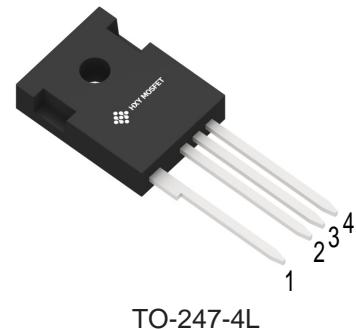




Features

- 3rd generation SiC MOSFET technology
- Optimized package with separate driver source pin
- High blocking voltage with low on-resistance
- High-speed switching with low capacitances
- Fast intrinsic diode with low reverse recovery (Q_{rr})
- Halogen free, RoHS compliant



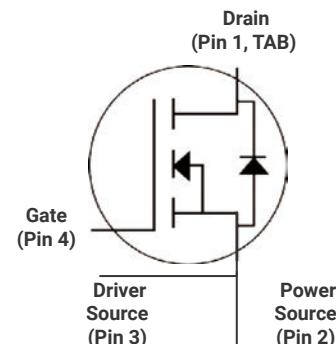
Benefits

- Reduce switching losses and minimize gate ringing
- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

Applications

- Renewable energy
- EV battery chargers
- High voltage DC/DC converters
- Switch Mode Power Supplies

Ordering Part Number	Package	Brand
HXYS97N65MPI	TO-247-4L	HXY MOSFET



Maximum Ratings (T_c = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DS}	650	V
Continuous drain current T _c = 25°C T _c = 100°C	I _D	97 69	A
Pulsed drain current (T _c = 25°C, t _p limited by T _{jmax})	I _D pulse	241	A
Avalanche energy, single pulse (L=10mH)	E _{AS}	1620	mJ
Gate-Source voltage	V _{GS}	-5/+20	V
Gate-Source voltage (dynamic, Absolute maximum values)	V _{GSmax}	-10/+25	V
Power dissipation (T _c = 25°C)	P _{tot}	429	W
Operating junction and storage temperature	T _j , T _{stg}	-55...+175	°C



Electrical Characteristics (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	650	-	-	V	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$
Gate threshold voltage	$\text{V}_{\text{GS(th)}}$	2	-	4	V	$\text{V}_{\text{DS}}=\text{V}_{\text{GS}}, \text{I}_D=15\text{mA}$
Zero gate voltage drain current	I_{DSS}	-	1 10	100	μA	$\text{V}_{\text{DS}}=650\text{V}, \text{V}_{\text{GS}}=0\text{V}$ $\text{T}_j=25^\circ\text{C}$ $\text{T}_j=175^\circ\text{C}$
Gate-source leakage current	I_{GS}	-		250	nA	$\text{V}_{\text{GS}}=20\text{V}, \text{V}_{\text{DS}}=0\text{V}$
Drain-source on-state resistance	$\text{R}_{\text{DS(on)}}$	-	30 25 34	- 45	m	$\text{V}_{\text{GS}}=18\text{V}, \text{I}_D=33.5\text{A},$ $\text{V}_{\text{GS}}=20\text{V}, \text{I}_D=33.5\text{A},$ $\text{T}_j=25^\circ\text{C}$ $\text{T}_j=175^\circ\text{C}$
Transconductance	g_{fs}	-	5.6	-	S	$\text{V}_{\text{DS}}=20\text{V}, \text{I}_D=17.6\text{A}$
Dynamic Characteristics						
Input Capacitance	C_{iss}	-	3280	-	pF	$\text{V}_{\text{DS}} = 650\text{V}$ $\text{V}_{\text{GS}} = 0\text{V}$ $\text{T}_j = 25^\circ\text{C}$ $\text{V}_{\text{AC}} = 25\text{mV}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	-	359	-		
Reverse Transfer Capacitance	C_{rss}	-	33	-		
Gate Total Charge	Q_G	-	172	-	nC	$\text{V}_{\text{DS}} = 400\text{V}$ $\text{V}_{\text{GS}} = -5/20\text{V}$ $\text{I}_D = 33.5\text{A}$
Gate-Source charge	Q_{gs}	-	41	-		
Gate-Drain charge	Q_{gd}	-	38	-		
Turn-On Switching Energy	E_{ON}	-	478	-	μJ	$\text{V}_{\text{DD}} = 400\text{V}$ $\text{V}_{\text{GS}} = -5/+20\text{V}$ $\text{I}_D = 33.5\text{A}$ $\text{R}_G = 10$ $\text{L} = 100\mu\text{H}$
Turn-Off Switching Energy	E_{OFF}	-	115			
Turn-on delay time	$\text{t}_{\text{d(on)}}$	-	32	-		
Rise time	t_r	-	44	-	ns	
Turn-off delay time	$\text{t}_{\text{d(off)}}$	-	84	-		
Fall time	t_f	-	22	-		
Gate resistance	R_G	-	1.1	-		$\text{V}_{\text{AC}} = 25\text{mV}, f=1\text{MHz}$



Body Diode Characteristics

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Body Diode Forward Voltage	V _{SD}		3.2		V	V _{GS} =0V, I _{SD} =8.8A, T _J =25°C
			2.6			V _{GS} =0V, I _{SD} =8.8A, T _J =175°C
Continuous Diode Forward Current	I _S		83		A	V _{GS} = 4V, T _C =25°C
Body Diode Reverse Recovery Time	t _{rr}	-	40	-	ns	V _R = 400V, I _D = 17.6A di/dt = 1000A/μS
Body Diode Reverse Recovery Charge	Q _{rr}	-	156	-	nC	



Typical Performance Characteristics

Fig 1. Output Characteristic ($T_J=55^\circ\text{C}$)

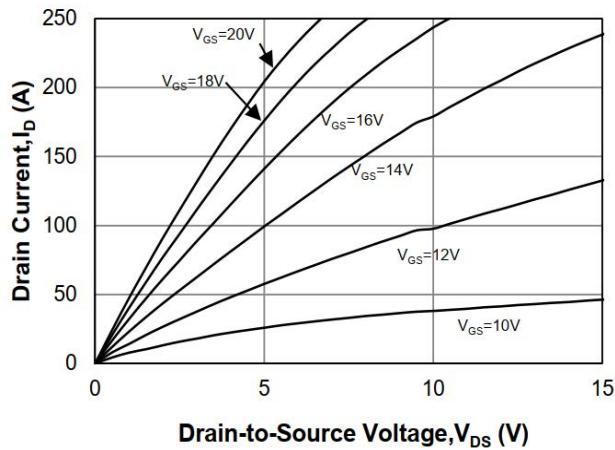


Fig 2. Output Characteristic ($T_J=25^\circ\text{C}$)

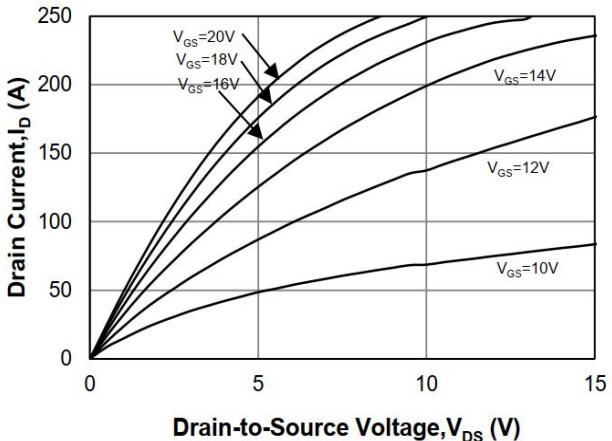


Fig 3. Output Characteristic ($T_J=175^\circ\text{C}$)

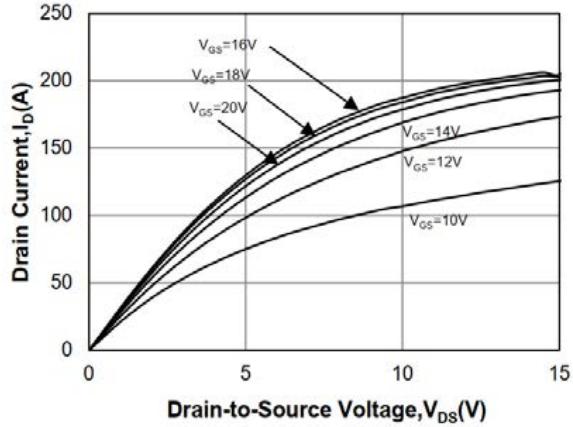


Fig 4: $R_{DS(on)}$ Vs I_D Characteristic

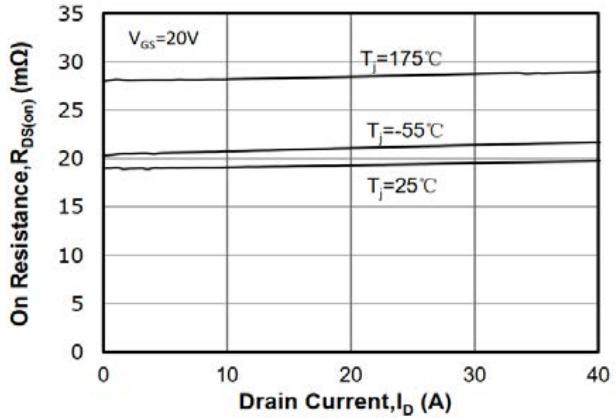


Fig 5: $R_{DS(on)}$ vs. Temperature

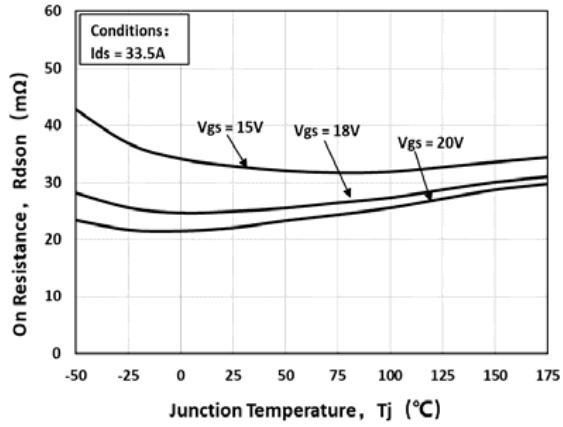


Fig 6: Transfer Characteristic

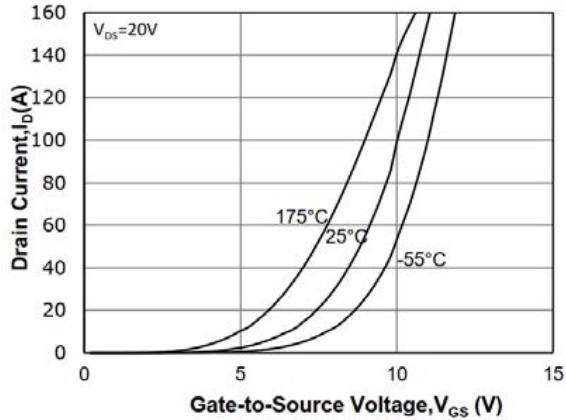




Fig 7: Body-diode Characteristic

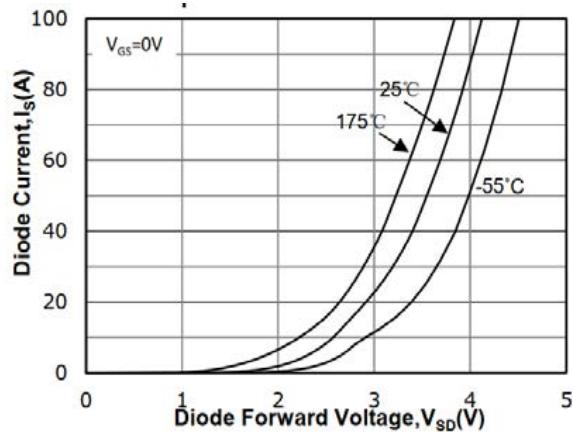


Fig 8: V_{TH} Vs T_J Temperature Characteristic

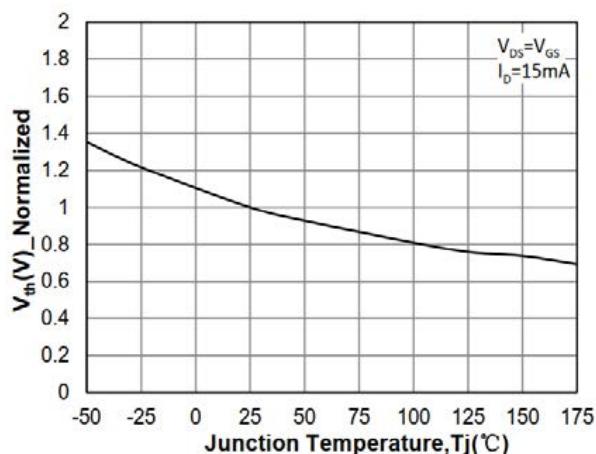


Fig 9: Gate Charge Characteristics

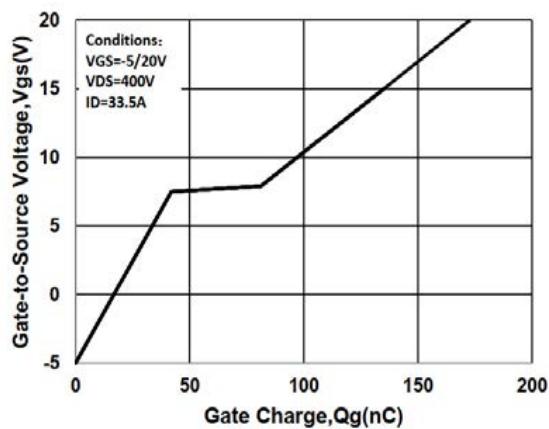


Fig 10: Continuous Drain Current vs. Case Temperature

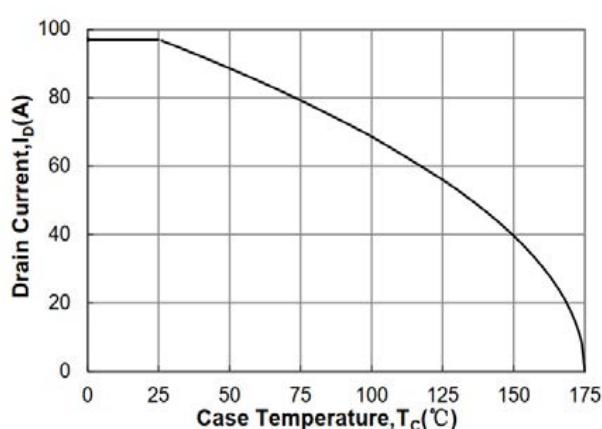


Fig 11: Safe Operating Area

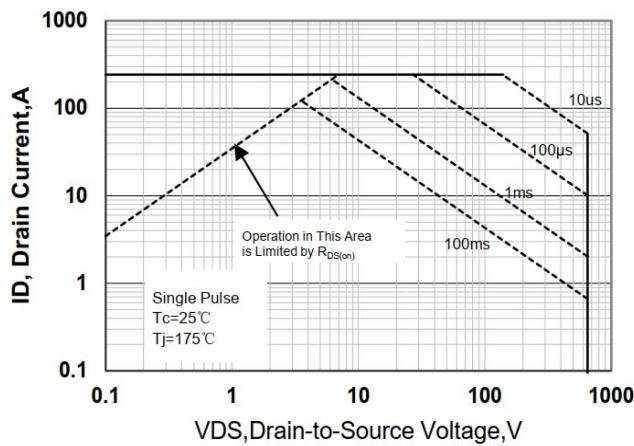


Fig 12: Capacitance Characteristics

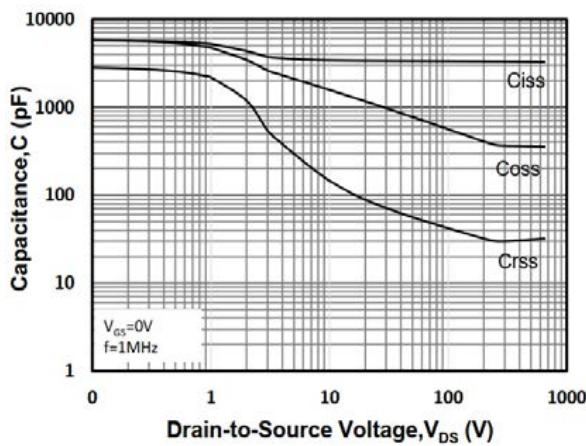
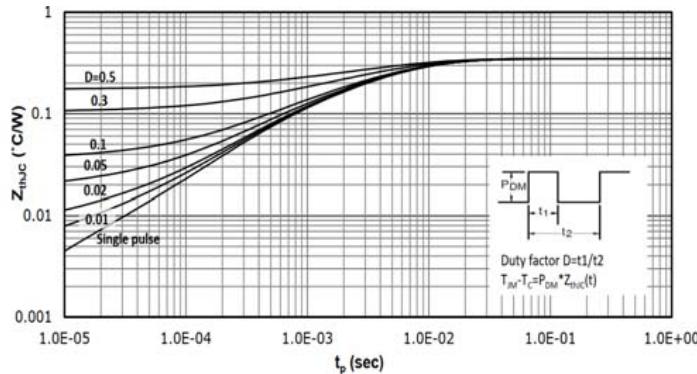




Fig 13: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

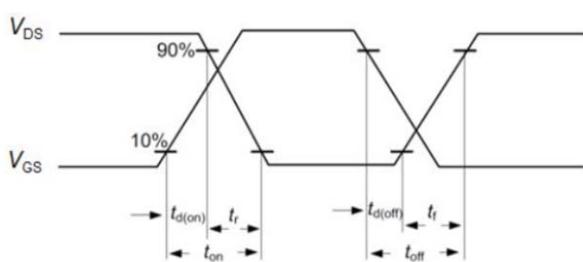


Figure B. Dynamic test circuit

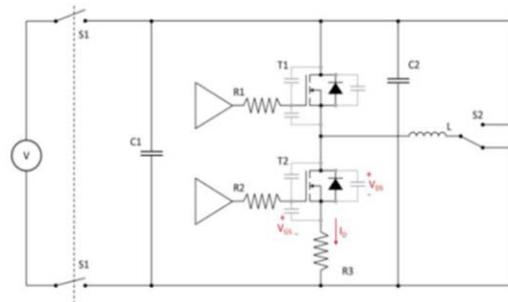
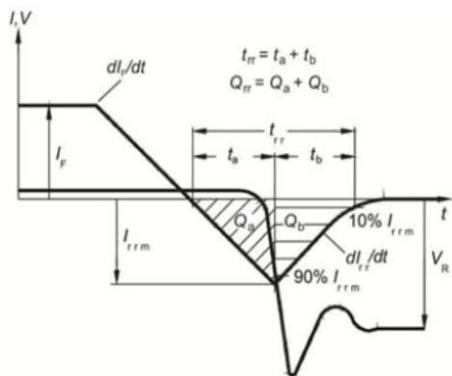


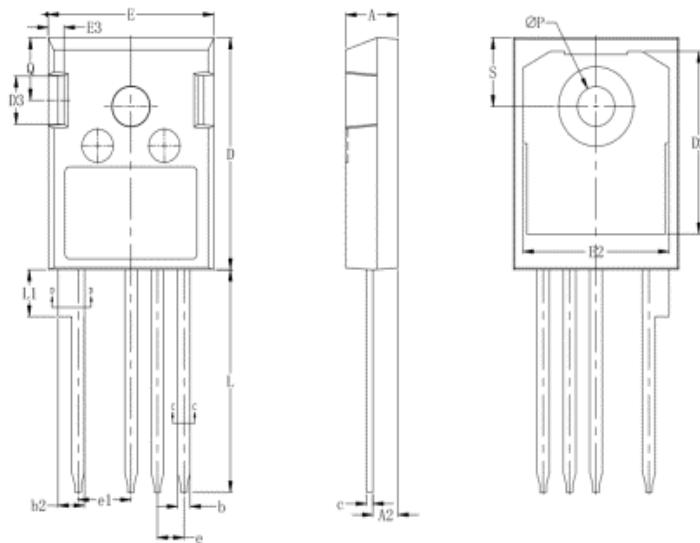
Figure C. Definition of body diodeswitching characteristics





Package Dimensions

Package TO-247-4L



Items	Values(mm)	
	MIN	MAX
A	4.8	5.2
A2	2.2	2.6
b	1.05	1.4
b2	2.4	2.75
c	0.5	0.75
D	20	21.5
D2	15.5	17.2
D3	4	5
E	15.5	16.1
E2	13	15
E3	1	2
e	2.54 BSC.	
e1	5.08 BSC.	
L	19	21
L1	4	4.45
ΦP	3.5	3.7
Q	5.4	5.9
S	5.9	6.4



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