

POWER MOSFET

$I_D = 2.0A$
 $V_{DS} = 650V$
 $R_{DS(on)MAX} = 5.0\Omega$

Description/ Features

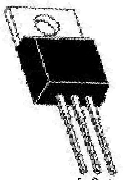
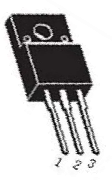
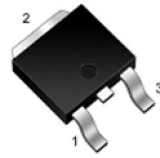
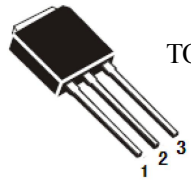
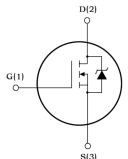
The MCIRF2N65 is used an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150°C Tj operation
- Low Power Loss & Low cost
- Fast Switching
- RoHS Compliant

Major Ratings and Characteristics

Characteristics	Values	Units
I_D	2.0	A
I_{DM}	8.0	A
V_{DS}	650	V
V_{GS}	± 30	V
T_J	150	°C
T storage	-55 ~ 150	°C

Case Styles

 TO-220	 TO-220F	 TO-252	 TO-251
			
1、 GATE 2、 DRAIN 3、 SOURCE			

Ordering Information

Part Number	Package	Packaging
MCIRF2N65	TO-220	Tube
MFIRF2N65	TO-220F	Tube
MJIRF2N65	TO-251	Tube
MKIRF2N65	TO-252	Tube & Tape & Reel

MCIRF2N65 MFIRF2N65
MKIRF2N65 MJIRF2N65

Absolute Maximum Rating (Tamb = 25°C)

Parameter	Symbol	Value		Unit
Drain-Source Voltage	V_{DS}	650		V
Gate-Source Voltage	V_{GS}	± 30		V
Drain Current-Pulsed	I_{DM}	8		A
Total Dissipation	P_D	TO-220	54	W
		TO-220F	20	
		TO-251	44	
		TO-252	44	
Junction Temperature	T_J	150		°C
Storage Temperature	T_{stg}	-55~150		°C
Single Pulse Avalanche Energy	E_{AS}	130		mJ

Electrical Characteristics(Tamb=25°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}	$V_{DS}=600V, V_{GS}=0V$	-	10	μA
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=2A$	-	1.4	V
Forward Trans conductance	G_{fs}	$V_{DS}=10V, I_D=1.0A$	0.8		S
Gate-Body Leakage Current($V_{ds}=0V$)	I_{GSS}	$V_{GS}=\pm 30V$	-	± 100	nA
Static Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_S=1.0A$	-	5.0	Ω
Thermal Resistance Junction-Case	R_{thJ-C}	TO-220	-	2	°C/W
		TO-220F	-	2.5	
		TO-251	-	2.32	
		TO-252	-	2.32	

Dynamic Characteristics(Tamb=25°C)

Characteristic	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$	-	270	350	pF
Output Capacitance	C_{OSS}		-	45	55	pF
Reverse Transfer Capacitance	C_{RSS}		-	4.5	7.0	pF



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

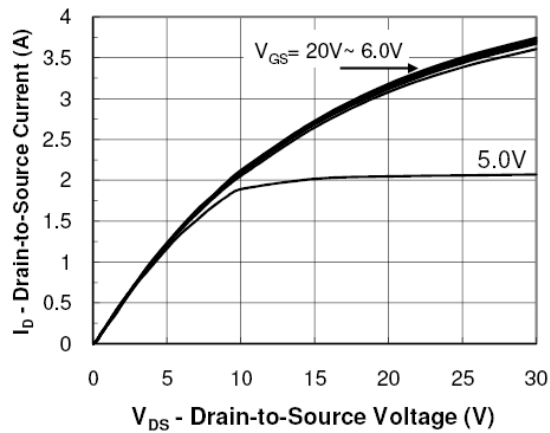
Characteristic	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=300\text{V}, I_D=2.0\text{A},$ $R_G=25\Omega$	-	10	30	nS
Turn-On Rise Time	T_r		-	25	60	nS
Turn-Off Delay Time	$T_{d(off)}$		-	20	50	nS
Turn-Off Rise Time	T_f		-	25	60	nS
Total Gate Charge	Q_g	$V_{DS}=480\text{V}, I_D=2.0\text{A},$ $V_{GS}=10\text{V}$	-	9	12	nC
Gate-Source Charge	Q_{gs}		-	1.7	-	nC
Gate-Drain Charge	Q_{gd}		-	4.3	-	nC

Drain-Source Diode Maximum Ratings And Characteristics($T_{amb}=25^{\circ}\text{C}$)

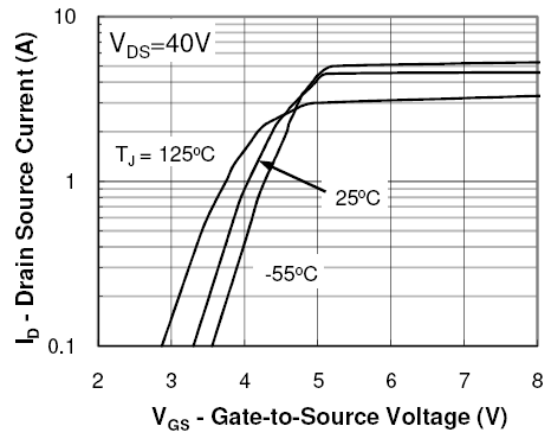
Characteristic	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Max. Diode Forward Current	I_S		-	-	2	A
Max. Pulsed Forward Current	I_{SM}		-	-	8	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_D=2.0\text{A}$	-	-	1.4	V
Reverse Recovery Time	T_{rr}	$V_{GS}=0\text{V}, I_D=2.0\text{A},$ $dI_F/dt=100\text{A/uS}$	-	180	-	nS
Reverse Recovery Charge	Q_{rr}		-	0.75	-	uC

MCIRF2N65 MFIRF2N65 MKIRF2N65 MJIRF2N65

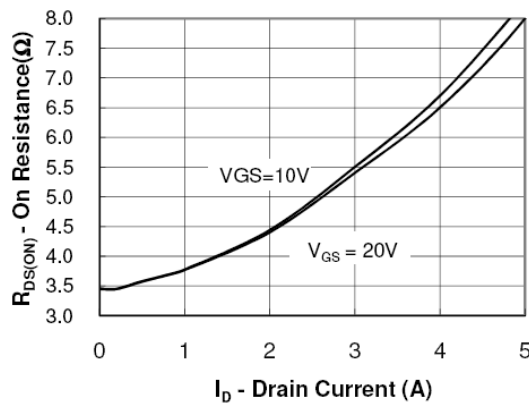
Characteristics Curve



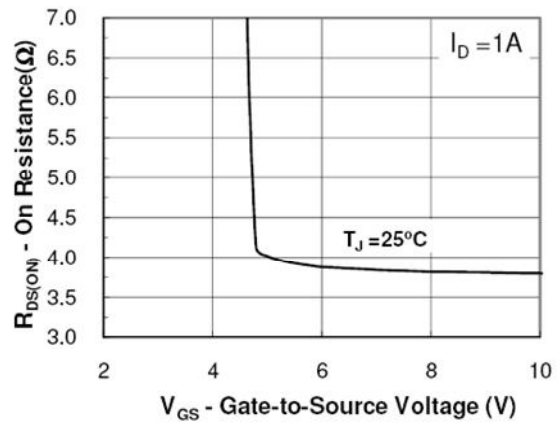
Output Characteristic



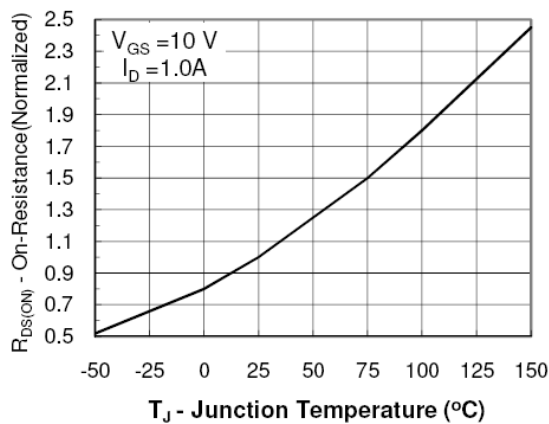
Transfer Characteristic



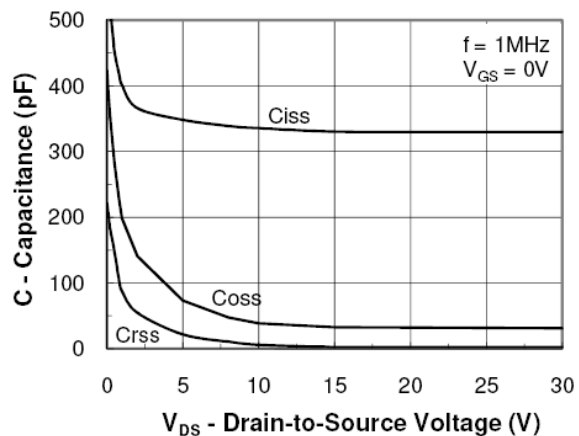
On Resistance Vs Drain Current



On Resistance Vs Gate Source Voltage

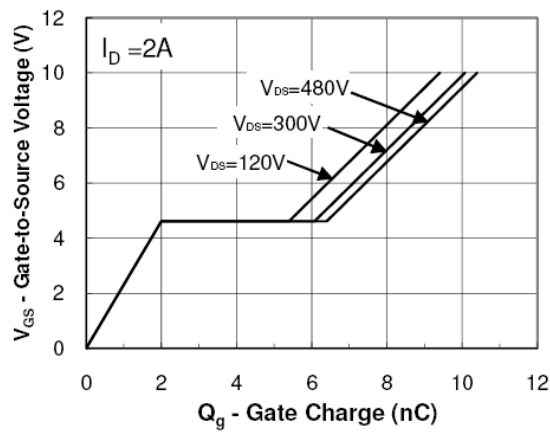


On Resistance Vs Junction Temperature

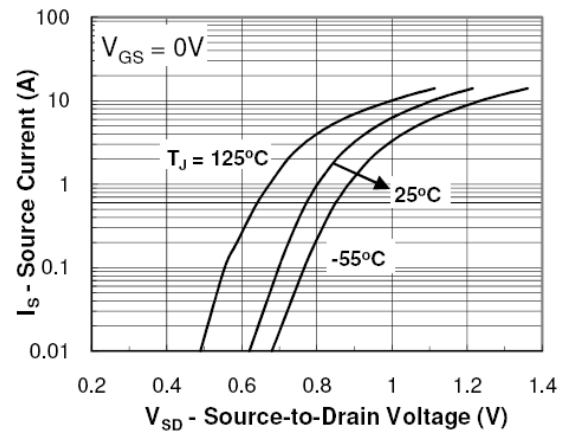


Capacitance

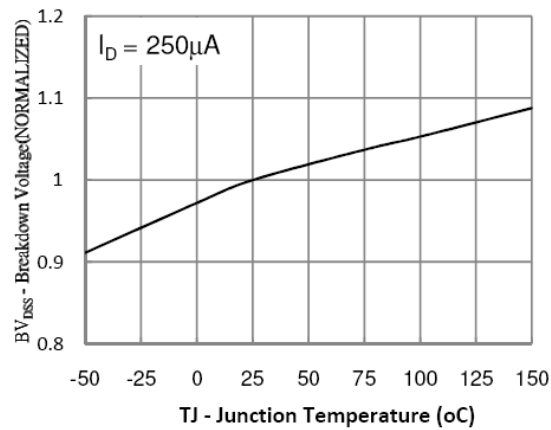
Characteristics Curve



Gate Charge Waveform



Source-Drain Diode Forward Voltage



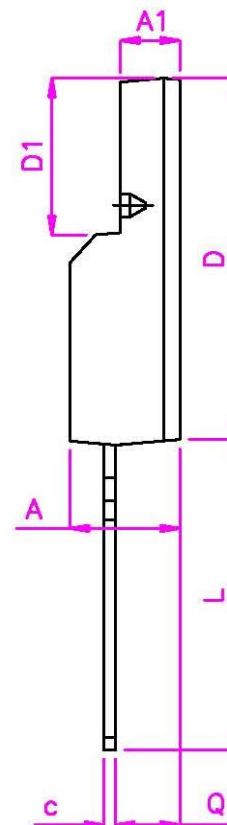
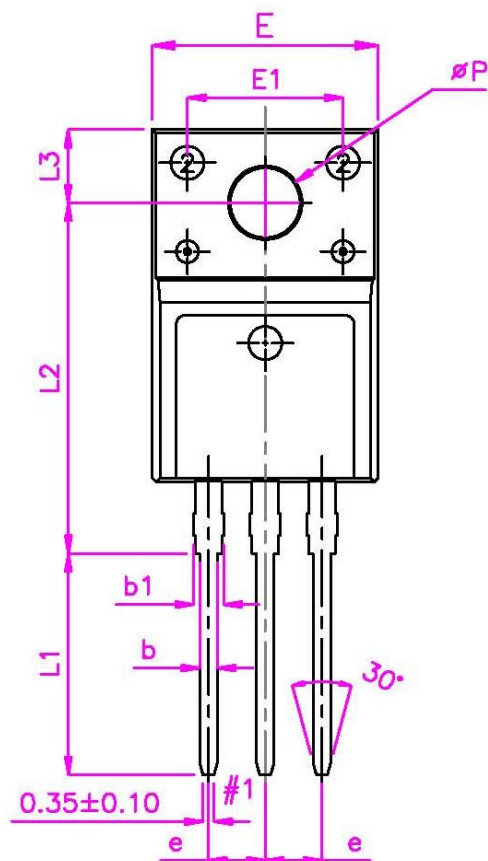
Breakdown Voltage Vs Junction Temperature

MCIRF2N65 MFIRF2N65
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TO-220F Mechanical Data

UNIT.: mm

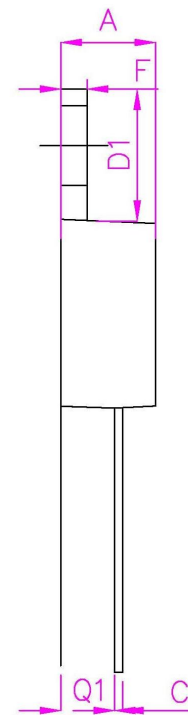
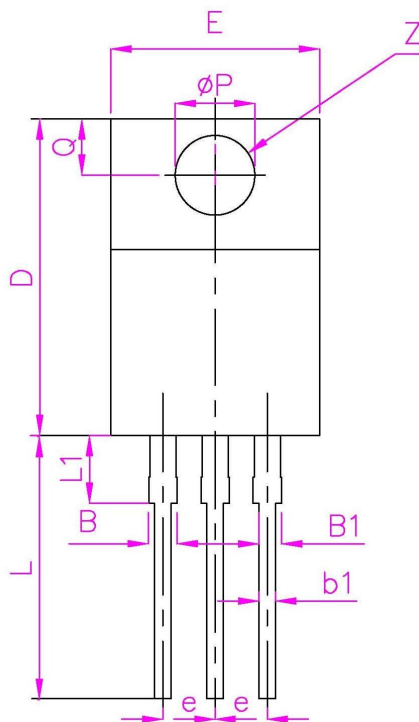
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
A	4.2	-	4.70	E1	-	7.0	-
A1	2.30	-	2.90	e	-	2.54	-
b	0.45	-	0.9	L	12.5	-	14.3
b1	1.1	-	1.7	L1	9.45	-	10.05
c	0.35	-	0.9	L2	15	-	16
D	14.5	-	17	L3	3.2	-	4.4
D1	6.10	-	9.0	ΦP	3.0	-	3.3
E	9.6	-	10.3	Q	2.5	-	2.90



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	-

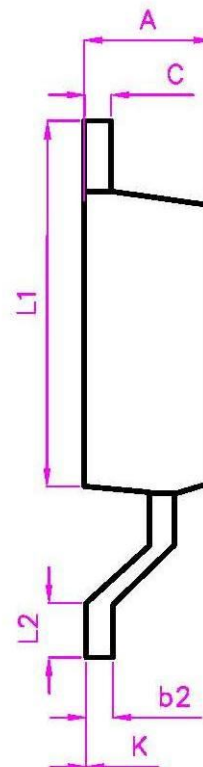
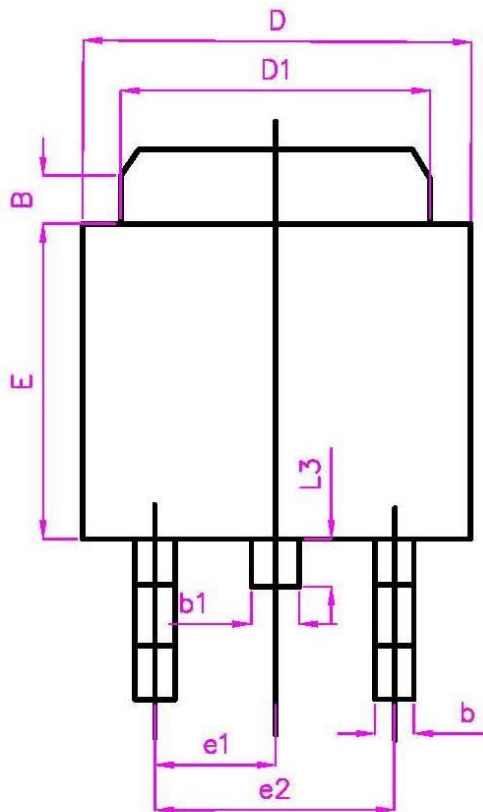


MCIRF2N65 MFIRF2N65
MKIRF2N65 MJIRF2N65

TO-252 Mechanical Data

UNIT.: mm

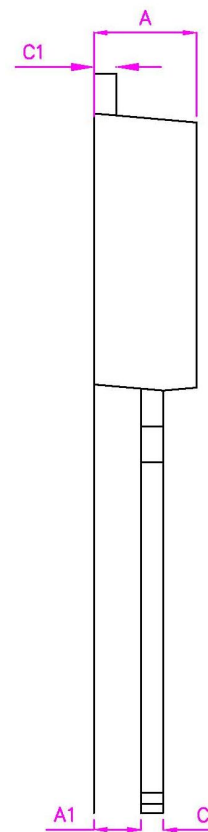
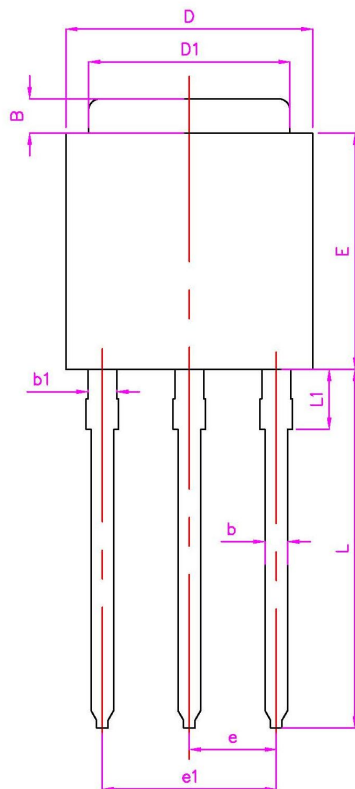
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
A	2.10	-	2.50	E	5.30	-	6.30
B	0.85	-	1.25	e1	2.25	-	2.35
b	0.50	-	0.80	e2	4.45	-	4.75
b1	0.50	-	0.90	L1	9.20	-	10.60
b2	0.45	-	0.70	L2	0.90	-	1.75
C	0.45	-	0.70	L3	0.60	-	1.10
D	6.30	-	6.75	K	-0.1	-	0.10
D1	5.10	-	5.50				



TO-251 Mechanical Data

UNIT.: mm

Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
A	2.10	-	2.50	D1	5.10	-	5.50
A1	0.95	-	1.30	E	5.30	-	6.30
B	0.80	-	1.25	e	-	2.30	-
b	0.50	-	0.80	L	7.00	-	9.20
b1	0.70	-	0.90	L1	1.45	-	1.95
c	0.45	-	0.70	R	-	0.30	-
C1	0.45	-	0.70				
D	6.35	-	6.80				



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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