DI054N10D1-AQ

N-SGT Enhancement Mode MOSFET

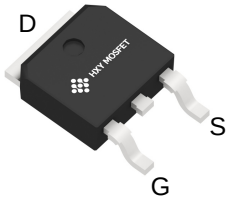
General Description

The DI054N10D1-AQ 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.



TO-252-2L

General Features

V_{DS} = 100V I_D = 70A

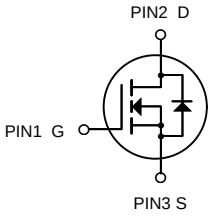
$R_{DS(ON)}$ < 10.5mΩ @ V_{GS}=10 V

Applications

DC-DC Converters

Power management functions

Synchronous-rectification applications



N-SGT MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
DI054N10D1-AQ	TO-252-2L	HXY MOSFET	2500

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain source voltage	100	V
V_{GS}	Gate source voltage	±20	V
I_D	Continuous drain current, T_C=25°C	70	A
P_D	Power dissipation, T_C=25°C	100	W
EAS	Single pulsed avalanche energy	110	mJ
Tstg.T_j	Operation and storage temperature	-55 to 150	°C
$R_{\theta JC}$	Thermal resistance, junction-case	1.25	°C/W
$R_{\theta JA}$	Thermal resistance, junction-ambient	64	°C/W

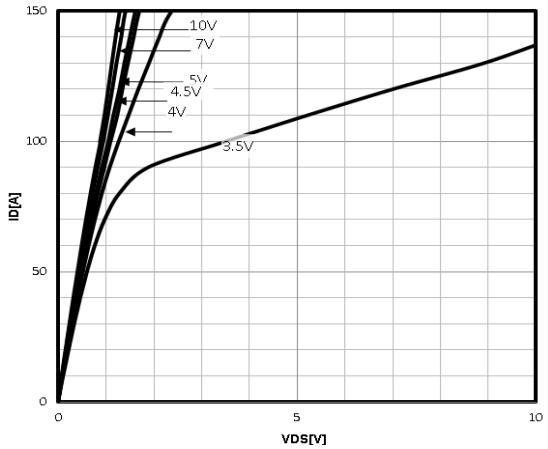
Electrical Characteristics at T_j=25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	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}=VGS, I_D=250μA	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	mΩ
		V_{GS}=4.5V, I_D=15A		9.5	15	mΩ
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 = 4Ω	--	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 °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

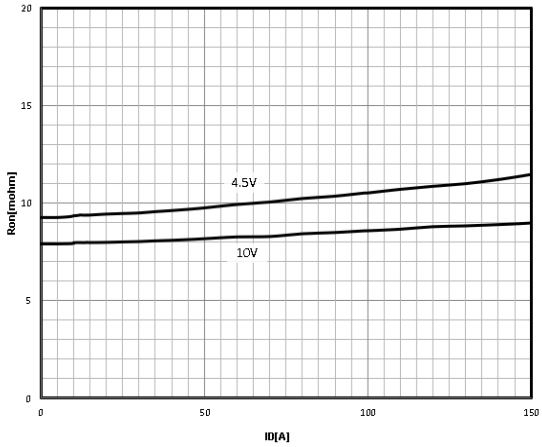
a1: Repetitive rating; pulse width limited by maximum junction temperature
a2: VDD=50V, L=0.3mH, Rg=25Ω, Starting TJ=25°C.

Typical Characteristics

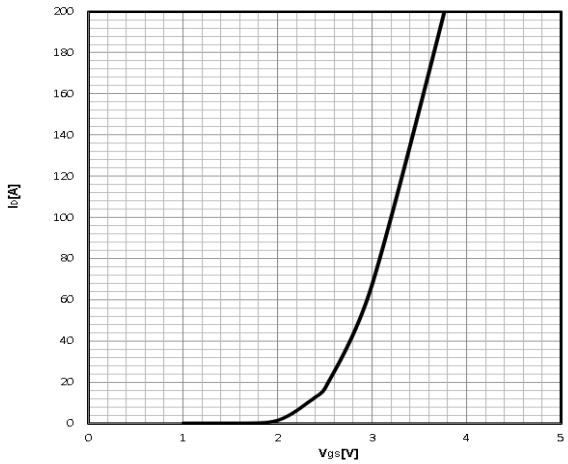
Typ. output characteristics
$I_D=f(V_{DS})$



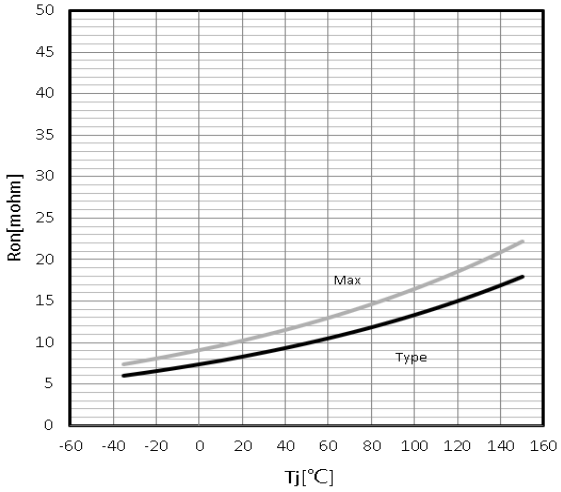
Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$



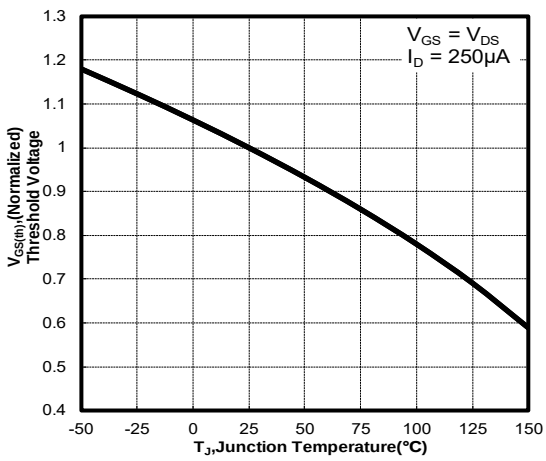
Typ. transfer characteristics
$I_D=f(V_{GS})$



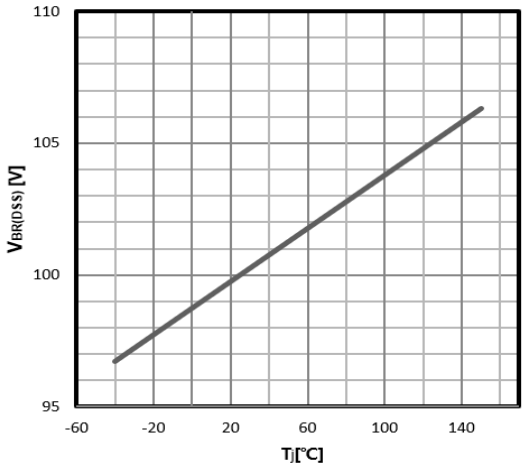
Drain-source on-state resistance
$R_{DS(on)}=f(T_j)$;I_D=20A; V_{GS}=10V



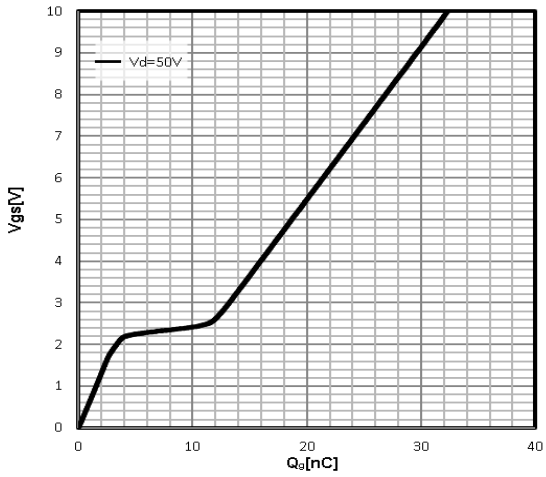
Gate Threshold Voltage
$V_{TH}=f(T_j)$; I_D=250uA



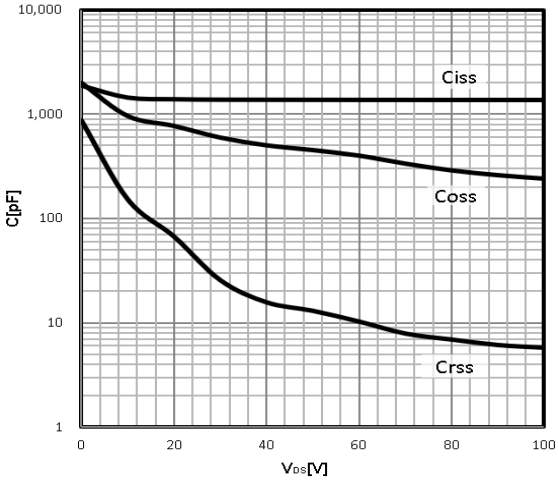
Drain-source breakdown voltage
$V_{BR(DSS)}=f(T_j)$; I_D=250uA



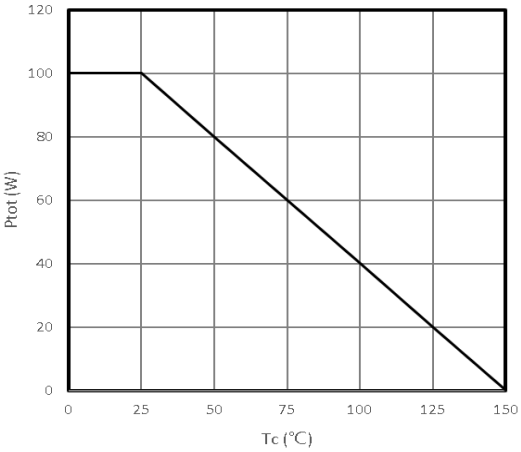
Typ. gate charge
$V_{GS}=f(Q_g)$; $I_D=10A$



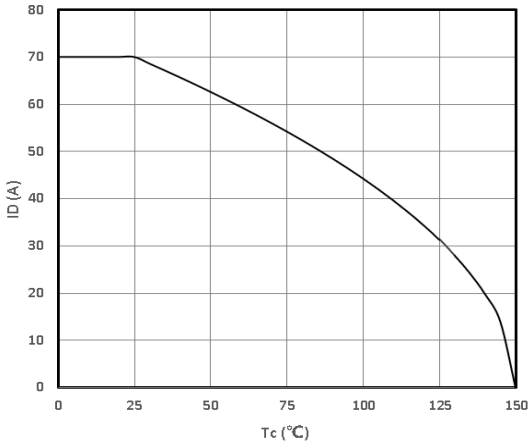
Typ. capacitances
$C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$



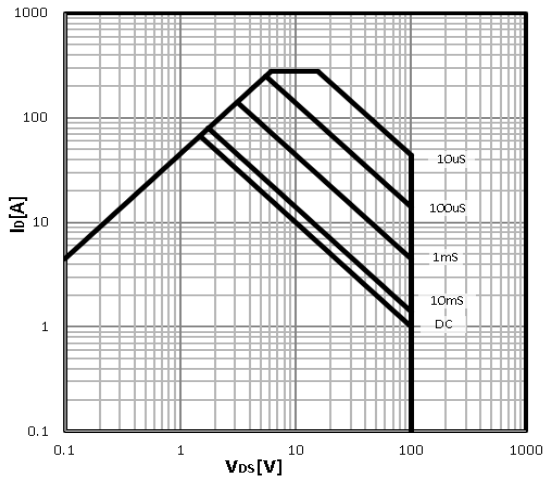
Power Dissipation
$P_{tot}=f(T_C)$



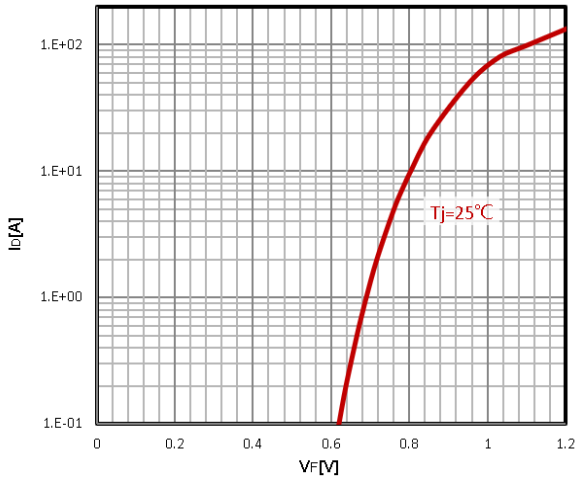
Maximum Drain Current
$I_D=f(T_C)$



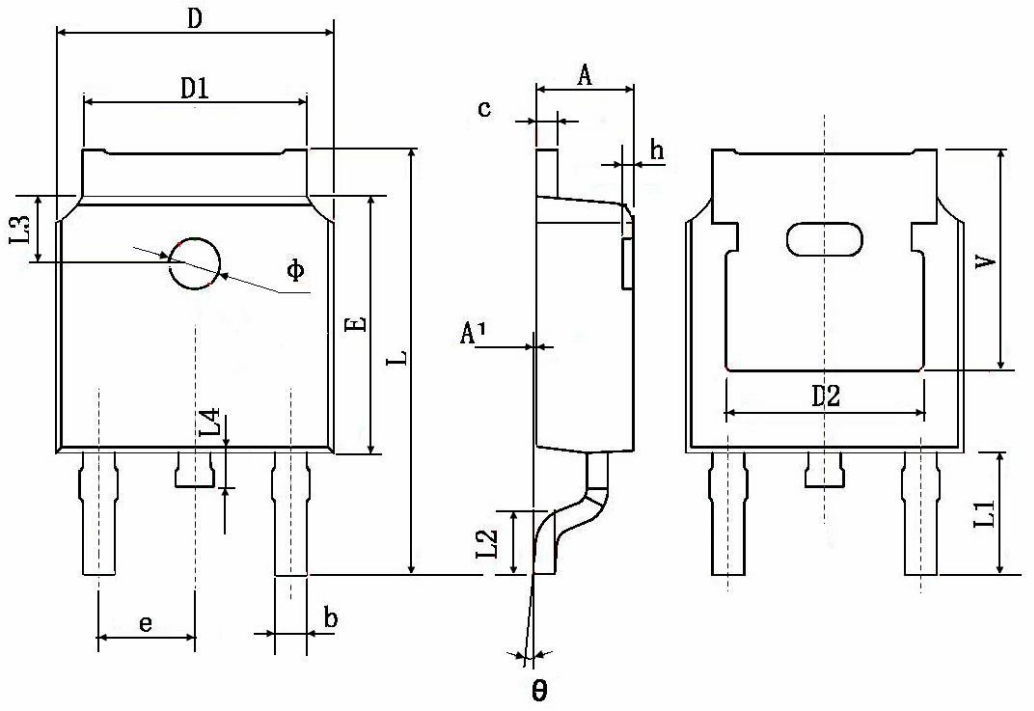
Safe operating area
$I_D=f(V_{DS})$



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



TO-252-2L 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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