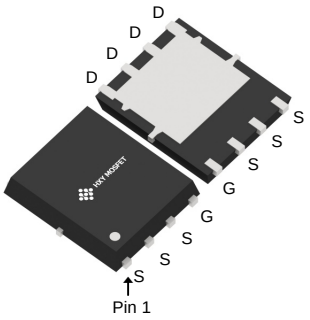
MCAC45N10Y-TP

N-SGT Enhancement Mode MOSFET

General Description

The MCAC45N10Y-TP 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.

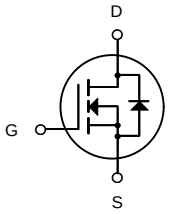


DFN5X6-8L

General Features

V_{DS} =100V I_D = 80A

$R_{DS(ON)}$ < 7mΩ @ V_{GS}=10V



N-Channel MOSFET

Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
MCAC45N10Y-TP	DFN5X6-8L	HXY MOSFET	5000

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	ID	80	A
Pulsed drain current	ID, pulse	300	A
Power dissipation	P_D	97	W
Single pulsed avalanche energy	EAS	90	mJ
Operation and storage temperature	Tstg，Tj	-55 to 150	°C
Thermal resistance, junction-case	RθJC	1.3	°C/W

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=20A	-	6.4	7	mΩ
		V_{GS}=4.5V, I_D=8A	-	9.2	11.4	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=50V, V_{GS}=0V, f=1.0MHz	-	2944	-	pF
C_{oss}	Output Capacitance		-	736	-	pF
C_{rss}	Reverse Transfer Capacitance		-	2.04	-	pF
Q_g	Total Gate Charge	V_{DS}=50V, I_D=30A, V_{GS}=10V	-	39.4	-	nc
Q_{gs}	Gate-Source Charge		-	5.6	-	nc
Q_{gd}	Gate-Drain(“Miller”) Charge		-	7.6	-	nc
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=50V, I_D=25A, R_G=6Ω, V_{GS}=10V	-	13	-	nc
t_r	Turn-on Rise Time		-	27.5	-	nc
$t_{d(off)}$	Turn-off Delay Time		-	45.5	-	nc
t_f	Turn-off Fall Time		-	41.5	-	nc
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	75	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	300	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=30A	-	-	1	V
t_{rr}	Body Diode Reverse Recovery Time	T_J=25°C, I_F=12A,dI/dt=100A/μs	-	177	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	1291	-	nc

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25°C, V_{DD}=50V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=19A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Performance Characteristics

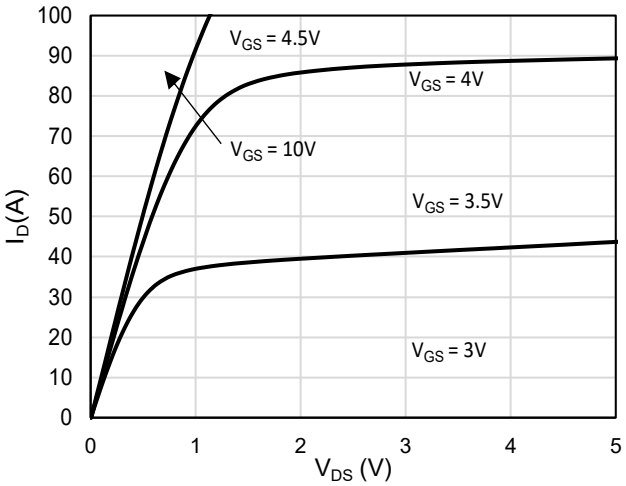


Figure 1: On-Region Characteristics

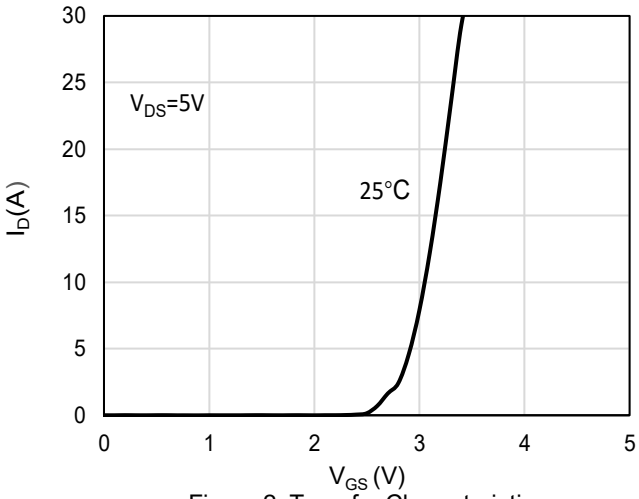


Figure 2: Transfer Characteristics

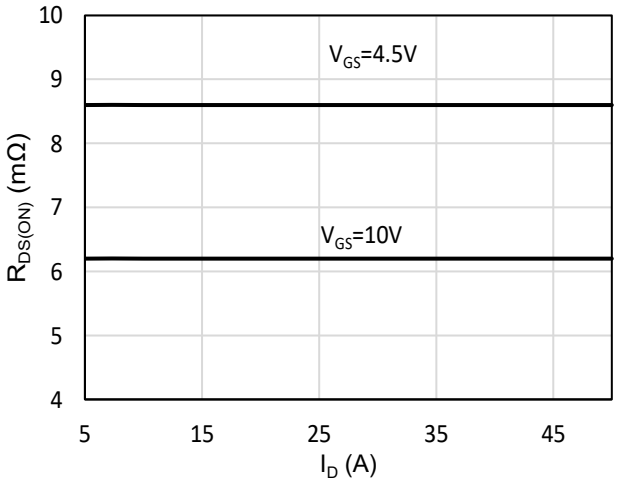


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

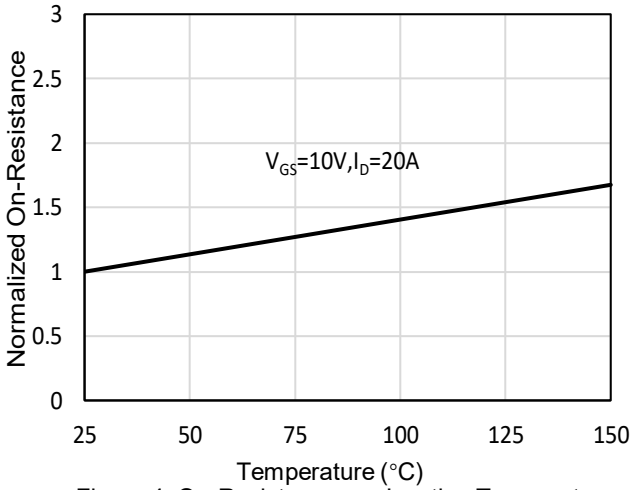


Figure 4: On-Resistance vs. Junction Temperature

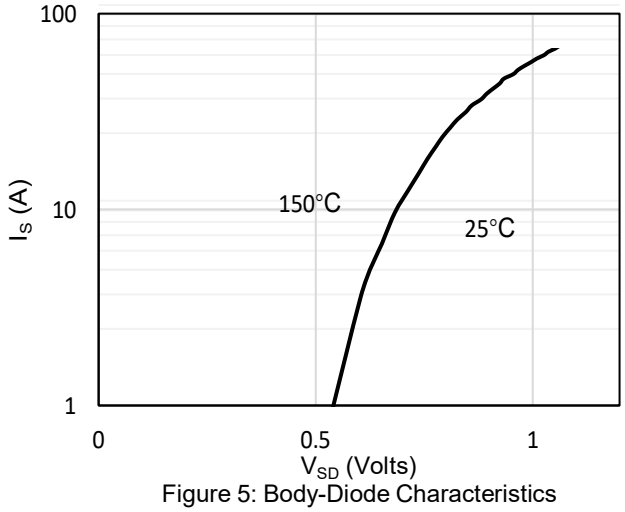


Figure 5: Body-Diode Characteristics

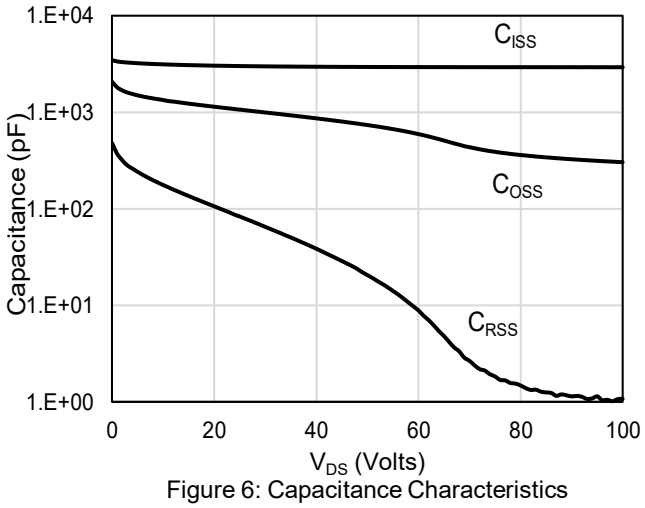


Figure 6: Capacitance Characteristics

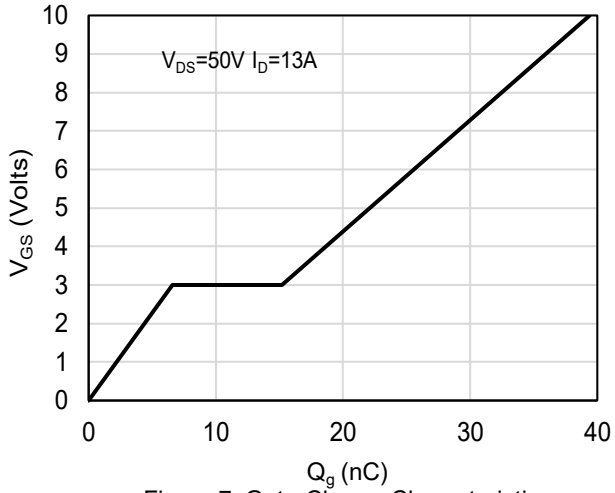


Figure 7: Gate-Charge Characteristics

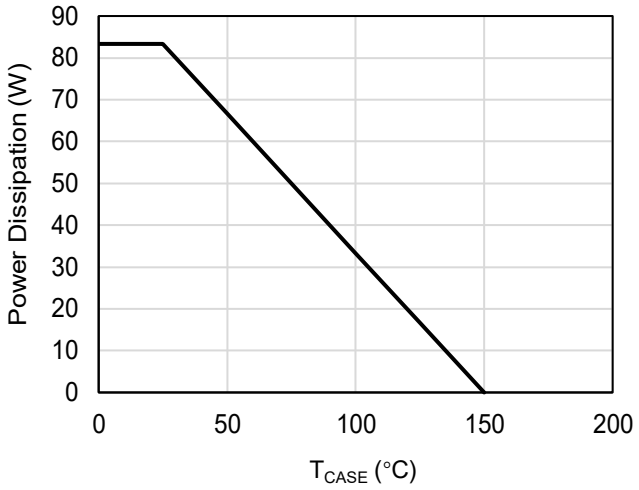


Figure 8: Power De-rating

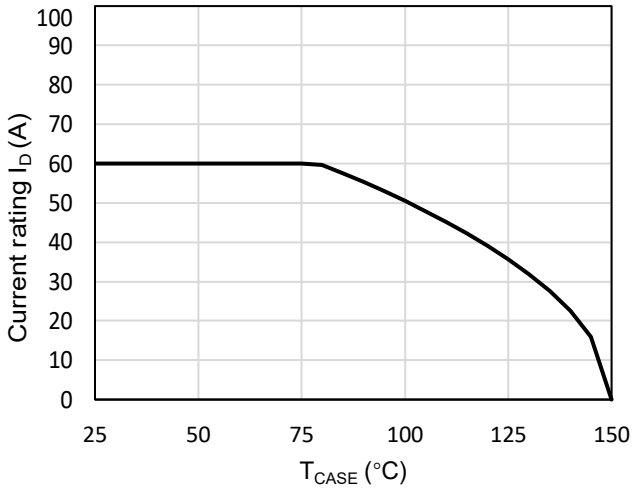


Figure 9: Current De-rating

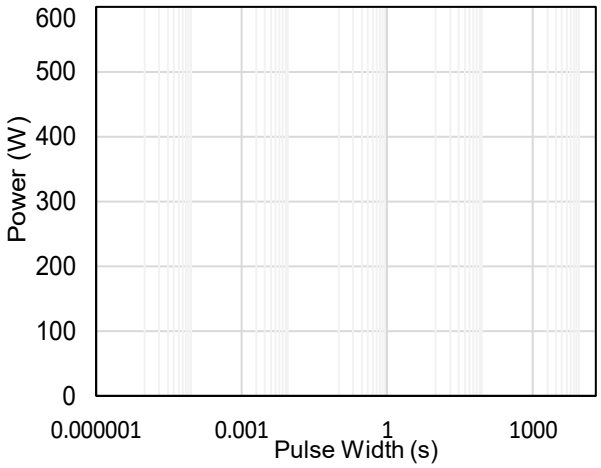


Figure 10: Single Pulse Power Rating Junction-to-Case

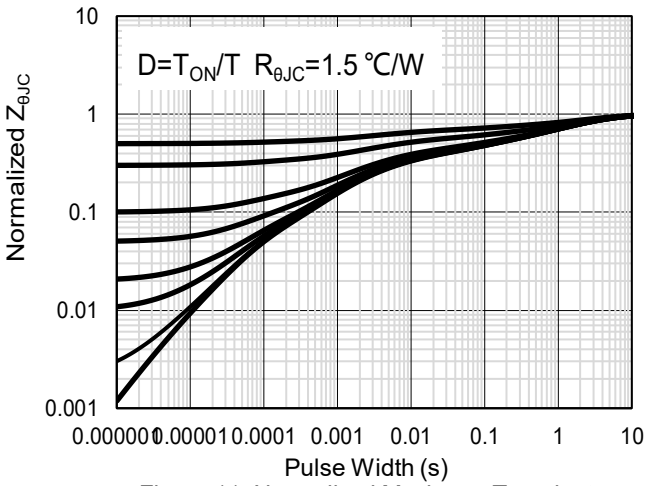


Figure 11: Normalized Maximum Transient Thermal Impedance

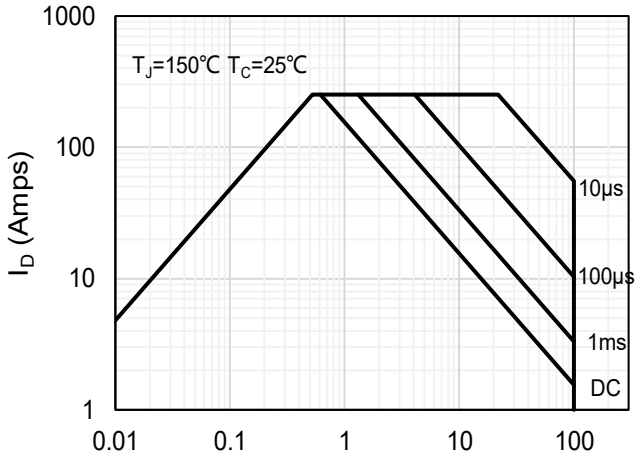
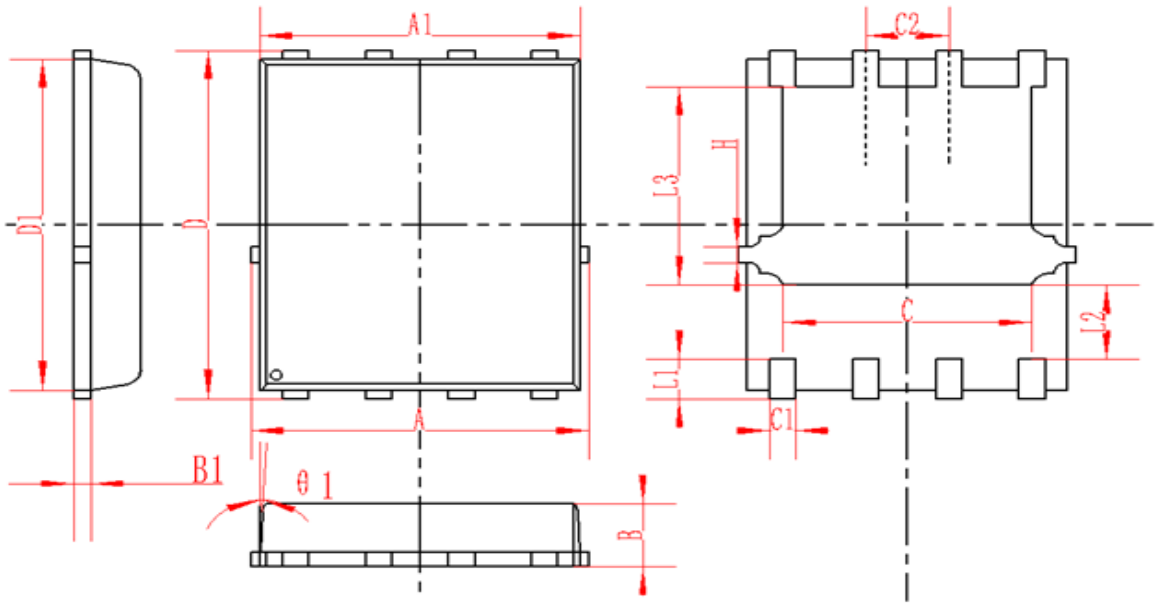


Figure 12: Maximum Forward Biased Safe Operating Area

DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010

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