



MPQ50N30

N-Channel Power MOSFET

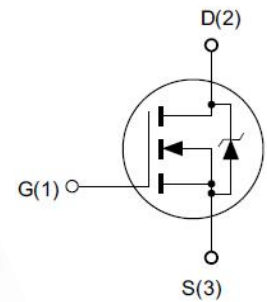
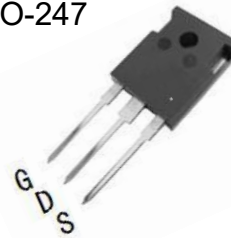
Features

- ◆ 300V, 50A, $R_{DS(ON)}(Typ.) = 65m\Omega @ V_{GS} = 10V$.
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ High Efficiency Switch Mode Power Supplies
- ◆ DC-DC Converters
- ◆ Power Management For Inverter Systems
- ◆ Power Management For UPS

TO-247



Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	300	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_C = 25^\circ C$	50	A
	Drain Current-Continuous, $T_C = 100^\circ C$	30	A
I_{DM}	Drain Current-Pulsed ^b	150	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ C$	205	W
dv/dt	Peak Diode Recovery dv/dt ^c	5	V/ns
E_{AS}	Single Pulsed Avalanche Energy ^d	720	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.61	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	43	$^\circ C/W$

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	300	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 300V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V



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■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 25A$	-	65	80	m Ω
g_{fs}	Forward Transconductance	$V_{DS} = 15V, I_D = 25A$	-	26.5	-	S

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_g	Gate Series Resistance	$f = 1.0MHz$	-	5	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 50V,$ $V_{GS} = 0V,$ $f = 10KHz$	-	4086	-	pF
C_{oss}	Output Capacitance		-	220	-	pF
C_{rss}	Reverse Transfer Capacitance		-	16	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 150V,$ $I_D = 50A,$ $V_{GS} = 10V,$ $R_G = 5\Omega$	-	16	-	ns
t_r	Turn-On Rise Time		-	47	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	45	-	ns
t_f	Turn-Off Fall Time		-	15	-	ns
Q_g	Total Gate Charge	$V_{DS} = 150V,$ $I_D = 50A,$ $V_{GS} = 10V$	-	81	-	nC
Q_{gs}	Gate-Source Charge		-	21	-	nC
Q_{gd}	Gate-Drain Charge		-	20	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_{GS} = 0V$	-	-	50	A
I_{SM}	Maximum Pulsed Current	$V_{GS} = 0V$	-	-	150	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 50A$	-	0.9	2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_S = 50A, V_{GS} = 0V$ $dI_F/dt = 100A/\mu s$	-	240	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_S = 50A, V_{GS} = 0V$ $dI_F/dt = 100A/\mu s$	-	2053	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- $I_{SD} = 25A, dI_F/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS},$ Start $T_J = 25^\circ C$.
- $L = 10mH, V_{DD} = 100V, I_{AS} = 12A, R_G = 5\Omega$ Starting $T_J = 25^\circ C$.

■ Characteristic Curve

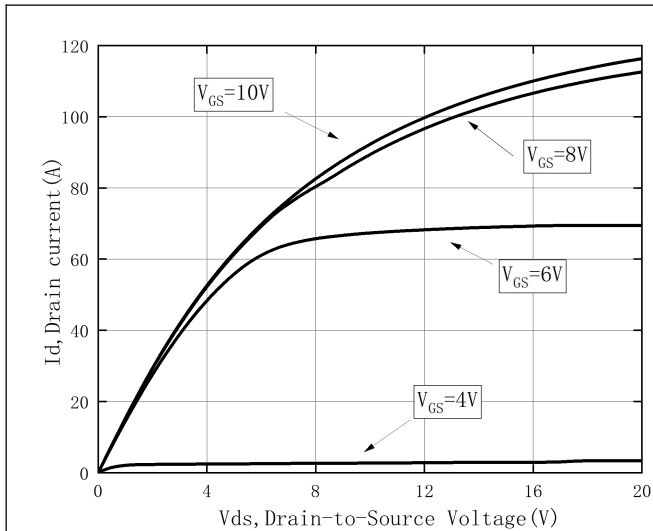


Figure 1. Typical Output Characteristics

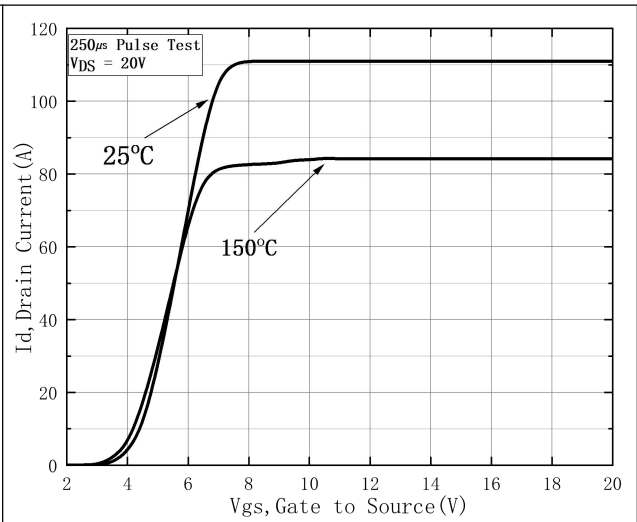


Figure 2. Typical Transfer Characteristics

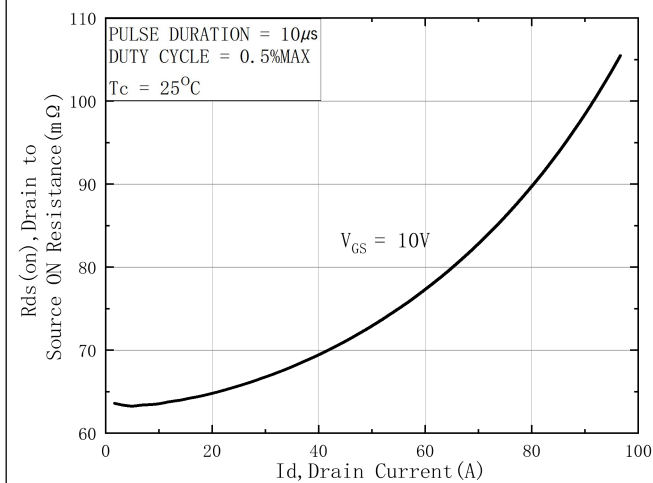


Figure 3. On- Resistance vs. Drain Current

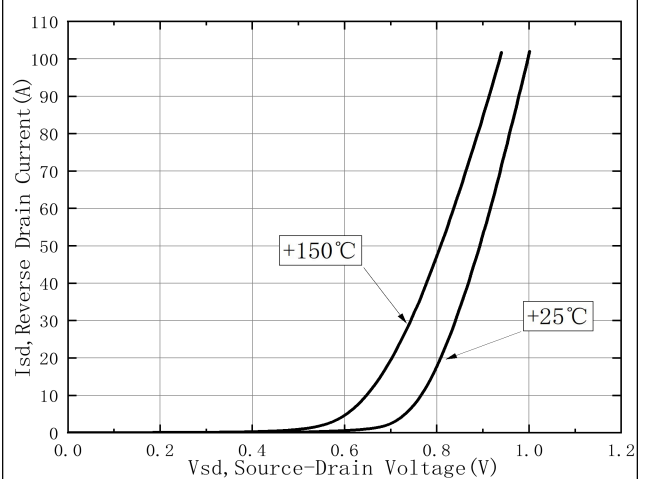


Figure 4. Body-Diode Characteristics

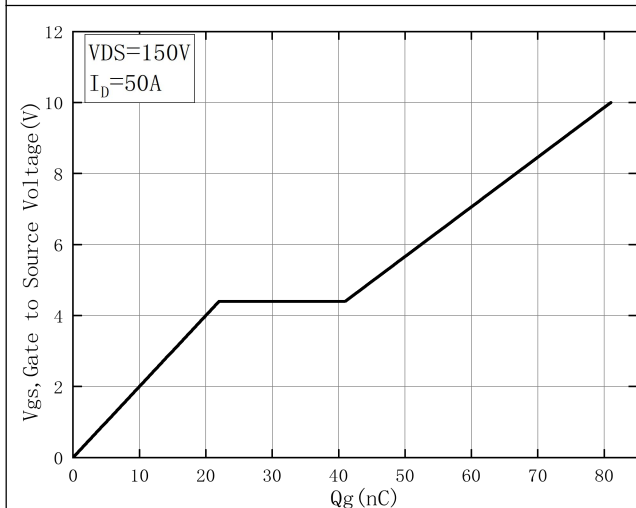


Figure 5. Gate-Charge Characteristics

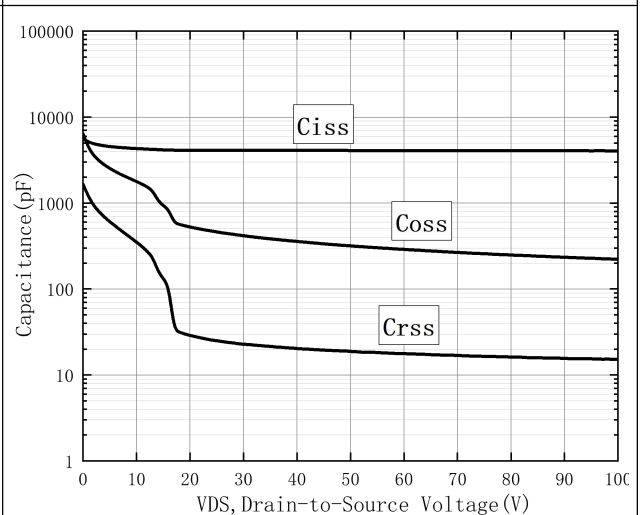


Figure 6. Capacitance Characteristics

■ Characteristic Curve

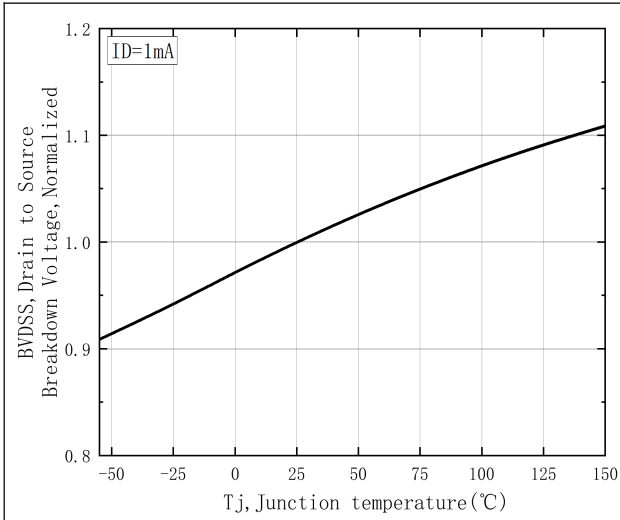


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

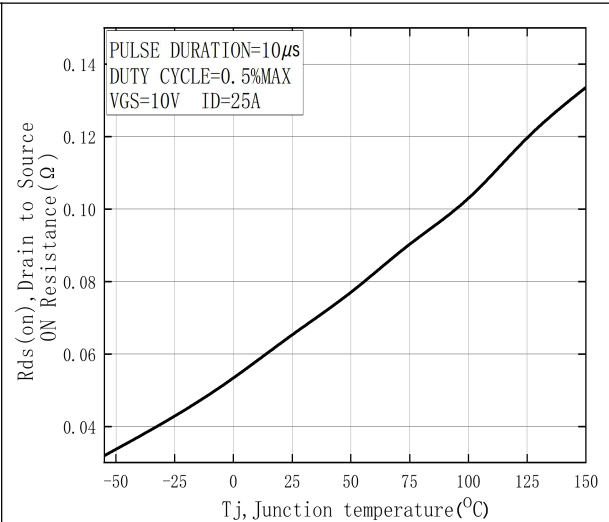


Figure 8. Normalized on Resistance vs. Junction Temperature

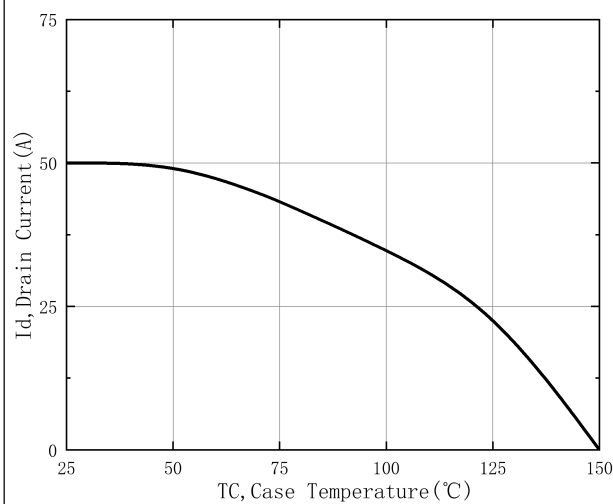


Figure 9: Maximum Continuous Drain Current vs. Case Temperature

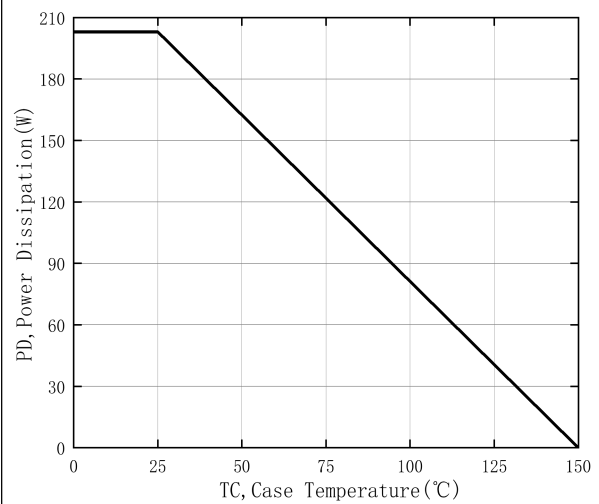


Figure 10: Maximum Power Dissipation vs Case Temperature

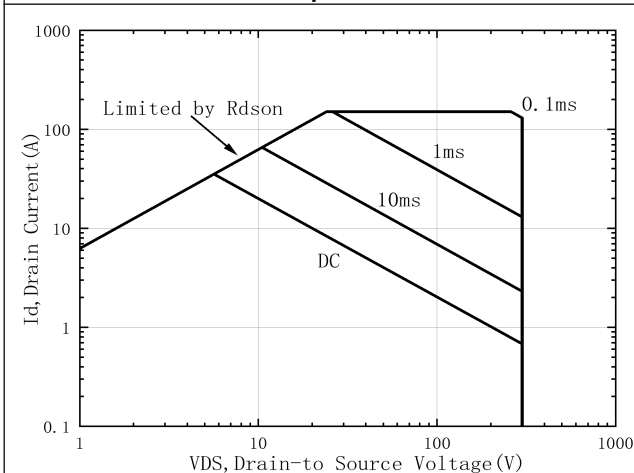


Figure 11. Maximum Safe Operating Area

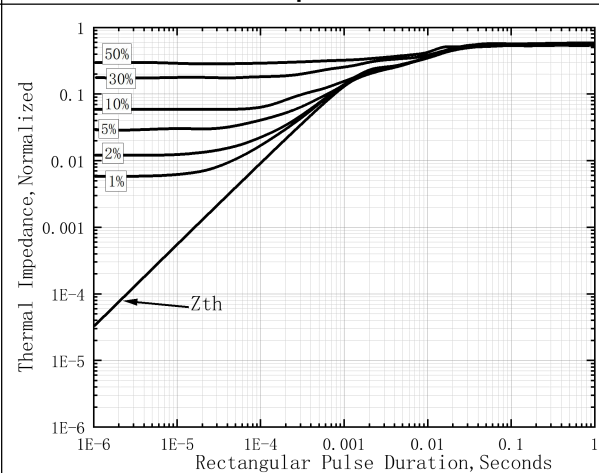


Figure 12: Normalized Maximum Transient Thermal Impedance

■ Package Information

TO-247-3L

