

■ PRODUCT CHARACTERISTICS

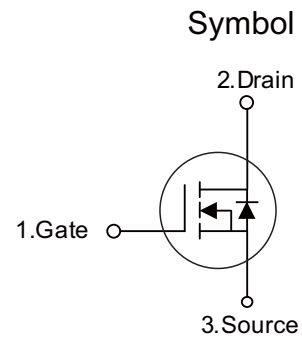
VDSS	500V
$R_{DS(on)max}(@V_{GS}=10V)$	0.2Ω
ID	28A

■ APPLICATIONS

- * High efficiency switch mode power supplies
- * Electronic lamp ballasts based on half bridge
- * LED power supplies

■ FEATURES

- * $R_{DS(ON)} \leq 0.2\Omega @ V_{GS}=10V$
- * High Switching Speed
- * Improved dv/dt capability



TO-220F

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT28N50HF	TO-220F	50 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Ratings	Units
Drain-source voltage	V_{DSS}	500	V
Gate-source voltage	V_{GSS}	±30	V
Drain current continuous	I_D	28	A
Drain current pulsed (note1)	I_{DP}	112	A
Avalanche energy	Repetitive	E_{AR}	43
	Single pulse	E_{AS}	1960
Peak diode recovery dv/dt (note 3)	dv/dt	4.5	V/ns
Total power dissipation	P_D	$T_C=25^\circ\text{C}$	479
		derate above 25°C	3.83
Junction temperature	T_J	+150	$^\circ\text{C}$
Storage temperature	T_{STG}	-55~+150	$^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{JC}	0.625	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	500	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=400V, T_C=125^\circ C$	-	-	10	μA
Gate-body leakage current	I_{GSS}	$V_{GS}=30V, V_{DS}=0V$	-	-	100	nA
		$V_{GS}=-30V, V_{DS}=0V$	-	-	-100	nA
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Static drain-source on-resistance	$R_{DS(on)}$	$V_{DS}=10V, I_D=14A$	-	0.16	0.2	Ω
Forward transconductance	g_{FS}	$V_{DS}=40V, I_D=14A$ (note4)	-	26	-	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1MHz$	-	4085	-	pF
Output capacitance	C_{oss}		-	474	-	pF
Reverse transfer capacitance	C_{rss}		-	60	-	pF
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD}=250V, I_D=28A,$ $R_G=25\Omega$ (note4,5)	-	45	-	ns
Rise time	t_r		-	87	-	ns
Turn-off delay time	$t_{d(off)}$		-	355	-	ns
Fall time	t_f		-	130	-	ns
Total gate charge	Q_g	$V_{DS}=400V, I_D=28A,$ $V_{GS}=10V$ (note4,5)	-	102	-	nC
Gate-source charge	Q_{gs}		-	43	-	nC
Gate-drain charge	Q_{gd}		-	20	-	nC
Drain-source diode characteristics						
Drain-source diode forward voltage	V_{SD}	$V_{GS}=0V, I_D=28A$	-	-	1.4	V
Continuous drain-source current	I_{SD}		-	-	28	A
Pulsed drain-source current	I_{SM}		-	-	112	A
Reverse recovery time	t_{rr}	$I_{SD}=28A$ $di_{SD}/dt=100A/\mu s$ (note4)	-	656	-	ns
Reverse recovery charge	Q_{rr}		-	11.5	-	μC

Note:1 Repetitive rating: pulse width limited by maximum junction temperature

2. $L=5mH, I_{AS}=28A, V_{DD}=50V, R_G=25\Omega$, starting $T_J=25^\circ C$
3. $I_{SD}\leq 28A, di/dt\leq 100A/\mu s, V_{DD}\leq BV_{DSS}$, starting $T_J=25^\circ C$
4. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

■ ELECTRICAL CHARACTERISTICS DIAGRAMS

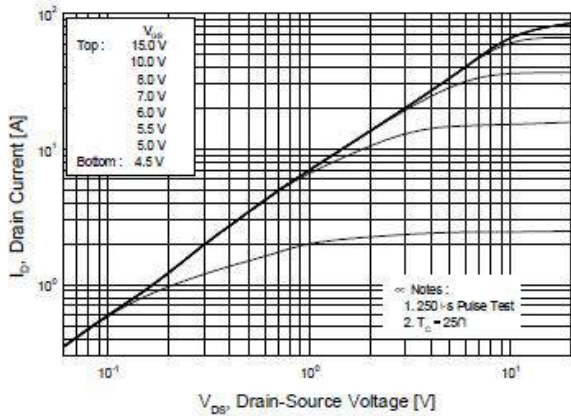


Figure 1. On-Region Characteristics

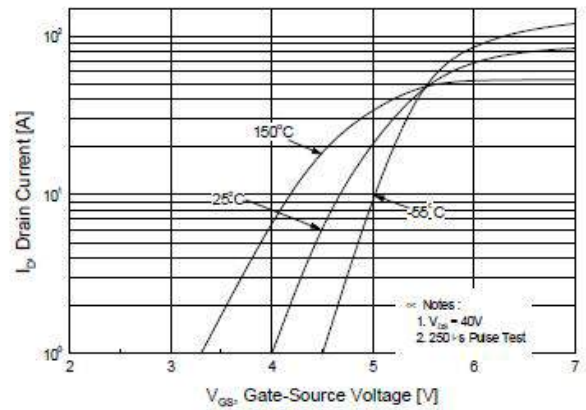


Figure 2. Transfer Characteristics

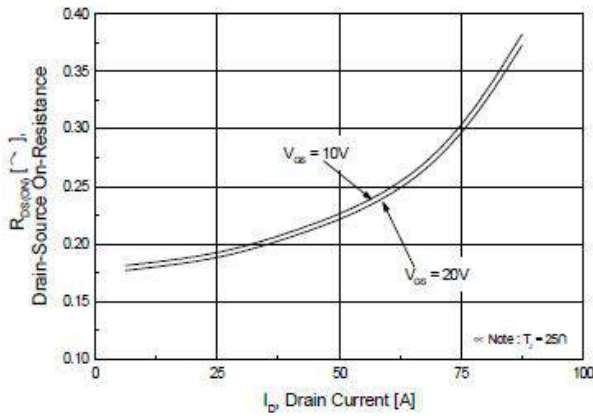


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

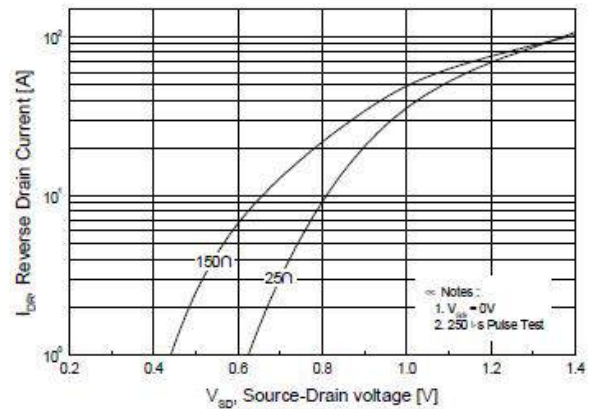


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

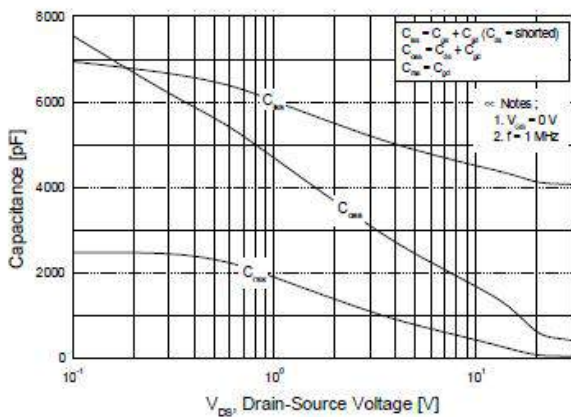


Figure 5. Capacitance Characteristics

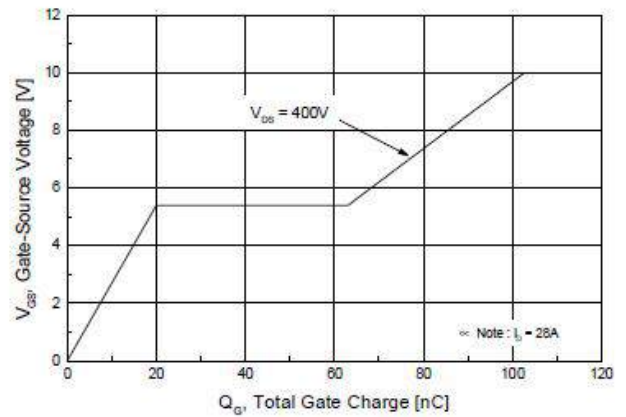


Figure 6. Gate Charge Characteristics

■ ELECTRICAL CHARACTERISTICS DIAGRAMS(Cont.)

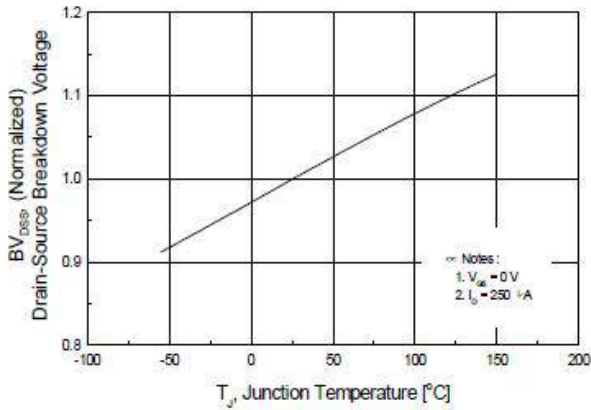


Figure 7. Breakdown Voltage Variation vs Temperature

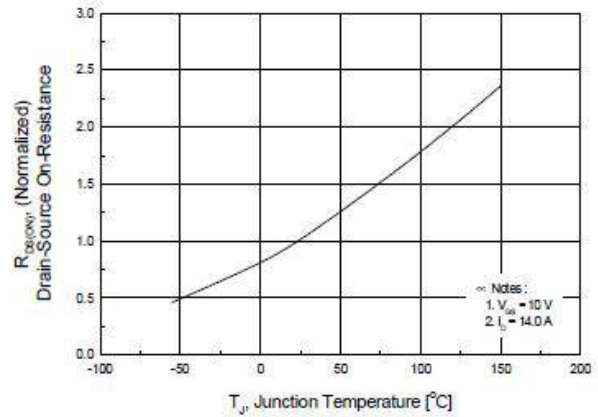


Figure 8. On-Resistance Variation vs Temperature

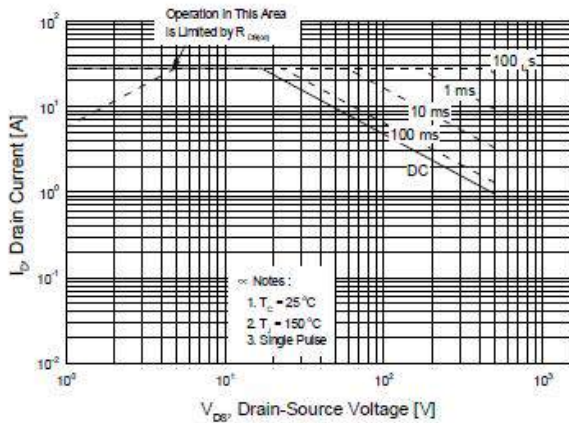


Figure 9. Maximum Safe Operating Area

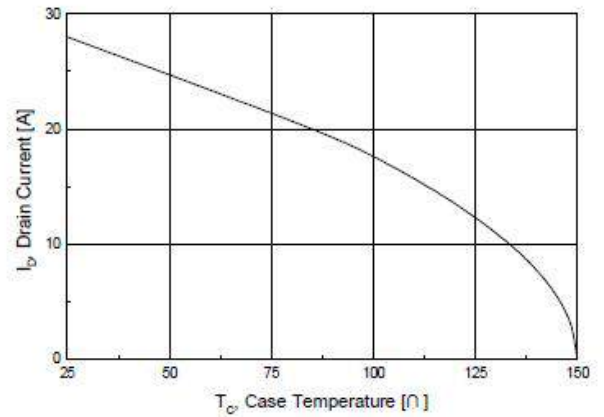


Figure 10. Maximum Drain Current vs Case Temperature

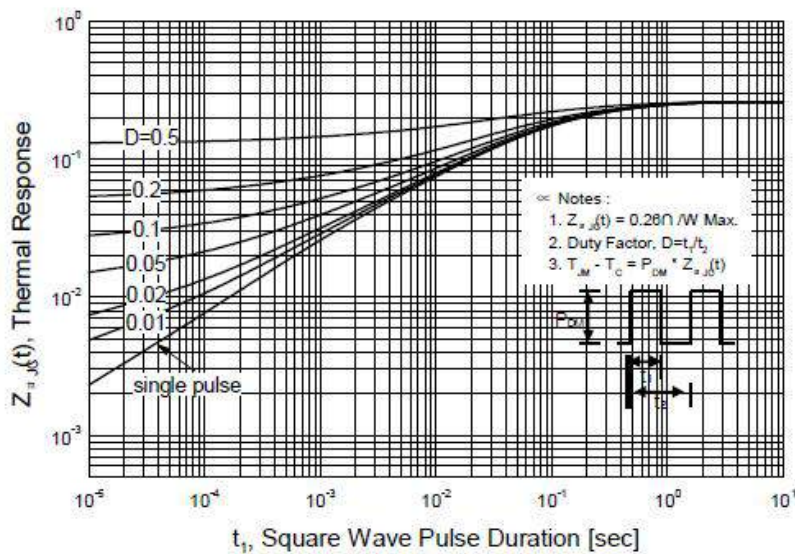


Figure 11. Transient Thermal Response Curve

■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS

