



Description

The TPN6R303NC 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.

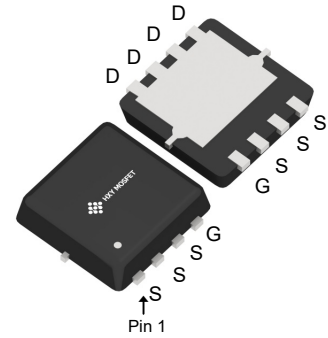
General Features

$V_{DS} = 30V$ $I_D = 40A$

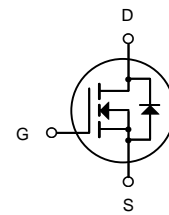
$R_{DS(ON)} < 6.3m\Omega @ V_{GS}=10V$

Applications

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



DFN3X3-8L



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
TPN6R303NC	DFN3X3-8L	HXY MOSFET	5000

Absolute Maximum Ratings (TC=25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	40	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	28	A
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	27	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	24	A
I_{DM}	Pulsed Drain Current ²	135	A
EAS	Single Pulse Avalanche Energy ³	29.8	mJ
I_{AS}	Avalanche Current	27	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	30	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range		°C
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	50	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.6	°C/W



Electrical Characteristics(T_J=25°C unless other wisenoted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =20A	---	5	6.3	mΩ
		V _{GS} =4.5V , I _D =15A	---	6.9	9	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	---	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =24V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =20A	---	67	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	1.7	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V , V _{GS} =4.5V , I _D =15A	---	8	---	nC
Q _{gs}	Gate-Source Charge		---	2.4	---	
Q _{gd}	Gate-Drain Charge		---	3.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V , V _{GS} =10V , R _G =3.3Ω I _D =15A	---	7.1	---	ns
T _r	Rise Time		---	40	---	
T _{d(off)}	Turn-Off Delay Time		---	15	---	
T _f	Fall Time		---	6	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	814	---	pF
C _{oss}	Output Capacitance		---	498	---	
C _{rss}	Reverse Transfer Capacitance		---	41	---	
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	---	---	40	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	I _F =20A , di/dt=100A/μs ,	---	15	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	25	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=24A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

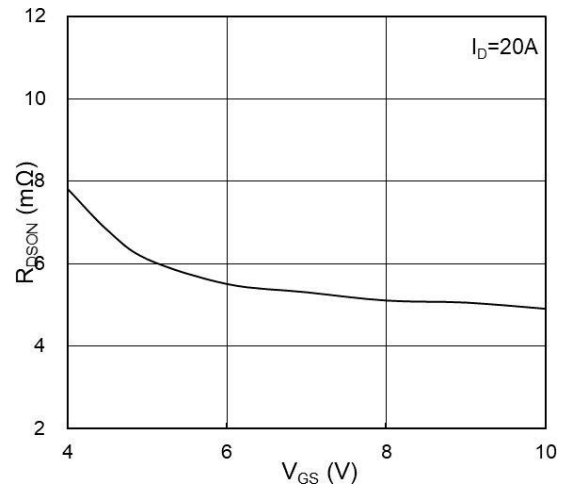
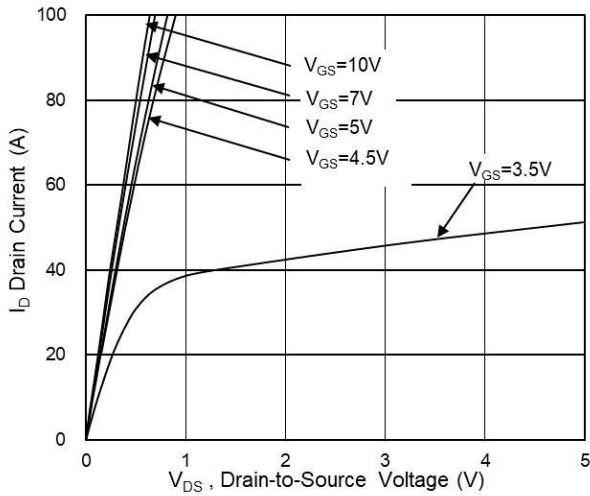


Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs G-S Voltage

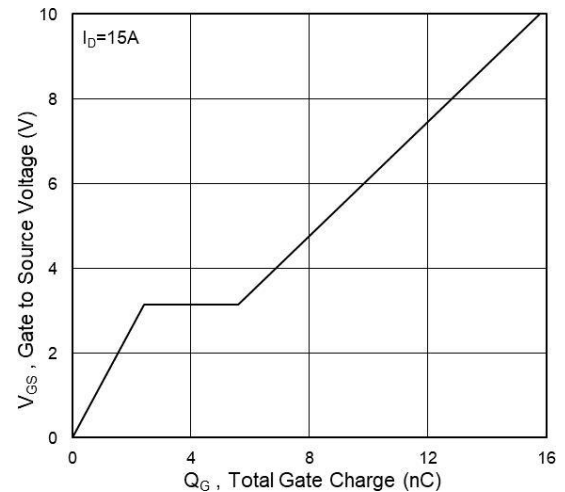
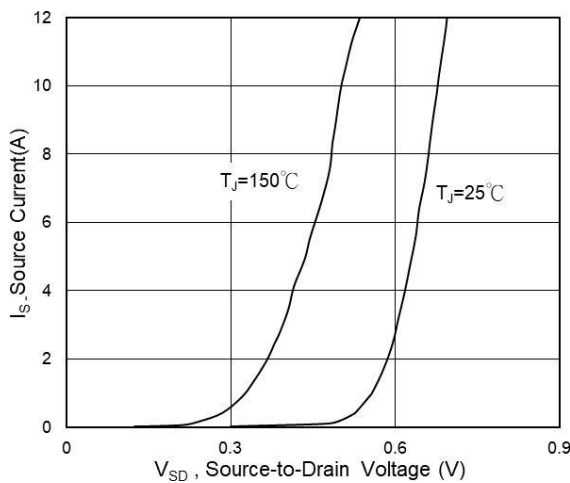


Fig.3 Source Drain Forward Characteristics

Fig.4 Gate-Charge Characteristics

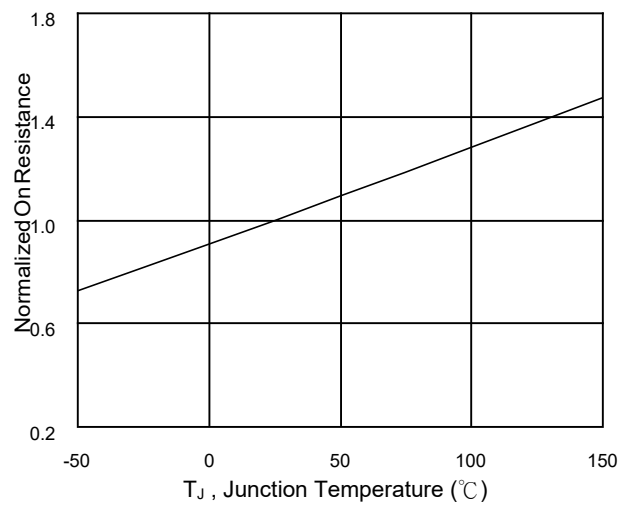
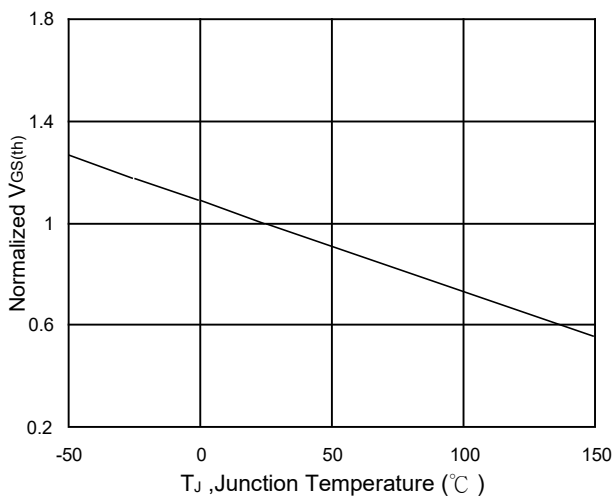


Fig.5 Normalized $V_{GS(th)}$ vs T_J

Fig.6 Normalized R_{DSON} vs T_J

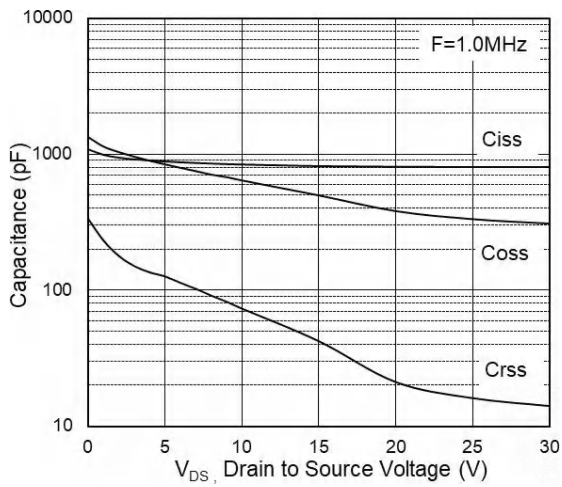


Fig.7 Capacitance

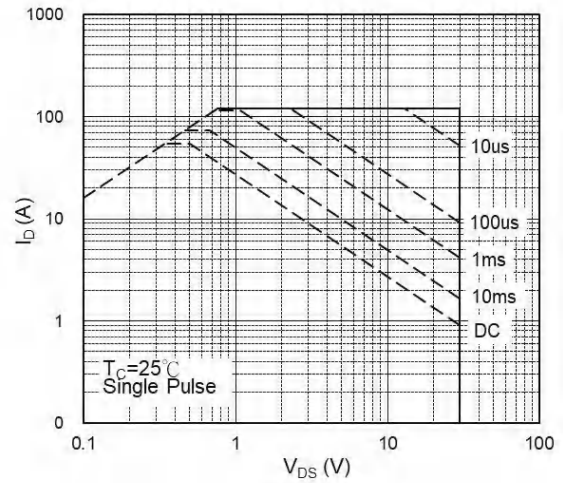


Fig.8 Safe Operating Area

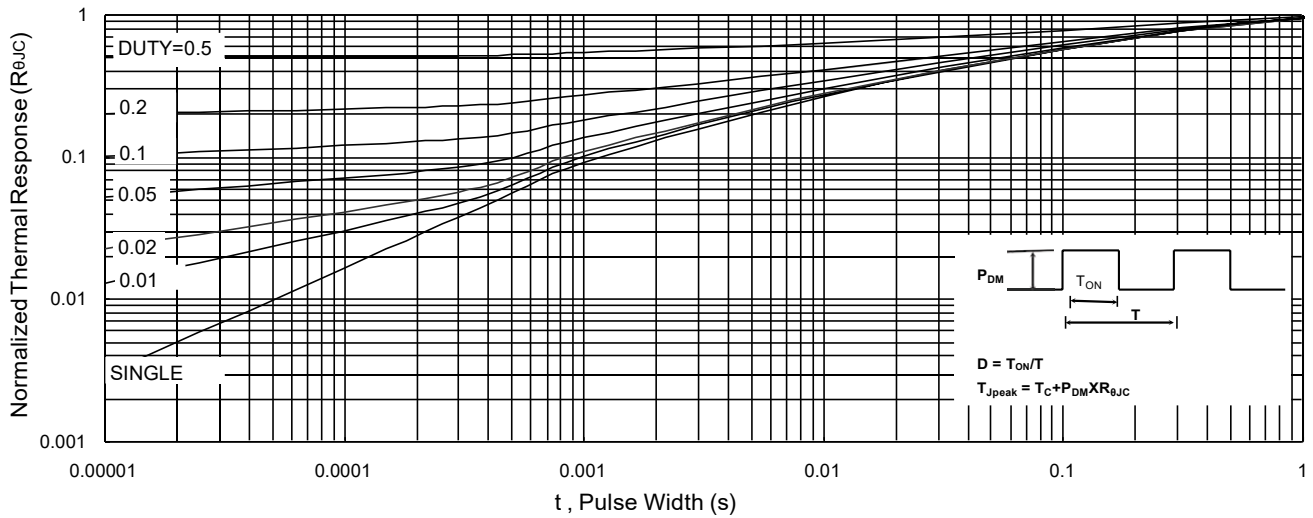


Fig.9 Normalized Maximum Transient Thermal Impedance

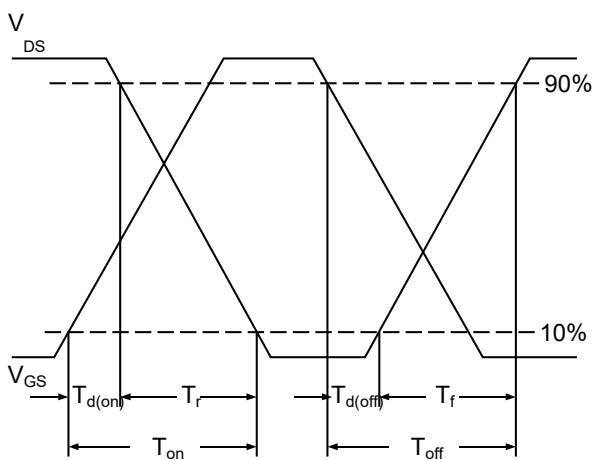


Fig.10 Switching Time Waveform

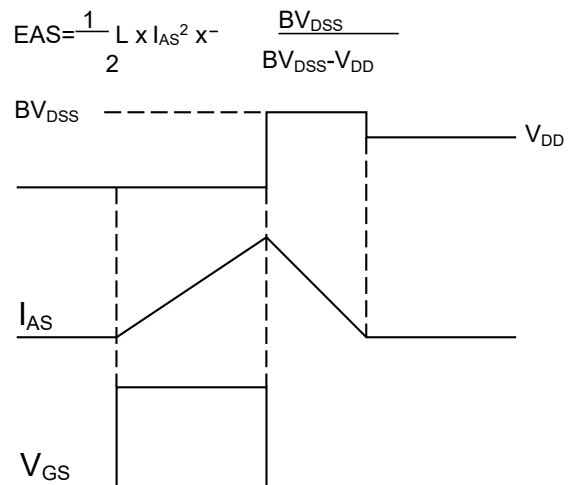


Fig.11 Unclamped Inductive Switching Waveform



DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°



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