



MPQ90N25

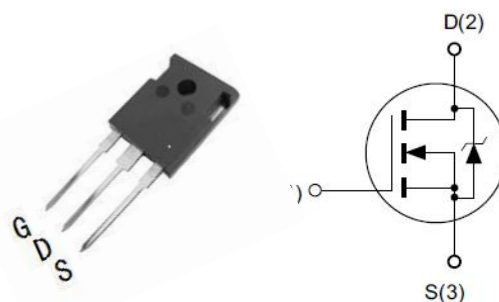
N-Channel Power MOSFET

Features

- ◆ 250V, 90A, $R_{DS(ON)}$ (Typ.) = 22m Ω @ V_{GS} = 10V.
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ Adaptor
- ◆ Standby Power
- ◆ Switching power supply
- ◆ LED Power



TO-247

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

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	250	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_c = 25^\circ \text{C}$	90	A
	Drain Current-Continuous, $T_c = 100^\circ \text{C}$	53	A
I_{DM}	Drain Current-Pulsed ^b	360	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ \text{C}$	291	W
E_{AS}	Single Pulsed Avalanche Energy ^d	1125	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ \text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.43	$^\circ \text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	$^\circ \text{C/W}$

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

■ Off Characteristics

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



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■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 45A$	-	22	35	mΩ

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 125V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	4508	-	pF
C_{oss}	Output Capacitance		-	302	-	pF
C_{rss}	Reverse Transfer Capacitance		-	7.6	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 125V, V_{GS}=10V$ $R_{Gen} = 2.7\Omega$	-	14.5	-	ns
t_r	Turn-On Rise Time		-	48.5	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	52.2	-	ns
t_f	Turn-Off Fall Time		-	30.9	-	ns
Q_g	Total Gate Charge	$V_{DS} = 125V, I_D = 40A,$ $V_{GS} = 10V$	-	62.7	-	nC
Q_{gs}	Gate-Source Charge		-	27.8	-	nC
Q_{gd}	Gate-Drain Charge		-	7.8	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current		-	-	90	A
I_{SM}	Maximum Pulsed Current		-	-	360	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 40A$	-	-	1.4	V
T_{rr}	Body Diode Reverse Recovery Time	$I_S=40A, V_{GS} = 0V$ $dI_F/dt=100A/us$	-	190	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_S=40A, V_{GS} = 0V$ $dI_F/dt=100A/us$	-	1065	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- $I_{SD} = 90A, dI_F/dt \leq 100A/us, V_{DD} \leq BV_{DS},$ Start $T_J = 25^\circ C$.
- $L = 10mH, V_{DD} = 50V, I_{AS} = 15A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.

■ Characteristic Curve

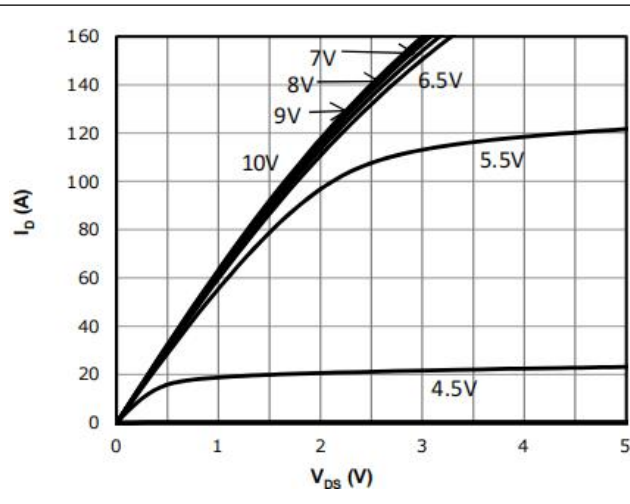


Figure 1. Typical Output Characteristics

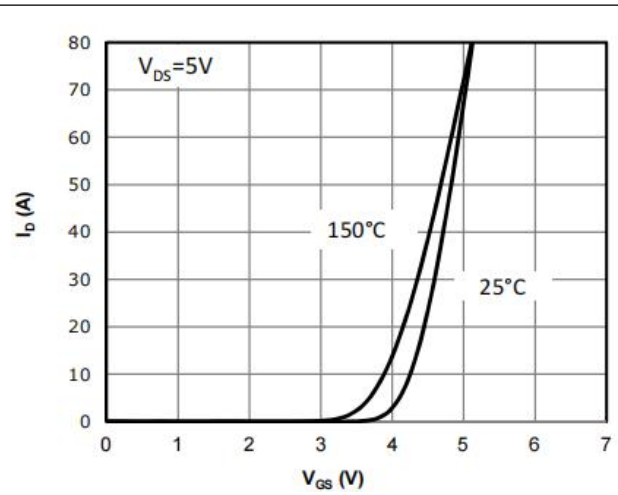


Figure 2. Typical Transfer Characteristics

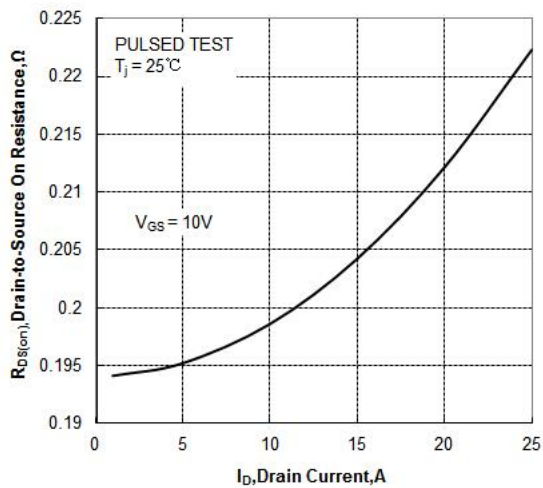


Figure 3. On-Resistance vs. Drain Current

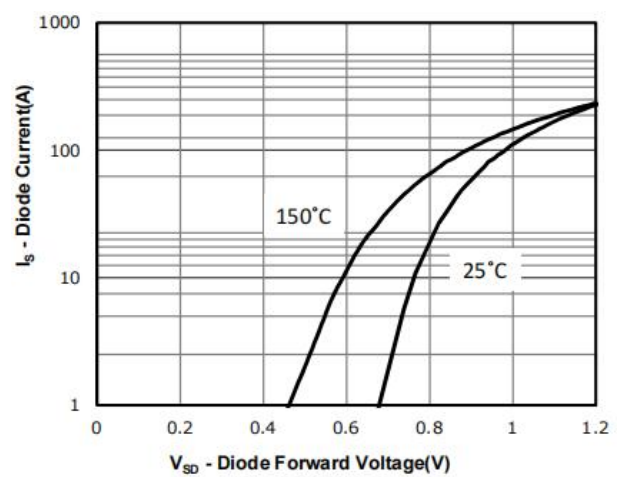


Figure 4. Body-Diode Characteristics

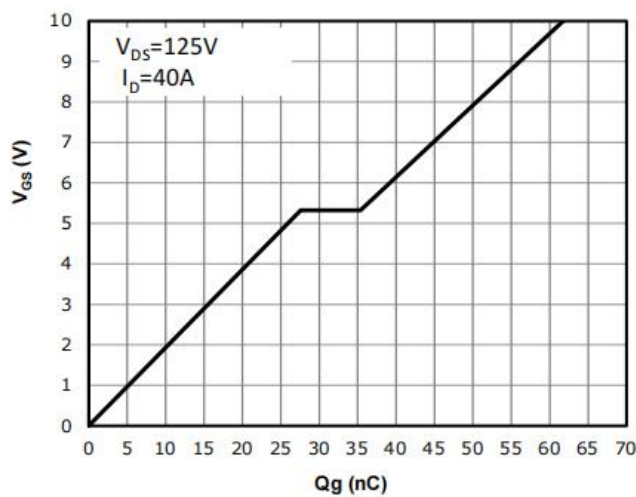


Figure 5. Gate-Charge Characteristics

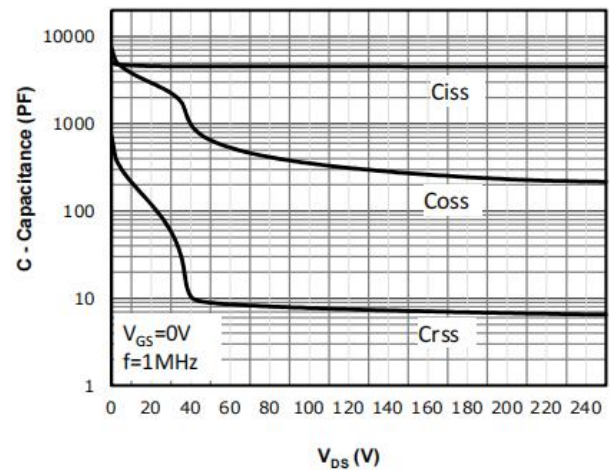


Figure 6. Capacitance Characteristics

■ Characteristic Curve

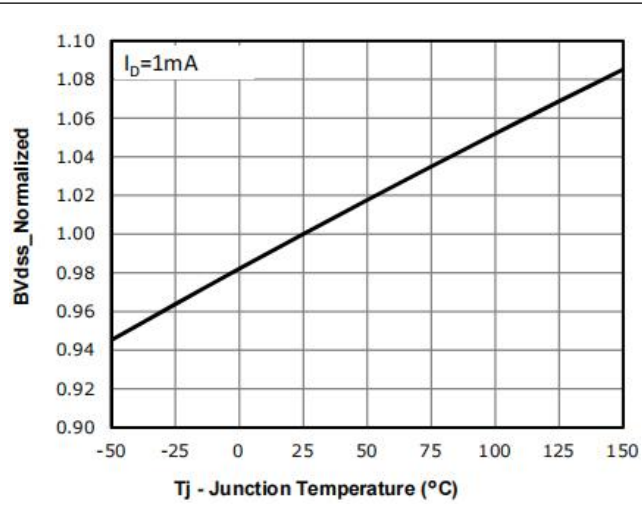


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

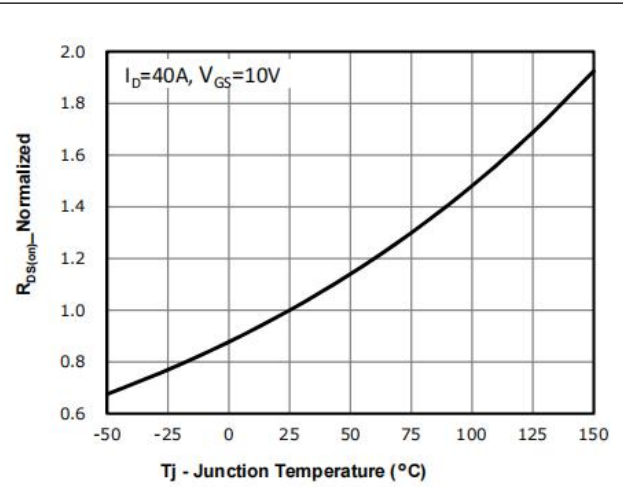


Figure 8. Normalized on Resistance vs. Junction Temperature

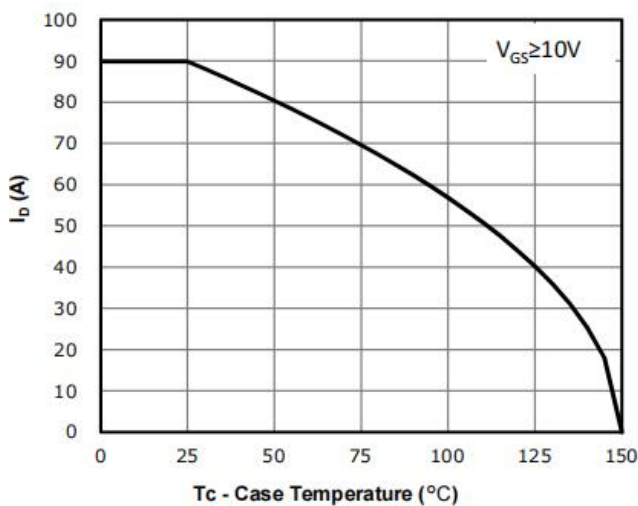


Figure 9: Maximum Continuous Drain Current vs. Case Temperature

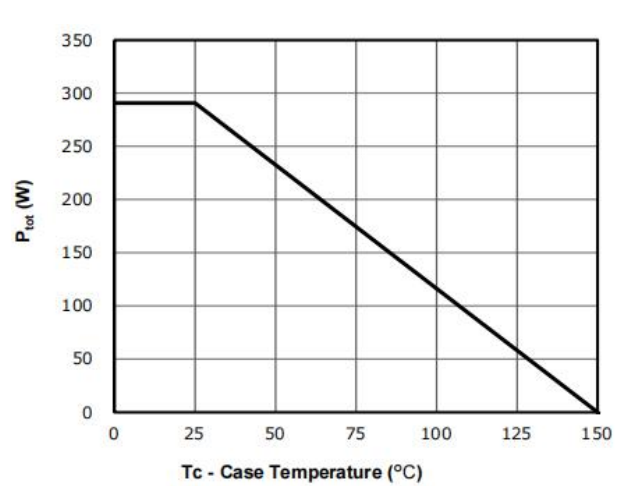


Figure 10: Maximum Power Dissipation vs Case Temperature

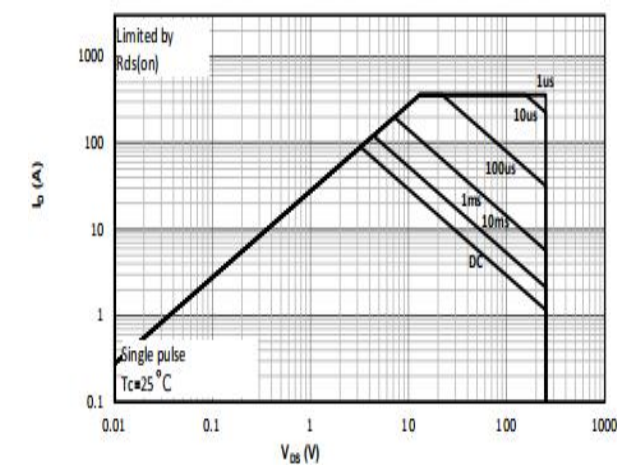


Figure 11. Maximum Safe Operating Area

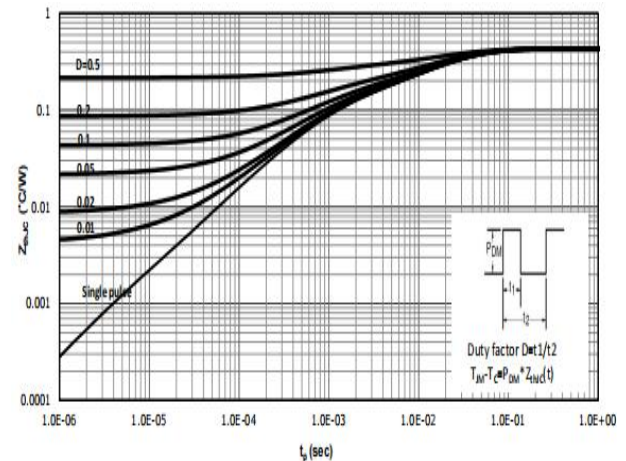


Figure 12: Normalized Maximum Transient Thermal Impedance

■ Package Information

