

600V / 4.0A
N-Channel Enhancement Mode MOSFET

600V, $R_{DS(ON)}=2.4\Omega@V_{GS}=10V, I_D=2.0A$

Features

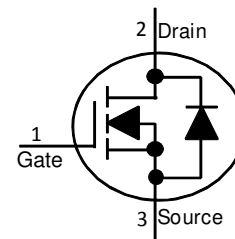
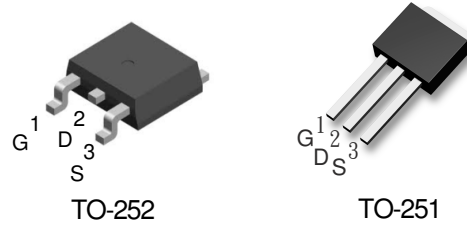
- Low ON Resistance
- Fast Switching
- Low Gate Charge & Low C_{RSS}
- Fully Characterized Avalanche Voltage and Current
- Specially Designed for AC Adapter, Battery Charger and SMPS
- In compliance with EU RoHs 2002/95/EC Directives

Mechanical Information

- Case: TO-252 / ITO-251 Molded Plastic
- Terminals : Solderable per MIL-STD-750,Method 2026

Marking & Ordering Information

TYPE	MARKING	PACKAGE	PACKING
HY4N60D	4N60D	TO-252	2500PCS/REEL
HY4N60M	4N60M	TO-251	80PCS/TUBE



Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	HY4N60D	HY4N60M	Units
Drain-Source Voltage		V_{DS}	600		V
Gate-Source Voltage		V_{GS}	± 30		V
Continuous Drain Current	$T_c=25^\circ\text{C}$	I_D	4	4	A
Pulsed Drain Current ¹⁾		I_{DM}	16	16	A
Maximum Power Dissipation	$T_c=25^\circ\text{C}$	P_D	56.8	48	W
Derating Factor			0.46	0.39	
Avalanche Energy with Single Pulse $I_{AS}=4A, VDD=90V, L=27.5mH$		E_{AS}	220		mJ
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150		$^\circ\text{C}$

Note : 1. Maximum DC current limited by the package

Thermal Characteristics

PARAMETER	Symbol	HY4N60D	HY4N60M	Units
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	2.2	2.6	$^\circ\text{C/W}$
Junction-to Ambient Thermal Resistance	$R_{\theta JA}$	50	110	$^\circ\text{C/W}$

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Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2.0A$	-	2.0	2.4	Ω
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	10	μA
Gate Body Leakage	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=480V, I_D=4.0A$ $V_{GS}=10V$	-	15.4	22	nC
Gate-Source Charge	Q_{gs}		-	3.8	-	
Gate-Drain Charge	Q_{gd}		-	5.4	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=300V, I_D=4.0A$ $V_{GS}=10V, R_G=25\Omega$	-	12.4	16	ns
Turn-On Rise Time	t_r		-	13.2	18	
Turn-Off Delay Time	$t_{d(off)}$		-	22.8	32	
Turn-Off Fall Time	t_f		-	9.6	14	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V$ $f=1.0MHz$	-	460	620	pF
Output Capacitance	C_{oss}		-	63	72	
Reverse Transfer Capacitance	C_{rss}		-	1.8	5.6	
Source-Drain Diode						
Max. Diode Forward Current	I_S	-	-	-	4.0	A
Max.Pulsed Source Current	I_{SM}	-	-	-	16	A
Diode Forward Voltage	V_{SD}	$I_S=4.0A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_F=4.0A$ $di/dt=100A/\mu s$	-	290	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.8	-	μC

NOTE : Plus Test : Pluse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Typical Characteristics Curves ($T_C=25^\circ\text{C}$, unless otherwise noted)

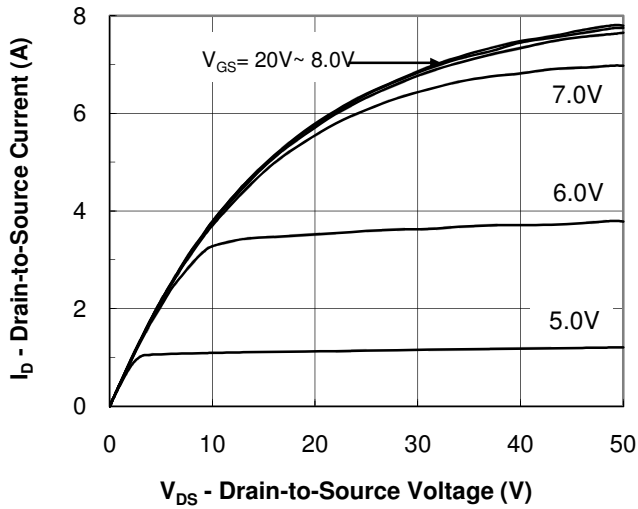


Fig.1 Output Characteristic

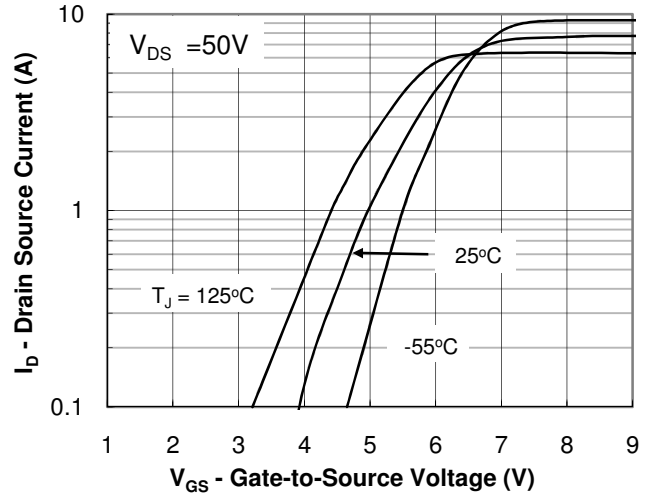


Fig.2 Transfer Characteristic

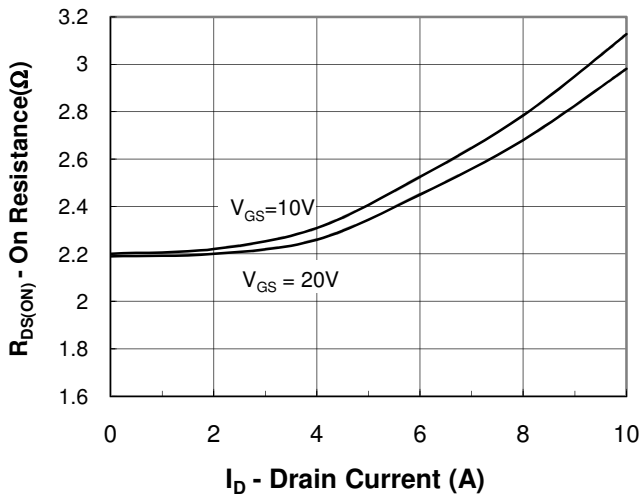


Fig.3 On-Resistance vs Drain Current

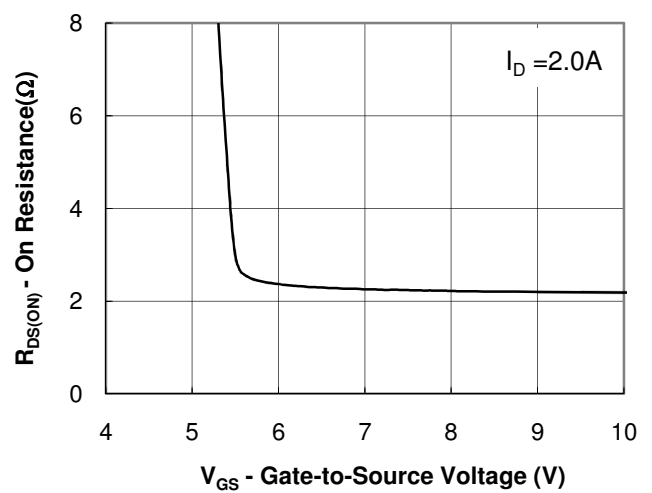


Fig.4 On-Resistance vs Gate to Source Voltage

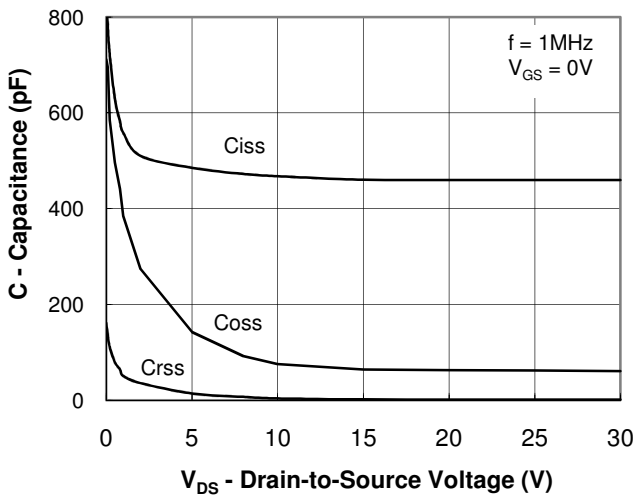


Fig.5 Capacitance Characteristic

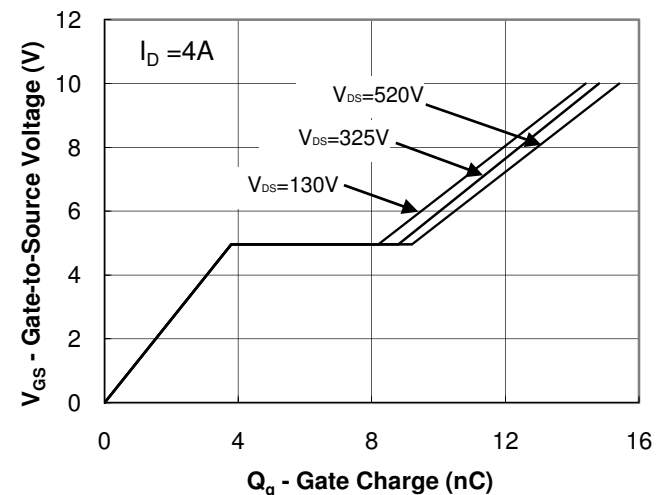


Fig.6 Gate Charge Characteristic

Typical Characteristics Curves ($T_C=25^\circ\text{C}$, unless otherwise noted)

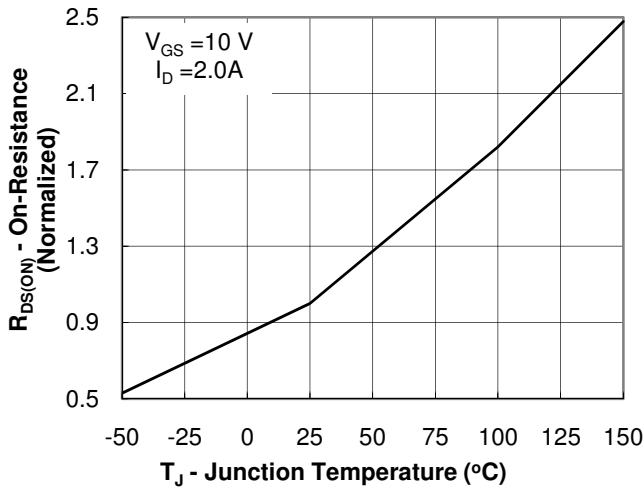


Fig.7 On-Resistance vs Junction Temperature

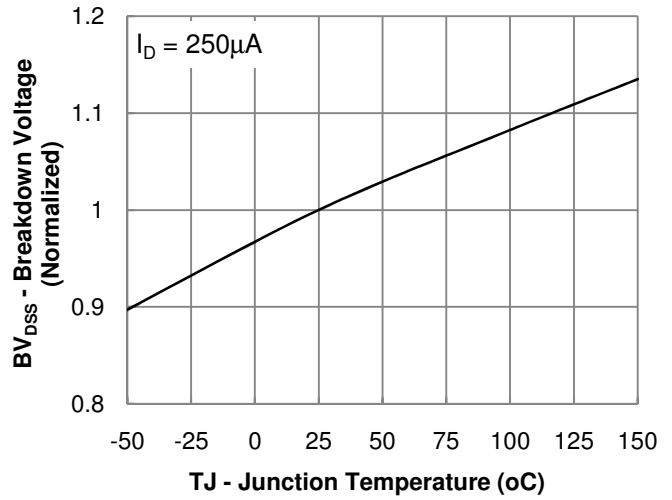


Fig.8 Breakdown Voltage vs Junction Temperature

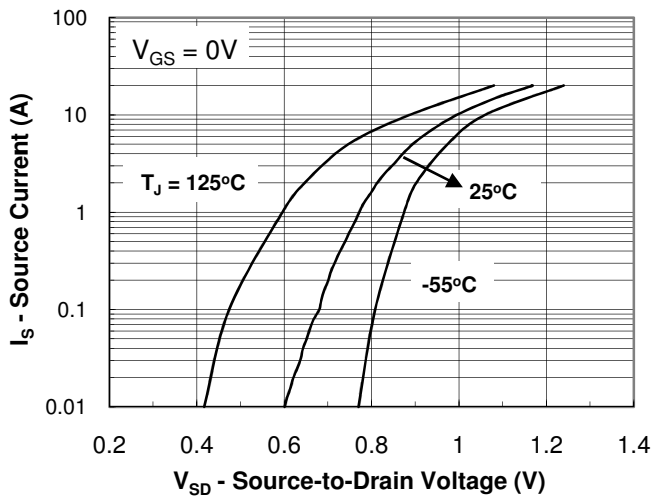


Fig.9 Body Diode Forward Voltage Characteristic