

Features ➤ Super Low Gate Charge ➤ 100% EAS Guaranteed ➤ Green Device Available ➤ Excellent CdV/dt effect decline ➤ Advanced high cell density Trench technology	B_{vds}	R_{dson}	I_D
	-30V	3.5mΩ	-120A
	Application ➤ DC-DC Converters ➤ Synchronous-rectification applications ➤ Power management functions		

Package

Marking and pin assignment

TO220 top view

Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
120P03	120P03T	TO220	50

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current, $V_{GS}=-10V^{1,6}$	$T_C=25^{\circ}\text{C}$	I_D	-120	A
	$T_C=100^{\circ}\text{C}$	I_D	-80	A
Pulsed Drain Current ²		I_{DM}	-470	A
Single Pulse Avalanche Energy ³		EAS	580	mJ
Avalanche Current		I_{AS}	-80	A
Power Dissipation ⁴	$T_C=25^{\circ}\text{C}$	P_D	100	W
Storage Temperature Range		T_{STG}	-55 ~ +175	$^{\circ}\text{C}$
Operating Junction Temperature Range		T_J	-55 ~ +175	$^{\circ}\text{C}$



Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	3.6	°C/W
Thermal Resistance, Junction -to-Ambient ¹	$R_{\theta JA}$	50	°C/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL120P03T	TO220	1	2	3	Tube

Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	1	μA
Gate-body Leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.7	-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$	-	3.5	4.5	m Ω
		$V_{GS}=-4.5V, I_D=-20A$	-	5	6.5	m Ω
Forward Transconductance	g_{fs}	$V_{DS}=-5V, I_D=-20A$	-	65	-	S
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V,$ $f=1MHz$	-	7000	-	pF
Output Capacitance	C_{oss}		-	820	-	
Reverse Transfer Capacitance	C_{rss}		-	540	-	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	2.2	-	Ω
Total Gate Charge	Q_g	$V_{GS}=-10V, V_{DS}=-15V, I_D=-20A$	-	130	-	nC
Gate-Source Charge	Q_{gs}		-	12	-	
Gate-Drain Charge	Q_{gd}		-	31	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DS}=-15V,$ $R_L=0.75\Omega, R_G=3\Omega$	-	14	-	ns
Rise Time	t_r		-	13	-	
Turn-Off Delay Time	$t_{d(off)}$		-	65	-	
Fall Time	t_f		-	37	-	
Source-Drain Current	I_{SD}		-	-	-108	A
Forward on Voltage ³	V_{SD}	$I_S=-20A, V_{GS}=0V$	-	-	-1.2	V
Reverse Recovery time	T_{rr}	$I_F=-20A, dI/dt=100A/\mu s$	-	30	-	ns
Reverse Recovery Charge	Q_{rr}		-	40	-	nC

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=15\text{V}$, $V_G=-10\text{V}$, $R_g=25\Omega$, $L=0.5\text{mH}$.
- 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Performance Characteristics

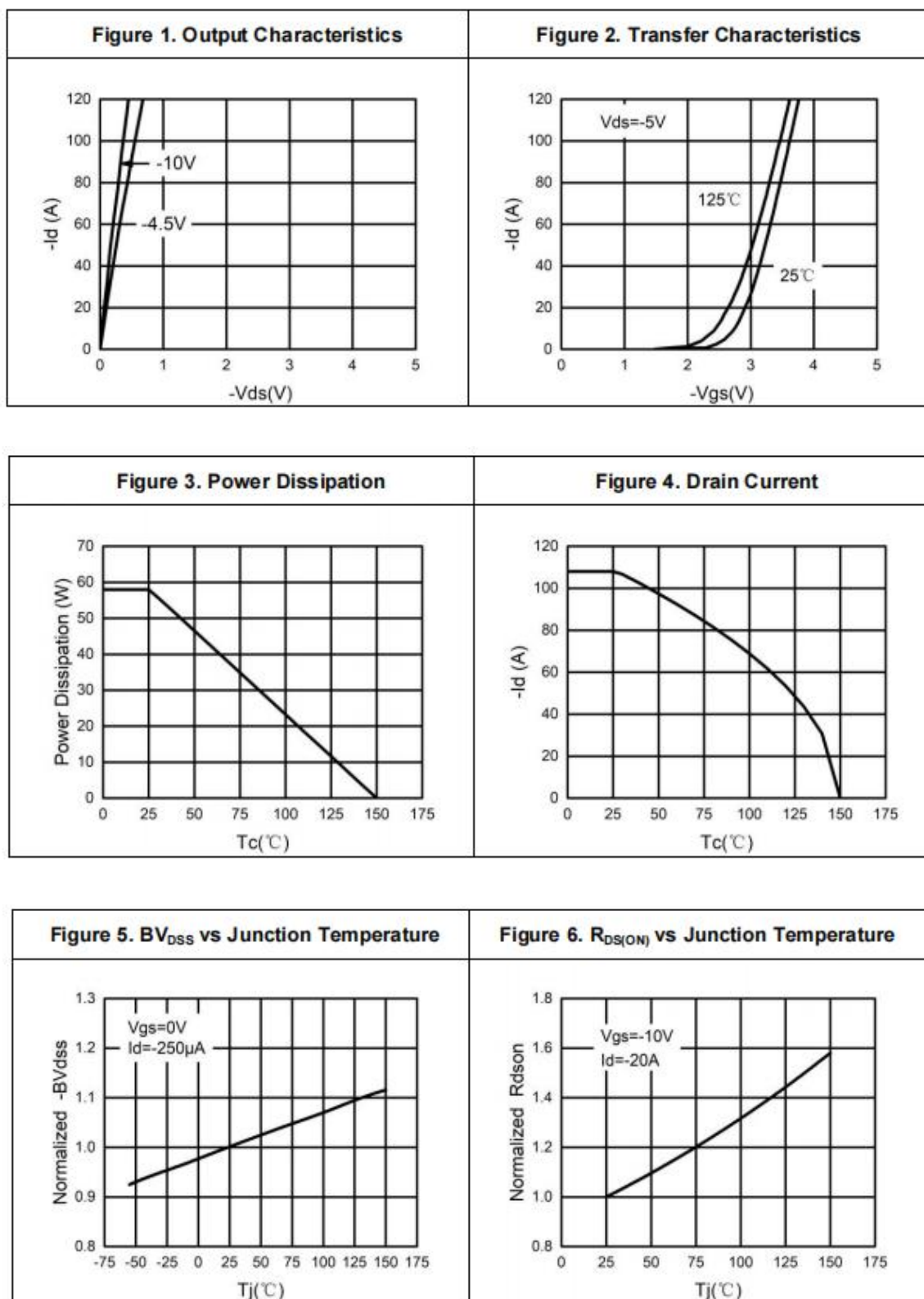


Figure 7. Gate Charge Waveforms

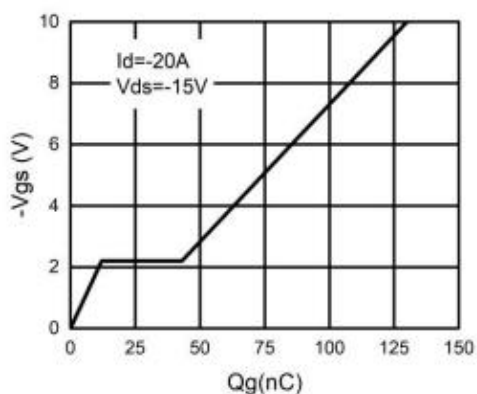


Figure 8. Capacitance

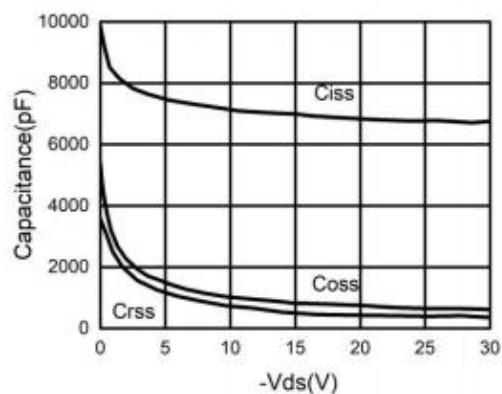


Figure 9. Body-Diode Characteristics

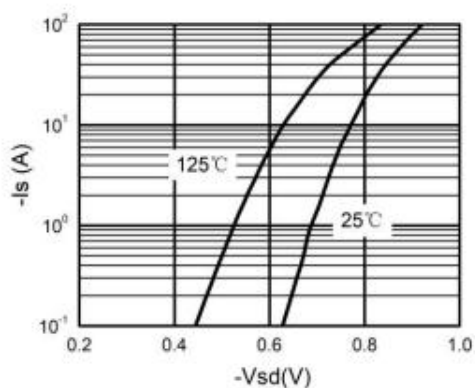
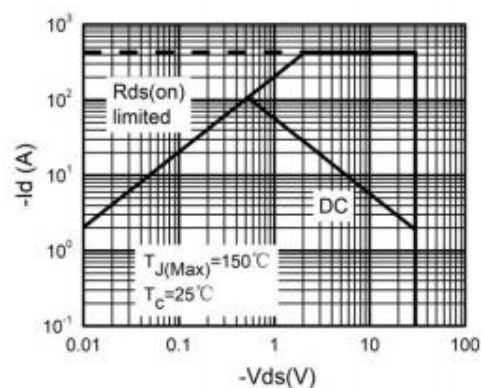
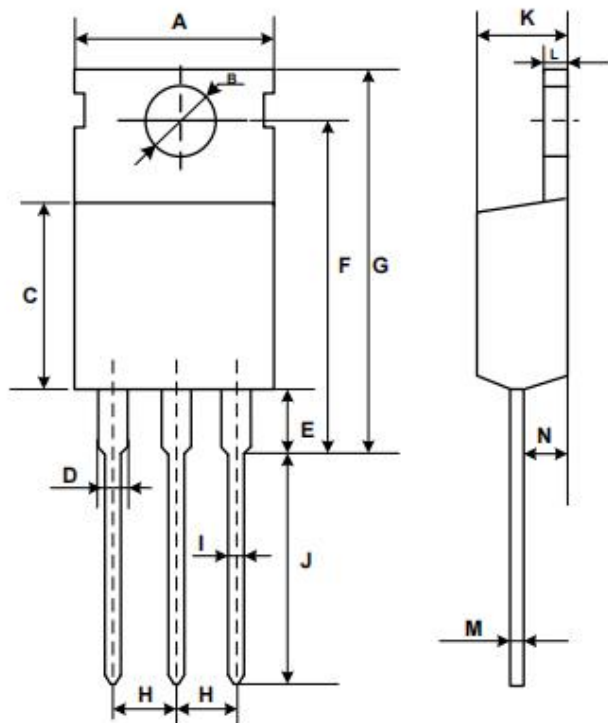


Figure 10. Maximum Safe Operating Area



Package Dimensions TO220

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.50
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60



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