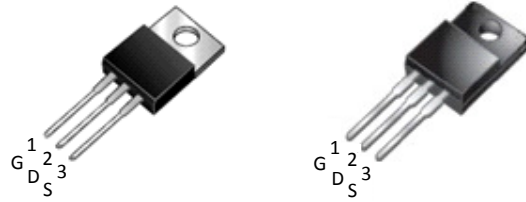


<b>650V / 10A</b> <b>N-Channel Enhancement Mode MOSFET</b>	$650V, R_{DS(ON)}=1.0\Omega @ V_{GS}=10V, I_D=5.0A$
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### Features

- 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



TO-220AB

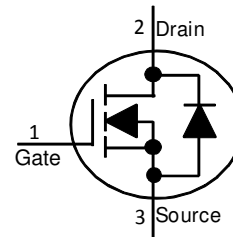
ITO-220AB

### Mechanical Information

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

### Marking & Ordering Information

TYPE	MARKING	PACKAGE	PACKING
HY10N65T	10N65T	TO-220AB	50PCS/TUBE
HY10N65FT	10N65FT	ITO-220AB	50PCS/TUBE



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

Parameter		Symbol	HY10N65T	HY10N65FT	Units
Drain-Source Voltage		$V_{DS}$	650		V
Gate-Source Voltage		$V_{GS}$	$\pm 30$		V
Continuous Drain Current	$T_c=25^\circ C$	$I_D$	10	10	A
Pulsed Drain Current <sup>1)</sup>		$I_{DM}$	40	40	A
Maximum Power Dissipation	$T_c=25^\circ C$	$P_D$	156	50	W
Derating Factor			1.25	0.4	
Avalanche Energy with Single Pulse $I_{AS}=10A, V_{DD}=90V, L=12mH$		$E_{AS}$	600		mJ
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150		$^\circ C$

**Note :** 1. Maximum DC current limited by the package

### Thermal Characteristics

PARAMETER	Symbol	HY10N65T	HY10N65FT	Units
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	0.8	2.5	$^\circ C/W$
Junction-to Ambient Thermal Resistance	$R_{\theta JA}$	62.5	100	$^\circ C/W$

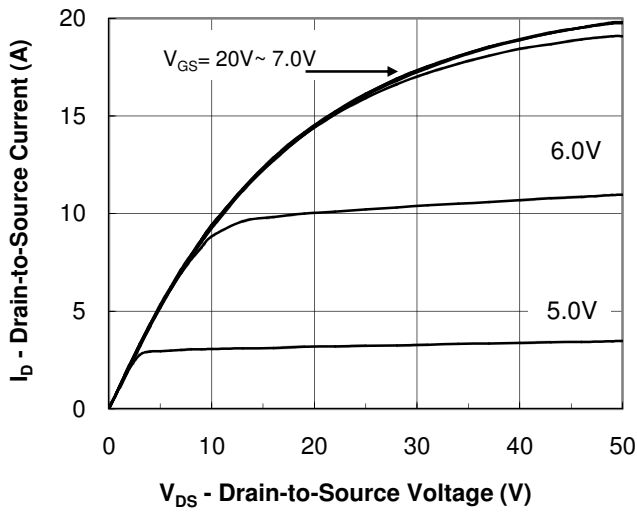
**COMPANY RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN,FUNCTIONS AND RELIABILITY WITHOUT NOTICE**

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

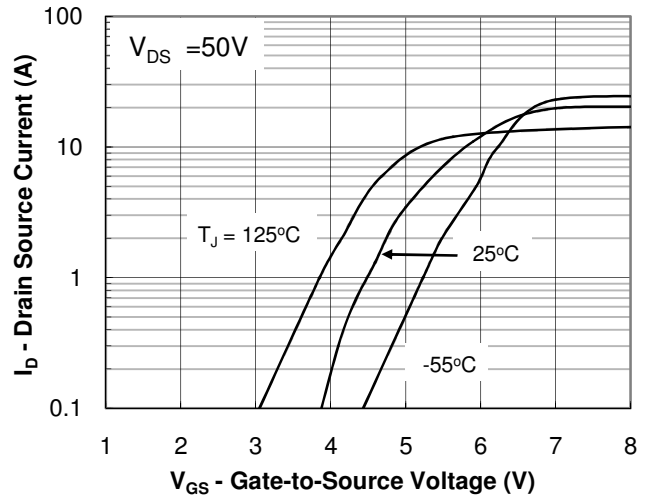
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5.0A$	-	0.84	1.0	$\Omega$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	10	$\mu A$
Gate Body Leakage	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=520V, I_D=10A,$ $V_{GS}=10V$	-	36.4	48	nC
Gate-Source Charge	$Q_{gs}$		-	7.8	-	
Gate-Drain Charge	$Q_{gd}$		-	10.2	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=325V, I_D=10A$ $V_{GS}=10V, R_G=25\Omega$	-	13.8	18	ns
Turn-On Rise Time	$t_r$		-	21.6	32	
Turn-Off Delay Time	$t_{d(off)}$		-	52	88	
Turn-Off Fall Time	$t_f$		-	24.8	36	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V$ $f=1.0MHz$	-	1150	1850	pF
Output Capacitance	$C_{oss}$		-	145	175	
Reverse Transfer Capacitance	$C_{rss}$		-	4.5	12	
<b>Source-Drain Diode</b>						
Max. Diode Forward Current	$I_S$	-	-	-	10	A
Max.Pulsed Source Current	$I_{SM}$	-	-	-	40	A
Diode Forward Voltage	$V_{SD}$	$I_S=10A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_F=10A$ $di/dt=100A/\mu s$	-	440	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	4.3	-	$\mu C$

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

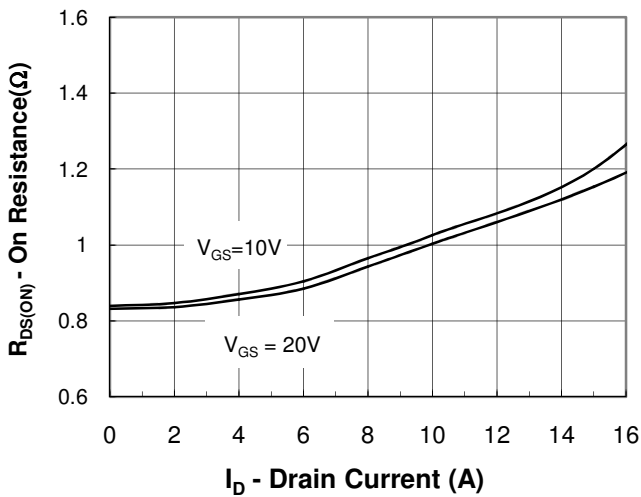
## Typical Characteristics Curves ( $T_C=25^\circ\text{C}$ , unless otherwise noted)



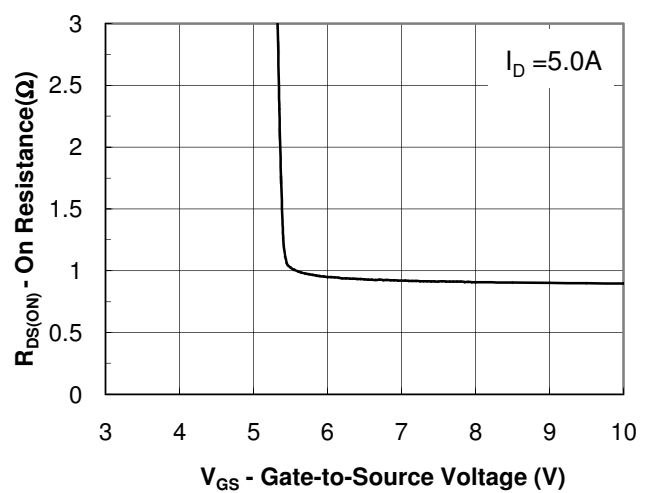
**Fig.1 Output Characteristic**



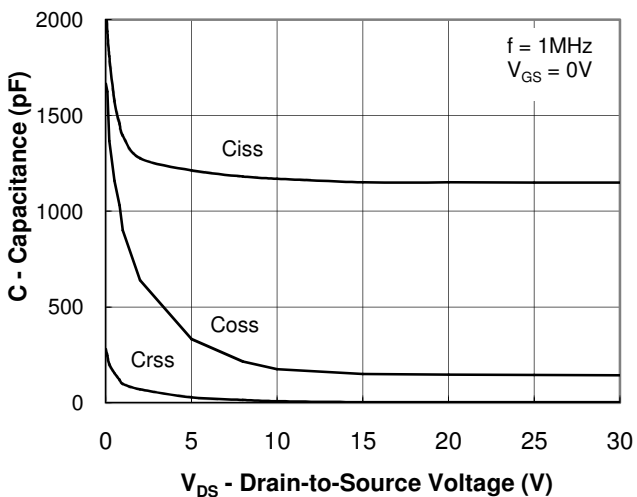
**Fig.2 Transfer Characteristic**



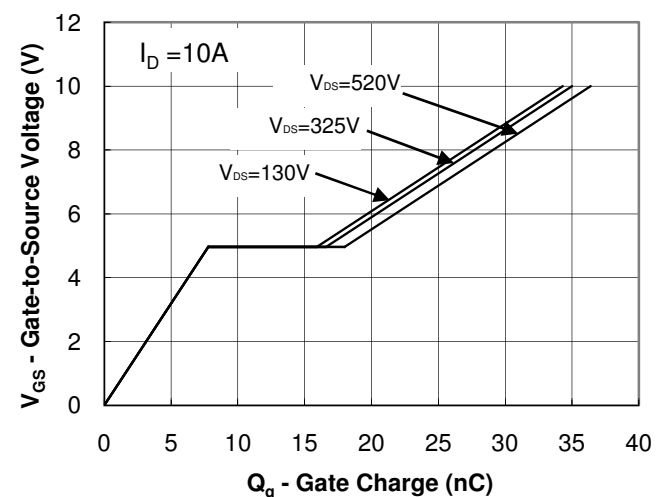
**Fig.3 On-Resistance vs Drain Current**



**Fig.4 On-Resistance vs Gate to Source Voltage**

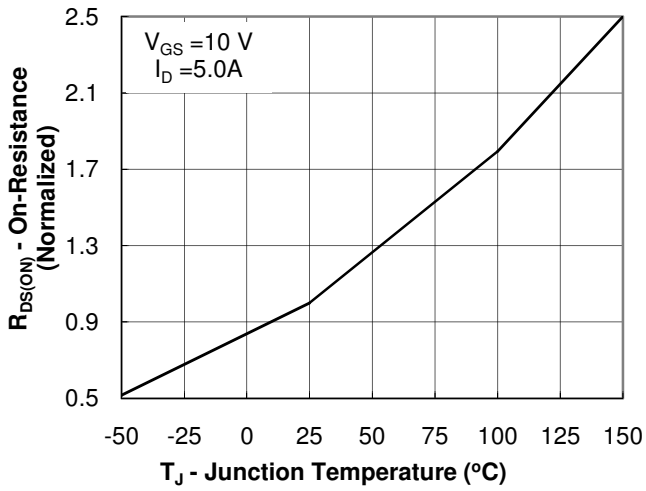


**Fig.5 Capacitance Characteristic**

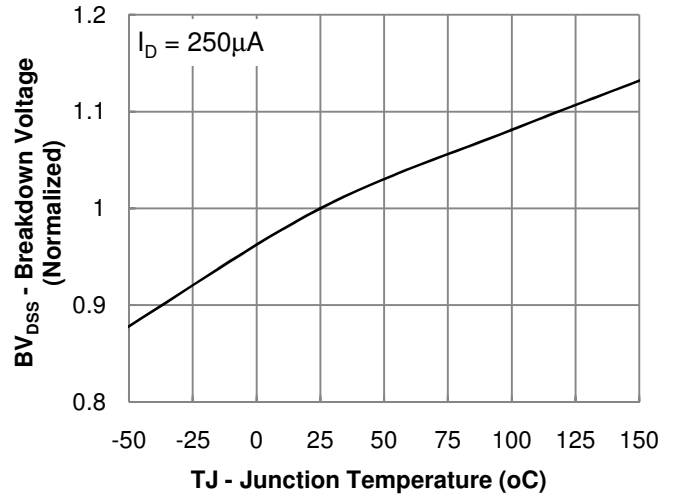


**Fig.6 Gate Charge Characteristic**

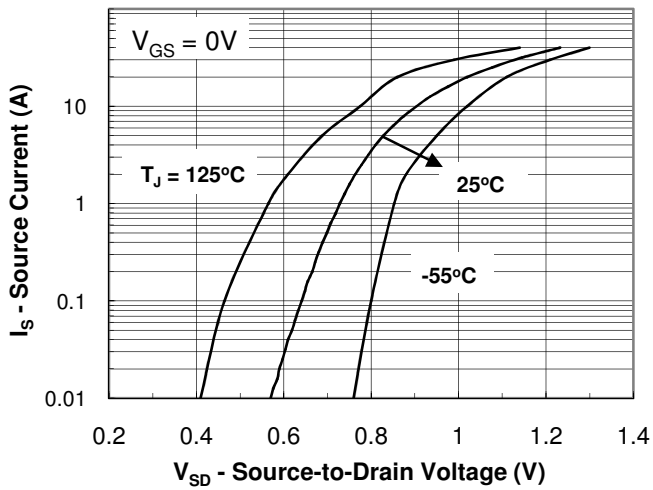
## Typical Characteristics Curves ( $T_C=25^\circ\text{C}$ , unless otherwise noted)



**Fig.7 On-Resistance vs Junction Temperature**



**Fig.8 Breakdown Voltage vs Junction Temperature**



**Fig.9 Body Diode Forward Voltage Characteristic**