

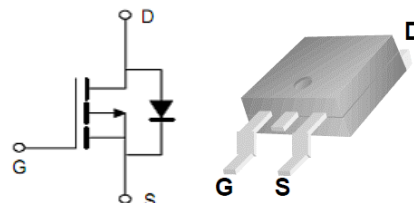
Features

- Improved dv/dt Capability, High Ruggedness
- Maximum Junction Temperature Range (150°C)

Applications

- DC Fan
- Brushless motor
- Optimized for Power Management Applications for Portable Products, such as H-bridge, Inverters Car Charger and Others

$V_{(BR)DSS}$	-60	V
I_D	-25	A
$R_{DS(ON)}@V_{GS}=-10V$	35	mΩ
$R_{DS(ON)}@V_{GS}=-4.5V$	45	mΩ



TO-252

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
IRFR9024NTRPBF-CN	TO-252	CD35RP06M	13inch	2500PCS	50000PCS

Absolute Maximum Ratings

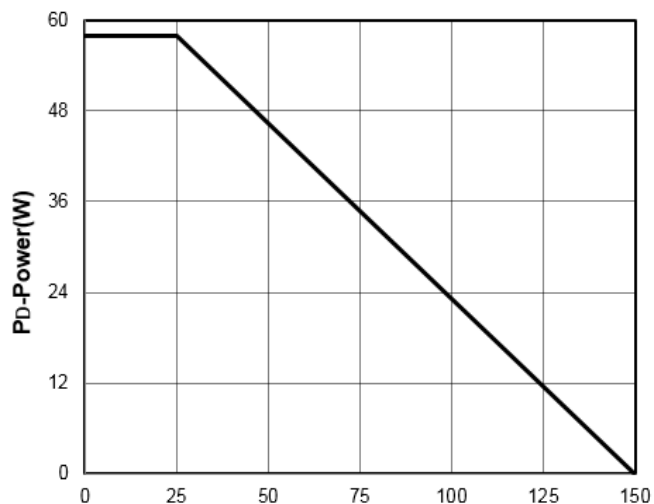
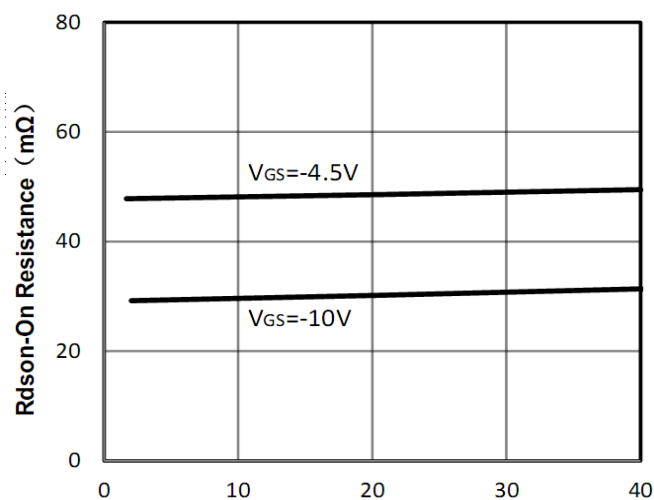
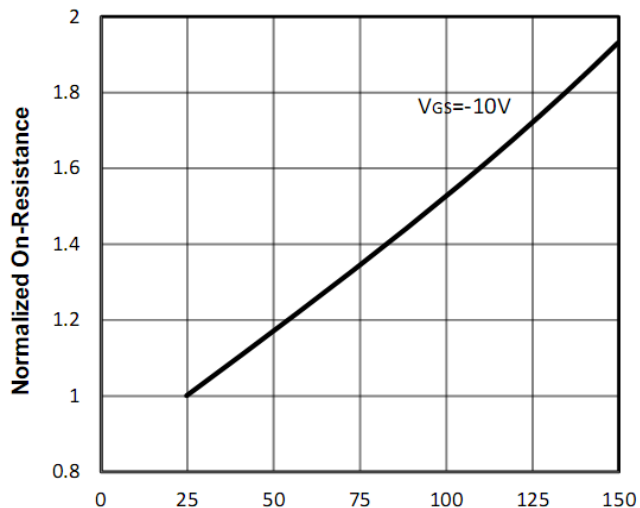
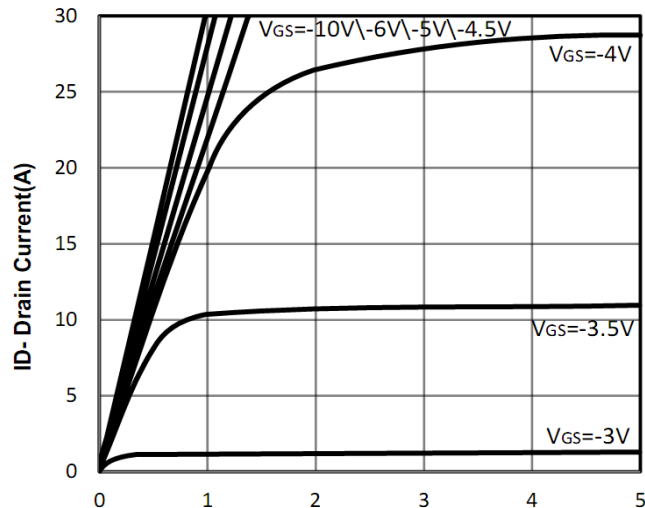
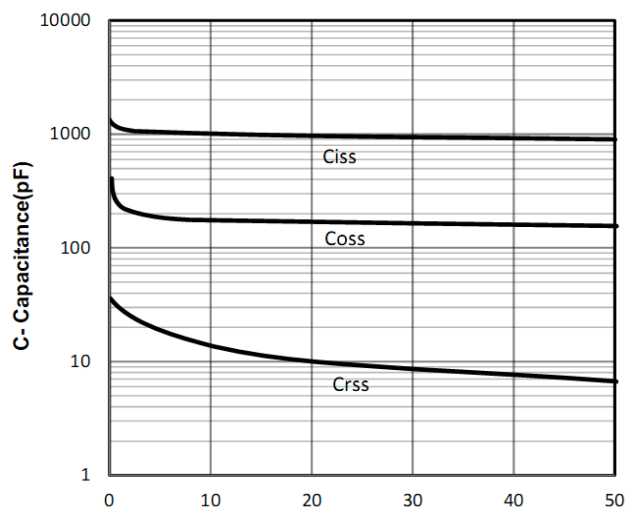
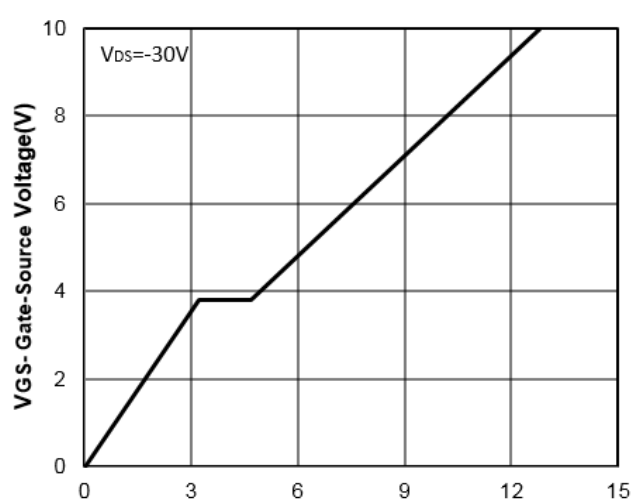
Symbol	Parameter		Value	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)				
V _{(BR)DSS}	Drain-Source Breakdown Voltage		-60	V
V _{GS}	Gate-Source Voltage		±20	V
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-50 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	-25	A
Mounted on Large Heat Sink				
E _{AS}	Single Pulse Avalanche Energy (Note1)		34	mJ
I _{DM}	Pulse Drain Current Tested (Silicon Limit) (Note2)	T _C =25°C	-100	A
I _D	Continuous Drain current	T _C =25°C	-25	A
P _D	Maximum Power Dissipation	T _C =25°C	58	W
R _{θJC}	Thermal Resistance Junction-to-Case (Note3)		2.16	°C/W

P-Channel Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain- Source Breakdown Voltage	VGS=0V ID=-250μA	-60	--	--	V
I _{DSS}	Zero Gate Voltage Drain current	VDS=-60V,VGS=0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-1	-2	-2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance (Note4)	VGS=-10V, ID=-15A	--	35	42	mΩ
		VGS=-4.5V, ID=-10A	--	45	53	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) (Note5)						
C _{iss}	Input Capacitance	VDS= -30V, VGS=0V, F=1MHz	--	946	--	pF
C _{oss}	Output Capacitance		--	188	--	pF
C _{rss}	Reverse Transfer Capacitance		--	8.8	--	pF
Q _g	Total Gate Charge	VDS= -30V, ID= -7A, VGS= -10V	--	12.8	--	nC
Q _{gs}	Gate-Source Charge		--	3.2	--	nC
Q _{gd}	Gate-Drain Charge		--	1.5	--	nC
Switching Characteristics (Note5)						
t _{d(on)}	Turn-on Delay Time	VDD=- 30V, ID=-4A, VGS=-10V, RG=3Ω	--	5.3	--	nS
t _r	Turn-on Rise Time		--	1.6	--	nS
t _{d(off)}	Turn-off Delay Time		--	20	--	nS
t _f	Turn-off Fall Time		--	3.9	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	IS=-25A,VGS=0V	--	--	-1.2	V

Note:

- Limited by TJmax, starting TJ = 25° C, RG = 4.5Ω, VD = -20V, VGS = -10V. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1: T_J -Junction Temperature (°C)

Figure2: -ID -Drain Current (A)

Figure3: -T_J Junction Temperature (°C)

Figure4: -V_{DS} -Drain Source Voltage (V)

Figure5: -V_{DS} -Drain Source Voltage (V)

Figure6: Qg -Gate Charge (nC)

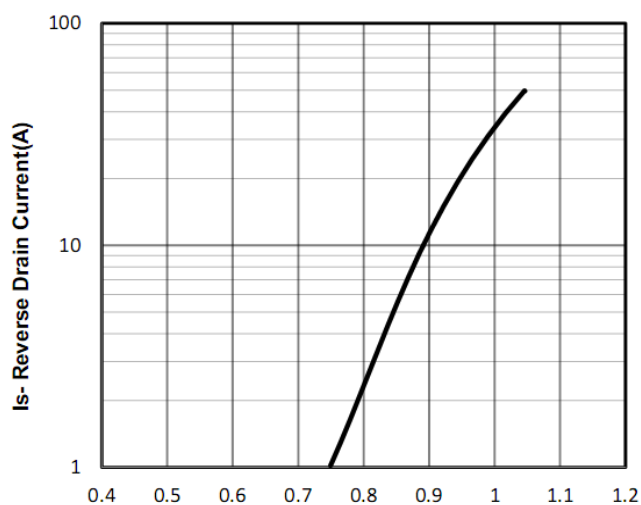


Figure7: -Vsd –Source Drain Voltage (V)

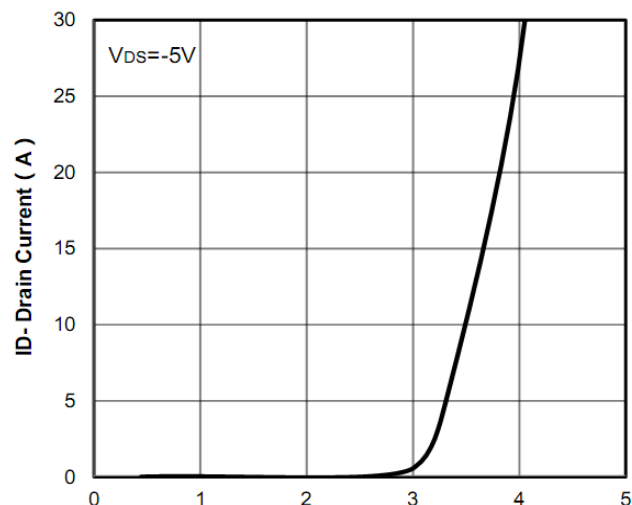


Figure8: -Vgs –Gate Source Voltage (V)

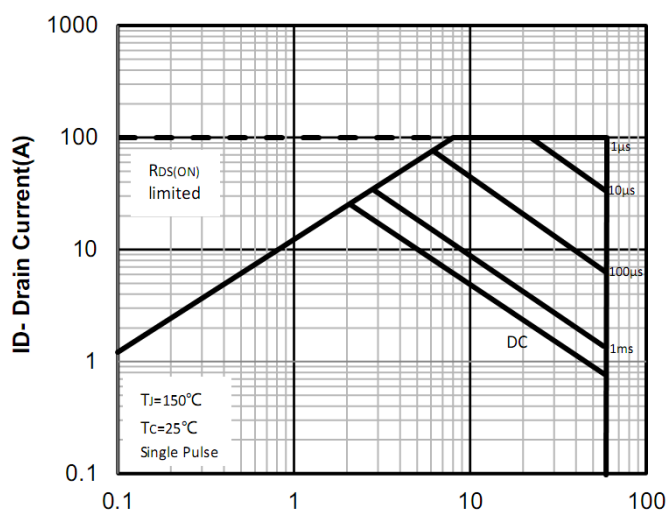


Figure9: -VDS -Drain Source Voltage (V)

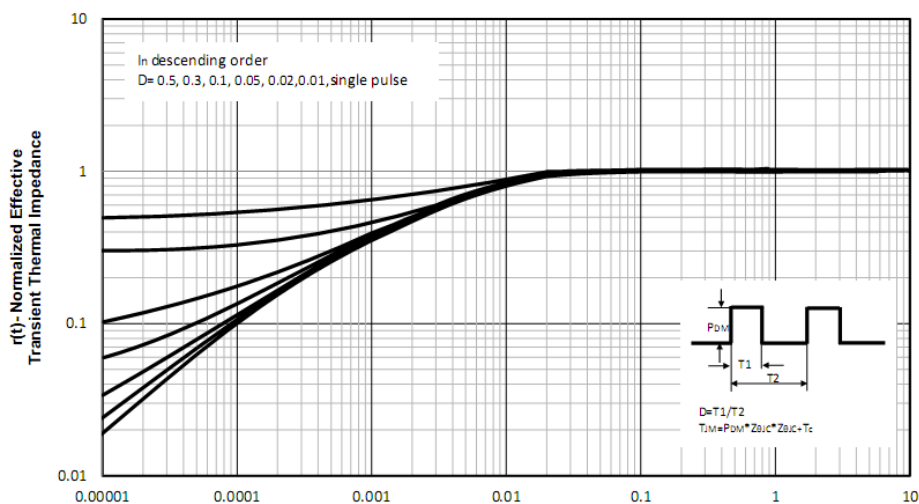
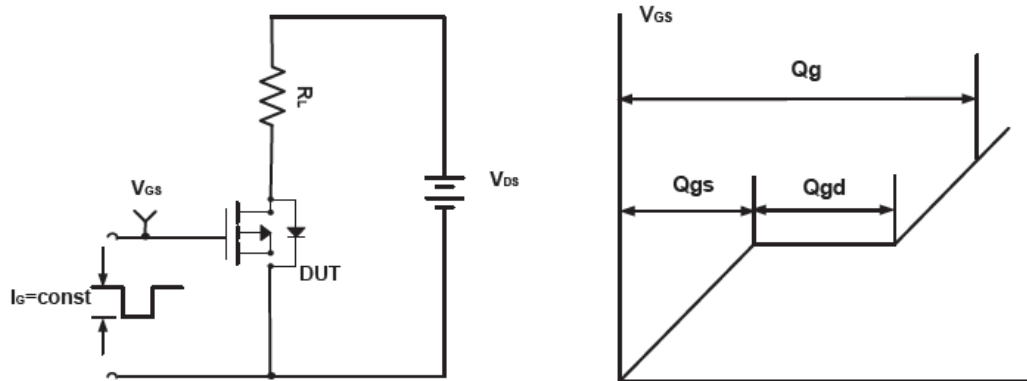
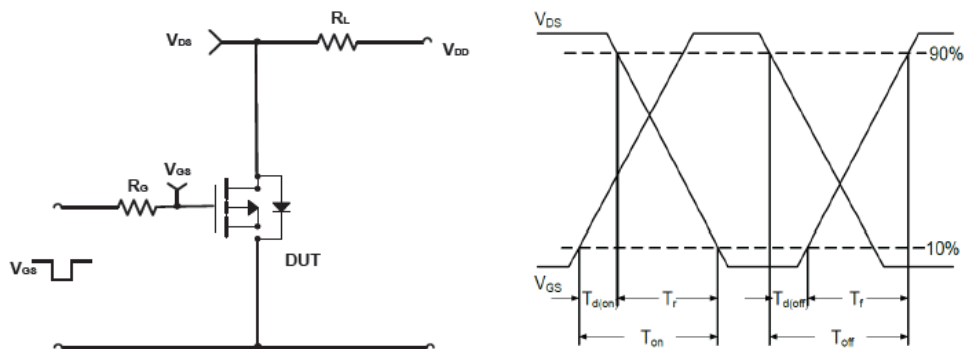
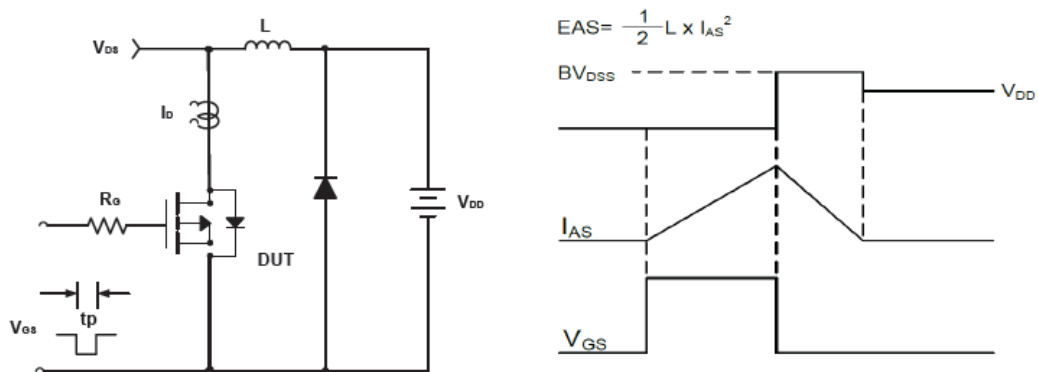
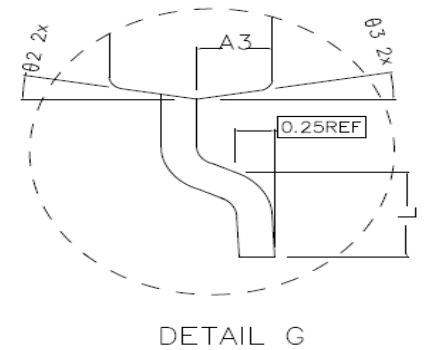
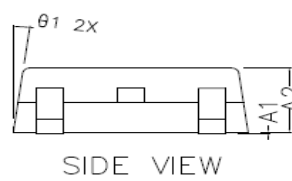
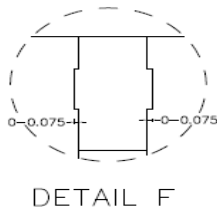
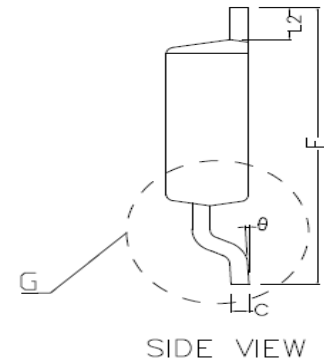
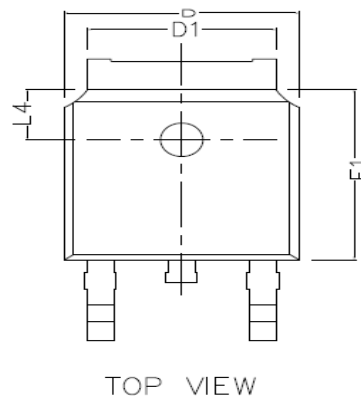
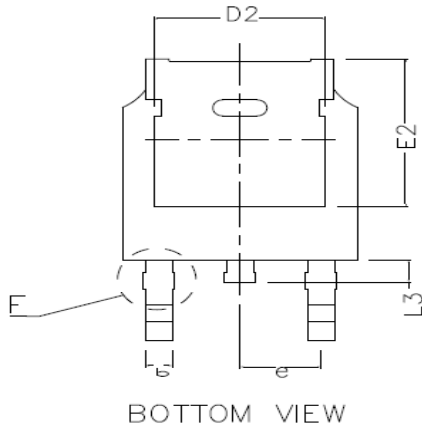


Figure10: Square Wave Pulse Duration (sec)

Test Circuit and Waveform (P-Channel):

Figure A Gate Charge Test Circuit & Waveforms

Figure B Switching Test Circuit & Waveforms

Figure C Unclamped Inductive Switching Circuit & Waveforms

TO-252 Package Outline Dimensions (Units: mm)


COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.000	0.100	0.150
A2	2.200	2.300	2.400
A3	1.020	1.070	1.120
b	0.710	0.760	0.810
c	0.460	0.508	0.550
D	6.500	6.600	6.700
D1	5.330REF		
D2	4.830REF		
E	9.900	10.100	10.300
E1	6.000	6.100	6.200
E2	5.600REF		
e	2.286TYPE		
L	1.400	1.550	1.700
L2	1.10REF		
L3	0.80REF		
L4	1.80REF		
theta	0~8°		
theta1	7° TYPE		
theta2	10° TYPE		
theta3	10° TYPE		

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