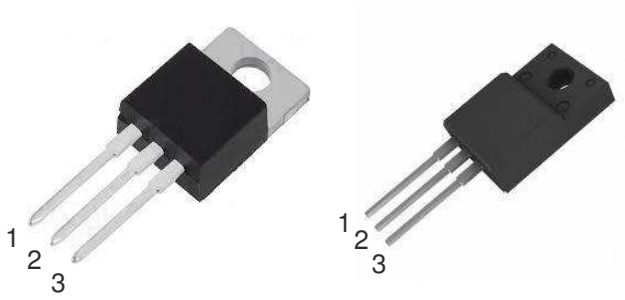
500V / 13A
N-Channel Enhancement Mode MOSFET

500V, $R_{DS(ON)}$=0.52Ω@V_{GS}=10V, I_D=6.5A

Features

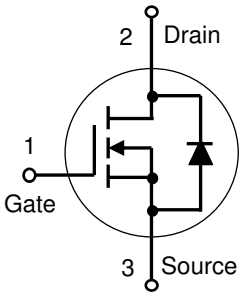
- Low On-State Resistance
- Fast Switching
- Low Gate Charge & Low C_{RSS}
- Fully Characterized Avalanche Voltage and Current
- Specially Desigened for AC Adapter, Battery Charger and SMPS
- In compliance with EU RoHs 2002/95/EC Directives

TO-220AB ITO-220AB



Mechanical Information

- Case: TO-220AB / ITO-220AB Molded Plastic
- Terminals : Solderable per MIL-STD-750,Method 2026



Marking & Ordering Information

TYPE	MARKING	PACKAGE	PACKING
HY13N50T	13N50T	TO-220AB	50PCS/TUBE
HY13N50FT	13N50FT	ITO-220AB	50PCS/TUBE

Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Parameter		Symbol	HY13N50T	HY13N50FT	Units
Drain-Source Voltage		V_{DS}	500		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C=25℃	I_D	13	13	A
Pulsed Drain Current [1]		I_{DM}	52	52	A
Maximum Power Dissipation Derating Factor	T_C=25℃	P_D	183 1.47	52 0.42	W
Avalanche Energy with Single Pulse I_{AS}=13A, V_{DD}=140V, L=7.5mH		E_{AS}	633		mJ
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150		℃

Note : 1. Maximum DC current limited by the package

Thermal Characteristics

Parameter	Symbol	HY13N50T	HY13N50FT	Units
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	0.68	2.4	℃/W
Junction-to-Case Thermal Resistance	$R_{\theta JA}$	50	110	℃/W

COMPANY RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN、FUNCTIONS AND RELIABILITY WITHOUT NOTICE

Electrical Characteristics (T_C=25℃, Unless otherwise noted)

Paramter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V、I_D=250uA	500	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}、I_D=250uA	2.0	-	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V、I_D=6.5A	-	0.44	0.52	Ω
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=500V、V_{GS}=0V	-	-	10	uA
Gate Body Leakage Current	I_{GSS}	V_{GS}=±30V、V_{DS}=0V	-	-	±100	nA
Dynamic						
Total Gate Charge	Qg	V_{DS}=400V，I_D=13A V_{GS}=10V	-	25.2	32	nC
Gate-Source Charge	Qgs		-	6.8	-	
Gate-Drain Charge	Qgd		-	7.6	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=250V，I_D=13A V_{GS}=10V，R_G=25Ω	-	26.8	32	ns
Turn-On Rise Time	t_r		-	32	42	
Turn-Off Delay Time	$t_{d(off)}$		-	68	82	
Turn-Off Fall Time	t_f		-	22.6	28	
Input Capacitance	C_{iss}	V_{DS}=25V，V_{GS}=0V f=1.0M_{HZ}	-	1450	-	pF
Output Capacitance	C_{oss}		-	190	-	
Reverse Transfer Capacitance	C_{rss}		-	6.5	-	
Source-Drain Diode						
Max. Diode Forwad Voltage	I_S	-	-	-	13	A
Max. Pulsed Source Current	I_{SM}	-	-	-	52	A
Diode Forward Voltage	V_{SD}	I_S=13A、V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V、I_S=13A di/dt=100A/us	-	450	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.5	-	uC

NOTE : Pulse Test : Pulse Width ≦ 300us, duty cycle ≦ 2%

Typical Characteristics Curves (T_C=25℃, unless otherwise noted)

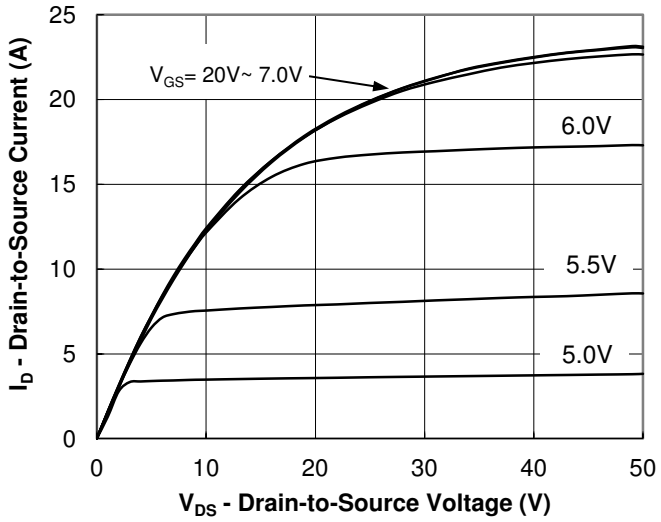


Fig.1 Output Characteristic

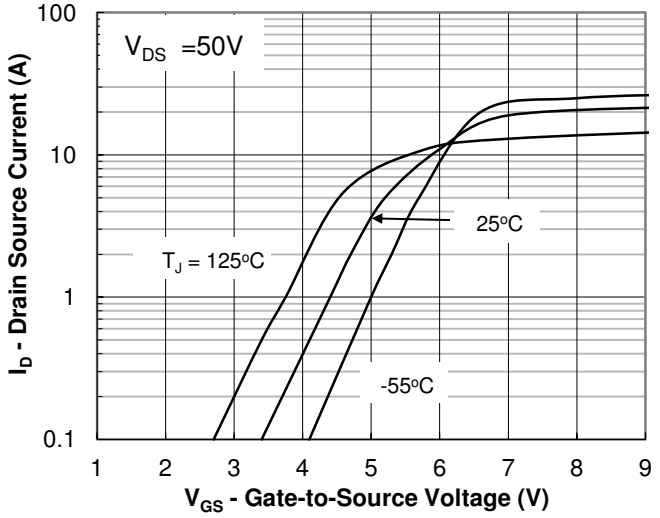


Fig.2 Transfer Characteristic

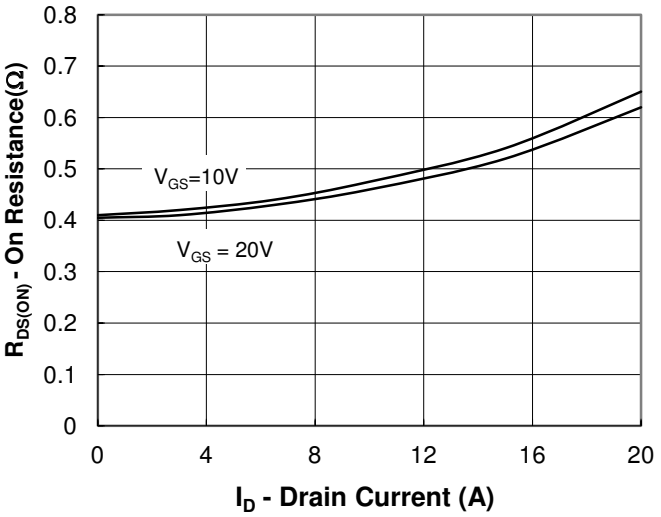


Fig.3 On-Resistance vs Drain Current

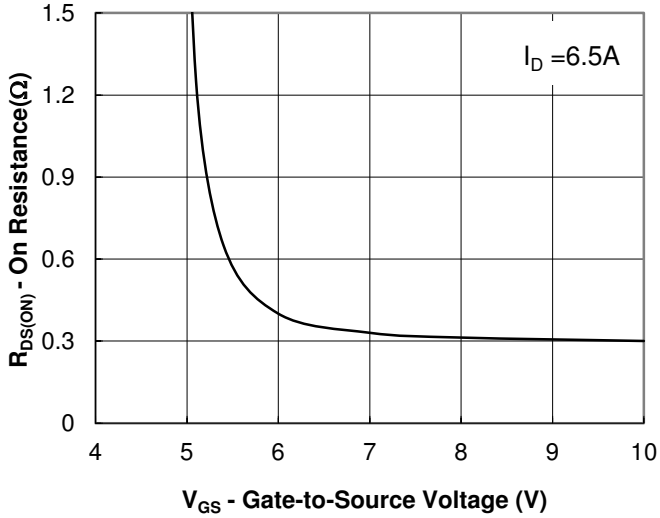


Fig.4 On-Resistance vs Gate to Source Voltage

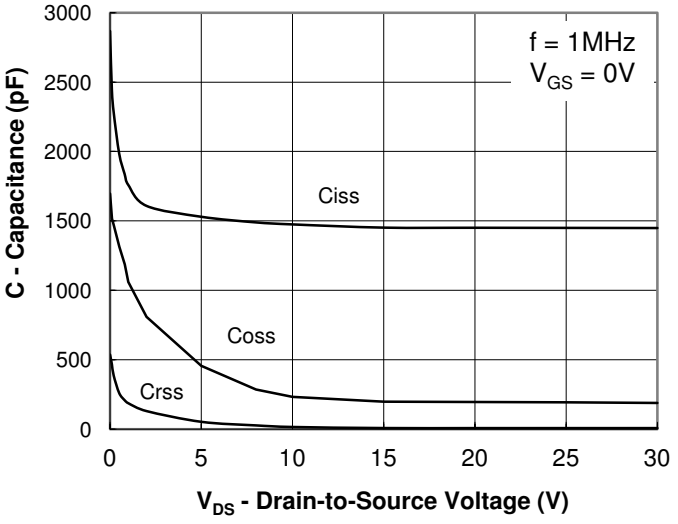


Fig.5 Capacitance Characteristic

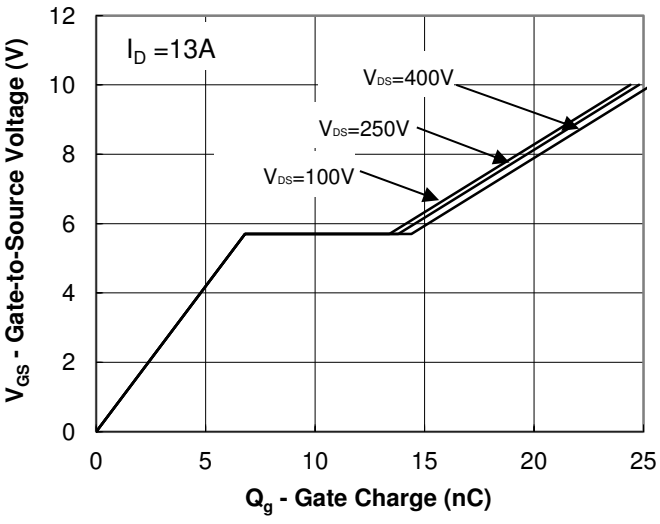


Fig.6 Gate Charge Characteristic

Typical Characteristics Curves (T_C=25℃, unless otherwise noted)

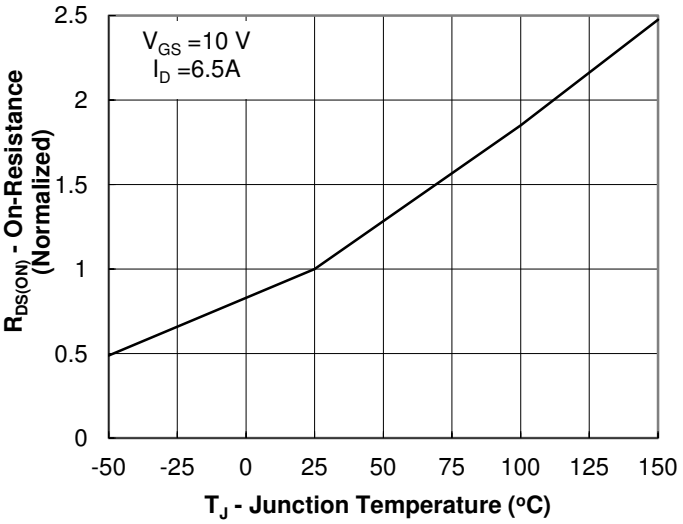


Fig.7 On-Resistance vs Junction Temperature

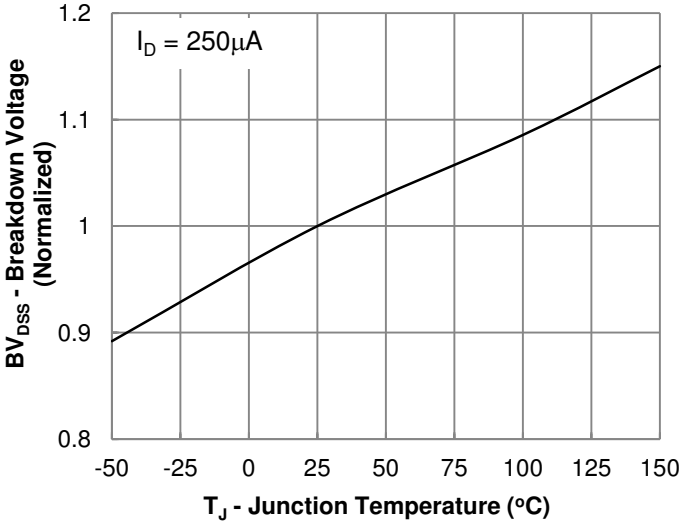


Fig.8 Breakdown Voltage vs Junction Temperature

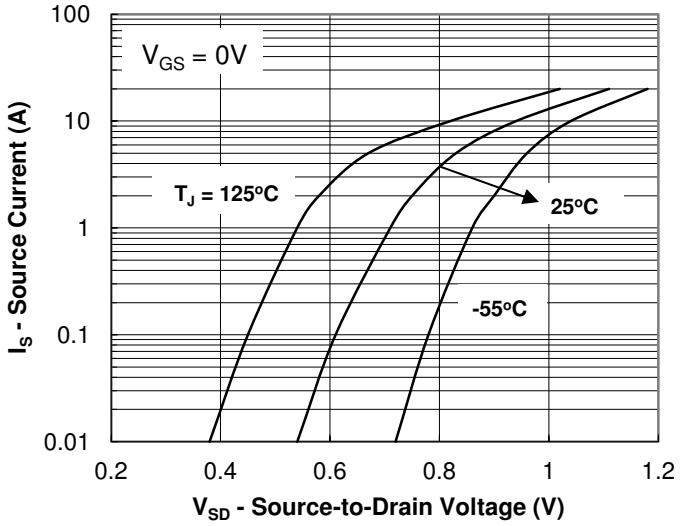


Fig.9 Body Diode Forward Voltage Characteristic