



## General Description

The MCAC7D5N10YL 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.

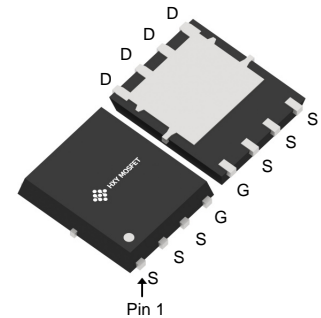
## General Features

$V_{DS} = 100V$   $I_D = 75A$

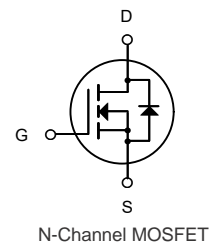
$R_{DS(ON)} < 7.5m\Omega @ V_{GS}=10V$

## Applications

Consumer electronic power supply Motor control  
Synchronous-rectification Isolated DC  
Synchronous-rectification applications



DFN5X6-8L  
(Power(5x6))



## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
MCAC7D5N10YL	DFN5X6-8L(Power(5x6))	HXY MOSFET	5000

## 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	$V_{GS}$	$\pm 20$	V
Continuous drain current <sup>1)</sup>	$I_D$	75	A
Pulsed drain current <sup>2)</sup>	$I_D$ , pulse	300	A
Power dissipation <sup>3)</sup>	$P_D$	97	W
Single pulsed avalanche energy <sup>5)</sup>	EAS	90	mJ
Operation and storage temperature	$T_{stg}, T_j$	-55 to 150	$^{\circ}C$
Thermal resistance, junction-case	$R_{\theta JC}$	1.3	$^{\circ}C/W$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.6	2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note3</small>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	6.4	7.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	-	9.2	11.4	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1.0MHz	-	2944	-	pF
C <sub>Oss</sub>	Output Capacitance		-	736	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	2.04	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	39.4	-	nc
Q <sub>gs</sub>	Gate-Source Charge		-	5.6	-	nc
Q <sub>gd</sub>	Gate-Drain(“Miller”) Charge		-	7.6	-	nc
Switching Characteristics						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =50V, I <sub>D</sub> =25A, R <sub>G</sub> =6Ω, V <sub>GS</sub> =10V	-	13	-	nc
t <sub>r</sub>	Turn-on Rise Time		-	27.5	-	nc
t <sub>d(off)</sub>	Turn-off Delay Time		-	45.5	-	nc
t <sub>f</sub>	Turn-off Fall Time		-	41.5	-	nc
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	75	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	300	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> =12A,dI/dt=100A/μs	-	177	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	1291	-	nc

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

2. EAS condition:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=50V$ ,  $V_G=10V$ ,  $R_G=25\Omega$ ,  $L=0.5mH$ ,  $I_{AS}=19A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$



## Typical Performance Characteristics

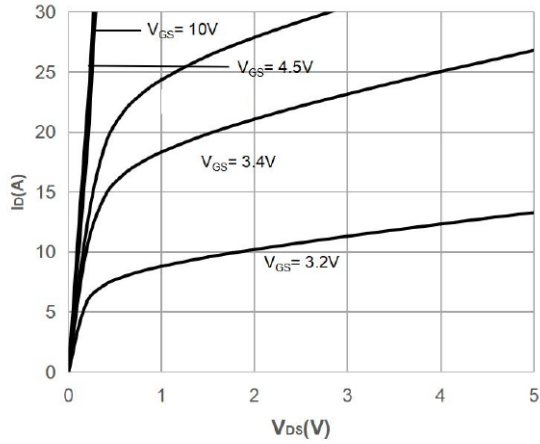


Figure 1: Output Characteristics

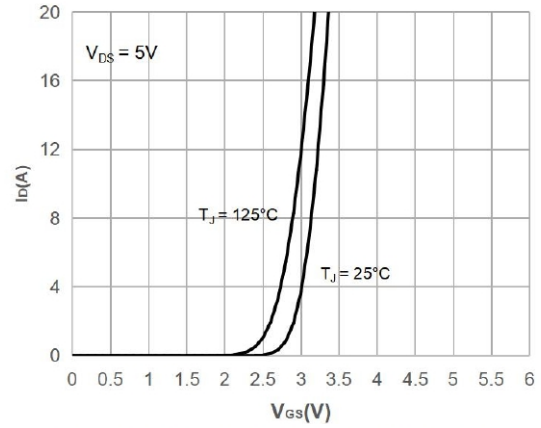


Figure 2: Typical Transfer Characteristics

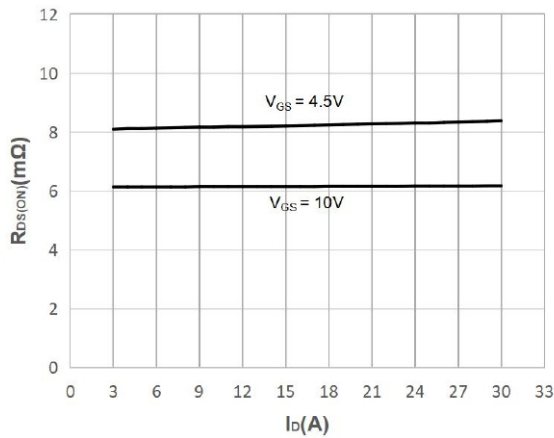


Figure 3: On-resistance vs. Drain Current

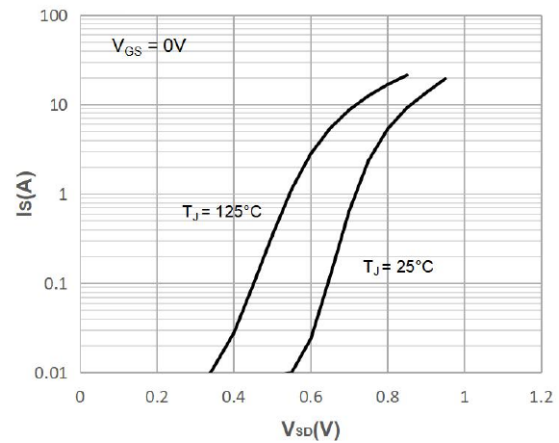


Figure 4: Body Diode Characteristics

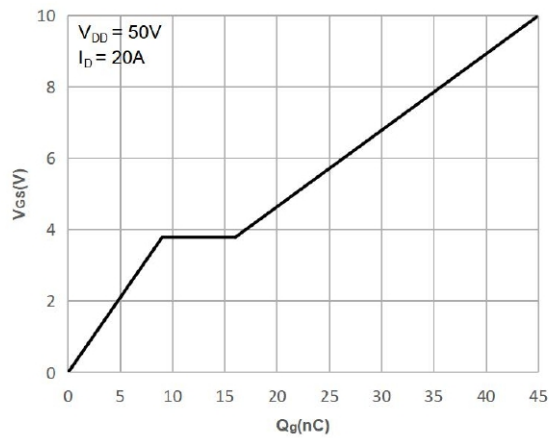


Figure 5: Gate Charge Characteristics

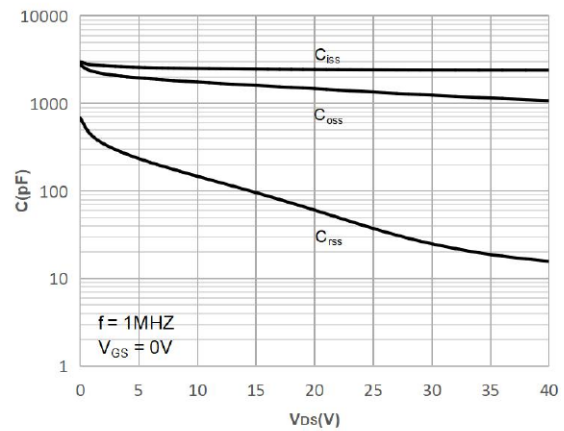


Figure 6: Capacitance Characteristics

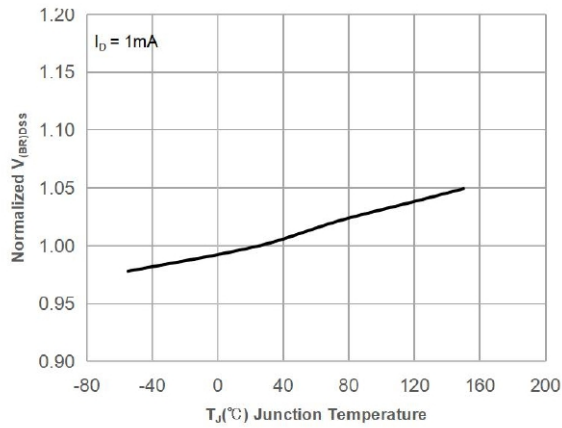


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

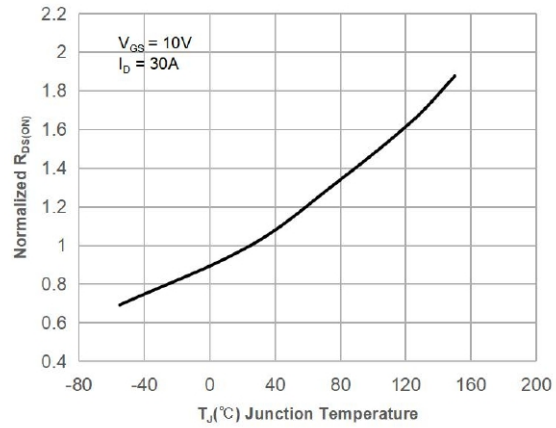


Figure 8: Normalized on Resistance vs. Junction Temperature

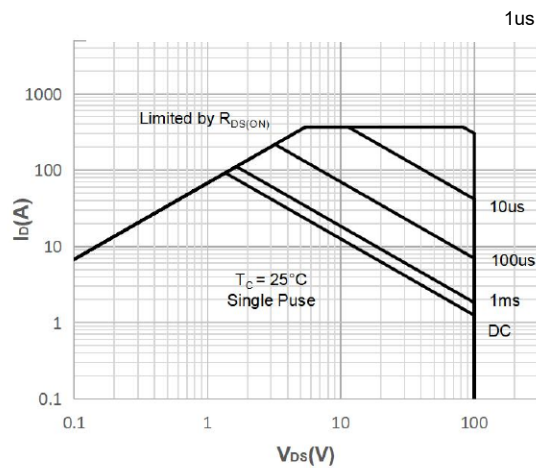


Figure 9: Maximum Safe Operating Area

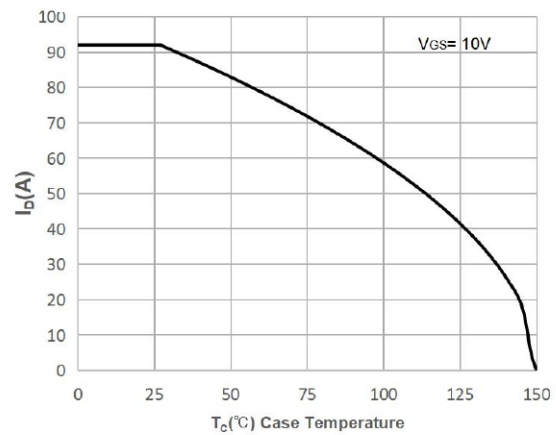


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

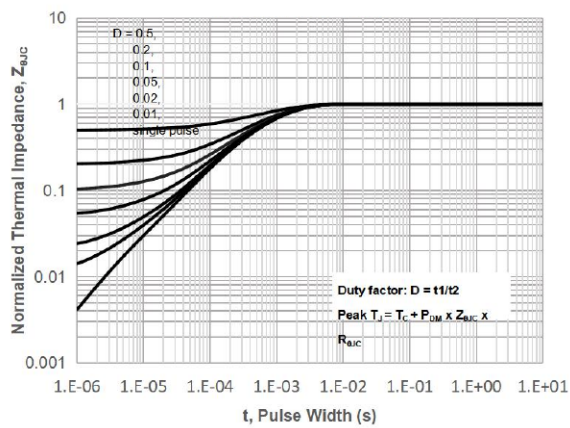


Figure 11: Normalized Maximum Transient Thermal Impedance

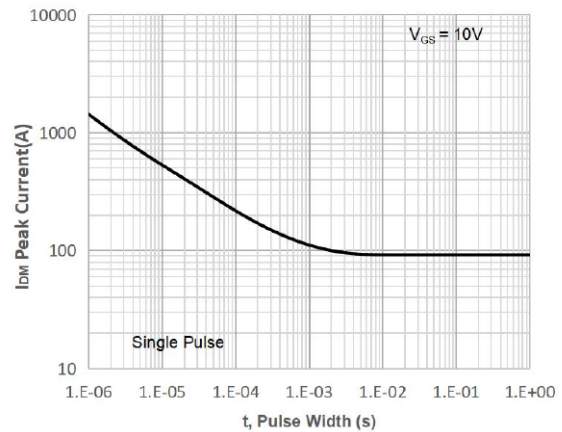
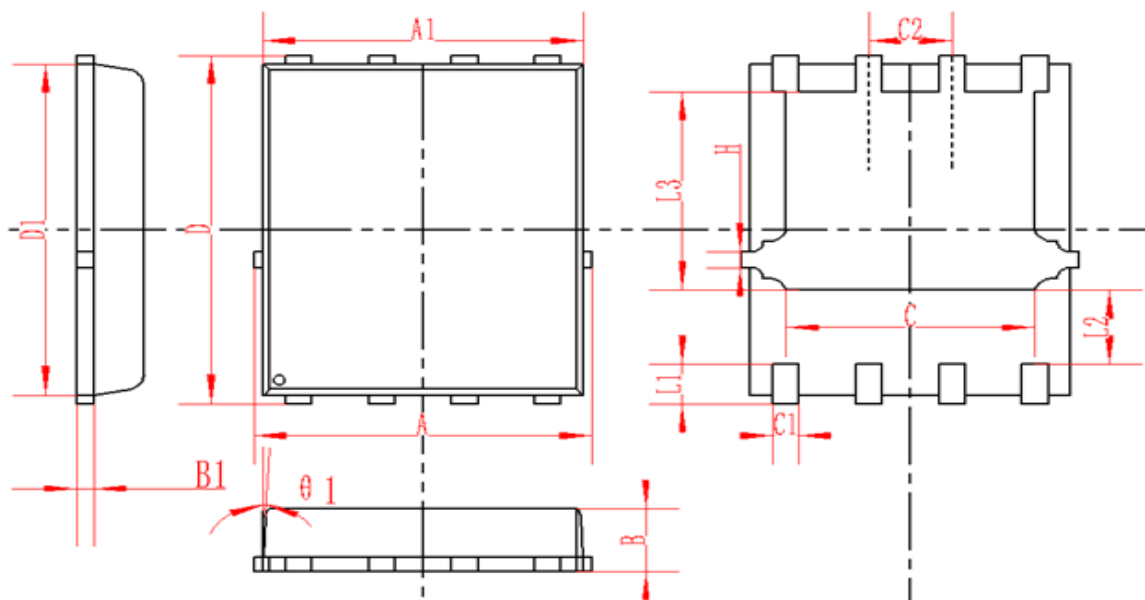


Figure 12: Peak Current Capacity



## DFN5X6-8L(Power(5x6)) 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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