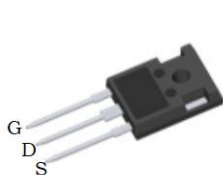




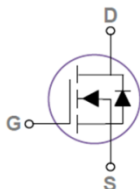
N-channel Power MOSFET

PRODUCT SUMMARY

I_D	100A
V_{DSS}	600V
$R_{DS(ON)-max}$ (@ $V_{GS}=10V$)	22m Ω
Q_g -typ. (nC)	192 nC
Configuration	single



TO-247



Schematic diagram

Features

- Low Gate Charge
- Low ON Resistance
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- 100% Avalanche Tested
- RoHS compliant

Applications

- EV Charger
- Server/Telecom/PC Power
- AC-DC Power Management
- Solar Inverter

ORDERING INFORMATION

Item	Sales Type	Marking	Package	Packaging
1	PDI A 60R022JF2	PDI60R022JF2	TO-247	Tube

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Limit	Unit
		TO-247	
Drain to Source Voltage	V_{DSS}	600	V
Continuous Drain Current (@ $T_C=25^\circ\text{C}$)	I_D	100 ⁽¹⁾	A
Continuous Drain Current (@ $T_C=100^\circ\text{C}$)		63.3 ⁽¹⁾	A
Continuous Drain Current (@ $T_C=125^\circ\text{C}$)		44.8 ⁽¹⁾	A
Drain current pulsed ⁽²⁾	I_{DM}	300 ⁽¹⁾	A
Gate to Source Voltage	V_{GS}	± 30	V
Single pulsed Avalanche Energy ⁽³⁾	E_{AS}	3000	mJ
Avalanche Energy, Repetitive ⁽²⁾	E_{AR}	1.6	mJ
Avalanche Current, Repetitive ⁽²⁾	I_{AR}	8	A
MOSFET dv/dt ruggedness, $V_{DS}=0\ldots 480\text{ V}$	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS}=0\ldots 480\text{ V}$, $I_{SD}\leq I_D$	dv/dt	50	V/ns
Total power dissipation (@ $T_C=25^\circ\text{C}$)	P_D	694	W
Operating Junction Temperature & Storage Temperature	T_{STG}, T_J	-55 to + 150	$^\circ\text{C}$
Maximum lead temperature for soldering purpose	T_L	260	$^\circ\text{C}$

Notes

1. Drain current is limited by maximum junction temperature.
2. Repetitive rating : pulse width limited by junction temperature.
3. $L = 60\text{mH}$, $I_{AS} = 10\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting at $T_J = 25^\circ\text{C}$



THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
		TO-247	
Thermal resistance, Junction to case (Maximum)	R_{thjc}	0.18	$^{\circ}\text{C/W}$
Thermal resistance, Junction to ambient (Maximum)	R_{thja}	33	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain to source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=1mA$	600	--	--	V
Drain to source leakage current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	--	--	10	μA
Gate to source leakage current, forward	I_{GSS}	$V_{GS}=30V, V_{DS}=0V$	--	--	100	nA
Gate to source leakage current, reverse		$V_{GS}=-30V, V_{DS}=0V$	--	--	-100	nA
On Characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=1mA$	3	4	5	V
Drain to source on state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=40A$	--	19	22	$m\Omega$
		$V_{GS}=10V, I_D=40A, T_j=150\text{ }^{\circ}C$	--	50	--	$m\Omega$
Forward Transconductance	G_{fs}	$V_{DS}=10V, I_D=40A$	--	48	--	S
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=50V, f=1MHz$	--	9317	--	pF
Output capacitance	C_{oss}		--	372	--	
Reverse transfer capacitance	C_{rss}		--	7.6	--	
Effective output capacitance, energy related	$C_{O(er)}$	$V_{GS}=0V, V_{DS}=0...400V$		301		pF
Effective output capacitance, time related	$C_{O(tr)}$			2017		
Turn on delay time	$t_{d(on)}$	$V_{DS}=400V, I_D=40A, R_G=2\Omega, V_{GS}=10V$	--	56	--	ns
Rising time	t_r		--	57	--	
Turn off delay time	$t_{d(off)}$		--	117	--	
Fall time	t_f		--	5.8	--	
Total gate charge	Q_g	$V_{DS}=480V, V_{GS}=10V, I_D=50A$	--	192	--	nC
Gate-source charge	Q_{gs}		--	60	--	
Gate-drain charge	Q_{gd}		--	77	--	
Gate Plateau Voltage	$V_{plateau}$		--	6.4	--	V
Gate Resistance	R_g	$f=1MHz$	--	1.8	--	Ω

SOURCE TO DRAIN DIODE RATINGS CHARACTERISTICS

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous source current	I_S	Integral reverse p-n Junction diode in the MOSFET	--	100	--	A
Pulsed source current	I_{SM}		--	300	--	A
Diode forward voltage drop.	V_{SD}	$I_S=50A, V_{GS}=0V$	--	0.88	1.2	V
Reverse recovery time	T_{rr}	$I_S=50A, V_{GS}=0V, V_R=300V, di/dt=100A/\mu s$	--	209	--	ns
Reverse recovery Charge	Q_{rr}		--	2.2	--	μC
Peak Reverse Recovery Current	I_{rrm}		--	19	--	A

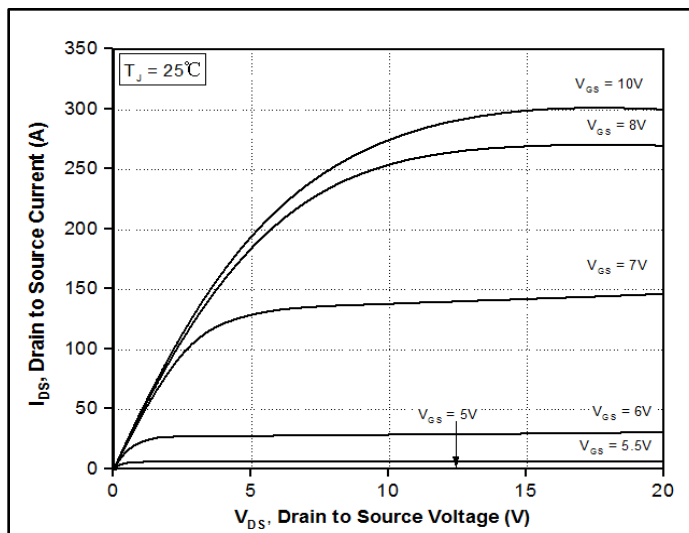


Fig1. Output characteristics $T_J = 25^\circ\text{C}$

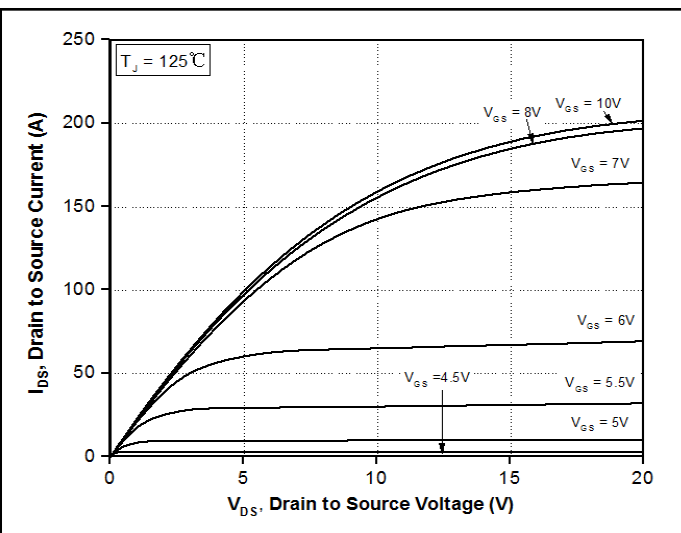


Fig2. Output characteristics $T_J = 125^\circ\text{C}$

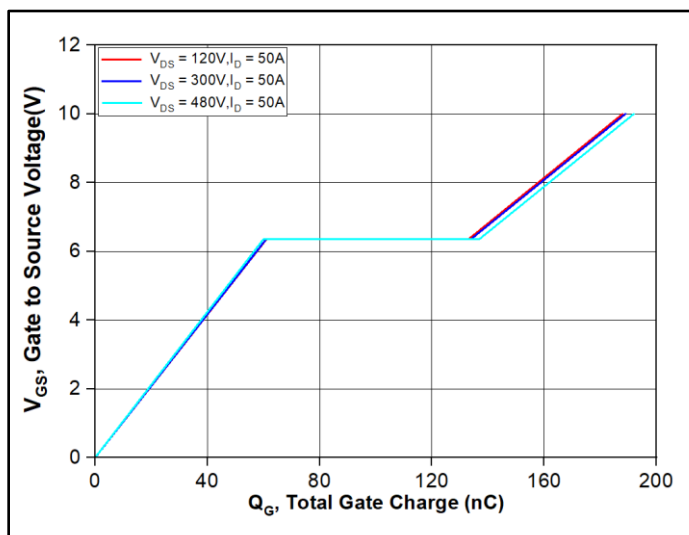


Fig3. Gate charge characteristics

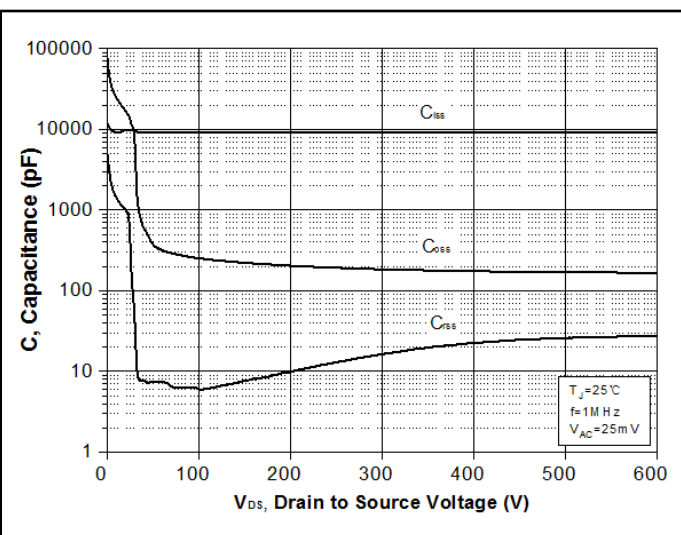


Fig4. Capacitance Characteristics

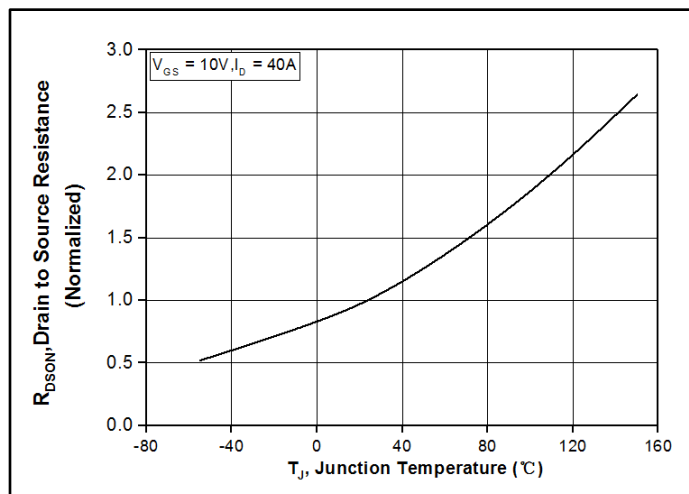


Fig5. $R_{DS(ON)}$ vs junction temperature

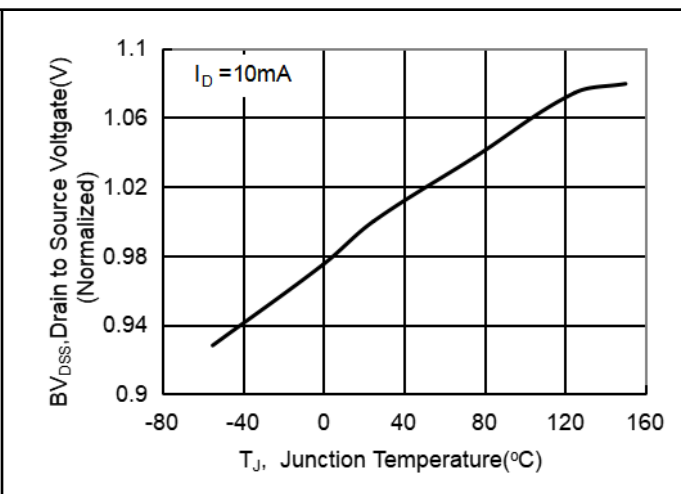


Fig6. BV_{DSS} vs junction temperature

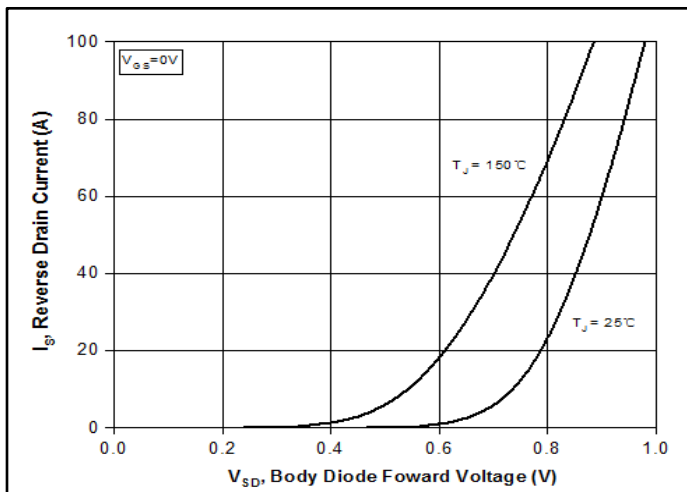


Fig 7 . Forward characteristics of reverse diode

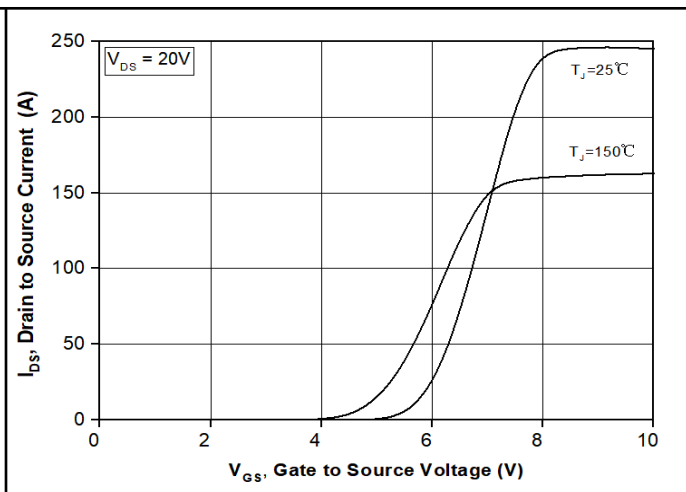


Fig 8 . Transfer characteristics

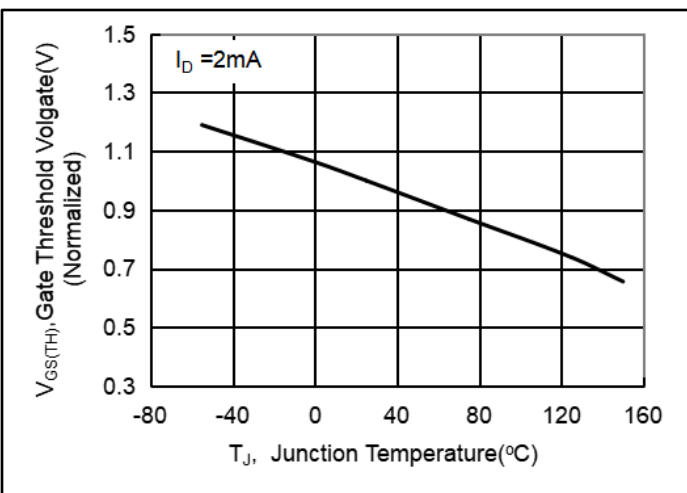


Fig 9 . $V_{GS(TH)}$ vs junction temperature

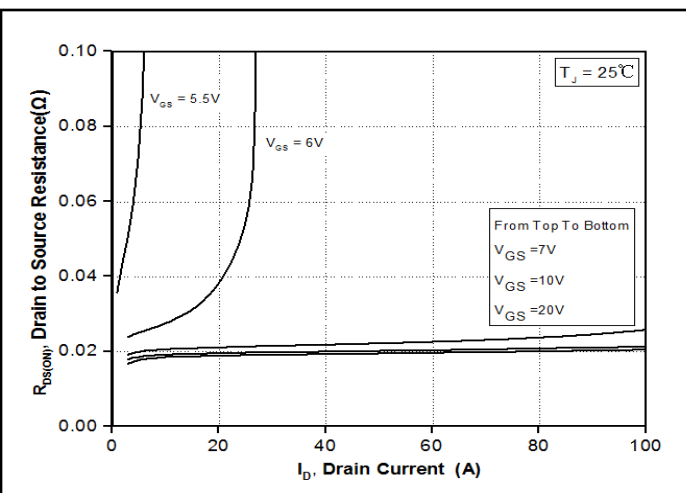


Fig 10. Drain-source on-state resistance $T_j = 25^\circ\text{C}$

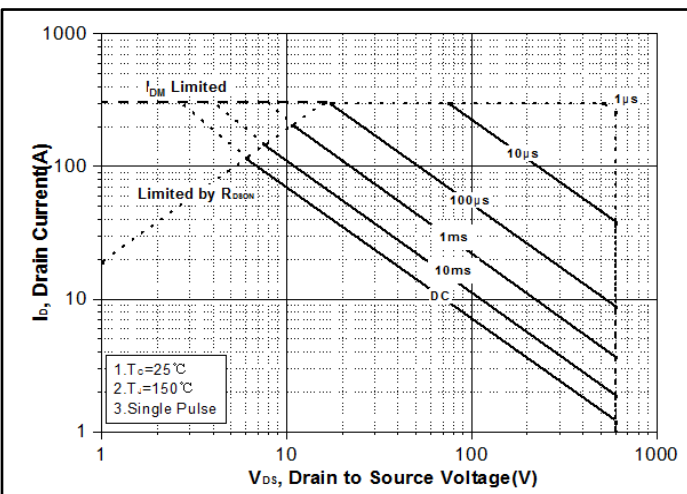


Fig 11. Safe operating area(TO-247)
 $T_c = 25^\circ\text{C}$

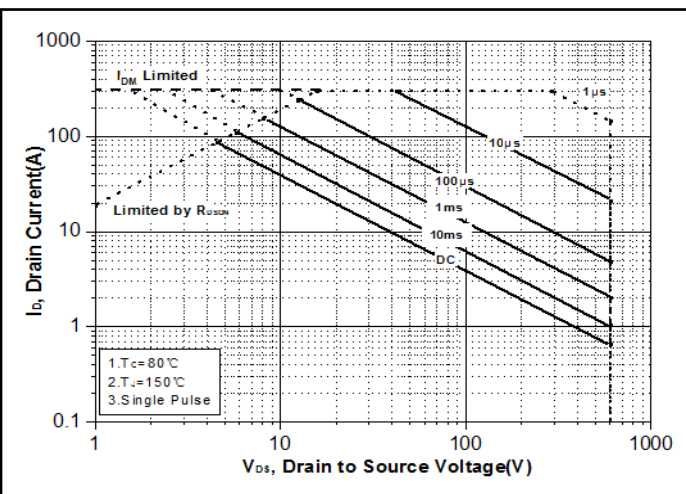


Fig 12. Safe operating area(TO-247)
 $T_c = 80^\circ\text{C}$

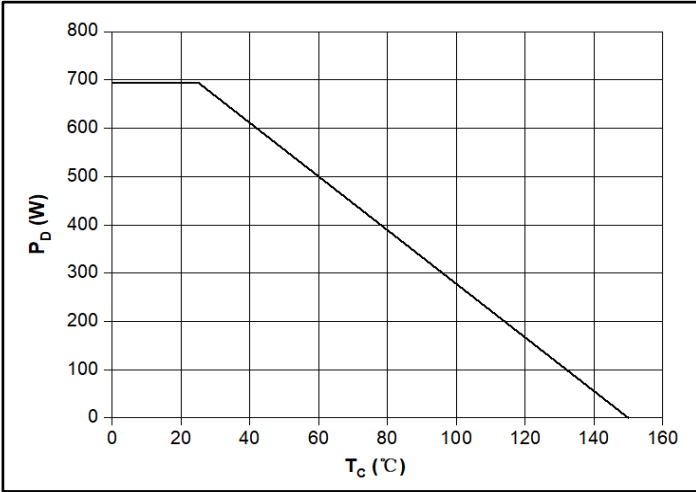


Fig 13 . Power dissipation

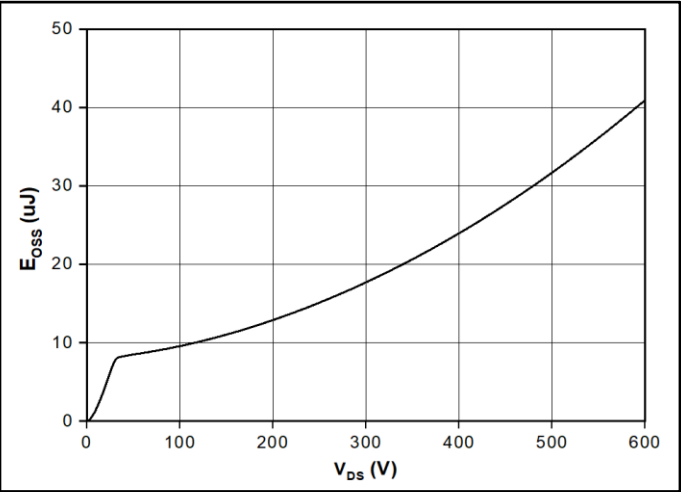


Fig 14 . E_{OSS} vs Drain-Source Voltage

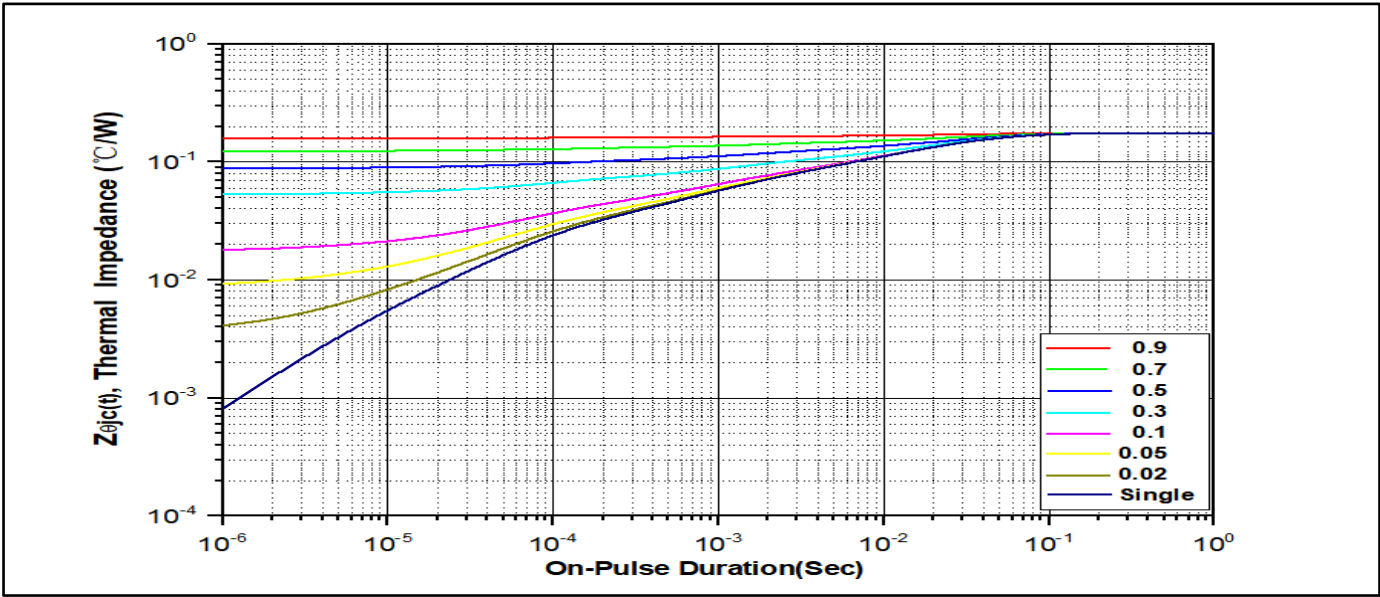


Fig 15. Transient thermal impedance

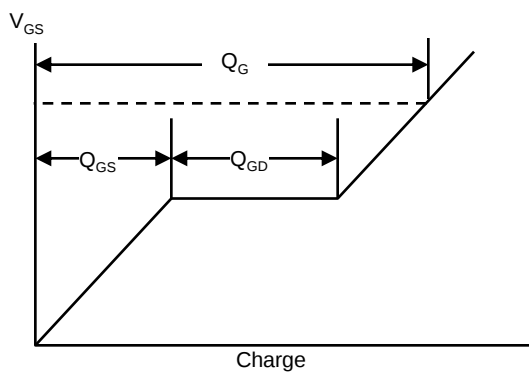
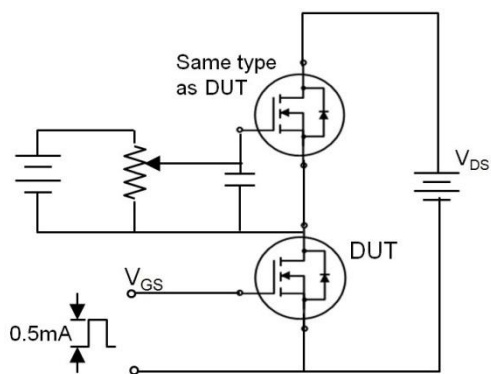


Fig 16. Gate charge test circuit & waveform

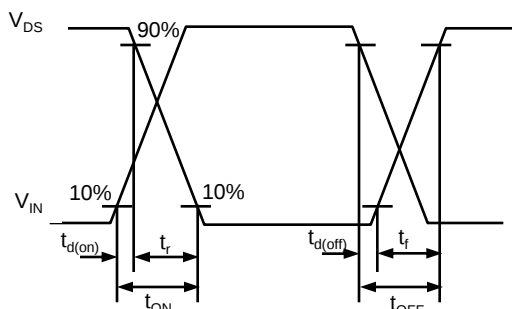
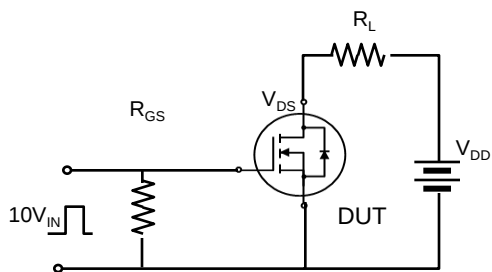


Fig 17. Switching time test circuit & waveform

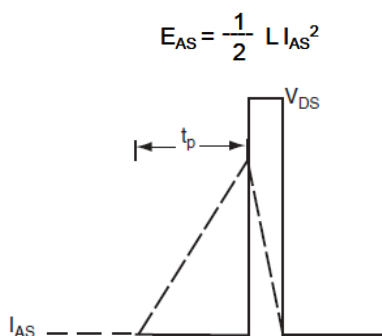
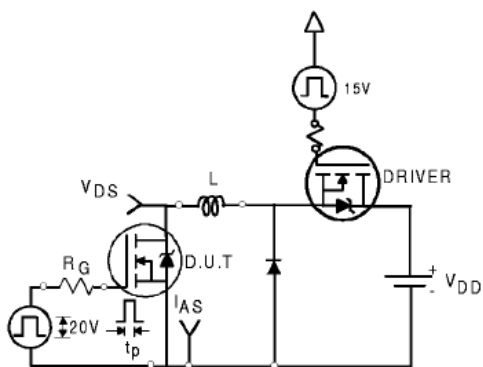


Fig 18. Unclamped Inductive switching test circuit & waveform

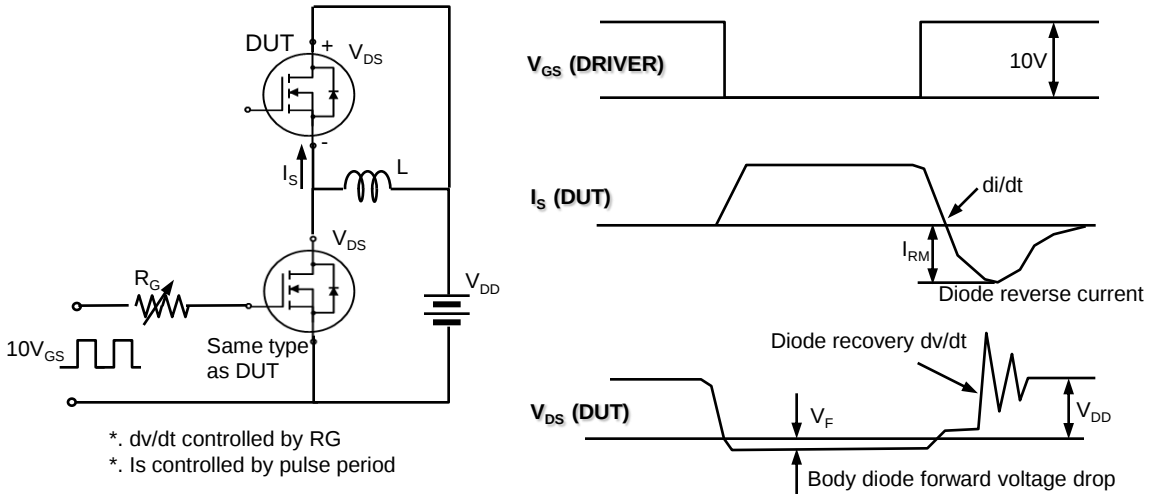
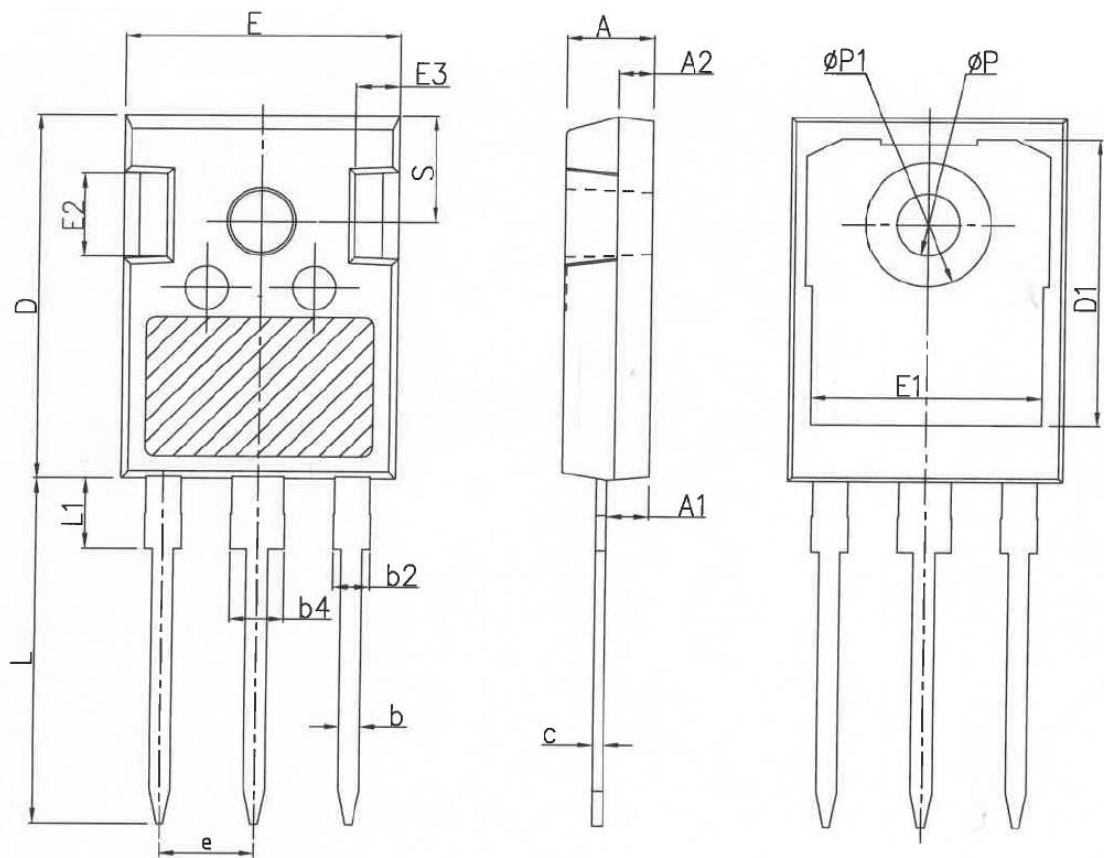


Fig 19. Peak diode recovery dv/dt test circuit & waveform



Package Outlines

TO-247-3L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		



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