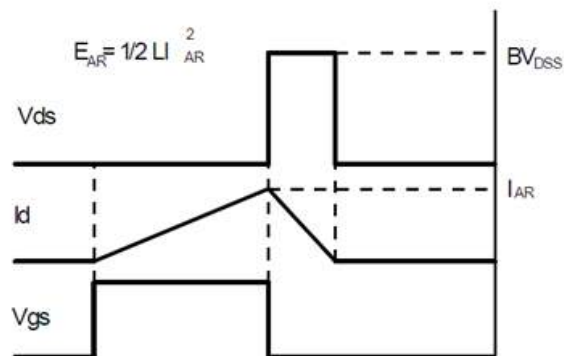
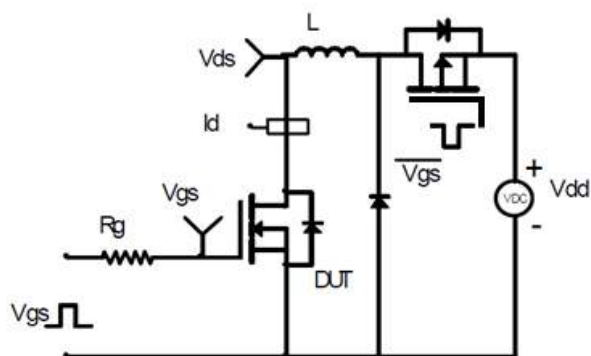


Figure 10. Power Dissipation vs. Temperature

■ TEST CIRCUITS AND WAVEFORMS



Unclamped Inductive Switching Test Circuit & Waveforms



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