



# MPF12N65B

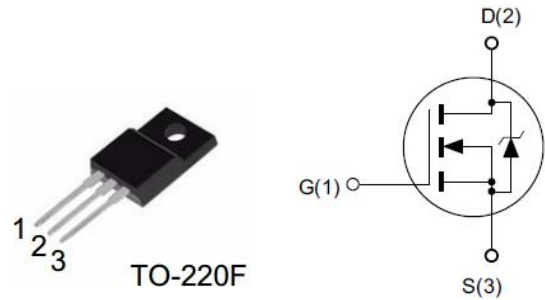
## N-Channel Power MOSFET

### Features

- ◆ 650V, 12A,  $R_{DS(on)}$ (Typ.) =  $0.62\Omega @ V_{GS} = 10V$
- ◆ Low Gate Charge
- ◆ Low  $C_{rss}$
- ◆ 100% Avalanche Tested
- ◆ Fast Switching

### Application

- ◆ TV Power
- ◆ A dapter/Charger
- ◆ Switch Mode Power Supply
- ◆ Uninterruptible Power Supply



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

Symbol	Parameter	Rating	Unit	
$V_{DS}$	Drain-Source Voltage <sup>a</sup>	650	V	
$V_{GS}$	Gate-Source Voltage	$\pm 30$		
$I_D$	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	12	A
		$T_C = 100^\circ\text{C}$	7.5	
$I_{DM}$	Drain Current-Pulsed <sup>b</sup>	48		
$P_D$	Maximum Power Dissipation, $T_J = 25^\circ\text{C}$	56	W	
dv/dt	Peak Diode Recovery dv/dt <sup>c</sup>	5.0	V/ns	
$E_{AS}$	Single Pulsed Avalanche Energy <sup>d</sup>	850	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	2.4	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	82	

### 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	$V_{GS} = 0V, I_D = 250\mu\text{A}$	655	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	-	-	1.0	$\mu\text{A}$
$I_{GSS}$	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	$\pm 100$	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 <sup>c</sup>	$V_{GS} = 10V, I_D = 6.0A$	-	0.62	0.7	$\Omega$

### ■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$R_G$	Gate Resistance	$f = 1.0MHz$	-	2.2	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	2200	-	pF
$C_{oss}$	Output Capacitance		-	149	-	
$C_{rss}$	Reverse Transfer Capacitance		-	4.6	-	

### ■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 325V,$ $V_{GS} = 10V,$ $I_D = 10A,$ $R_G = 25\Omega$	-	31	-	ns
$t_r$	Turn-On Rise Time		-	25	-	
$t_{d(off)}$	Turn-Off Delay Time		-	59	-	
$t_f$	Turn-Off Fall Time		-	44	-	
$Q_g$	Total Gate Charge	$V_{DD} = 520V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 12A$	-	40	-	nC
$Q_{gs}$	Gate-Source Charge		-	10.2	-	
$Q_{gd}$	Gate-Drain Charge		-	11.8	-	

### ■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_s = 10A$	-	-	1.2	V
$T_{rr}$	Body Diode Reverse Recovery Time	$V_R = 400V, I_F = 10A$ $di_F/dt = 100A/\mu s$	-	861	-	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge		-	9.5	-	$\mu C$
$I_{rrm}$	Peak reverse recovery current		-	TBD	-	A

Notes:

- $T_J = +25\text{ }^\circ C$  to  $+150\text{ }^\circ C$ .
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- $L = 11mH, V_{DD} = 50V, I_{AS} = 12A, R_G = 25\Omega$  Starting  $T_J = 25\text{ }^\circ C$ .

### Characteristic Curve

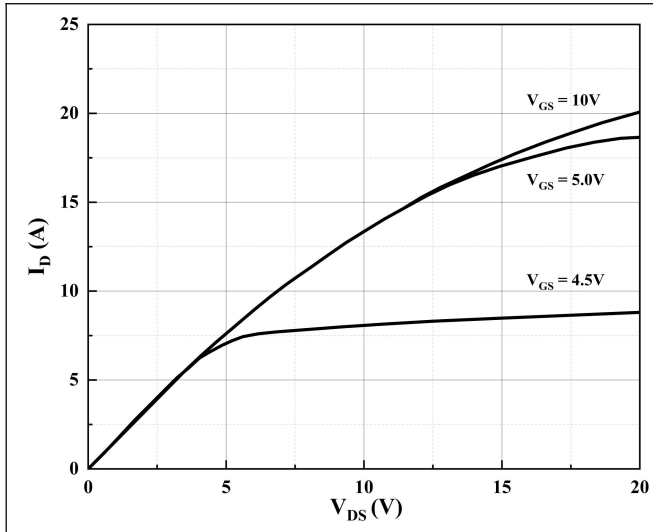


Figure 1. Typical Output Characteristics

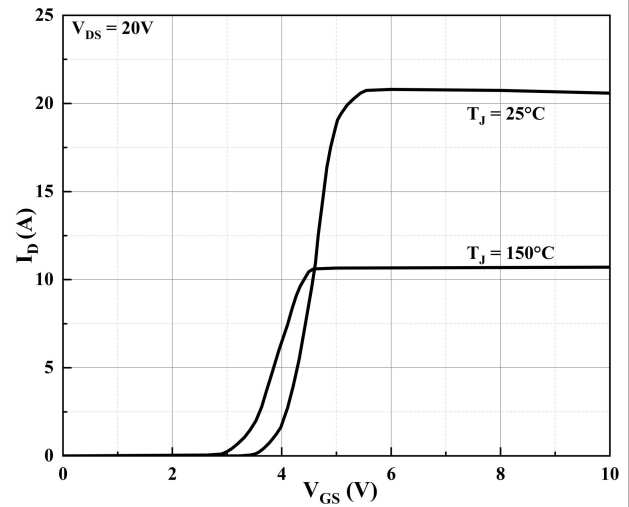


Figure 2. Typical Transfer Characteristics

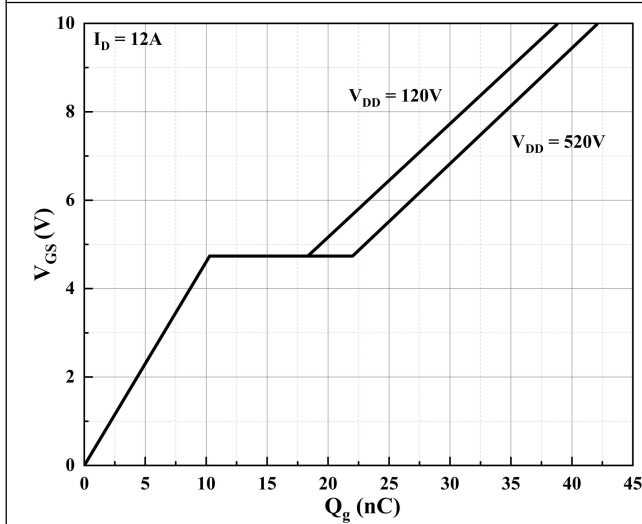


Figure 3. Typical Gate Charge

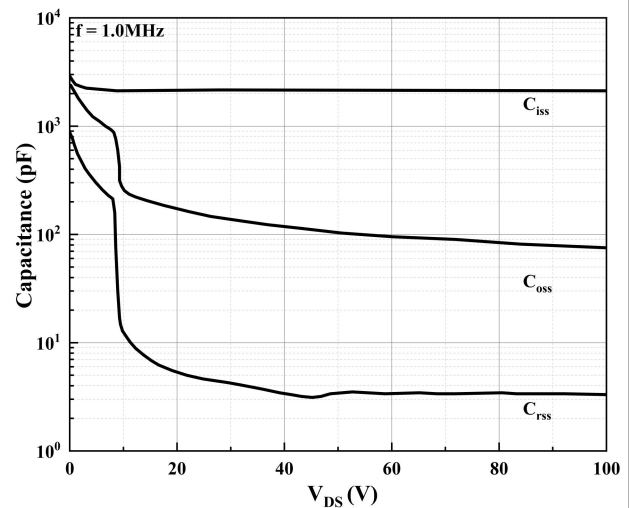


Figure 4. Typical Capacitance

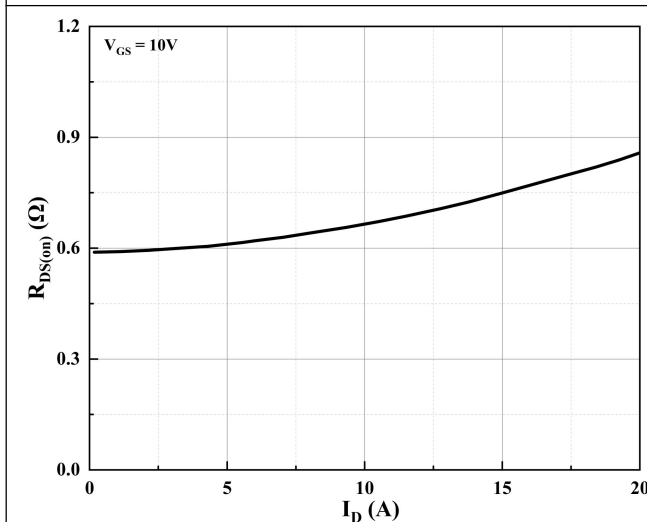


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

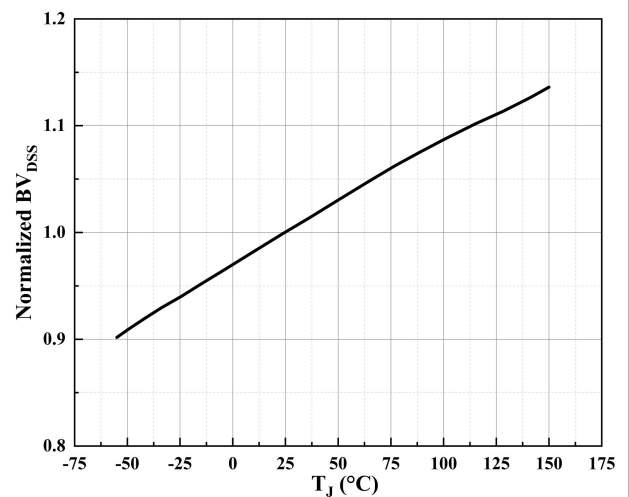


Figure 6. Drain-source Breakdown Voltage

### ■ Package Information

