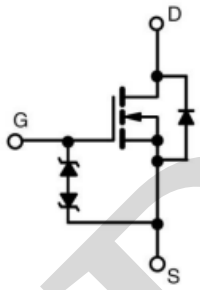
N-Channel Super Junction MOSFET

MCR60F075PT

TO-247

V_{DS}	650	V
$R_{DS(on),TYP}$	75	mΩ
I_D	42	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}	600	V
Drain Current –continuous @25°C	I_D	42	A
Drain Current –continuous @100°C	I_D	26.6	A
Pulsed Drain Current[1]	I_{DM}	126	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche[2]	E_{AS}	254	mJ
Operating Junction & Storage Temperature	T_j, T_{stg}	-55 to 150	°C
Lead Temperature (1/16” from case for 10sec.)	T_L	260	°C

Note:

1. Pulse width limited by maximum junction temperature.

2. I_{AS} = 6.3A, R_G = 25 ,starting TJ = 25℃.

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	600	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=600V,V_{GS}=0V	--	--	10	μA
	Zero Gate Voltage Drain Current (T_j =125℃)	V_{DS}=480V,V_{GS}=0V	--	--	30	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=2.8mA	3		5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=21.5A	--	64	75	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=400V,V_{GS}=0 V , f=250KHz	--	3080	--	pF
C_{oss}	Output Capacitance		--	83	--	pF
C_{rss}	Reverse Transfer Capacitance		--	2.4	--	pF
Q_g	Total Gate Charge	V_{DS}=400V,I_D=21.5A , V_{GS}=10V	--	76	--	nC
Q_{gs}	Gate-Source Charge		--	20	--	nC
Q_{gd}	Gate-Drain Charge		--	40	--	nC
Switching Characteristics						
$T_{d(on)}$	Turn-on Delay Time	V_{DS}=400V, I_D=40A, R_G=2Ω, V_{GS}=10V	--	20	--	ns
T_r	Turn-on Rise Time		--	12	--	ns
$T_{d(off)}$	Turn-Off Delay Time		--	61	--	ns
T_r	Turn-Off Fall Time		--	7	--	ns

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

I_S	Continuous Current		--	--	42	A
I_{SM}	Maximum Pulsed Diode Forward Curren		--	--	126	A
V_{SD}	Forward Voltage	V_{GS} = 0V, I_{SD} = 21.5 A	--	--	1.2	V
T_{rr}	Reverse Recovery Time	V_{DS} = 400 V, I_{SD} = 21.5 A, dI_F/dt = 100 A/μs	--	134	--	ns
Q_{rr}	Reverse Recovery Charge		--	0.85	--	uC

Typical Performance Characteristics

Figure 1. On-Region Characteristics

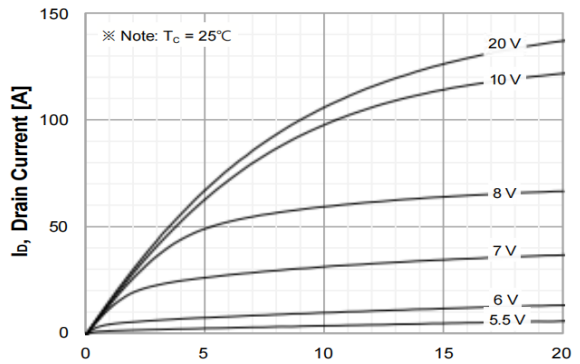


Figure 2. Transfer Characteristics

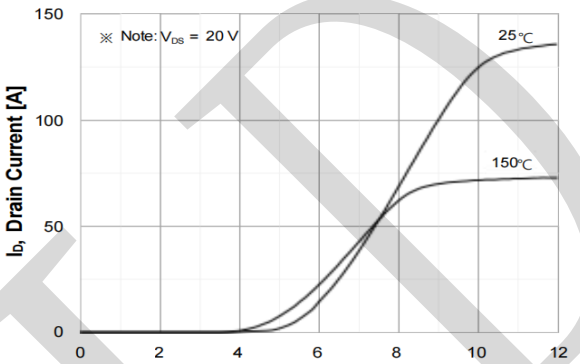


Figure 3. On-Resistance Characteristics vs. Drain Current and Gate Voltage

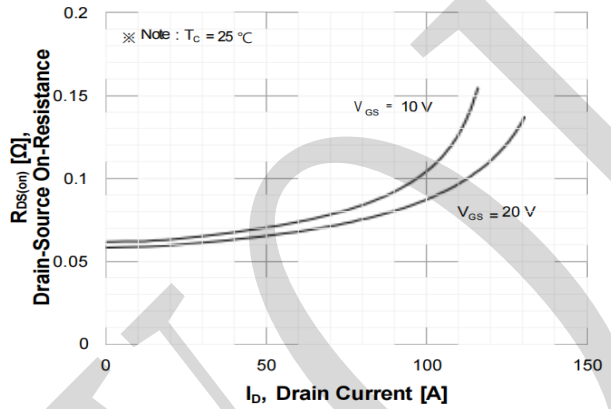


Figure 4. Diode Forward Voltage Characteristics vs. Source-Drain Current and Temperature

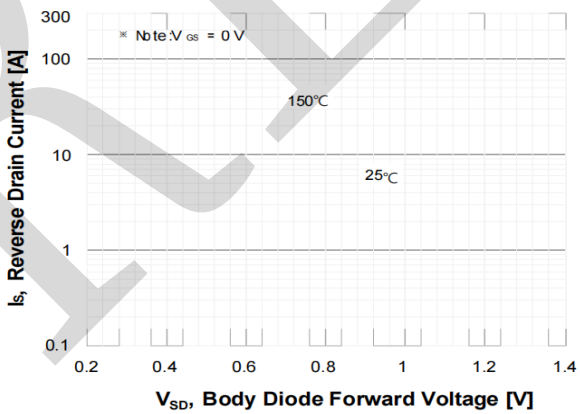


Figure 5. Capacitance Characteristics

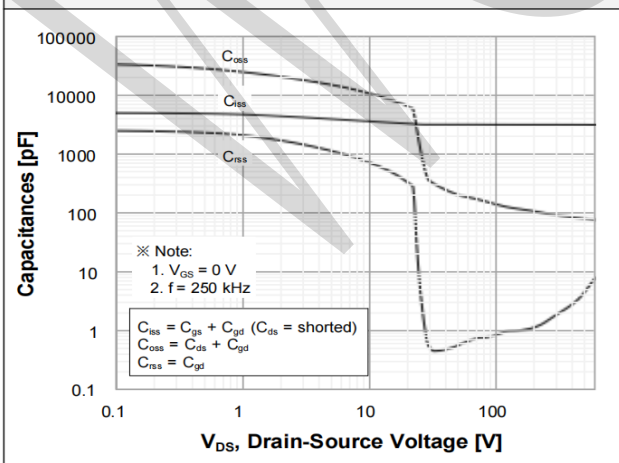
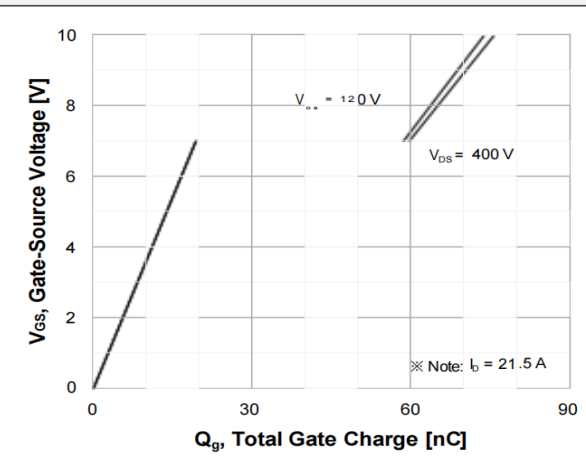


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics

Figure 7. Breakdown Voltage Characteristics vs. Temperature

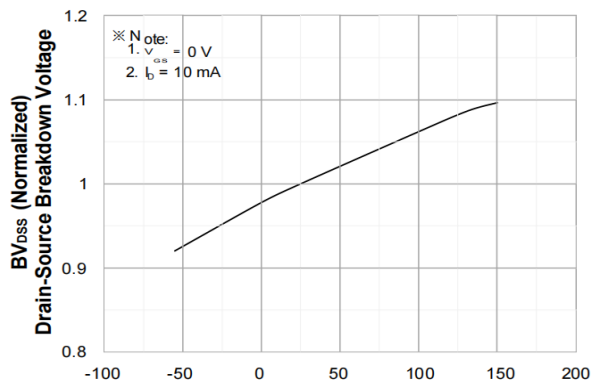


Figure 8. On-Resistance Characteristics vs. Temperature

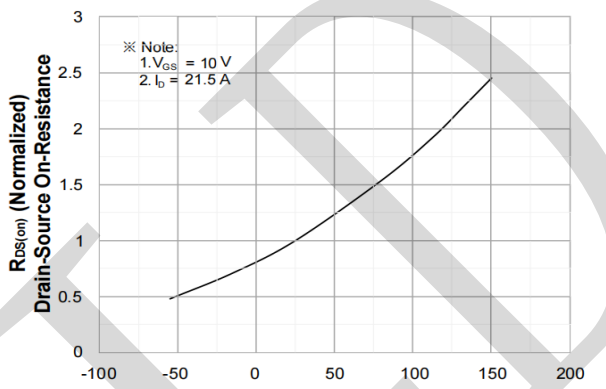


Figure 9. Maximum Safe Operating Area

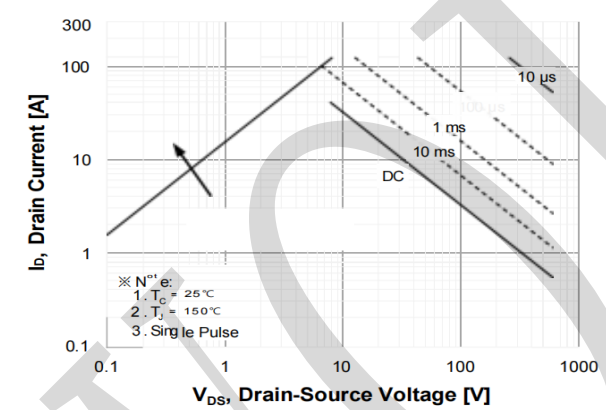


Figure 10. Maximum Drain Current vs. Case Temperature

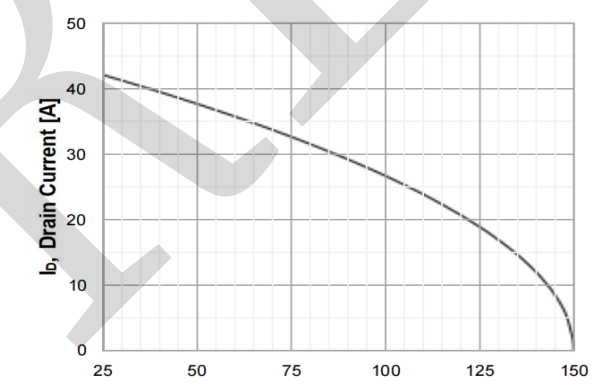


Figure 11. E_{oss} vs. Drain to Source Voltage

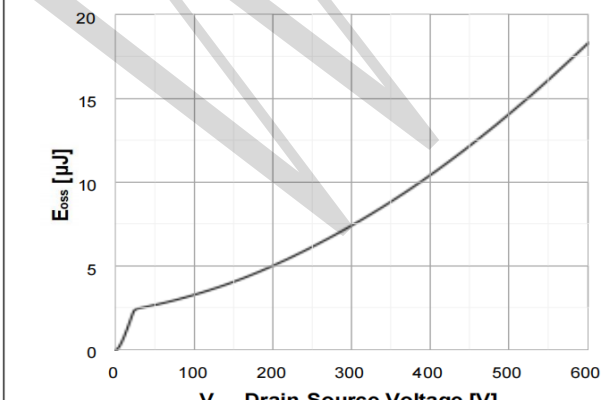
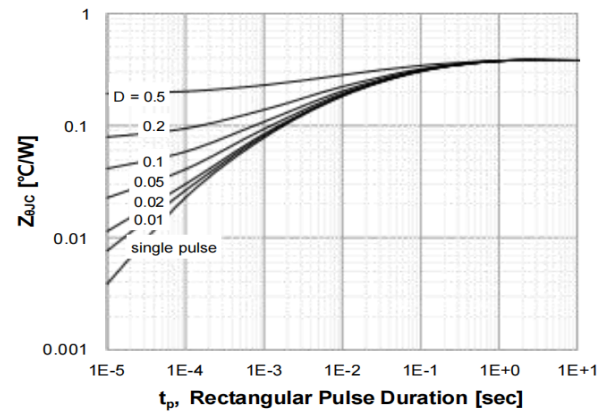


Figure 12. Transient Thermal Response Curve



Test Circuits

Figure 13. Inductive Load Switching Test Circuit and Waveforms

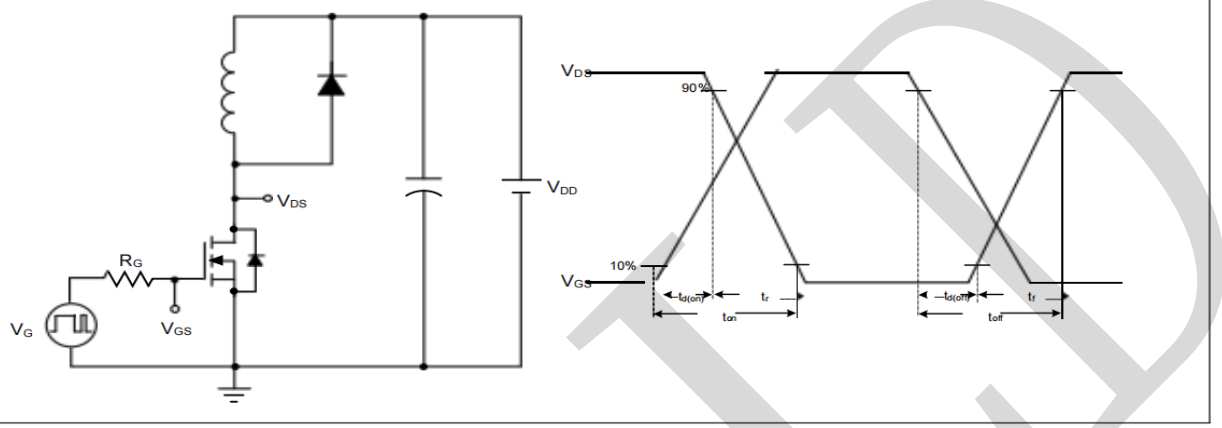


Figure 14. Unclamped Inductive Switching Test Circuit and Waveforms

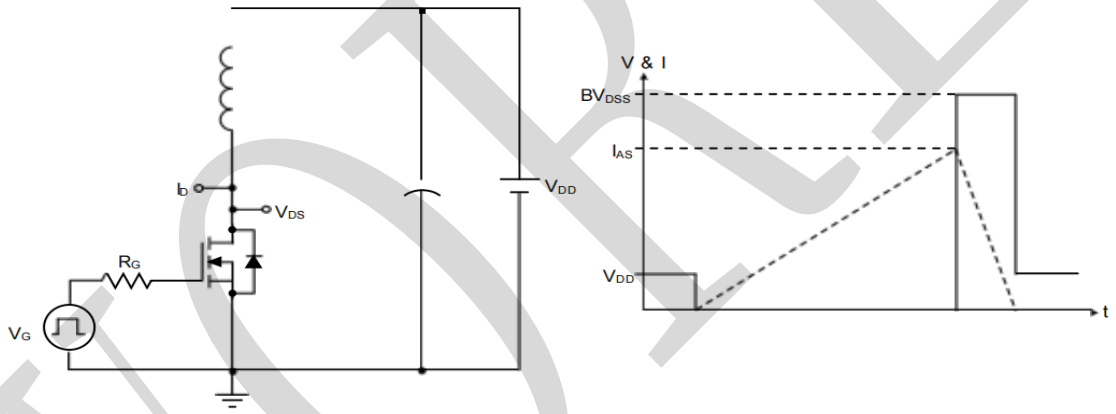
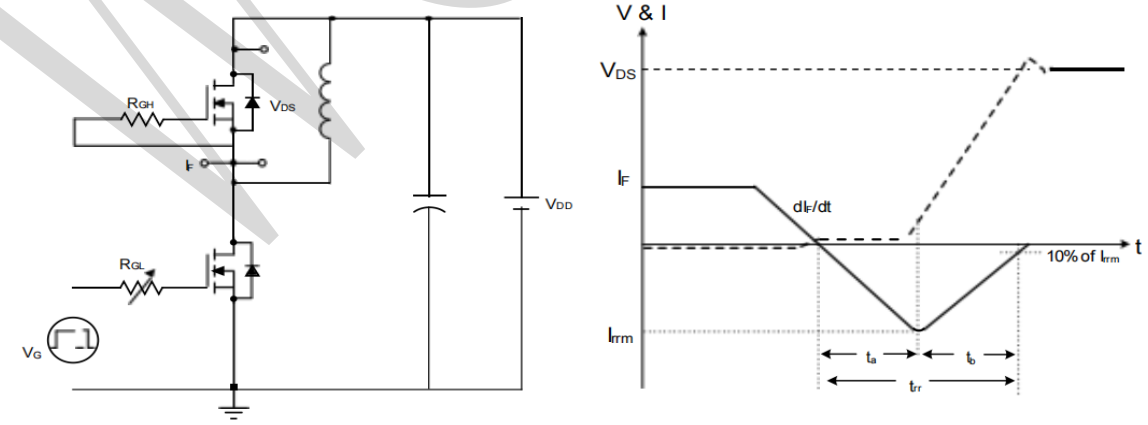
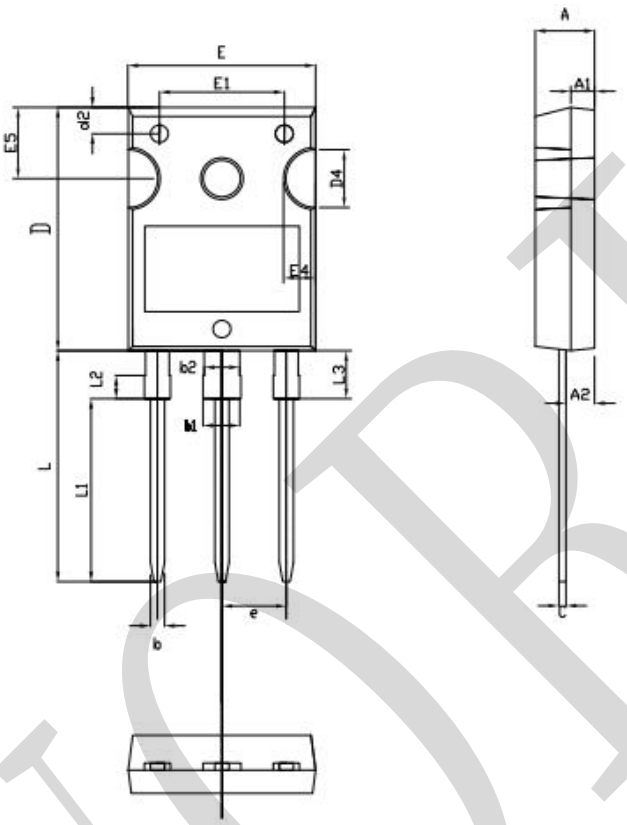


Figure 15. Peak Diode Recovery dv/dt Test Circuit and Waveforms

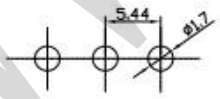


PACKAGE OUTLINE DIMENSIONS

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