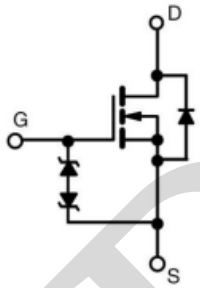
N-Channel Super Junction MOSFET

MCR65F105PT

TO-247

V_{DS}	650	V
$R_{DS(on),TYP}$	95	mΩ
I_D	30	A

FRD MOSFET
ESD protect



Features

1.Low on – resistance
2.Reduced Switching & Conduction Losses
3.Fast Recovery Body-Diode
4.Package TO-247

Applications

1.PC power
2.Telecom power
3.Server power
4.EV Charger
5.Motor driver

Maximum ratings, at T_A =25°C, unless otherwise specified

Absolute Maximum Ratings

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNITS
Drain-Source Voltage	V_{DS}	650	V
Drain Current –continuous @25ºC	I_D	30	A
Pulsed Drain Current[1]	I_{DM}	105	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche[2]	E_{AS}	1250	mJ
Operating Junction	T_j	-55 to 150	°C
Storage temperature	T_{stg}	-55 to 150	°C

Note:

1. Pulse width limited by maximum junction temperature.

2. I_D = 6.2A, V_{DD} = 50V ,starting TJ = 25℃.

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit

Electrical Characteristics (T_C = 2 5 ˚C unless otherwise noted)

$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V,V_{GS}=0V	--	--	20	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±30V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	3	4	5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=15A	--	95	105	mΩ

Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)

C_{iss}	Input Capacitance	V_{DS}=380V,V_{GS}=0 V , f=100KHz	--	3100	--	pF
C_{oss}	Output Capacitance		--	67	--	pF
C_{rss}	Reverse Transfer Capacitance		--	4.4	--	pF
Q_g	Total Gate Charge	V_{DS}=380V,I_D=16A , V_{GS}=10V	--	68	--	nC
Q_{gs}	Gate-Source Charge		--	14	--	nC
Q_{gd}	Gate-Drain Charge		--	25	--	nC

Switching Characteristics

$T_{d(on)}$	Turn-on Delay Time	V_{DS}=380V, I_D=15A, R_G=4.7Ω, V_{GS}=10V	--	10	--	ns
T_r	Turn-on Rise Time		--	5	--	ns
$T_{d(off)}$	Turn-Off Delay Time		--	80	--	ns
T_r	Turn-Off Fall Time		--	14	--	ns

Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)

I_S	Continuous Current		--	--	30	A
I_{Sm}	Maximum pulsed drain to source diode forward current		--	--	105	A
V_{SD}	Forward Voltage	V_{GS} = 0V, I_S = 15 A	--	--	0.9	V
T_{rr}	Reverse Recovery Time	V_R= 380 V, I_{SD} = 15A, dI_F/dt = 100 A/μs	--	185	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.4	--	μC
I_{mm}	Reverse recovery current		--	16	--	A
T_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D)				

Typical Performance Characteristics

Figure 1 . On- State Characteristics

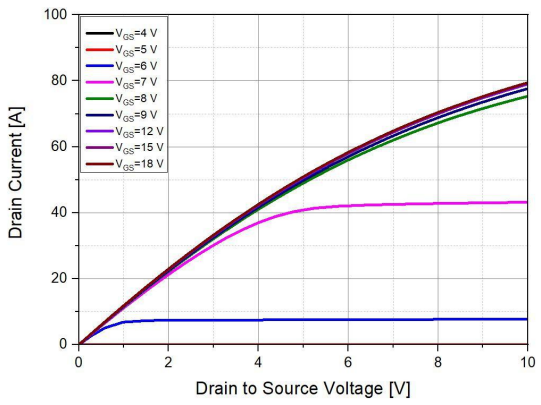


Figure 2 . Transfer Characteristics

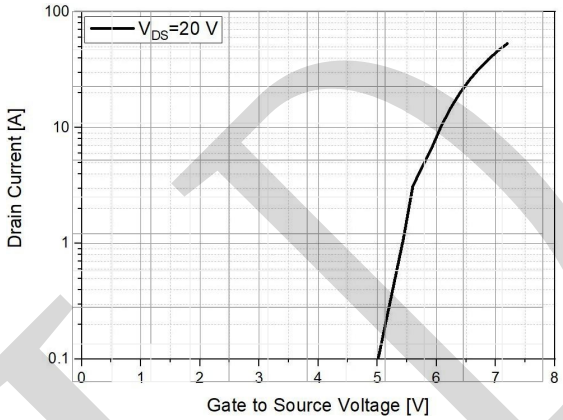


Figure 3 . On- Resistance Characteristics vs Drain Current and Gate Voltage

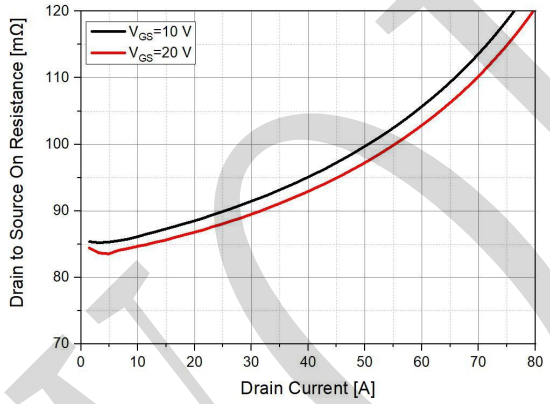


Figure 4 . On- State Characteristics Current vs Doide forward Voltage

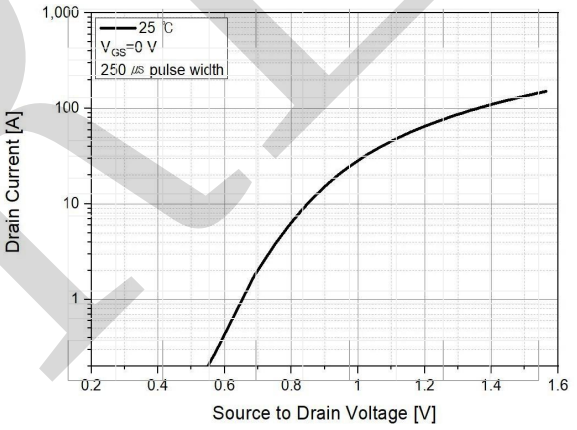


Figure 5 . Capacitance Characteristics

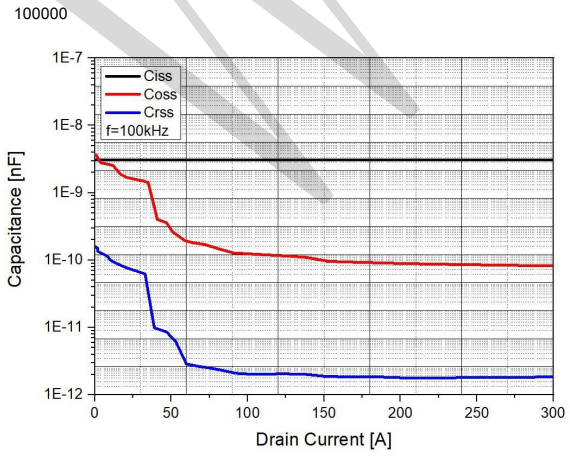
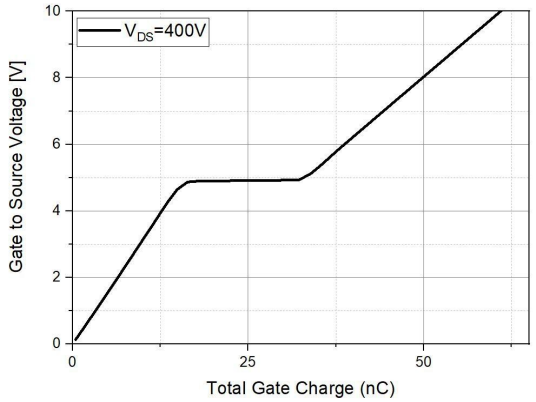


Figure 6 . Gate Charge Characteristics



Typical Performance Characteristics

Figure 7 . Drain to Source Resistance vs Gate to Source voltage

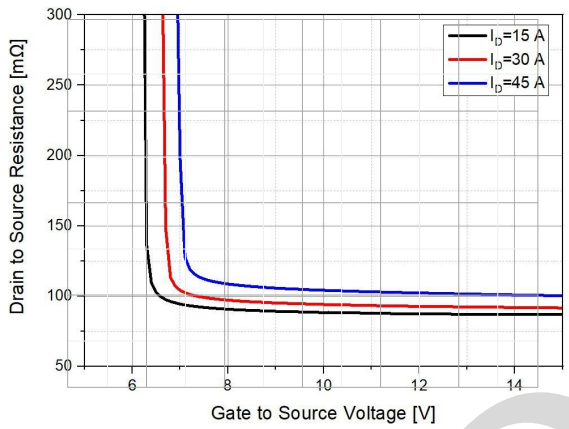


Figure 8 . Drain to Source Resistanc vs Gate to Source voltage

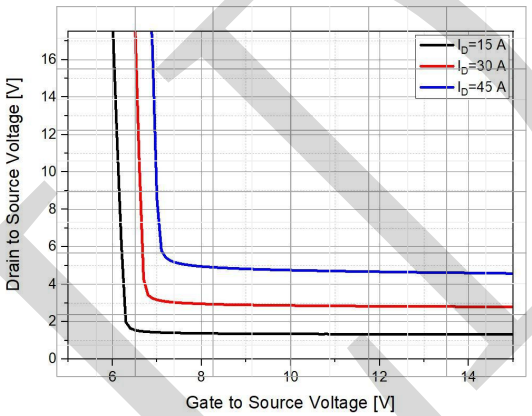
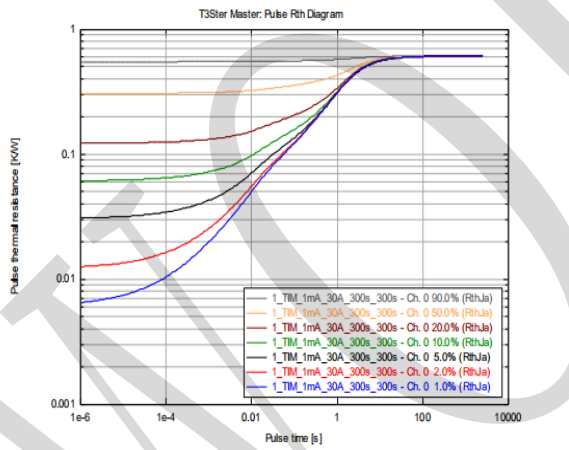
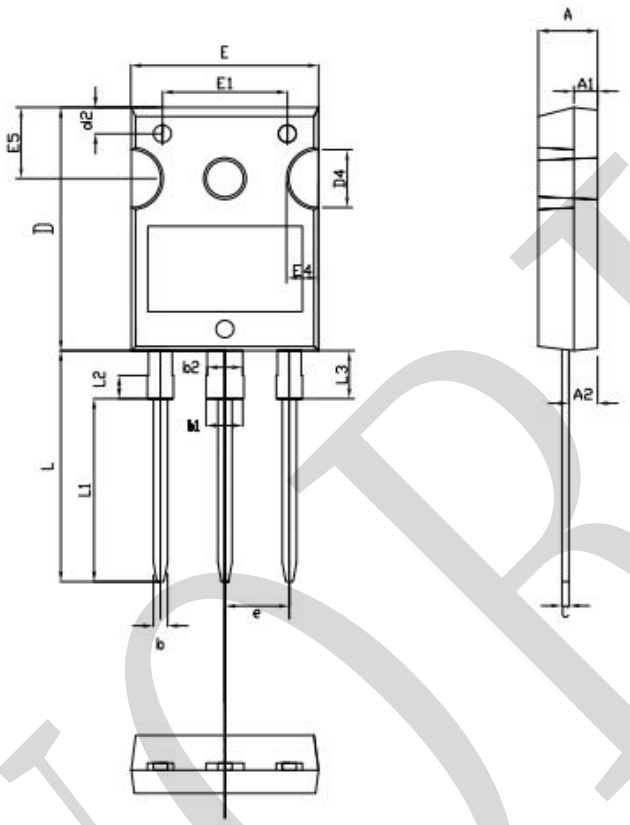


Figure 9 . Transient thermal response

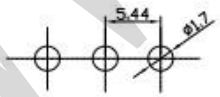


PACKAGE OUTLINE DIMENSIONS

TO-247



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.85	5.00	5.15
A1	1.90	2.00	2.10
A2	2.27	2.41	2.54
b	1.10	1.20	1.30
b1	2.90	-	3.20
b2	2.90	3.00	3.10
b3	1.90	2.00	2.10
b4	2.00	-	2.20
c	0.55	0.60	0.68
D	20.80	21.00	21.10
D1		8.23	
D2		8.32	
D3		1.17	
D4	3.68	4.90	5.10
d1	6.04	6.15	6.30
d2	2.20	2.30	2.40
E	15.70	15.80	16.00
E1		10.50	
E2		14.02	
E3		13.50	
E4	2.20	2.40	2.60
E5	5.49	5.80	6.00
e	5.34	5.44	5.54
L	19.72	19.92	20.12
L1		15.79	
L2		1.98	
L3	4.00	4.10	4.47
ø1	7.10	7.19	7.30
ø2	3.50	3.60	3.70