

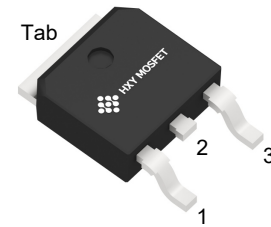


Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

Applications

- Solar Inverters
- Switch Mode Power Supplies
- UPS
- Battery Chargers

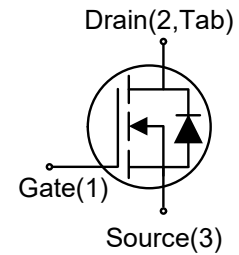


TO-252-2L



Ordering Information

Ordering Part Number	Package	Brand
PR6509KND3TL1	TO-252-2L	HXY MOSFET



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	650	V	
V_{GSmax}	Gate - Source Voltage (Absolute maximum values)	-8/+22	V	
V_{GS}	Gate - Source Voltage	-4/+18	V	
I_D	Continuous Drain Current	6.8	A	$T_C = 25^{\circ}C$
		4.8		$T_C = 100^{\circ}C$
$I_{D(pulse)}$	Pulsed Drain Current	29	A	Pulse width t_p limited by T_{jmax}
P_{TOT}	Power Dissipation	41	W	$T_C = 25^{\circ}C$
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^{\circ}C$	

•Example of acceptable V_{GS} waveform





Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless other wise specified)

Symbol	Parameter	Value			Unit	Test Condition	
		min.	typ.	max.			
Static Characteristics							
V _{DSS}	Drain-source breakdown voltage	750	-	-	V	V _{GS} =0V, I _D =100uA	
V _{GS(th)}	Gate threshold voltage	2	2.8	4	V	V _{DS} =V _{GS} , I _D =0.43mA	
I _{DSS}	Zero gate voltage drain current	- -	1 5	10 -	μA	V _{DS} =650V, V _{GS} =0V T _C =25°C T _C =175°C	
I _{GSS}	Gate-source leakage current	-		100	nA	V _{GS} =18V, V _{DS} =0V	
R _{DS(on)}	Drain-source on-state resistance	-	460 540	610	mΩ	V _{GS} =18V, I _D =2A, T _J =25°C T _J =175°C	
R _{DS(on)}	Drain-source on-state resistance	-	580	-	mΩ	V _{GS} =15V, I _D =2A, T _J =25°C	
g _{fs}	Transconductance	-	1.3	-	S	V _{DS} =20V, I _D =2A	
Dynamic Characteristics							
C _{iss}	Input Capacitance	-	176	-	pF	V _{DS} = 400V V _{GS} = 0V T _J = 25°C	
C _{oss}	Output Capacitance	-	17	-		V _{AC} = 25mV f = 1MHz	
C _{rss}	Reverse Transfer Capacitance	-	2	-			
Q _G	Gate Total Charge	-	8.5	-	nC	V _{DS} = 400V V _{GS} = -4/18V I _D = 1.6A	
Q _{gs}	Gate-Source charge	-	2.6	-			
Q _{gd}	Gate-Drain charge	-	2.6	-			
E _{ON}	Turn-On Switching Energy	-	32.5	-	μJ	V _{DD} = 400V V _{GS} = -4/+18V I _D = 1.6A R _G = 5Ω	
E _{OFF}	Turn-Off Switching Energy	-	0.53	-			
t _{d(on)}	Turn-on delay time	-	40	-	ns		
t _r	Rise time	-	33.5	-			
t _{d(off)}	Turn-off delay time	-	49	-			
t _f	Fall time	-	54	-			
R _G	Gate resistance	-	3.7	-	Ω	V _{AC} = 25mV, f=1MHz	
Body Diode Characteristics							
V _{SD}	Body Diode Forward Voltage		3		V	V _{GS} = 0V, I _{SD} =1A, T _J =25°C	
			2.7			V _{GS} = 0V, I _{SD} =1A, T _J =175°C	
t _{rr}	Body Diode Reverse Recovery Time	-	52	-	ns	V _R = 400V, V _{GS} = 0V I _D = 1.6A	
Q _{rr}	Body Diode Reverse Recovery Charge	-	21.8	-	nC	di/dt = 800A/μS T _J = 175°C	



Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions
R_{thJC}	Thermal Resistance from Junction to Case	3.7	$^{\circ}\text{C/W}$	
R_{thJA}	Thermal Resistance From Junction to Ambient	40		

Typical Performance

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

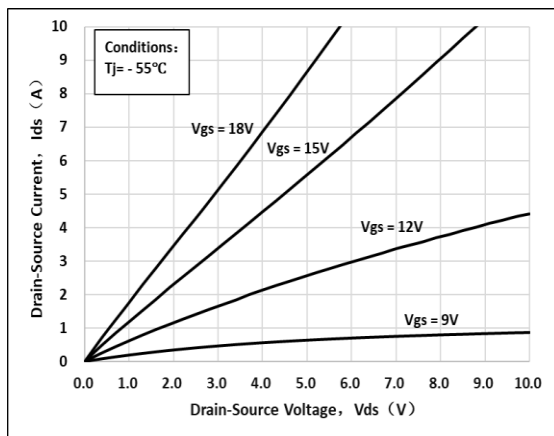


Fig 2. Output Characteristics ($T_J = 25^{\circ}\text{C}$)

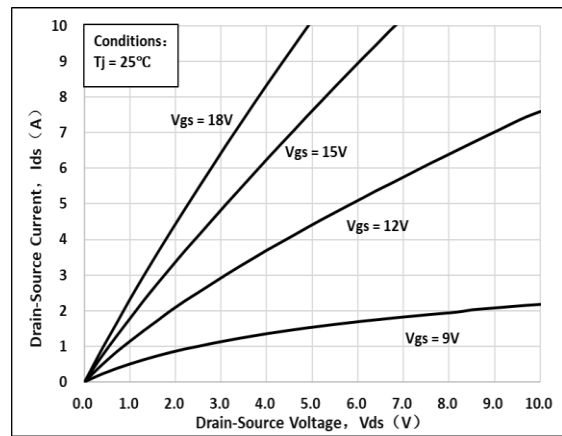


Fig 3. Output Characteristics ($T_J = 175^{\circ}\text{C}$)

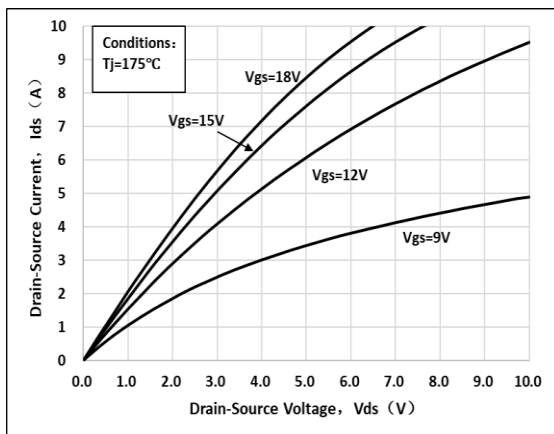


Fig 4: $R_{ds(on)}$ Vs I_{ds} Characteristics

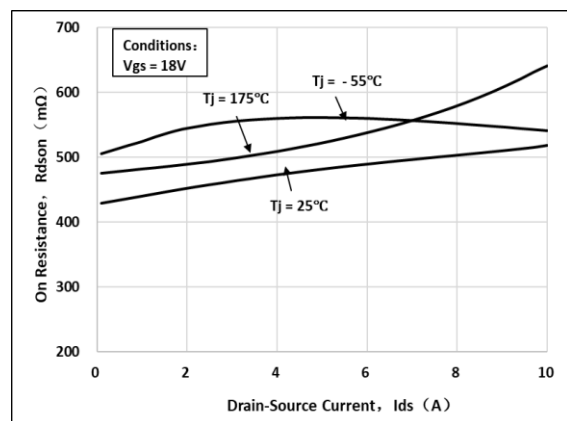




Fig 5: Rds(on) vs. Temperature

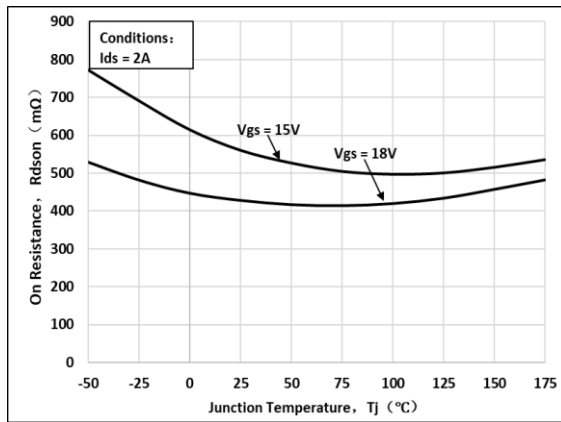


Fig 5: Transfer Characteristics

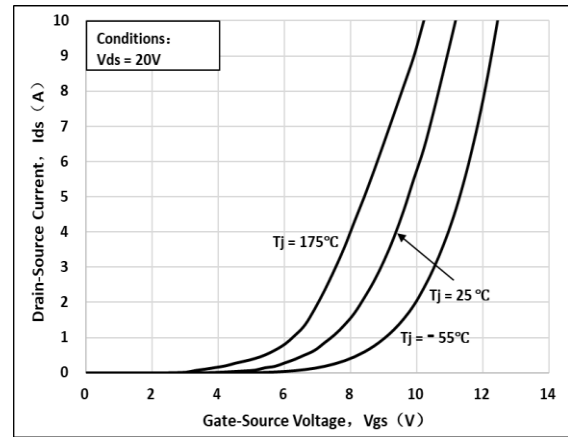


Fig 7: Body-diode Characteristics ($T_J = -55^{\circ}C$)

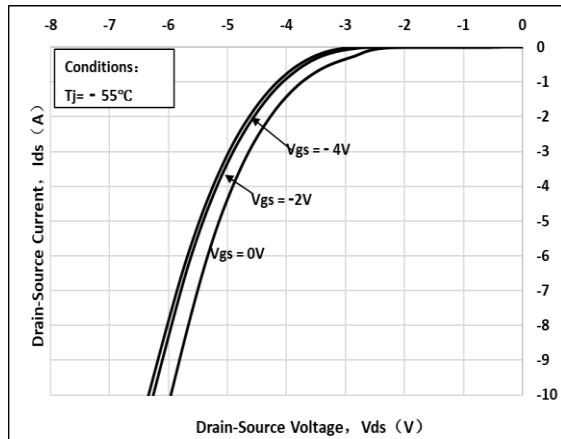


Fig 8: Body-diode Characteristics ($T_J = 25^{\circ}C$)

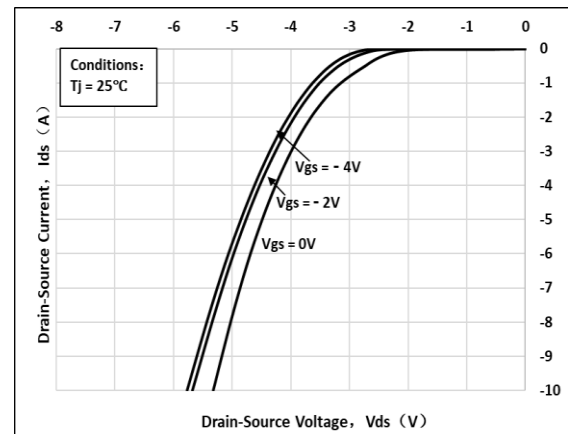


Fig 9: Body-diode Characteristics ($T_J = 175^{\circ}C$)

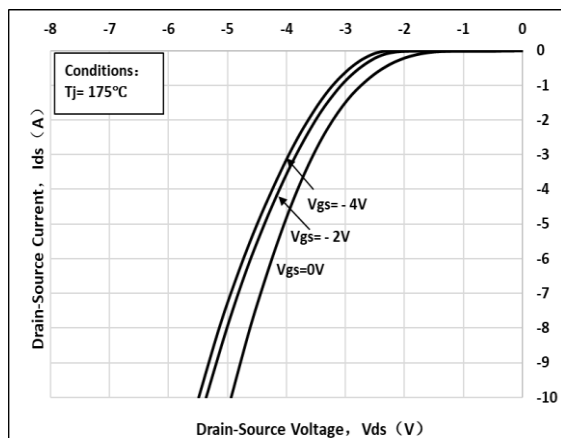


Fig 10: VTH Vs TJ Temperature Characteristics

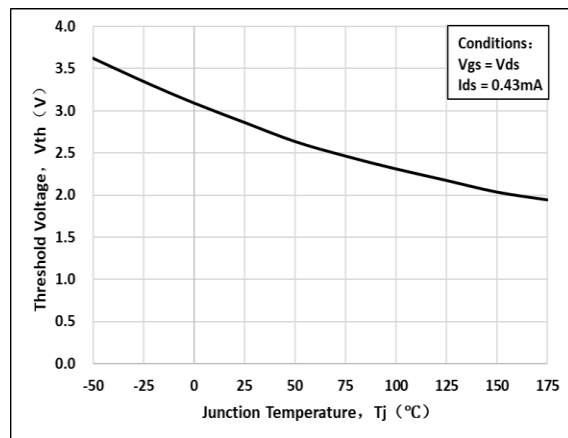




Fig 11: 3rd Quadrant Characteristics($T_J = -55^\circ\text{C}$)

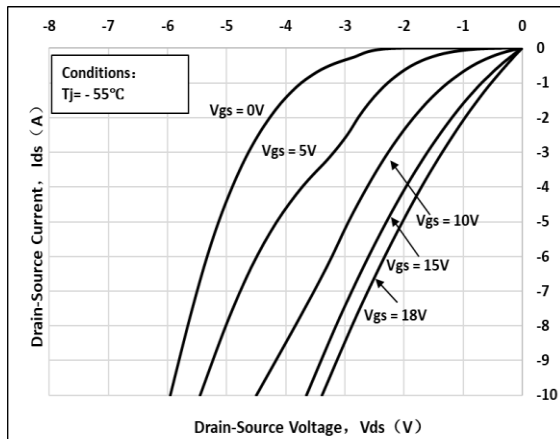


Fig 12: 3rd Quadrant Characteristics($T_J = 25^\circ\text{C}$)

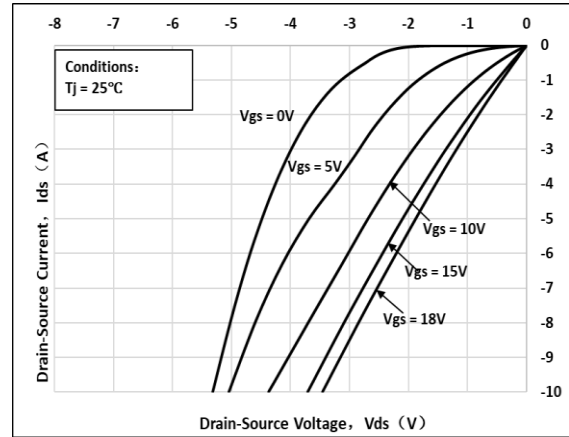


Fig 13: 3rd Quadrant Characteristics($T_J = 175^\circ\text{C}$)

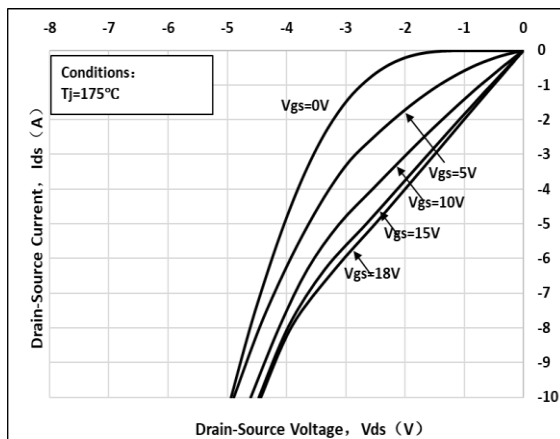


Fig 14: Gate Charge Characteristics

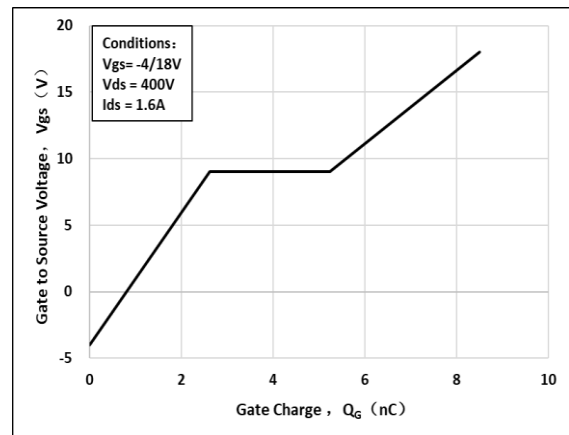


Fig 15: Continuous Drain Current vs. Case Temperature

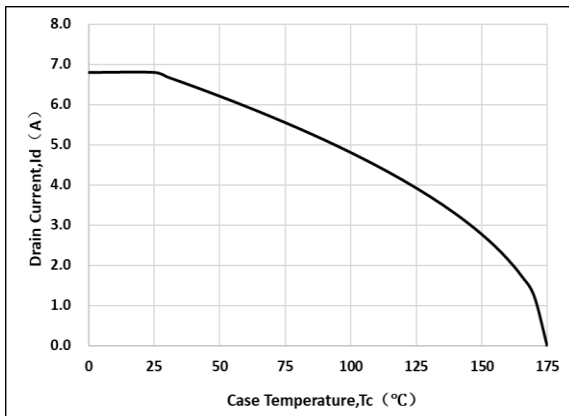


Fig 16: Safe Operating Area

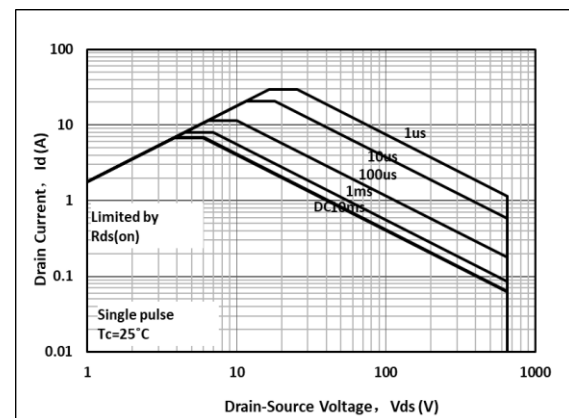




Fig 17: Capacitance Characteristics

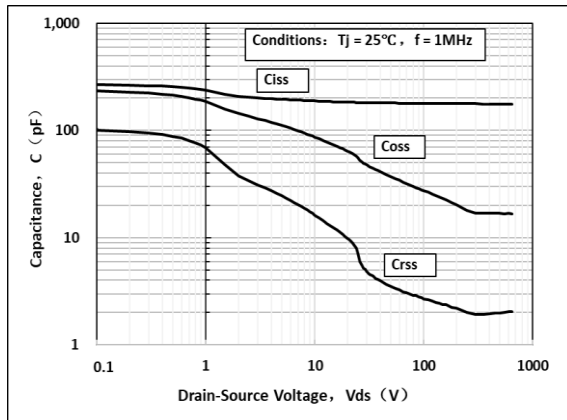
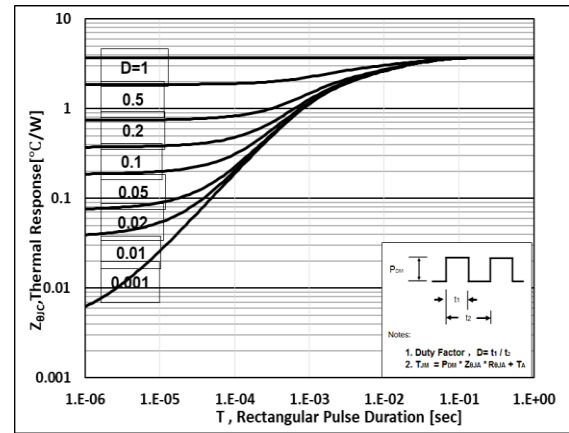


Fig 18: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

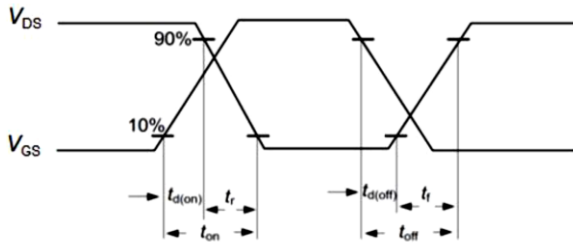


Figure B. Dynamic test circuit

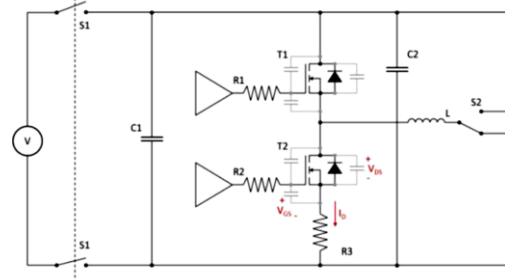


Figure C. Definition of body diodeswitching characteristics

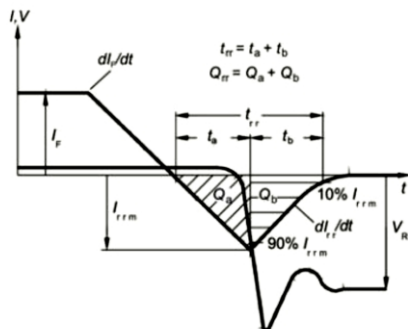
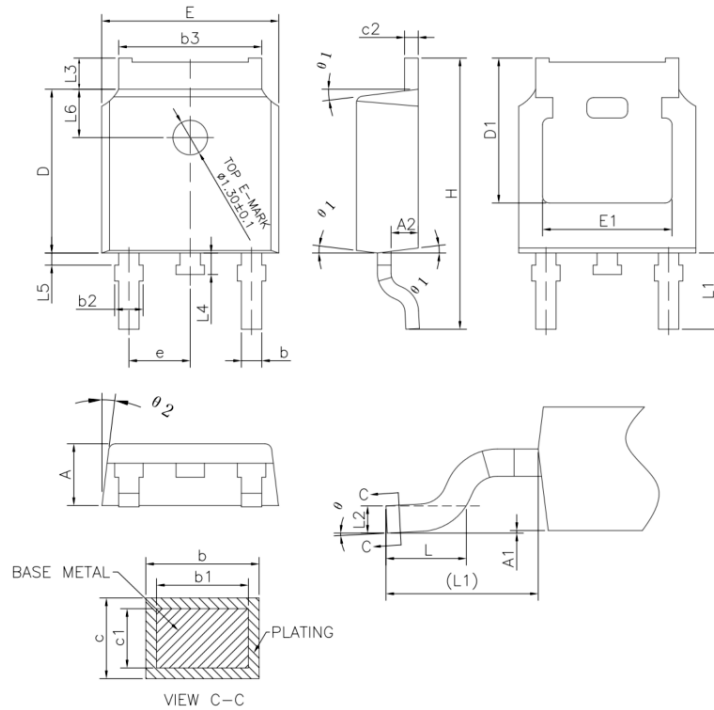


Figure C. Definition of diode switching characteristics



Package Dimensions

Package TO-252-2L



SYMBOL	Unit: mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	-	0.10
A2	0.90	1.01	1.10
b	0.72	-	0.85
b1	0.71	0.76	0.81
b2	0.72	-	0.90
b3	5.13	5.33	5.46
c	0.47	-	0.60
c1	0.46	0.51	0.56
c2	0.47	-	0.60
D	6.00	6.10	6.20
D1	5.25	-	-
E	6.50	6.60	6.70
E1	4.70	-	-
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.508 BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	0.15	-	0.75
L6	1.80 REF		
θ	0°	-	8°
θ_1	5°	7°	9°
θ_2	5°	7°	9°



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