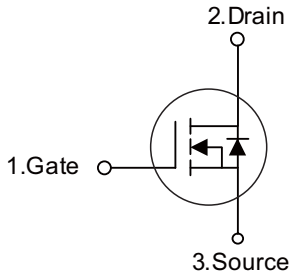
■ PRODUCT CHARACTERISTICS

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

Symbol

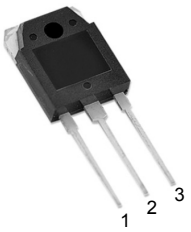


■ APPLICATIONS

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

■ FEATURES

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



TO-3PB

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT28N50Q	TO-3PB	30 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°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 (note1)	E_{AR}	43	mJ
	Single pulse (note2)	E_{AS}	1960	mJ
Peak diode recovery dv/dt (note 3)		dv/dt	4.5	V/ns
Total power dissipation	T_C=25ºC	P_D	479	W
	derate above 25ºC		3.83	W/ºC
Junction temperature		T_J	+150	ºC
Storage temperature		T_{STG}	-55~+150	ºC

*Drain current limited by maximum junction temperature.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	0.625	°C/W

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

Parameter		Symbol	Conditions	Min	Typ	Max	Units
Off characteristics							
Drain-source breakdown voltage		BV_{DSS}	V_{GS}=0V,I_D=250μA	500	-	-	V
Zero gate voltage drain current		I_{DSS}	V_{DS}=500V ,V_{GS}=0V	-	-	1	μA
			V_{DS}=400V ,T_C=125 ºC	-	-	10	μA
Gate-body leakage current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V	-	-	100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V	-	-	-100	nA
Breakdown voltage temperature coefficient		△BV_{DSS}/△T_J	I_D=250μA	-	0.6	-	V/°C
On characteristics							
Gate threshold voltage		$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	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=25Ω (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/μs (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=25Ω,staring T_J=25ºC

3. I_{SD}≤28A, di/dt≤100A/μs, V_{DD}≤BV_{DSS}, staring T_J=25 ºC

4. Pulse test: pulse width≤300μs,duty cycle≤2%

5. Essentially independent of operating temperature

■ TYPICAL CHARACTERISTICS

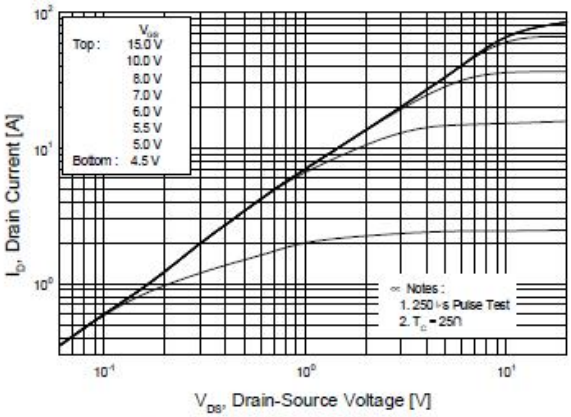


Figure 1. On-Region Characteristics

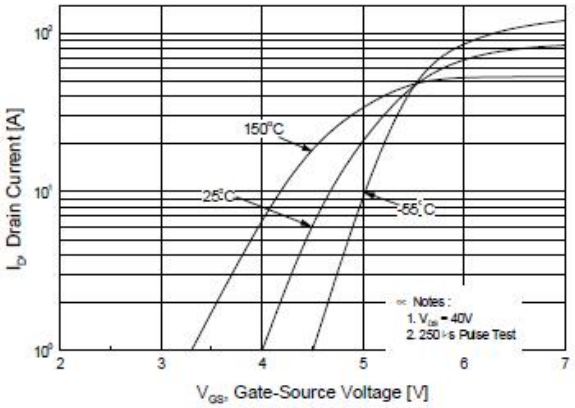


Figure 2. Transfer Characteristics

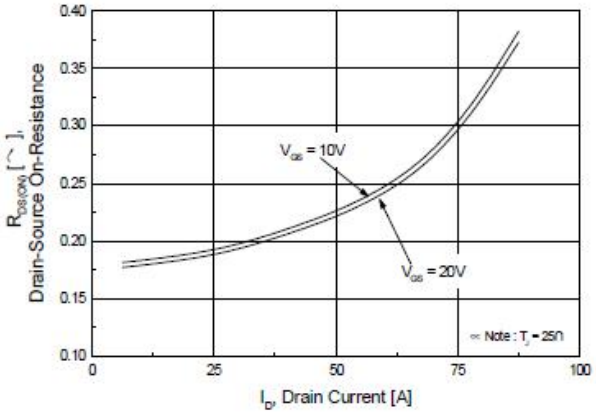


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

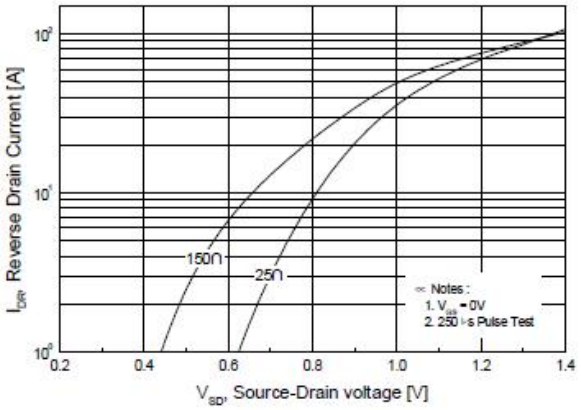


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

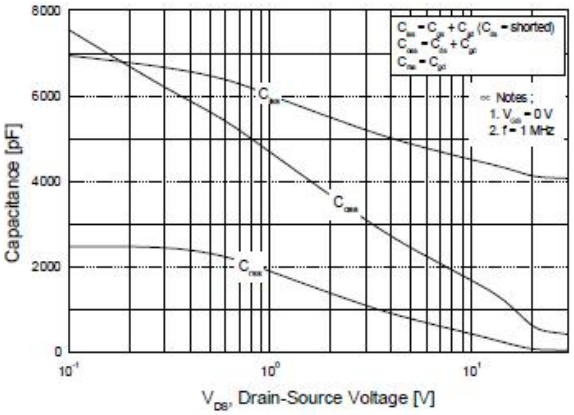


Figure 5. Capacitance Characteristics

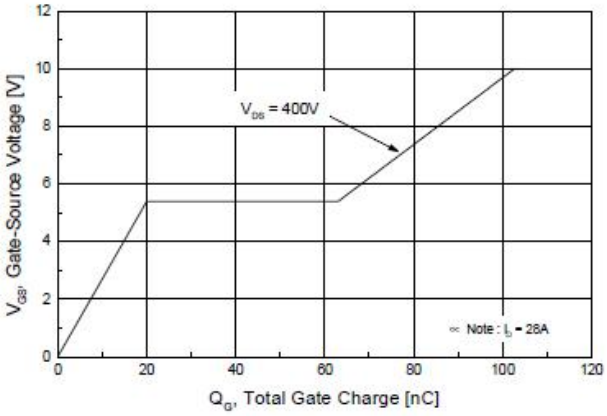


Figure 6. Gate Charge Characteristics

■ TYPICAL CHARACTERISTICS(Cont.)

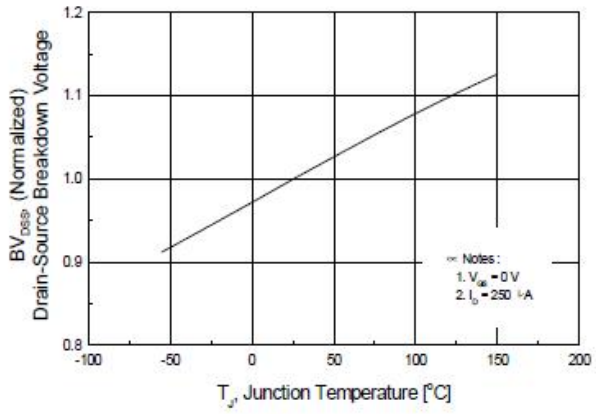


Figure 7. Breakdown Voltage Variation vs Temperature

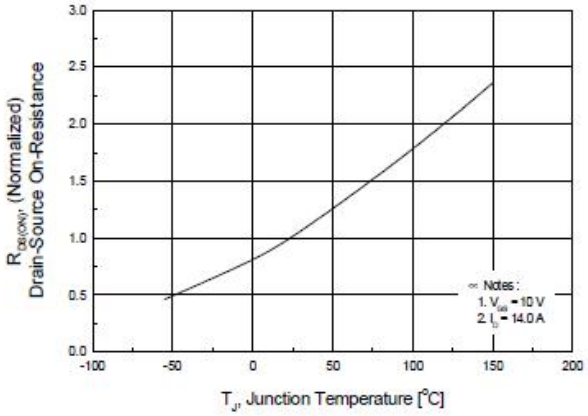


Figure 8. On-Resistance Variation vs Temperature

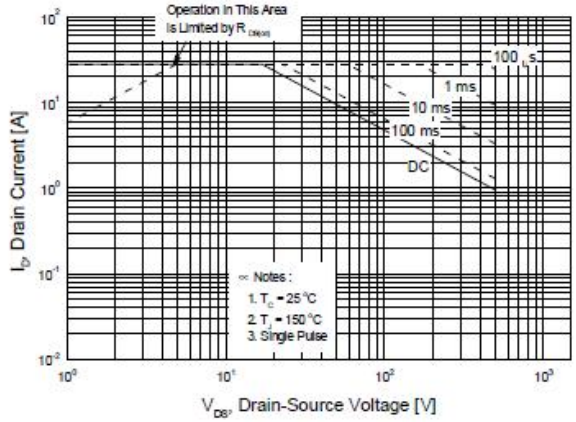


Figure 9. Maximum Safe Operating Area

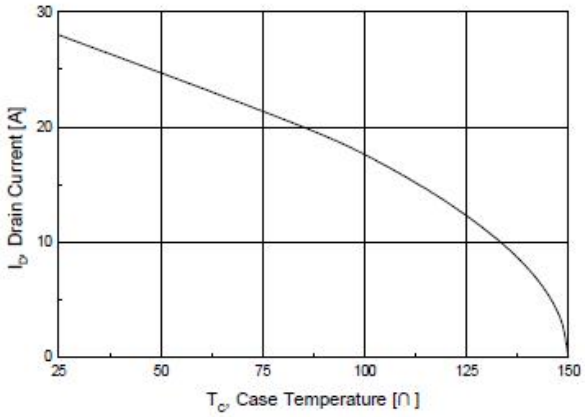


Figure 10. Maximum Drain Current vs Case Temperature

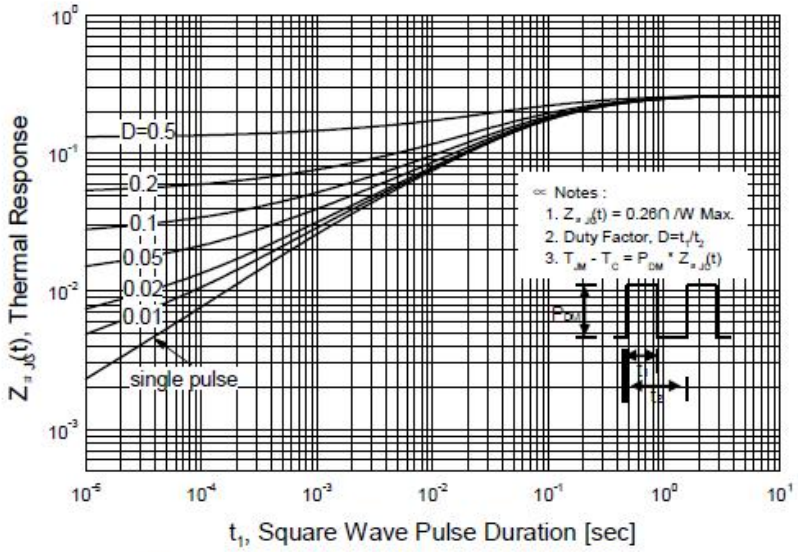


Figure 11. Transient Thermal Response Curve

■ TO-3PB PACKAGE OUTLINE DIMENSIONS