

Applications

- PC power
- LED lighting
- Solar/UPS
- EV Charger

Product Summary

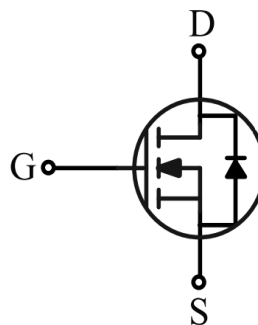
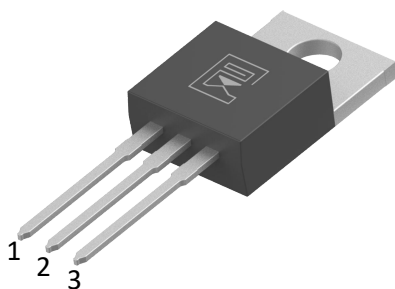
$V_{DS} @ T_{j,max}$	550	V
I_D	17	A
$R_{DS(ON)}, Typ @ 10V$	0.18	Ω
Q_g	23	nC

Features

- Multi-Epi process SJ-FET
- Low $R_{DS(ON)}$
- Excellent stability and uniformity
- 100% UIS and RG Tested
- Fast-Recovery body diode



TO-220



Gate: 1
Drain: 2
Source: 3

Package Marking and Ordering Information

Ordering code	Marking	Package	Packaging	Min. package quantity
MC190R50CFD2	MC190R50CFD2	TO-220	Tube	1000

➤➤ Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current Tc=25°C (Note 1)	I_D	17	A
Continuous Drain Current Tc=100°C (Note 1)		10	
Drain Current-Pulsed (Note 1)	I_{DM}	65	A
Total Dissipation	P_D	139	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	-55-150	°C
Single Pulse Avalanche Energy (Note 2)	E_{AS}	56	mJ

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

➤➤ Thermal Characteristics

Parameter	Symbol	Max	Unit
Maximum Junction-to-Case	$R_{\theta JC}$	0.9	°C/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	60	°C/W

Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD}=100V$, $T_{ch}=25^{\circ}C$ (initial), $L=0.5mH$, $R_g=25\Omega$.

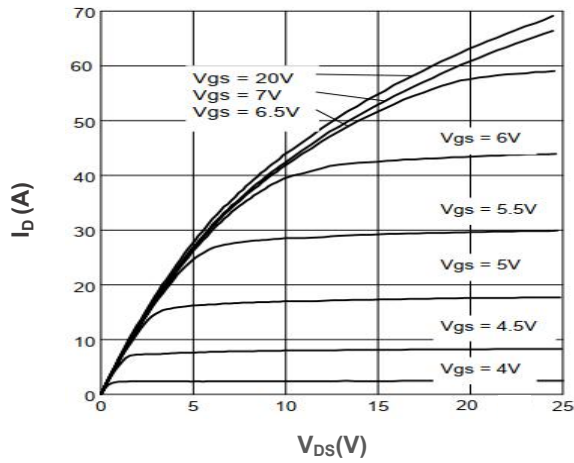
Note: This transistor is sensitive to electrostatic discharge and should be handled with care.

Electrical Characteristics (Tc=25°C unless otherwise noted)

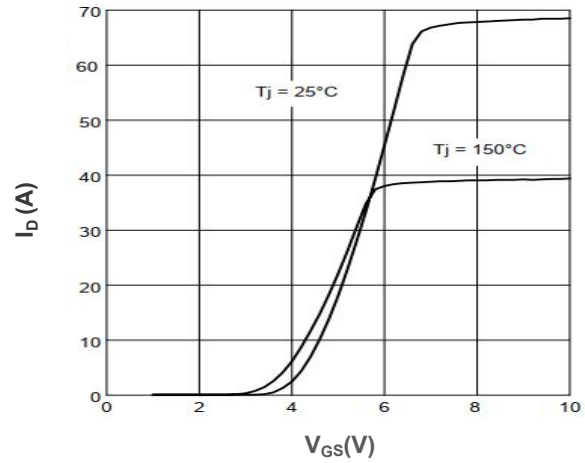
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
Static Parameters							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA		500	-	-	V
			T _j =150°C	550	-	-	
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V		-	-	5	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V		-	-	±100	nA
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA		2.1	3.1	4.1	V
Drain-Source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A		-	0.18	0.19	Ω
			T _j =150°C	-	0.43	-	
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		-	1050	-	pF
Output Capacitance	C _{oss}			-	1160	-	pF
Reverse Transfer Capacitance	C _{rss}			-	20	-	pF
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1.0MHz		-	2.5	-	Ω
Switching Paramters							
Turn-On Delay Time	t _{d(on)}	V _{DS} =400V, I _D =10A, V _{GS} =10V, R _G =2Ω		-	20	-	ns
Turn-On Rise Time	t _r			-	5	-	ns
Turn-Off Delay Time	t _{d(off)}			-	35	-	ns
Turn-Off Fall Time	t _f			-	5	-	ns
Total Gate Charge	Q _g	V _{DS} =400V, I _D =10A, V _{GS} =10V		-	23	-	nC
Gate-Source Charge	Q _{gs}			-	8	-	nC
Gate-Drain Charge	Q _{gd}			-	7	-	nC
Source-Drain Characteristics							
Max. Diode Forward Cuurent	I _S			-	-	20	A
Max. Pulsed Forward Cuurent	I _{SM}			-	-	65	A
Diode Forward Voltage	V _{sd}	V _{GS} =0V, I _S =10A		-	0.9	1.2	V
Reverse Recovery Time	t _{rr}	V _R =300V, I _F =10A, di/dt=100A/us		-	115	-	ns
Reverse Recovery Charge	Q _{rr}			-	0.6	-	μC



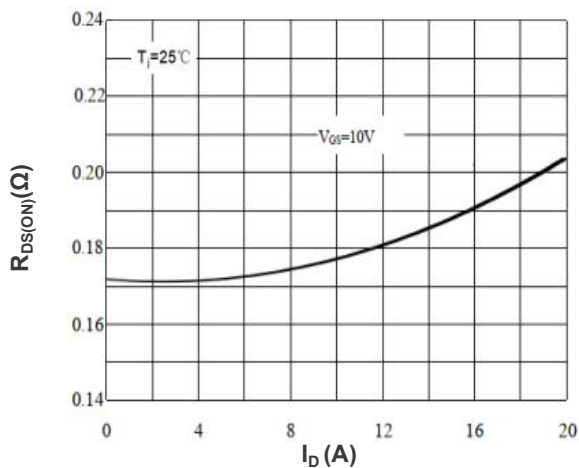
Characteristics Curves



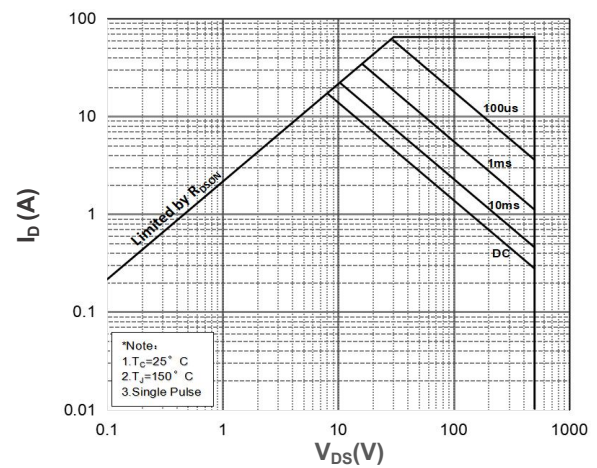
Output Characteristics



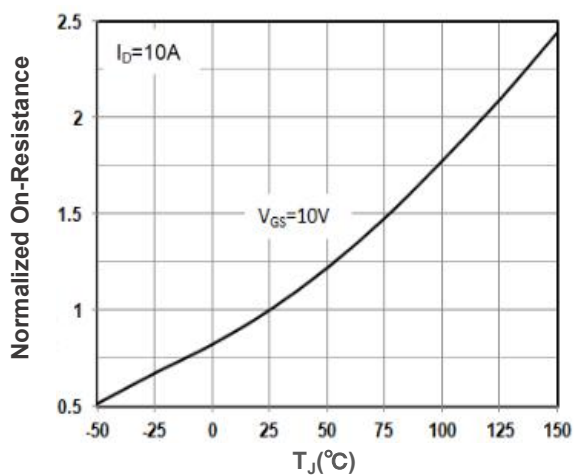
Transfer Characteristics



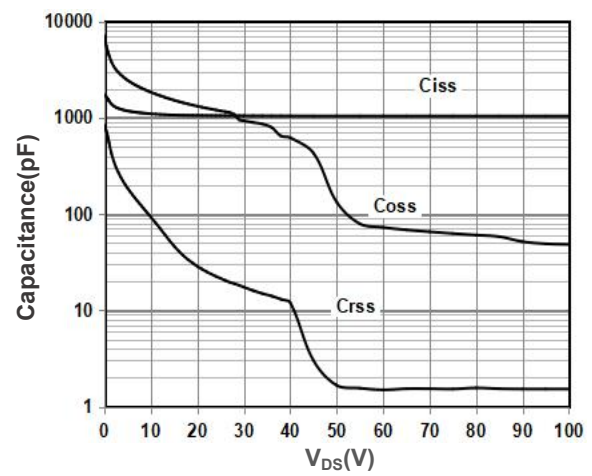
On Resistance Vs Drain Current



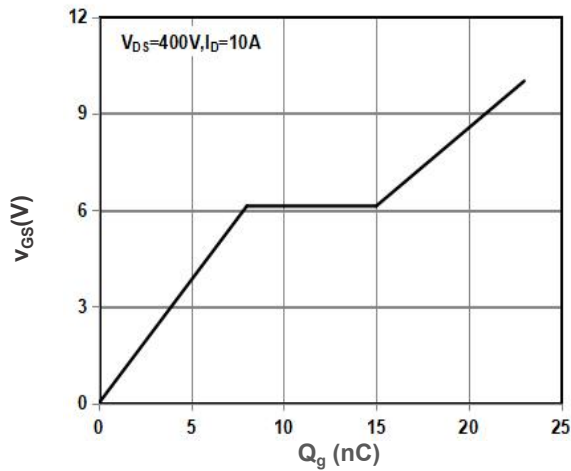
Maximum Safe Operating Area



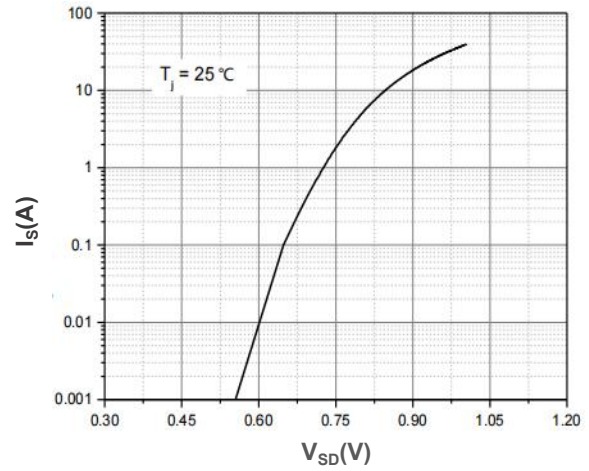
Rdson-JunctionTemperature



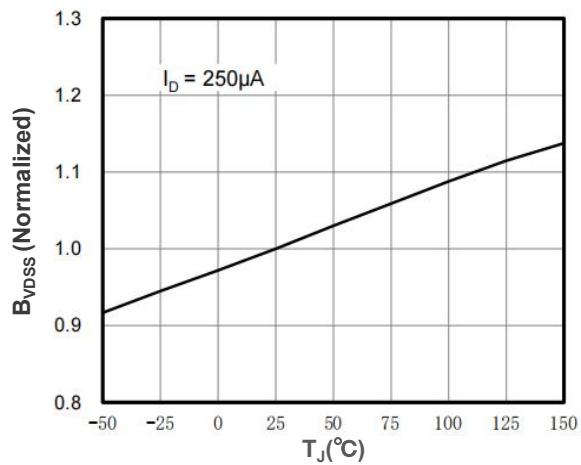
Capacitance



Gate Charge Waveform



Source-Drain Diode Forward Voltage



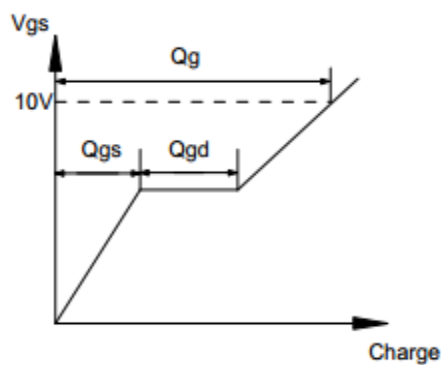
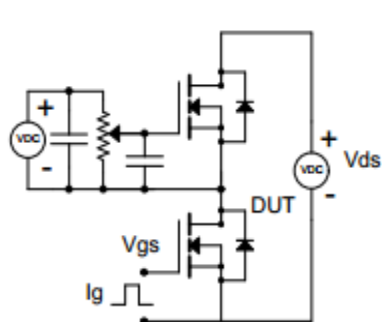
Breakdown Voltage Vs Junction Temperature

Note : The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

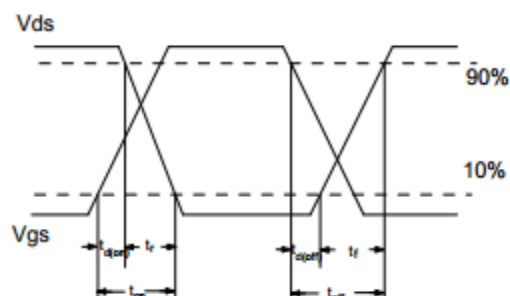
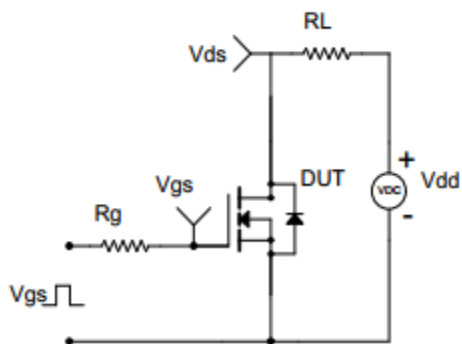


Test Circuit & Waveform

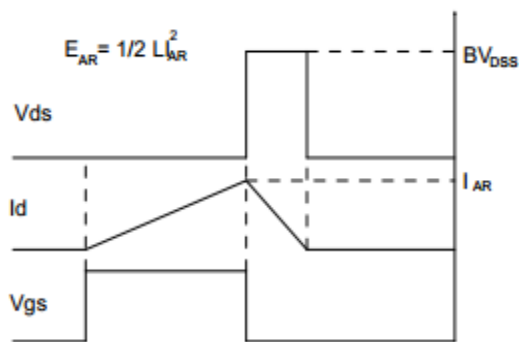
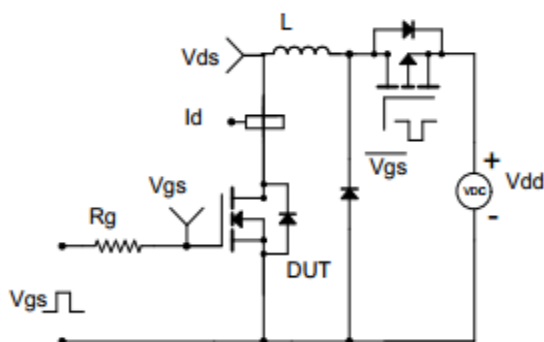
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform





TO-220 Package Dimensions

Unit: mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4.00		4.80	e	2.44	2.54	2.64
B	1.20		1.40	F	1.10		1.40
B1	1.00		1.40	L	12.50		14.50
b1	0.75		0.95	L1	3.00	3.50	4.00
c	0.40		0.55	ΦP	3.70	3.80	3.90
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		2.90
E	9.90		10.70	Y	8.02	8.12	8.22

