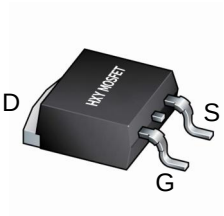
General Description

The IPD60N10S4L12ATMA1 use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness.

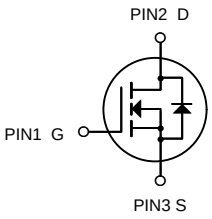


TO252-2L

General Features

V_{DS} =100V I_D =60A

$R_{DS(ON)}$ < 17mΩ @ V_{GS}=10V



N-Channel MOSFET

Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IPD60N10S4L12ATMA1	TO252-2L	HXY MOSFET	2500

Absolute Maximum Ratings at Tj=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	100	V
Gate source voltage	VGS	±20	V
Continuous drain current[1)]	ID	60	A
Pulsed drain current[2)]	ID, pulse	180	A
Power dissipation[3)]	P_D	67.5	W
Single pulsed avalanche energy[5)]	EAS	80	mJ
Operation and storage temperature	Tstg，Tj	-55 to 150	℃
Thermal resistance, junction-case	RθJC	1.85	°C/W
Thermal Resistance Junction-Ambient [1]	RθJA	45	°C/W

Electrical Characteristics (T_J= 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	-	-	V
Gate-Body Leakage Current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V	-	-	1	μA
	T_J=100°C			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	1.7	2.5	V
Drain-Source on-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	-	13.5	17	mΩ
			V_{GS} = 4.5V, I_D = 10A	-	17	20	
Forward Transconductance[4]		g_{fs}	V_{DS} = 10V, I_D = 20A	-	54	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = 50V, V_{GS} =0V, f =1MHz	-	1208	-	pF
Output Capacitance		C_{oss}		-	144	-	
Reverse Transfer Capacitance		C_{rss}		-	11.3	-	
Gate Resistance		R_G	f =1MHz	-	1.8	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = 10V, V_{DS} = 50V, I_D= 20A	-	22.7	-	nC
Gate-Source Charge		Q_{gs}		-	3	-	
Gate-Drain Charge		Q_{gd}		-	5	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD}= 50V, R_G = 3Ω, I_D= 20A	-	9.2	-	ns
Rise Time		t_r		-	3.6	-	
Turn-off Delay Time		$t_{d(off)}$		-	25.6	-	
Fall Time		t_f		-	4.4	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F = 20A, dI/dt = 100A/μs	-	30	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	42	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 20A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	60	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.4mH, I_{AS}=20A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test..

Typical Characteristics

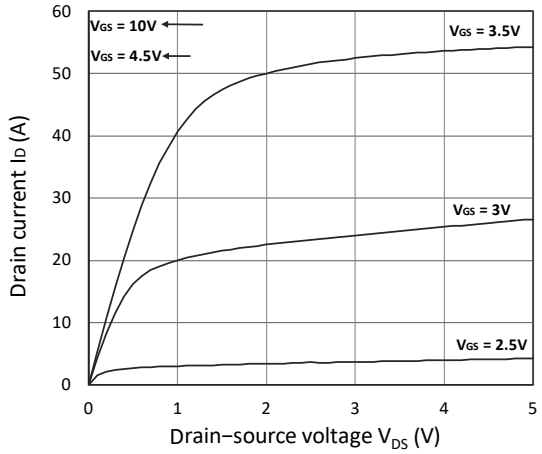


Figure 1. Output Characteristics

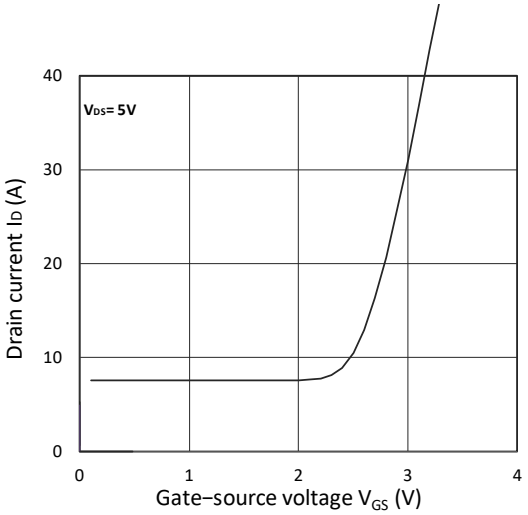


Figure 2. Transfer Characteristics

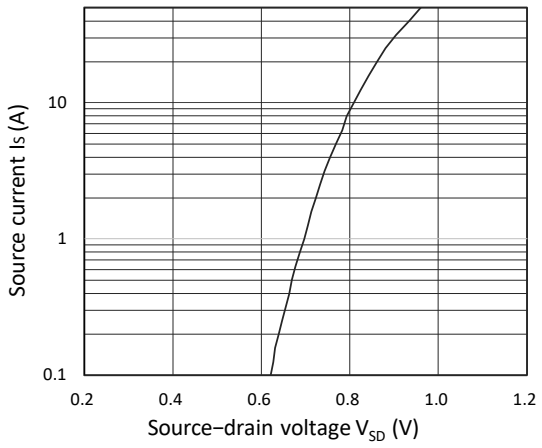


Figure 3. Forward Characteristics of Reverse

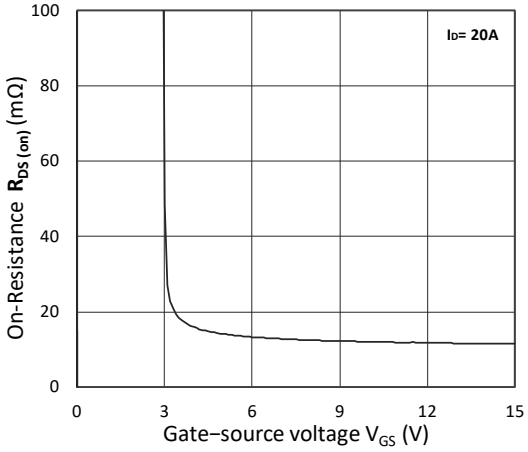


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

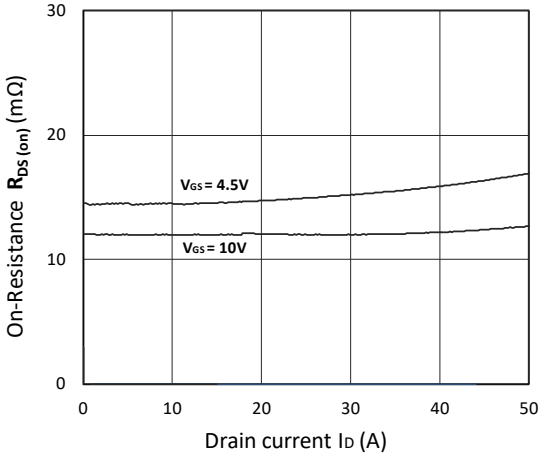


Figure 5. $R_{DS(ON)}$ vs. I_D

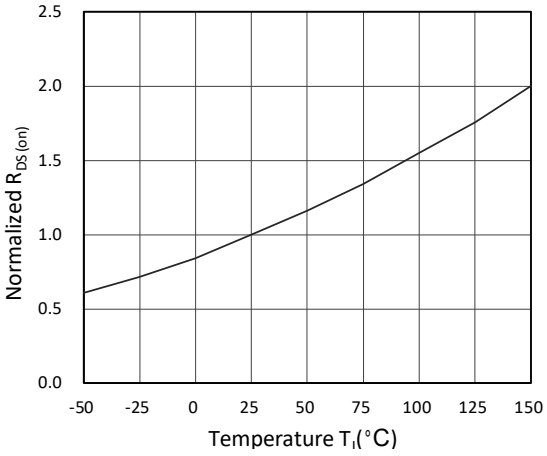


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

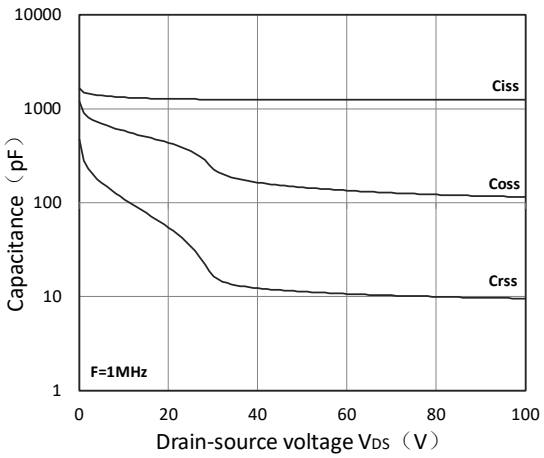


Figure 7. Capacitance Characteristics

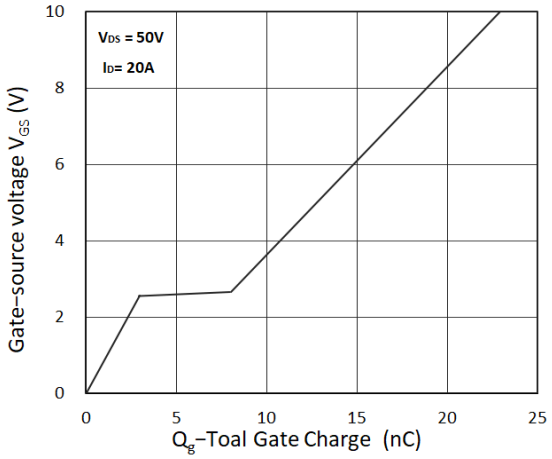


Figure 8. Gate Charge Characteristics

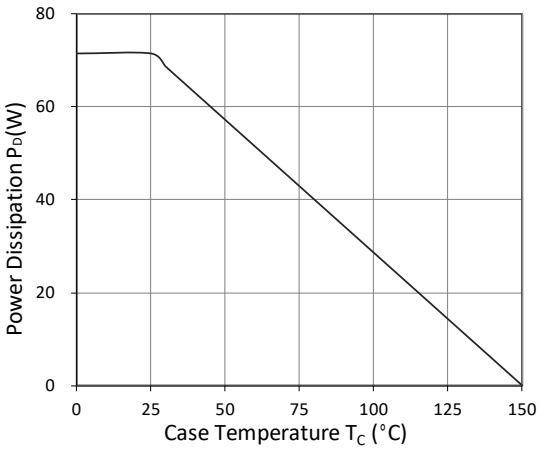


Figure 9. Power Dissipation

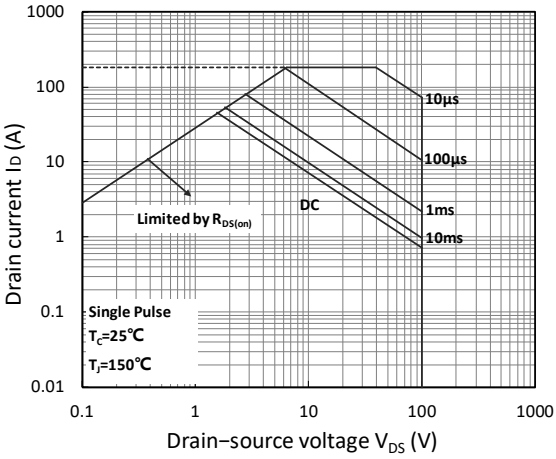


Figure10. Safe Operating Area

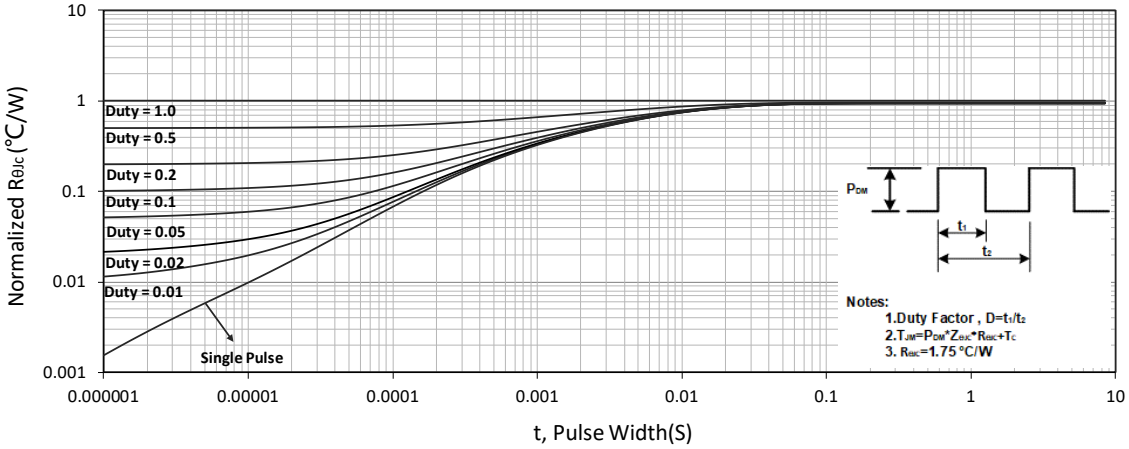


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

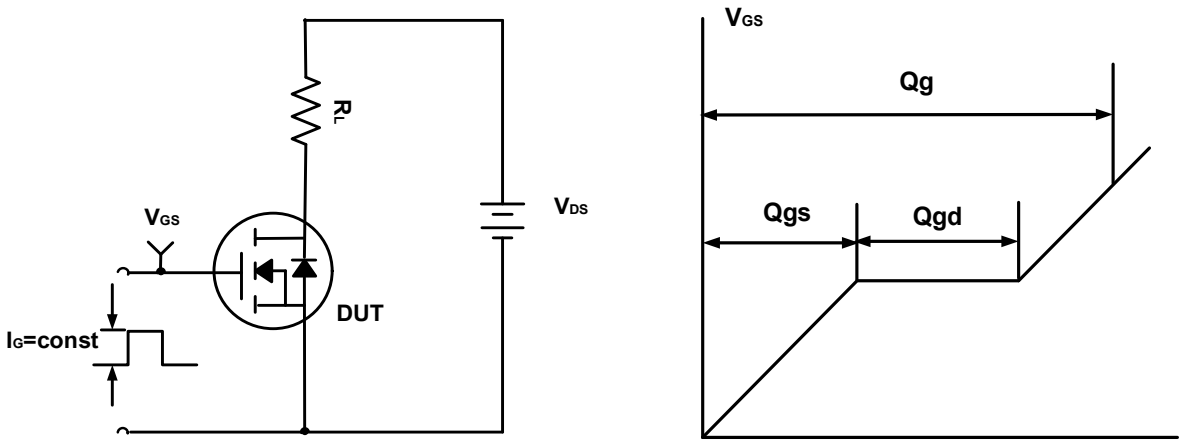


Figure A. Gate Charge Test Circuit & Waveforms

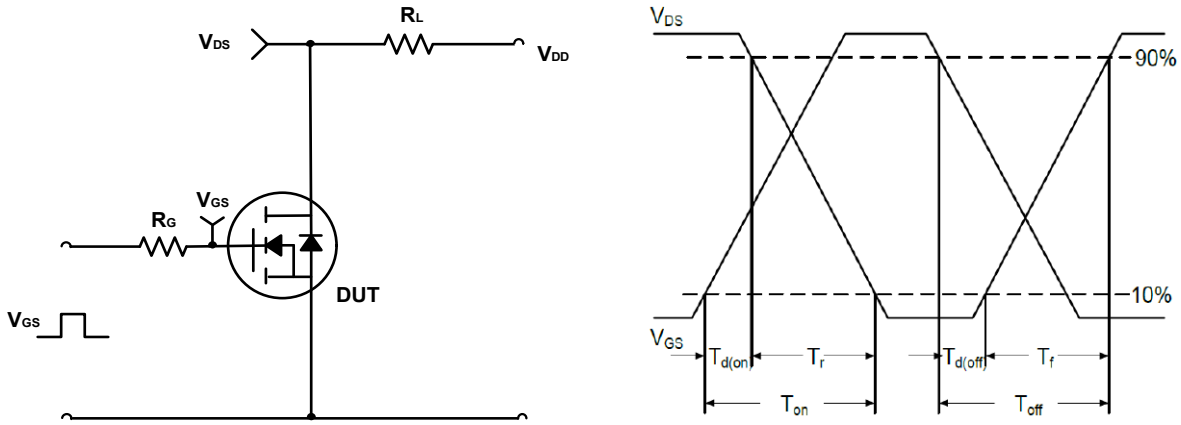


Figure B. Switching Test Circuit & Waveforms

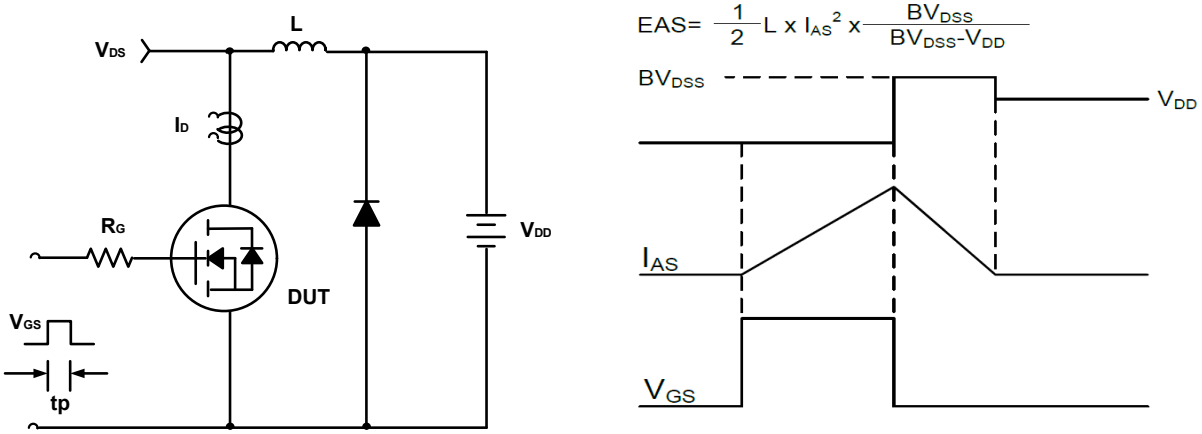
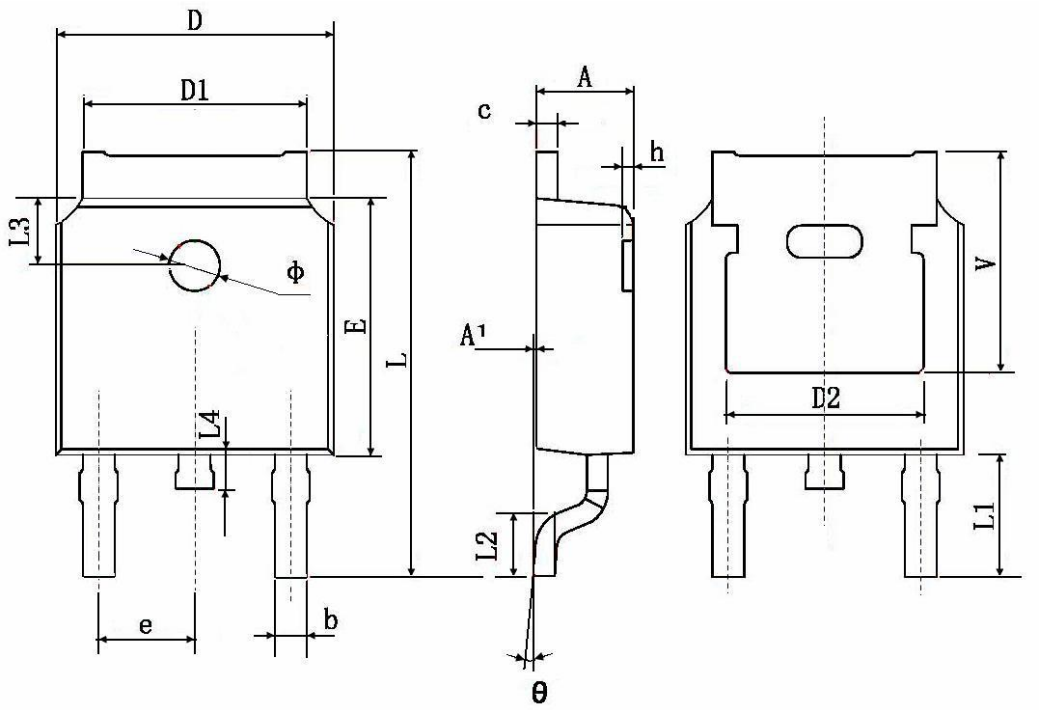


Figure C. Unclamped Inductive Switching Circuit & Waveforms

TO252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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