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FMY67N60S1FDA

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Automotive

FUJI POWER MOSFET

Super J MOS® S1 series FRED type N-Channel enhancement mode power MOSFET

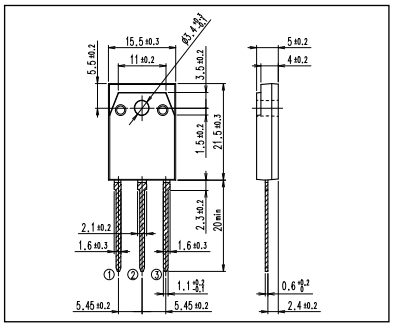
Features

Low on-state resistance
Low switching loss
Easy to use
(more controllable switching dV/dt by Rg)
Reliability assurance in accordance with AEC Q101
100% avalanche tested
Built in fast recovery diode

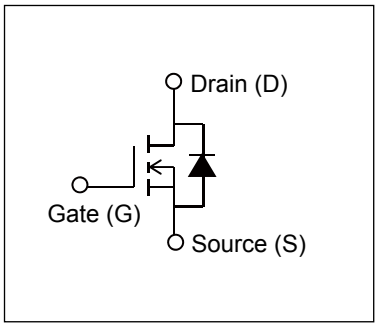
Applications

Automotive switching applications

Outline Drawings [mm]



Equivalent circuit schematic



Absolute Maximum Ratings at T_c=25°C (unless otherwise specified)

Description	Symbol	Characteristics	Unit	Remarks
Drain-Source Voltage	V_{DS}	600	V	
	V_{DSX}	600	V	V_{GS}=-30V
Continuous Drain Current	I_D	±67	A	Tc=25°C Note*1
		±43	A	Tc=100°C Note*1
Pulsed Drain Current	I_{DP}	±201	A	
Gate-Source Voltage	V_{GS}	±30	V	
Non-Repetitive Maximum Avalanche current	I_{AS}	20	A	Note *2
Non-Repetitive Maximum Avalanche Energy	E_{AS}	1293.7	mJ	Note *3
Maximum Drain-Source dV/dt	dV_{DS}/dt	50	kV/μs	V_{DS}=600V
Peak Diode Recovery dV/dt	dV/dt	40	kV/μs	Note *4
Peak Diode Recovery di/dt	-di/dt	100	A/μs	Note *5
Maximum Power Dissipation	P_D	2.5	W	T_a=25°C
		545		T_C=25°C
Operating and Storage Temperature range	T_{ch}	150	°C	
	T_{stg}	-55 to +150	°C	

Note *1 : Limited by maximum channel temperature.
Note *2 : T_{ch}≤150°C, See Fig.1 and Fig.2
Note *3 : Starting Tch=25°C, I_{AS}=20A, L=5.9mH, V_{DD}=60V, R_G=50Ω, See Fig.1 and Fig.2
E_{AS} limited by maximum channel temperature and avalanche current.
Note *4 : I_F≤-I_D, -di/dt=100A/μs, V_{DD}≤300V, T_{ch}≤150°C
Note *5 : I_F≤-I_D, dV/dt=40kV/μs, V_{DD}≤300V, T_{ch}≤150°C

Electrical Characteristics at T_c=25°C (unless otherwise specified)

• Static Ratings

Description	Symbol	Conditions		Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=1mA V_{GS}=0V		600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	I_D=3.5mA V_{DS}= V_{GS}		3.0	4.0	5.0	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 600V V_{GS}=0V	T_a=25°C	-	-	3	μA
		V_{DS}= 480V V_{GS}=0V	T_a=150°C	-	-	2	mA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V V_{DS}= 0V		-	-	100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	I_D=33.5A V_{GS}=10V		-	35	42	mΩ
Gate- Resistance	R_G	f=1MHz,Open drain		-	1.3	-	Ω

• Dynamic Ratings

Description	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Transconductance	g_{fs}	I_D=33.5A V_{DS}=10V	16	-	-	S
Input Capacitance	C_{iss}	V_{DS}=400V V_{GS}=0V f=250kHz	-	4900	-	pF
Output Capacitance	C_{oss}		-	173	-	
Reverse Transfer Capacitance	C_{rss}		-	14	-	
Turn-On Time	$t_{d(on)}$	V_{DD}=400V, V_{GS}=10V I_D=33.5A, R_G=10Ω See Fig.3 and Fig.4	-	175	-	ns
	t_r		-	47	-	
Turn-Off Time	$t_{d(off)}$		-	210	-	
	t_f		-	22	-	
Total Gate Charge	Q_G	V_{DD}=480V, I_D=67A V_{GS}=10V See Fig.5	-	220	-	nC
Gate-Source Charge	Q_{GS}		-	55	-	
Gate-Drain Charge	Q_{GD}		-	135	-	

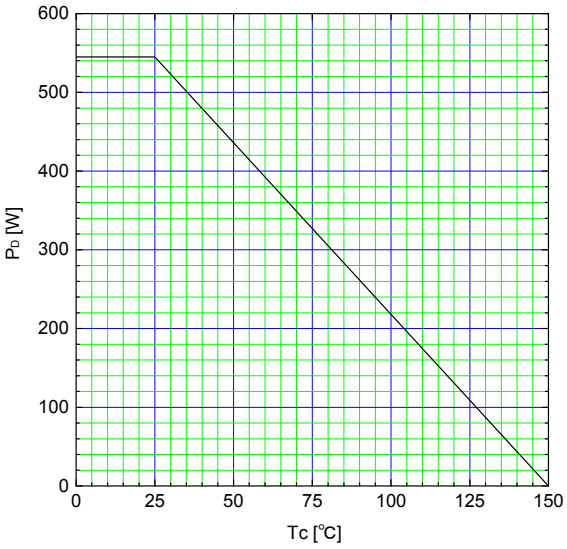
• Reverse Ratings

Description	Symbol	Conditions	Min.	Typ.	Max.	Unit
Avalanche Capability	I_{AV}	L=5.9mH, T_{ch}=25°C See Fig.1 and Fig.2	20	-	-	A
Diode Forward On-Voltage	V_{SD}	I_F=67A, V_{GS}=0V T_{ch}=25°C	-	-	1.35	V
Reverse Recovery Time	t_{rr}	I_F=43A, V_{GS}=0V V_{DD}=300V -di/dt=100A/μs See Fig.6	-	250	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.7	-	μC

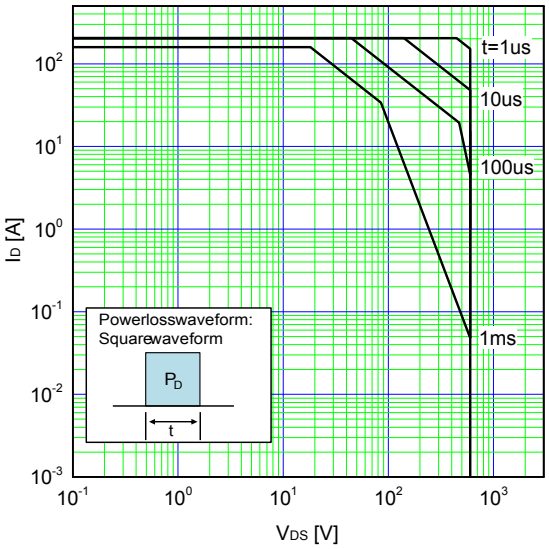
Thermal Characteristics

Description	Symbol	Min.	Typ.	Max.	Unit
Channel to Case	$R_{th(ch-c)}$	-	-	0.23	°C/W
Channel to Ambient	$R_{th(ch-a)}$	-	-	50	°C/W

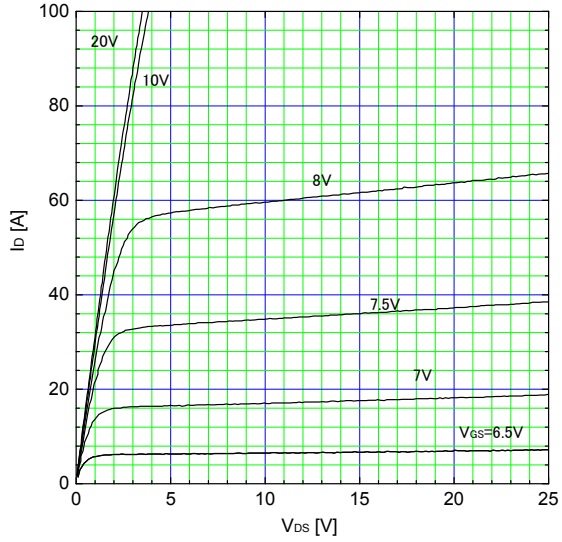
Allowable Power Dissipation
P_D=f(Tc)



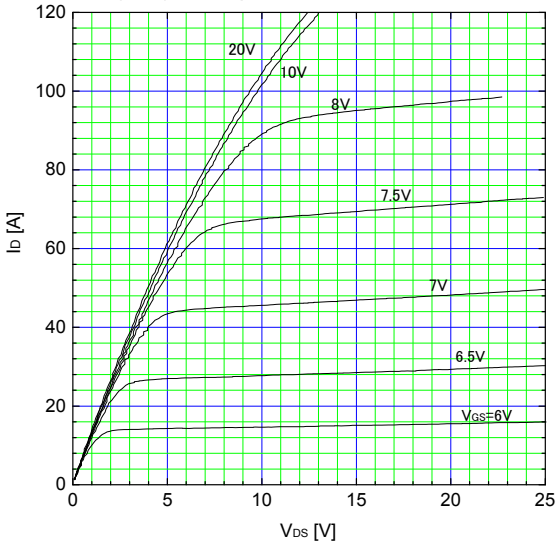
Safe Operating Area
I_D=f(V_{DS}): Duty=0 (Single pulse), Tc=25℃



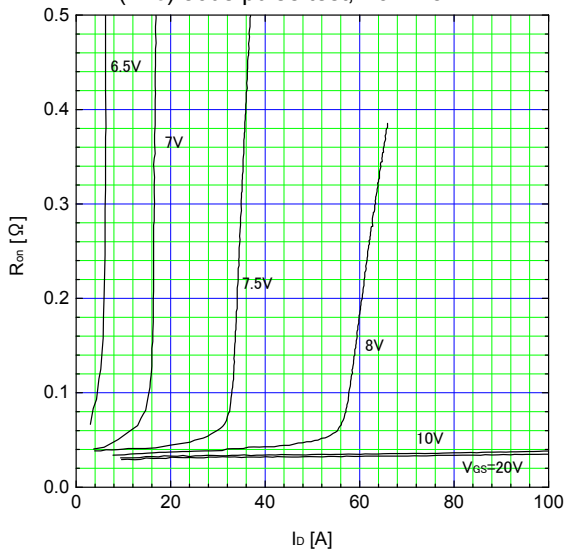
Typical Output Characteristics
I_D=f(V_{DS}):80us pulse test, Tch=25℃



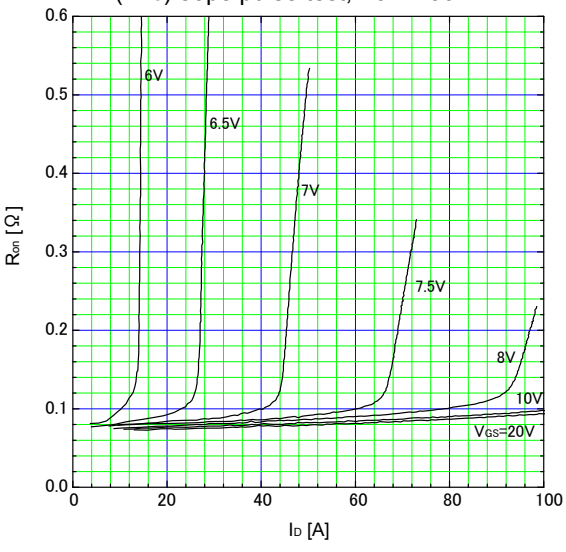
Typical Output Characteristics
I_D=f(V_{DS}):80us pulse test, Tch=150℃



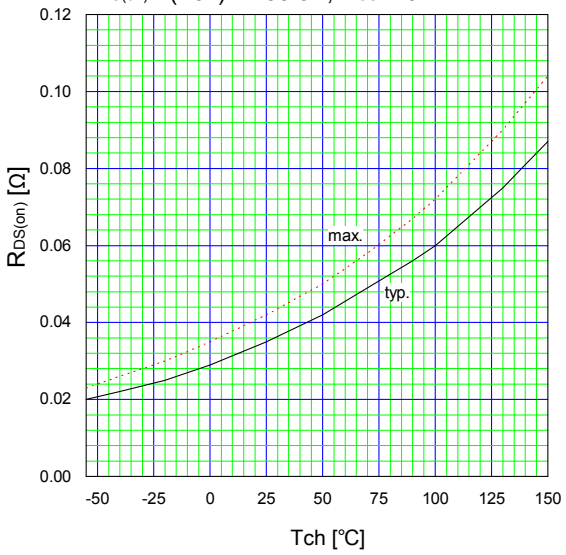
Typical Drain-Source on-state Resistance
I_D=f(V_{DS}):80us pulse test, Tch=25℃



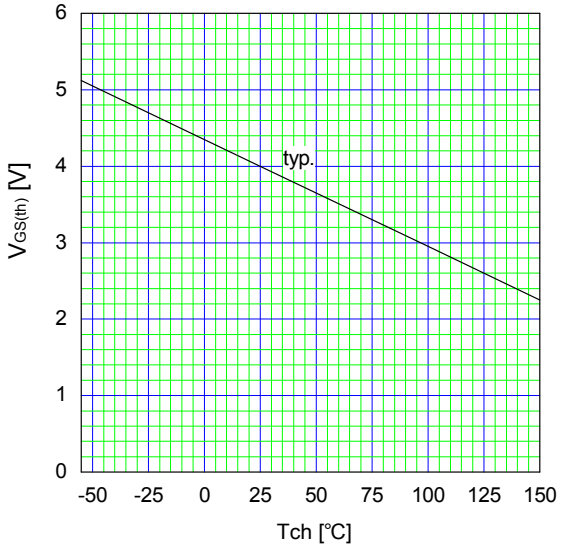
Typical Drain-Source on-state Resistance
I_D=f(V_{DS}):80μs pulse test, Tch=150℃



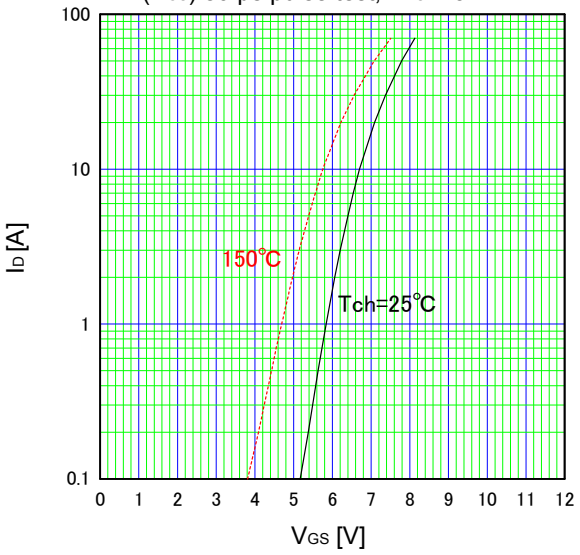
Drain-Source On-state Resistance
$R_{DS(on)}$=f(Tch):I_D=33.5A, V_{GS}=10V



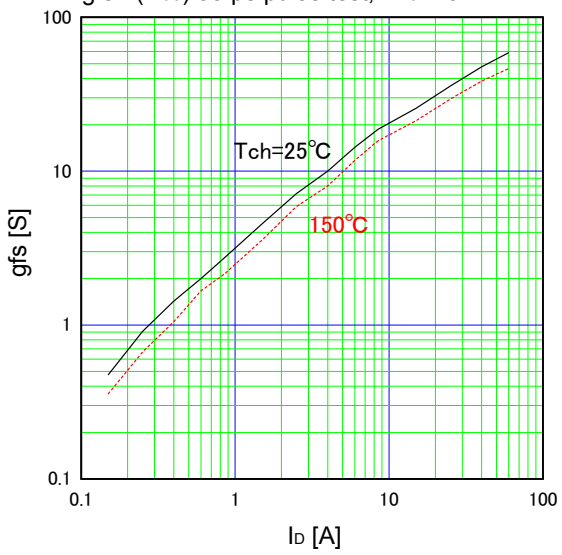
Gate Threshold Voltage vs. Tch
$V_{GS(th)}$=f(Tch):V_{DS}=V_{GS}, I_D=3.5mA



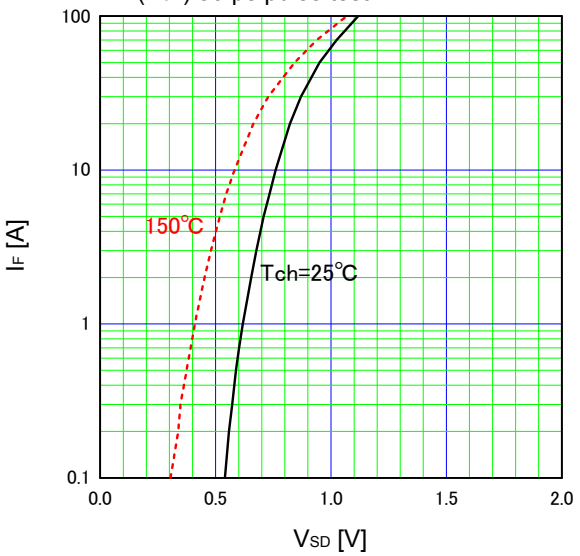
Typical Transfer Characteristics
I_D=f(V_{GS}):80 µs pulse test, V_{DS}=25V



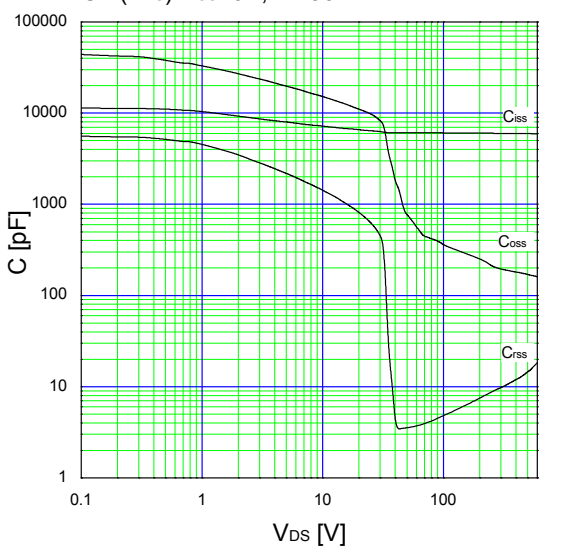
Typical Trans conductance
gfs=f(V_{GS}):80 µs pulse test, V_{DS}=25V



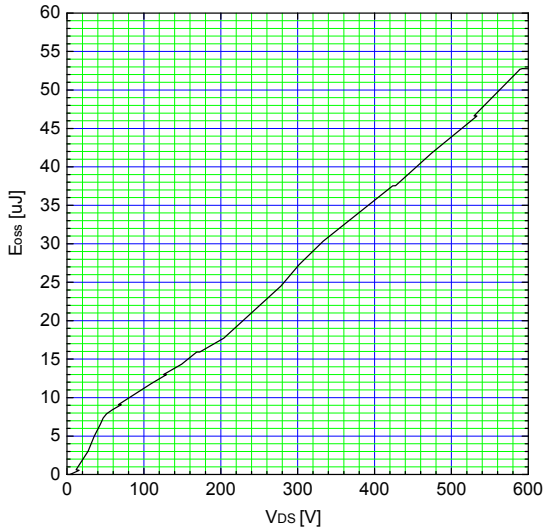
Typical Forward Characteristics of Reverce Diode
I_F=f(V_{SD}):80 µs pulse test



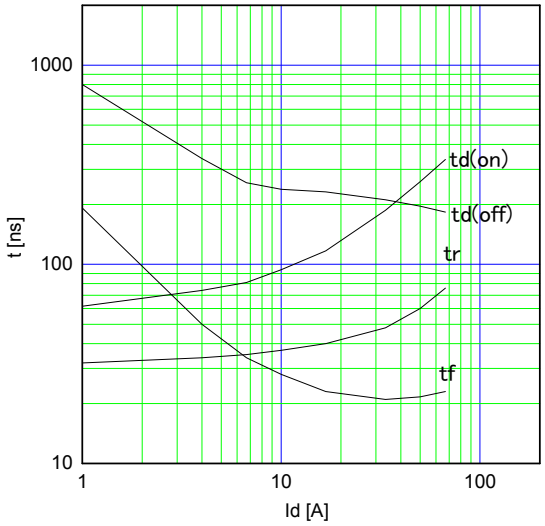
Typical Capacitance
C=f(V_{DS}):V_{GS}=0V, f=250kHz



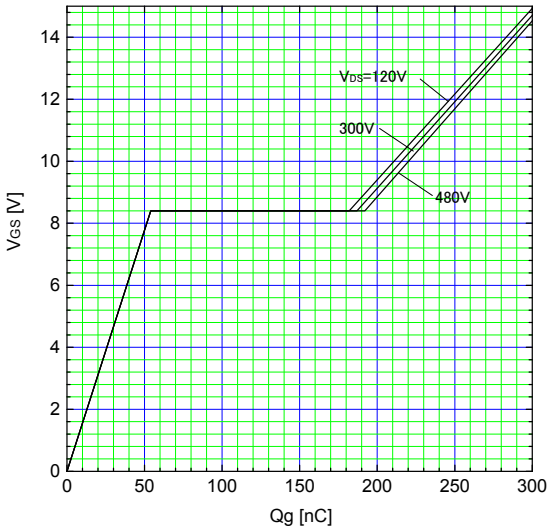
Typical Cross stored energy



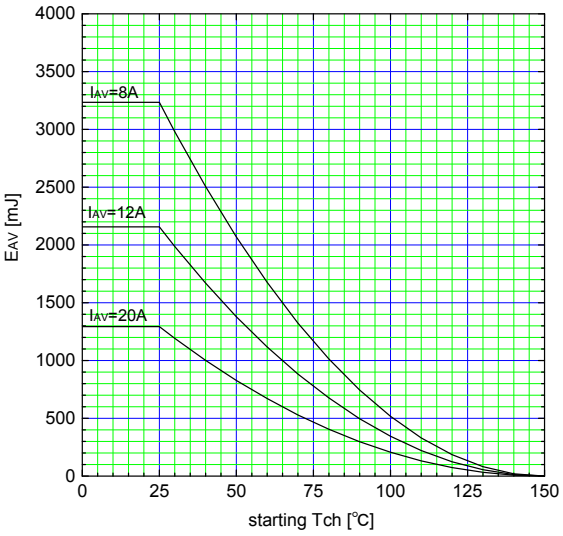
Typical Switching Characteristics vs. ID Tch=25℃
t=f(ID):Vdd=400V, VGS=10V/0V, RG=10Ω



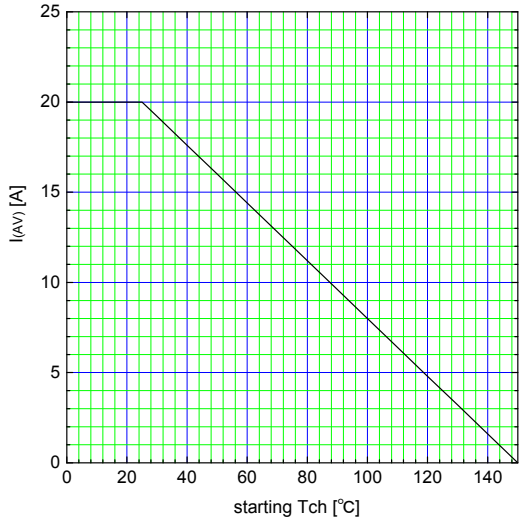
Typical Gate Characteristics
VGS=f(Qg):ID=67A, Tch=25℃



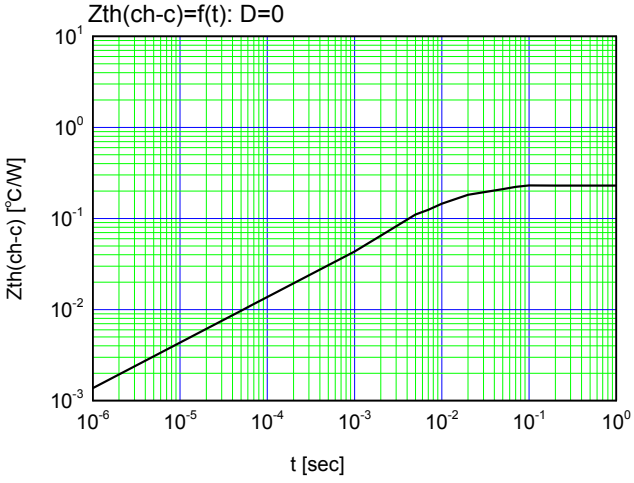
Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch), Vcc=60V, I(AV)<=20A



Maximum Avalanche Current vs. starting Tch
I(AV)=f(starting Tch), single pulse



Transient Thermal Impedance
Zth(ch-c)=f(t): D=0



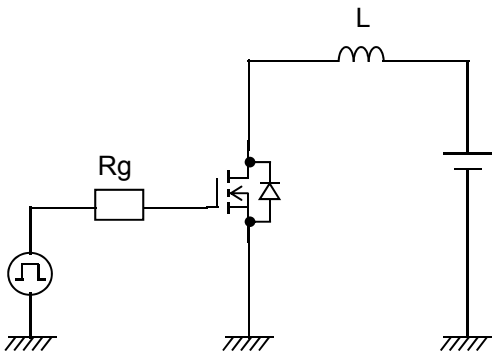


Fig.1 Avalanche Test circuit

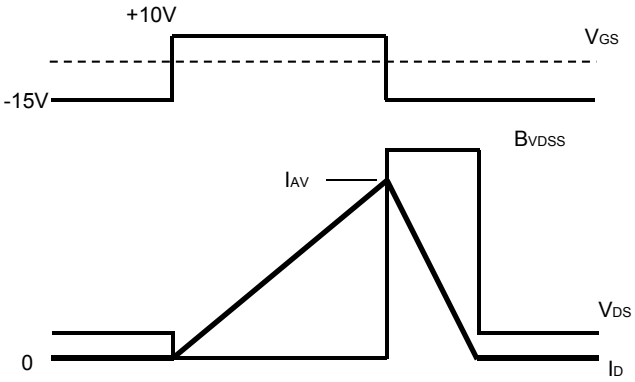


Fig.2 Operating waveforms of Avalanche Test

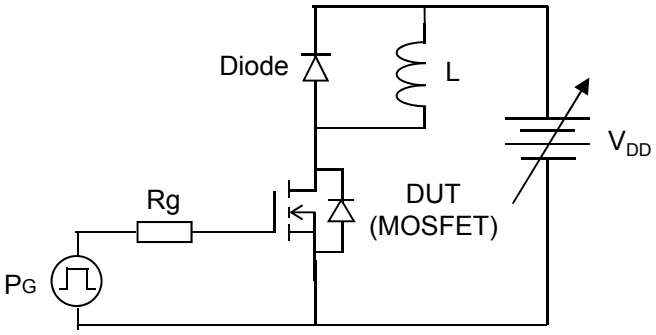


Fig.3 Switching Test circuit

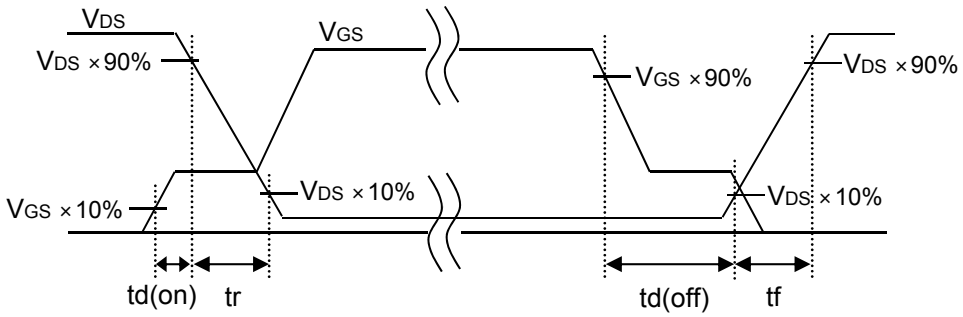


Fig.4 Operating waveform of Switching Test

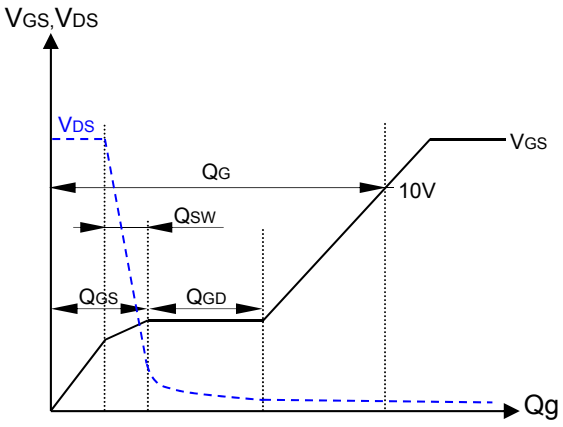


Fig.5 Operating waveform of Gate charge Test

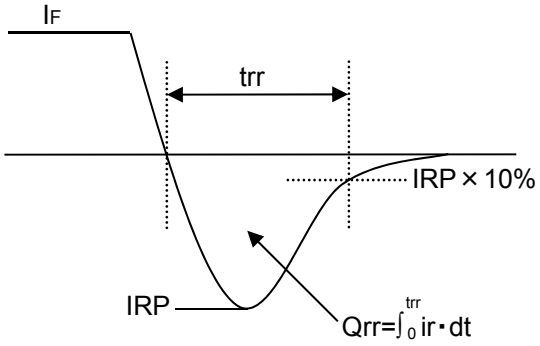
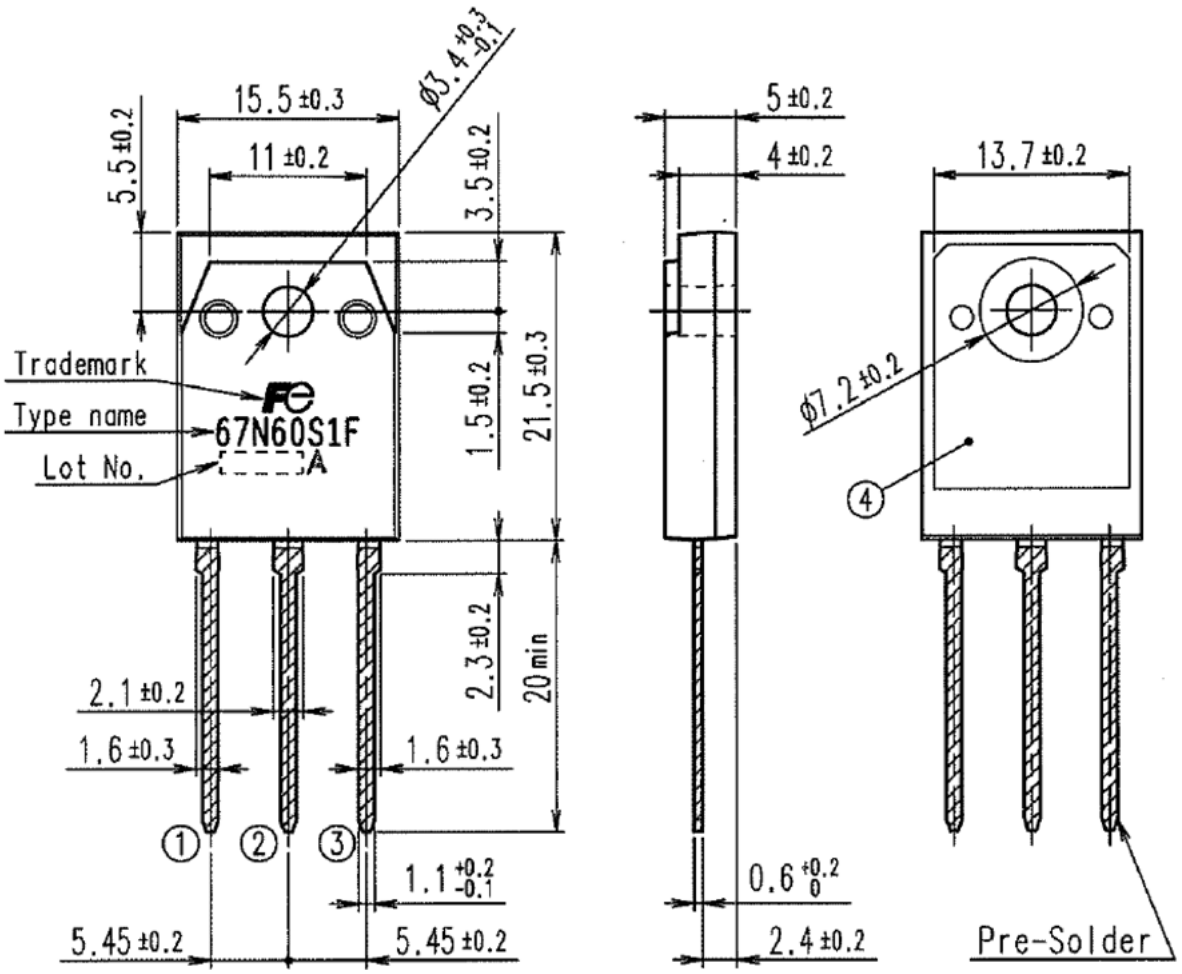
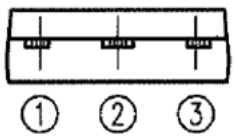


Fig.6 Operating waveform of
Body diode Recovery Test

Outview





CONNECTION

① GATE
②④ DRAIN
③ SOURCE

JEDEC: TO-247

DIMENSIONS ARE IN MILLIMETERS.

WARNING

1. This Data Sheet contains the product specifications, characteristics, data, materials, and structures as of Oct.2015.
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   - OA equipment
   - Communications equipment (Terminal devices)
   - Machine tools
   - AV equipment
   - Measurement equipment
   - Personal equipment
   - Industrial robots
   - Electrical home appliances etc.

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   - Backbone network equipment
   - Transportation equipment (automobiles, trains, ships, etc.)
   - Traffic-signal control equipment
   - Gas alarms, leakage gas auto breakers
   - Medical equipment
   - Burglar alarms, fire alarms, emergency equipment etc.

6. Do not use products in this Data Sheet for the equipment requiring strict reliability such as the following and equivalents strategic equipment (without limitation).
   - Aerospace equipment
   - Aeronautical equipment
   - Nuclear control equipment
   - Submarine repeater equipment

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