

POWER MOSFET

$$I_D = 10A$$

$$V_{DS} = 650V$$

$$R_{DS(on)MAX} = 0.8\Omega$$

Major Ratings and Characteristics

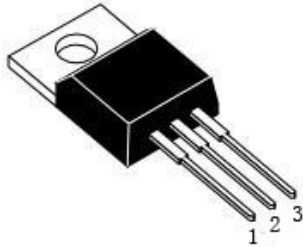
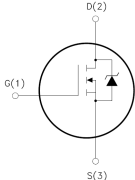
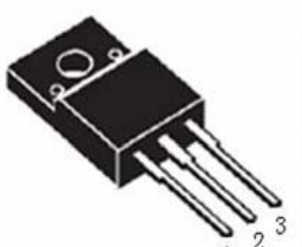
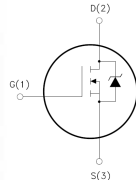
Characteristics	Values	Units
I_D	10	A
I_{DM}	40	A
V_{DS}	650	V
V_{GS}	± 30	V
T_J	150	$^{\circ}C$
T storage	-55 ~ 150	$^{\circ}C$

Description/ Features

The MFIRF10N65 is used an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150 $^{\circ}C$ Tj operation
- Low Power Loss & Low cost
- Fast Switching
- RoHS Compliant

Case Styles

  1、 GATE 2、 DRAIN 3、 SOURCE	  1、 GATE 2、 DRAIN 3、 SOURCE
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Ordering Information

Part Number	Package	Packaging
MCIRF10N65	TO-220	Tube
MFIRF10N65	TO-220F	Tube

MFIRF10N65

MCIRF10N65

Absolute Maximum Rating ($T_{amb}=25^{\circ}\text{C}$)

Parameter	Symbol	Value		Unit
Drain-Source Voltage	V_{DS}	650		V
Gate-Source Voltage	V_{GS}	± 30		V
Drain Current-Pulsed	I_{DM}	40		A
Total Dissipation	P_D	TO-220	156	W
		TO-220F	50	
Junction Temperature	T_J	150		$^{\circ}\text{C}$
Storage Temperature	$T_{stg.}$	$-55\sim 150$		$^{\circ}\text{C}$
Single Pulse Avalanche Energy	E_{AS}	TO-220	600	mJ
		TO-220F	600	

Electrical Characteristics($T_{amb}=25^{\circ}\text{C}$)

Characteristic	Symbol	Test Condition	MIN.	MAX.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	4	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	10	μA
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_D=10A$	-	1.5	V
Forward Trans conductance	G_{fs}	$V_{DS}=10V, I_D=5.0A$	5	-	S
Gate-Body Leakage Current($V_{ds}=0V$)	I_{GSS}	$V_{GS}=\pm 30V$	-	± 100	nA
Static Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5.0A$	-	0.95	Ω
Thermal Resistance Junction-Case	R_{thJ-C}	TO-220	-	2	$^{\circ}\text{C}/\text{W}$
		TO-220F	-	2.5	

Dynamic Characteristics($T_{amb}=25^{\circ}\text{C}$)

Characteristic	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	1210	1580	pF
Output Capacitance	C_{OSS}		-	145	190	pF
Reverse Transfer Capacitance	C_{RSS}		-	16	20	pF



Switching Characteristics(Tamb=25°C)

Characteristic	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Turn-On Delay Time	Td(on)	$V_{DD}=300V, I_D=10A,$ $R_G=25\Omega$	-	20	40	nS
Turn-On Rise Time	Tr		-	30	60	nS
Turn-Off Delay Time	Td(off)		-	90	180	nS
Turn-Off Rise Time	Tf		-	40	80	nS
Total Gate Charge	Qg	$V_{DS}=480V, I_D=10A,$ $V_{GS}=10V$	-	30	40	nC
Gate-Source Charge	Qgs		-	5	-	nC
Gate-Drain Charge	Qgd		-	14	-	nC

Drain-Source Diode Maximum Ratings And Characteristics(Tamb=25°C)

Characteristic	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Max. Diode Forward Current	Is		-	-	10	A
Max. Pulsed Forward Current	ISM		-	-	40	A
Diode Forward Voltage	VSD	$V_{GS}=0V, I_S=10A,$	-	-	1.5	V
Reverse Recovery Time	Trr	$V_{GS}=0V, I_S=10A,$ $dI_F/dt=100A/\mu S$	-	450	-	nS
Reverse Recovery Charge	Qrr		-	4.2	-	uC

Characteristics Curve

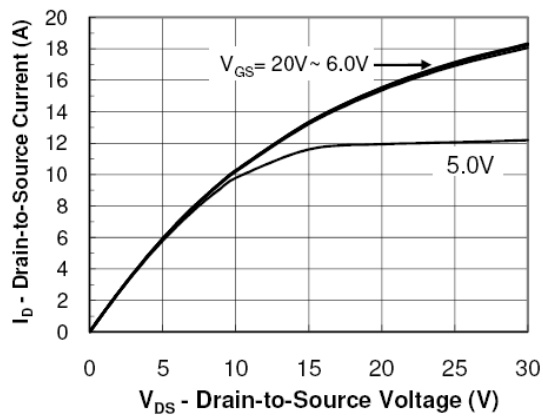


Figure1. Output Characteristic

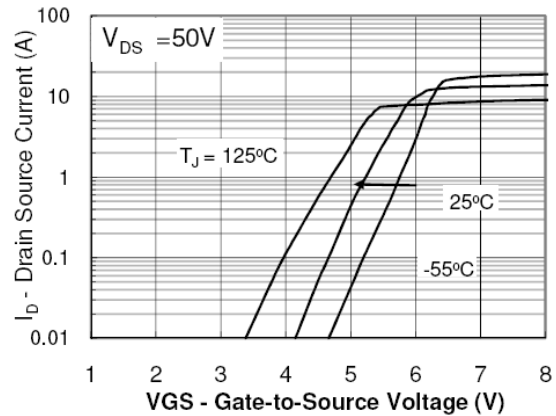


Figure2. Transfer Characteristic

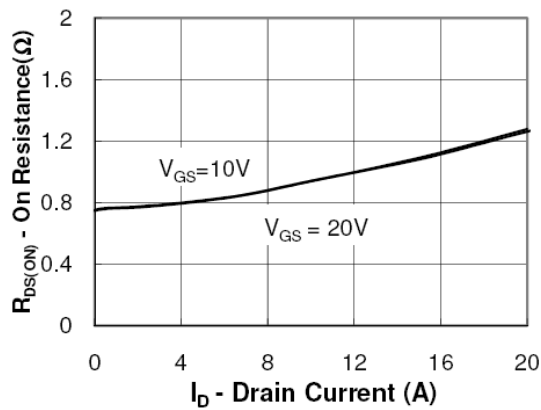


Figure3. On Resistance Vs Drain Current

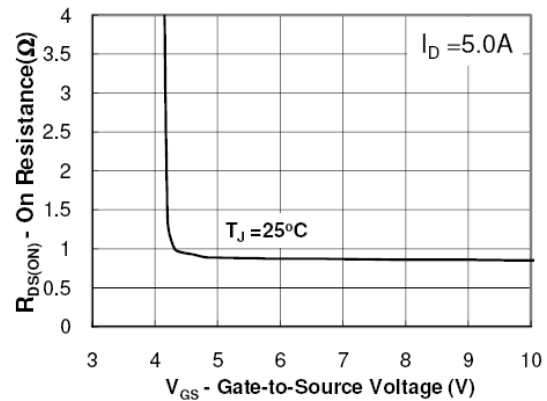


Figure4. On Resistance Vs Gate Source Voltage

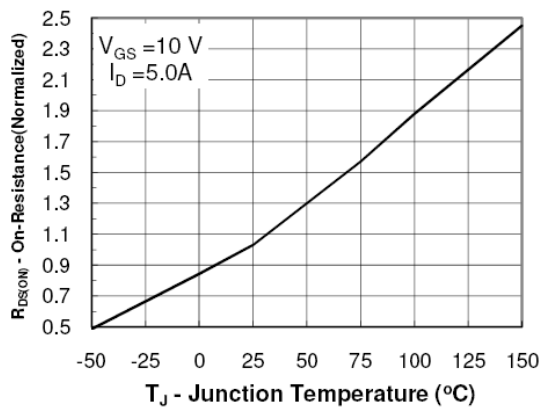


Figure5. On Resistance Vs Junction Temperature

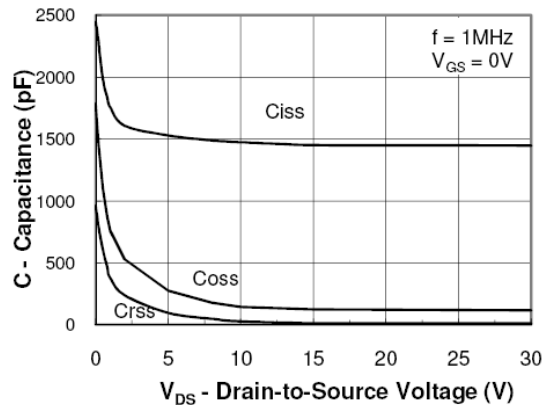


Figure6. Capacitance

Characteristics Curve

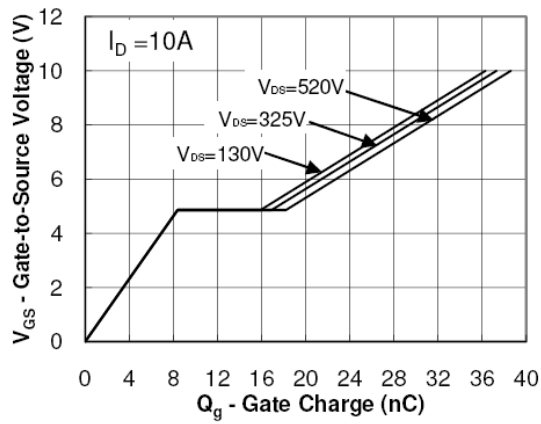


Figure7. Gate Charge Waveform

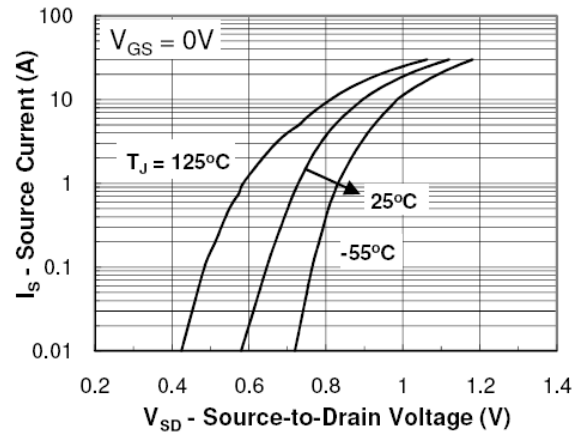


Figure8. Source-Drain Diode Forward Voltage

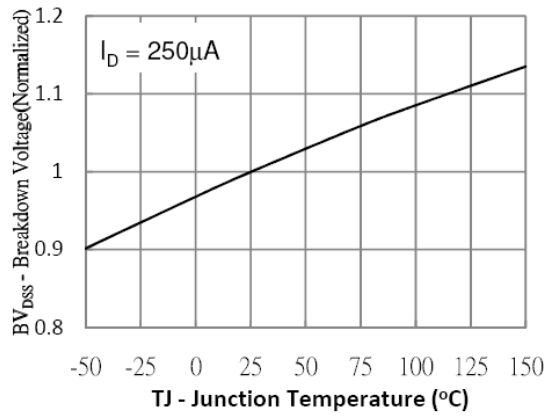


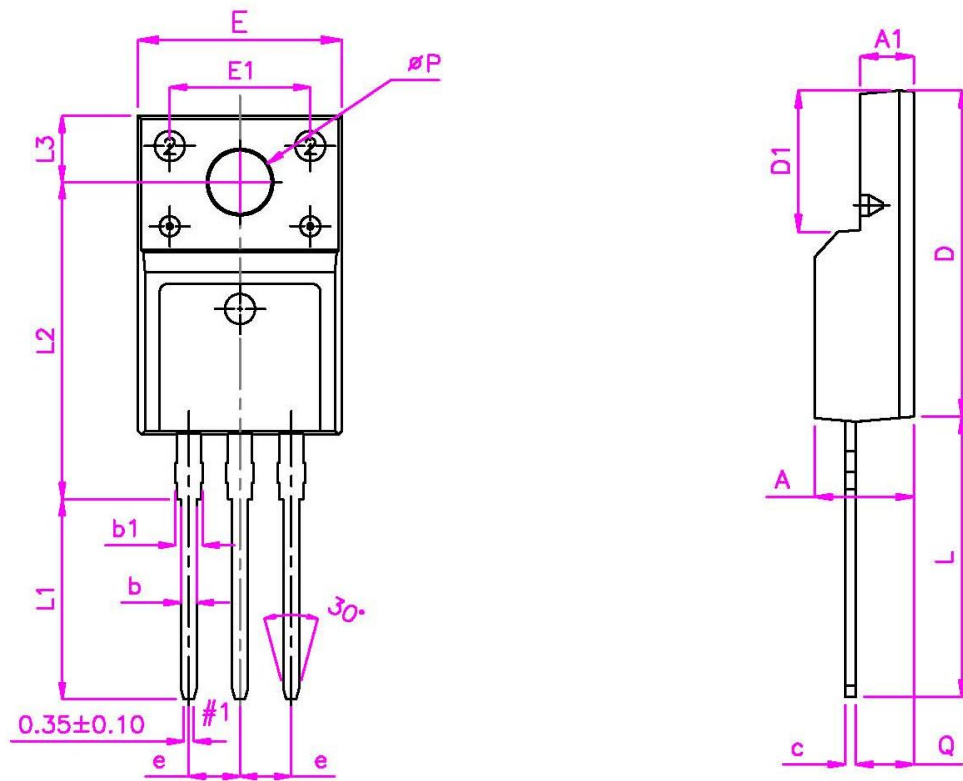
Figure9. Breakdown Voltage Vs Junction

MFIRF10N65
MCIRF10N65

TO-220F Mechanical Data

UNIT.: mm

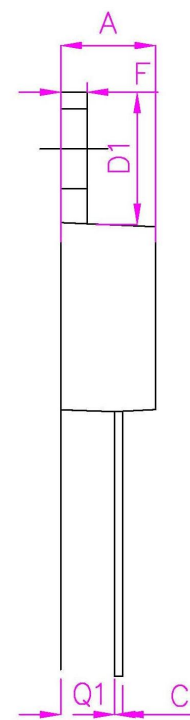
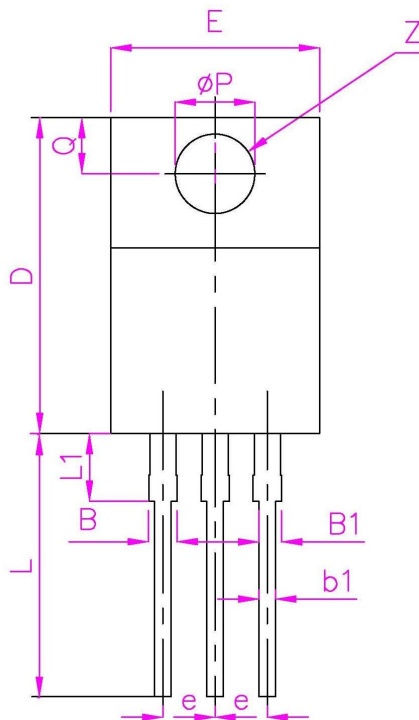
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
A	4.2	-	4.70	E1	-	7.0	-
A1	2.30	-	2.90	e	-	2.54	-
b	0.45	-	0.9	L	12.5	-	14.3
b1	1.1	-	1.7	L1	9.45	-	10.05
c	0.35	-	0.9	L2	15	-	16
D	14.5	-	17	L3	3.2	-	4.4
D1	6.10	-	9.0	ΦP	3.0	-	3.3
E	9.6	-	10.3	Q	2.5	-	2.90



TO-220 Mechanical Data

UNIT.: mm

Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
A	4.0	-	4.80	E	9.90	-	10.70
B	1.20	-	1.40	e	-	2.54	-
B1	1.0	-	1.30	F	1.10	-	1.40
b1	0.65	-	1.00	L	12.50	-	14.50
c	0.40	-	0.55	L1	3.00	3.50	4.00
D	15.0	-	16.5	Q	2.50	-	3.00
D1	5.90	-	6.90	Q1	2.00	-	2.90
				P	-	3.80	-



Data and specifications subject to change without notice.

This product has been designed and qualified for Industrial Level and Lead-Free.

Qualification Standards can be found on GS's Web site.

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