



General Description

The IPD12CN10NGATMA1 use advanced SGT MOSFET technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness.

General Features

$V_{DS} = 100V$ $I_D = 70A$

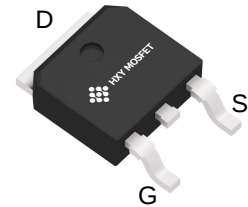
$R_{DS(ON)} < 17m\Omega$ @ $V_{GS} = 10V$

Applications

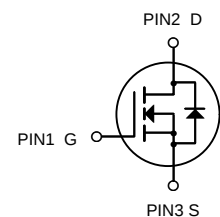
Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications



TO-252-2L



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IPD12CN10NGATMA1	TO-252-2L	HXY MOSFET	2500

Absolute Maximum Ratings at $T_j = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	100	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾	I_D	70	A
Pulsed drain current ²⁾	I_D , pulse	280	A
Power dissipation ³⁾	P_D	100	W
Single pulsed avalanche energy ⁵⁾	EAS	110	mJ
Operation and storage temperature	T_{stg} , T_j	-55 to 150	$^\circ C$
Thermal resistance, junction-case	$R_{\theta JC}$	1.25	$^\circ C/W$
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	64	$^\circ C/W$



Electrical Characteristics($T_J = 25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=100V, V_{GS}=0V$	--	--	1	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V, V_{DS}=0V$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V, V_{DS}=0V$	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.8	2.3	V
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=20A$	--	8.5	10.5	m Ω
		$V_{GS}=4.5V, I_D=15A$		9.5	15	m Ω
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 50V$ $f = 1.0MHz$	--	1368	--	pF
C_{oss}	Output Capacitance		--	451	--	
C_{rss}	Reverse Transfer Capacitance		--	12.9	--	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}$ Open	--	0.48	--	Ω
$t_{d(ON)}$	Turn-on Delay Time	$I_D=10A$ $V_{DS} = 50V$ $V_{GS} = 10V$ $R_G = 4\Omega$	--	16	--	ns
t_r	Rise Time		--	10	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	40	--	
t_f	Fall Time		--	6	--	
Q_g	Total Gate Charge	$V_{GS} = 10V$ $V_{DS} = 50V$ $I_D = 10A$	--	31.3	--	nC
Q_{gs}	Gate Source Charge		--	3.49	--	
Q_{gd}	Gate Drain Charge		--	7.63	--	
I_S	Diode Forward Current	$T_C=25^{\circ}\text{C}$	--	--	70	A
V_{SD}	Diode Forward Voltage	$I_S=10A, V_{GS}=0V$	--	--	1.2	V
t_{rr}	Reverse Recovery time	$I_S=10A, V_{DD}=50V$ dI/ dt=100A/ μs	--	103	--	ns
Q_{rr}	Reverse Recovery Charge		--	187	--	nC

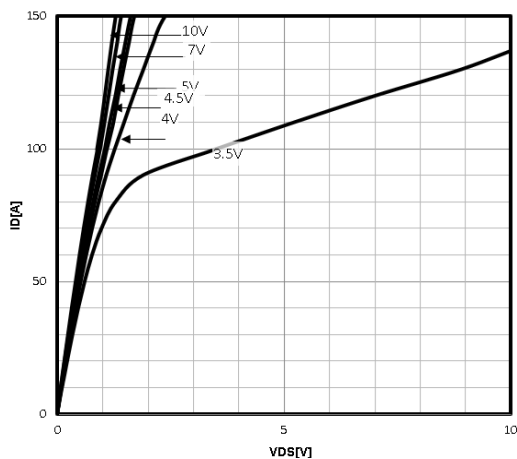
a1: Repetitive rating; pulse width limited by maximum junction temperature

a2: $V_{DD}=50V, L=0.3mH, R_g=25\Omega$, Starting $T_J=25^{\circ}\text{C}$.

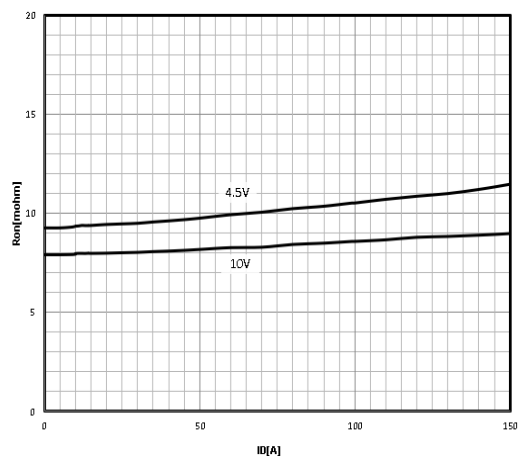


Typical Characteristics

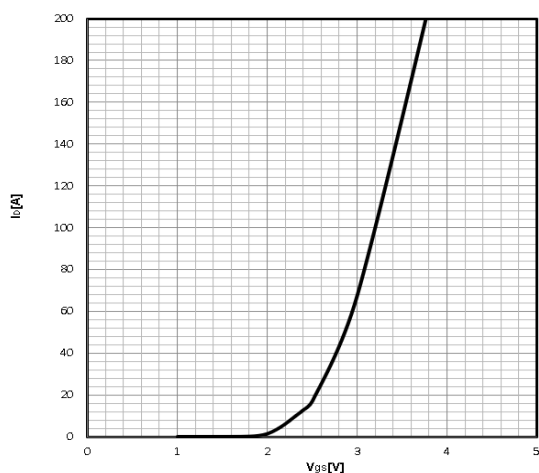
Typ. output characteristics
 $I_D=f(V_{DS})$



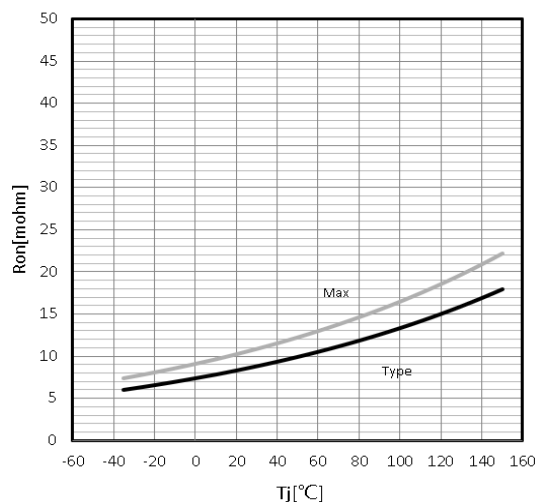
Typ. drain-source on resistance
 $R_{DS(on)}=f(I_D)$



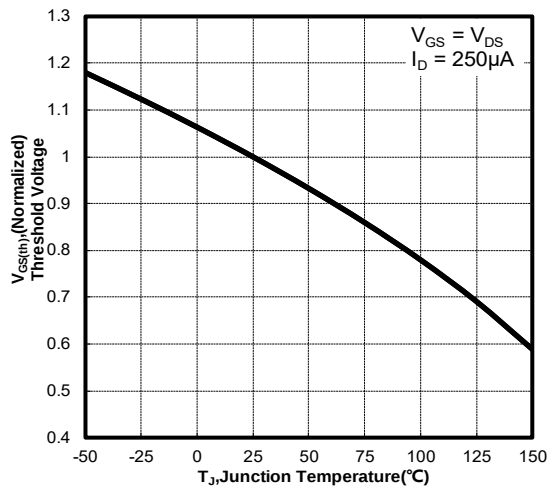
Typ. transfer characteristics
 $I_D=f(V_{GS})$



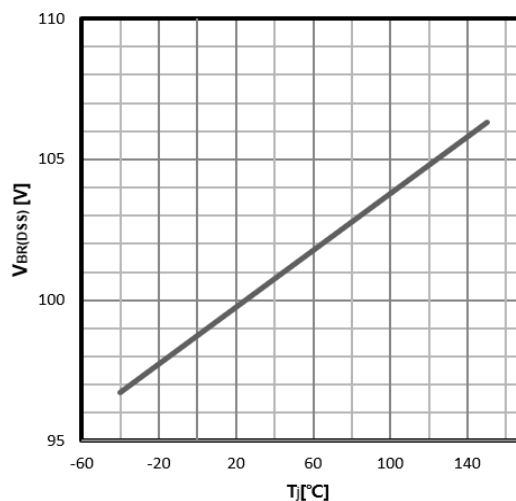
Drain-source on-state resistance
 $R_{DS(on)}=f(T_j); I_D=20A; V_{GS}=10V$



Gate Threshold Voltage
 $V_{TH}=f(T_j); I_D=250\mu A$

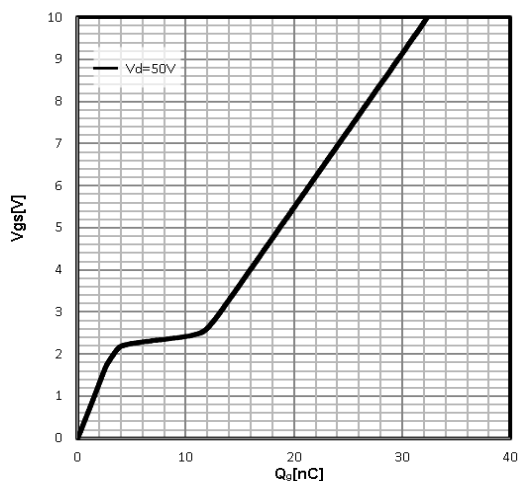


Drain-source breakdown voltage
 $V_{BR(DSS)}=f(T_j); I_D=250\mu A$

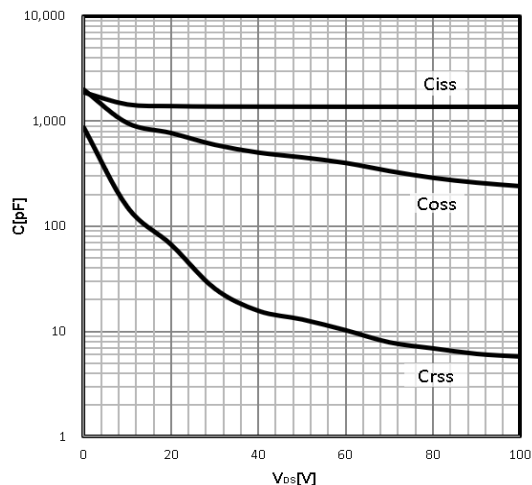




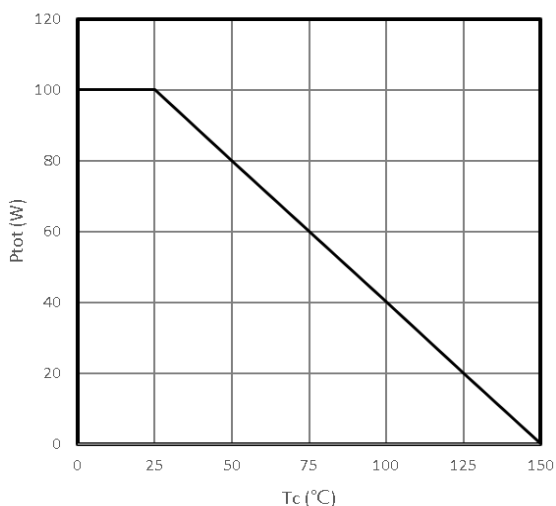
Typ. gate charge
 $V_{GS}=f(Q_g)$; $I_D=10A$



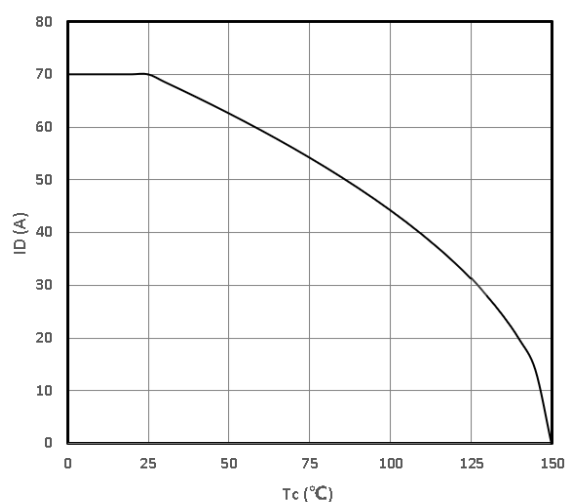
Typ. capacitances
 $C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$



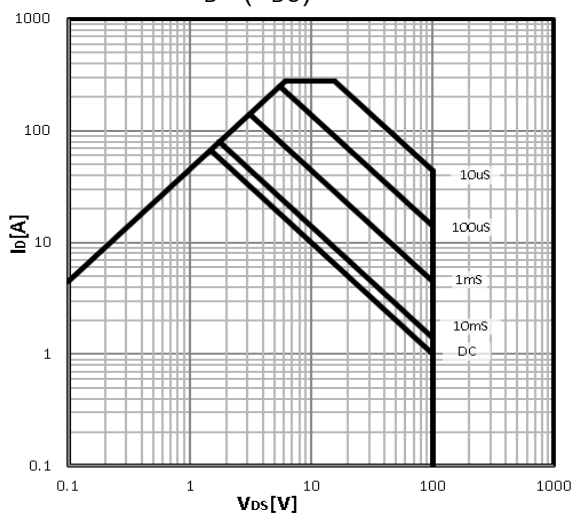
Power Dissipation
 $P_{tot}=f(T_c)$



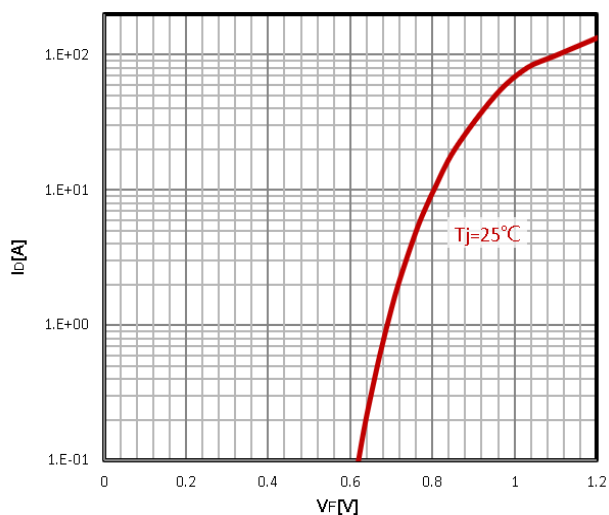
Maximum Drain Current
 $I_D=f(T_c)$



Safe operating area
 $I_D=f(V_{DS})$



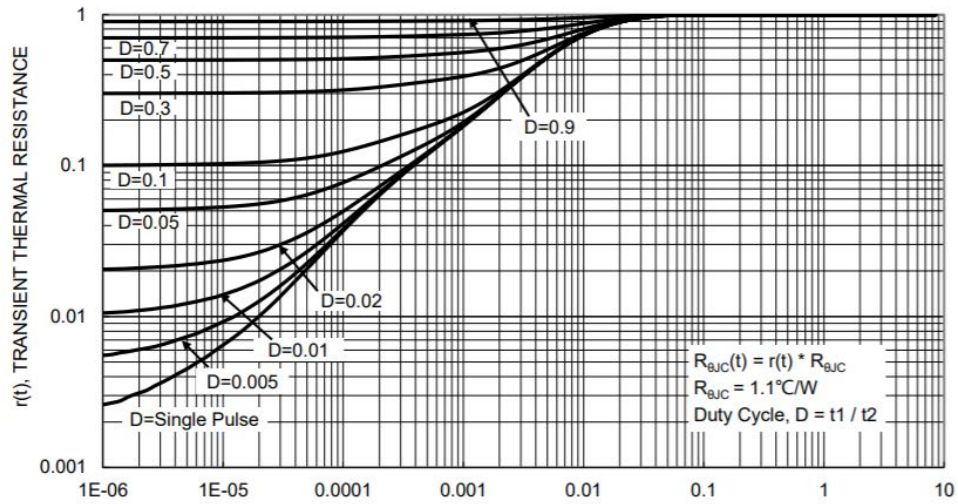
Body Diode Forward Voltage Variation
 $I_F=f(V_{GS})$





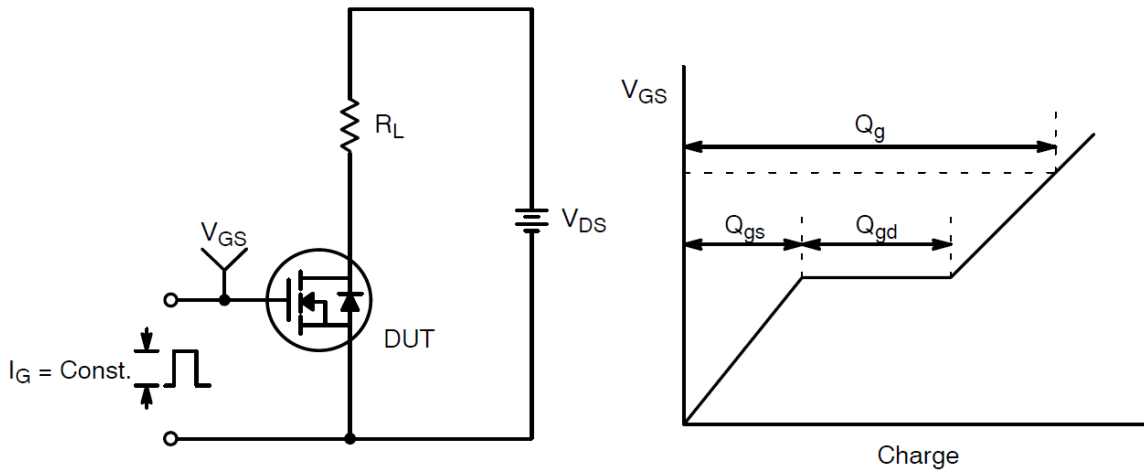
Max. transient thermal impedance

$$Z_{thJC}=f(t_p)$$

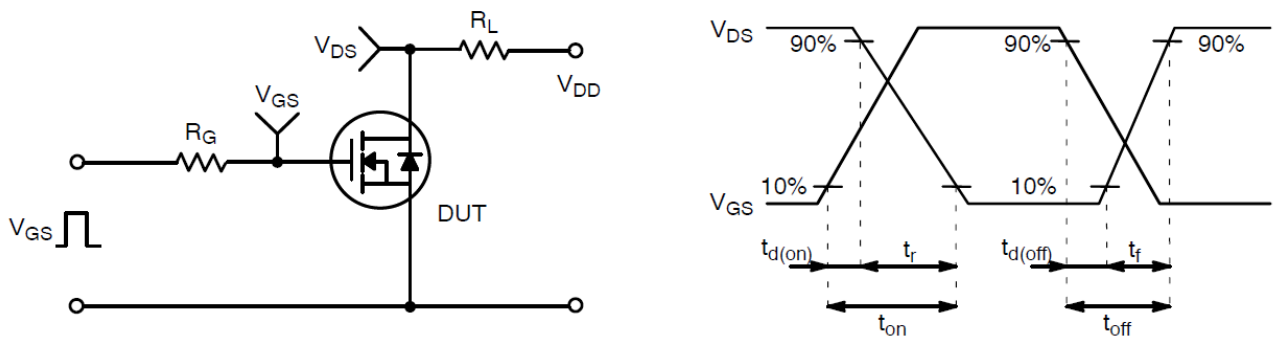




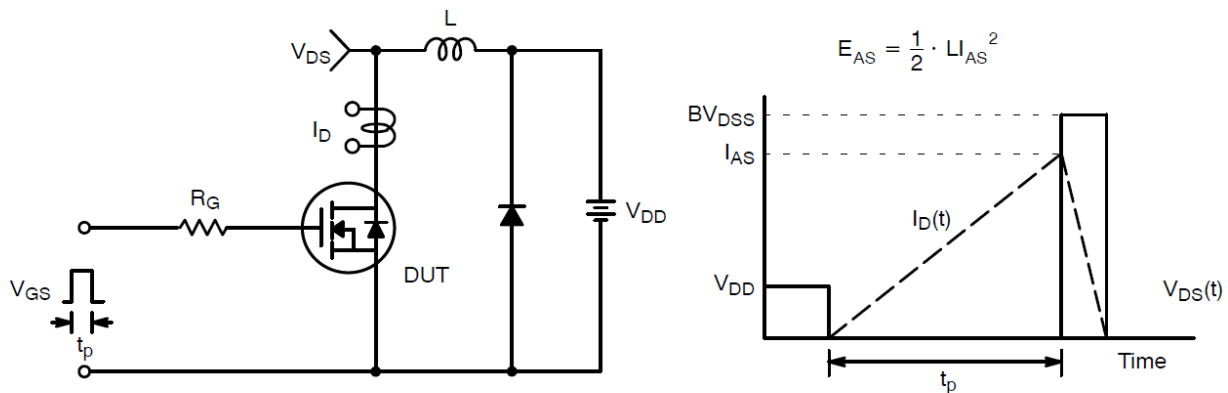
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



N-SGT Enhancement Mode MOSFET

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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