

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	2.8mΩ@4.5V	100A
	3.3mΩ@2.5V	



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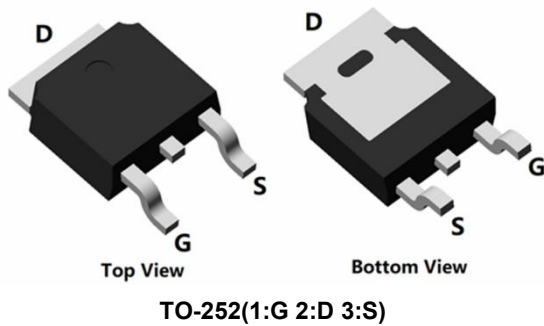
Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

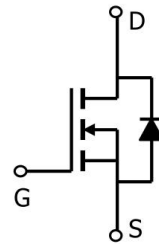
Applications

- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

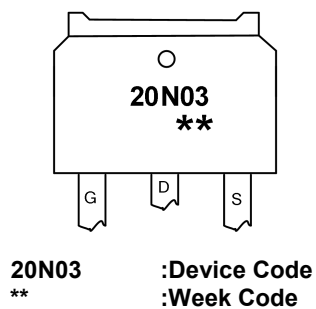
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tape
SP20N03TH	TO-252	2500

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	100	A
Continuous Drain Current ($T_C=100^\circ\text{C}$)	I_D	66	A
Pulsed Drain Current	I_{DM}	400	A
Single Pulse Avalanche Energy ¹	E_{AS}	205	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	45	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	2.8	$^\circ\text{C/W}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

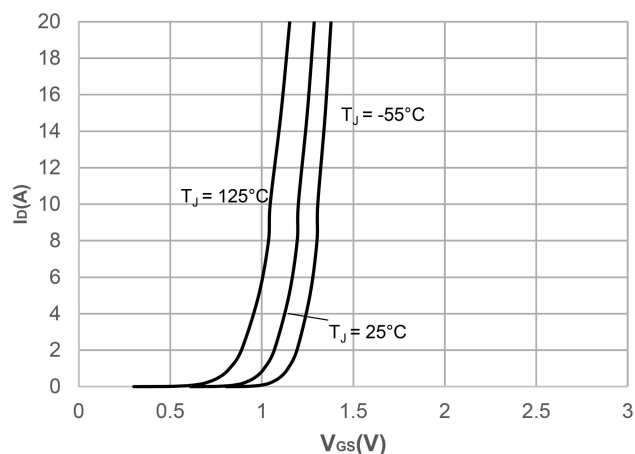
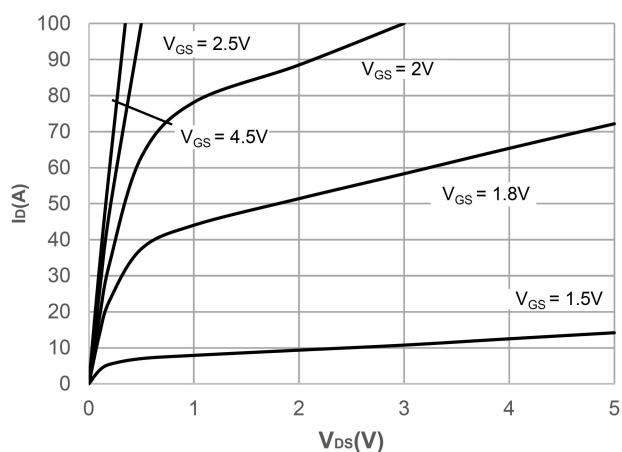
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	20	-	-	V
Drain-Source Leakage Current	IDSS	VDS=16V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	IGSS	VGS=±10V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =250uA	0.5	0.85	1.0	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=4.5V , ID=20A	-	2.8	4.5	mΩ
		VGS=2.5V , ID=15A	-	3.3	5.0	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=10V , VGS=0V , f=1MHz	-	3935	-	pF
Output Capacitance	Coss		-	701	-	
Reverse Transfer Capacitance	Crss		-	333	-	
Total Gate Charge	Qg	VGS=4.5V,VDS=10V,ID=30A	-	65	-	nC
Gate-Source Charge	Qgs		-	8	-	
Gate-Drain Charge	Qgd		-	11	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VGS=10V,VDD=10V, ID=30A, RG=3Ω	-	7	-	nS
Rise Time	Tr		-	19	-	
Turn-Off Delay Time	Td(off)		-	72	-	
Fall Time	Tf		-	68	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	100	A
Reverse Recovery Time	Trr	IS=20A, di/dt=100A/us, TJ=25℃	-	16	-	nS
Reverse Recovery Charge	Qrr		-	5.6	-	nC

Note :

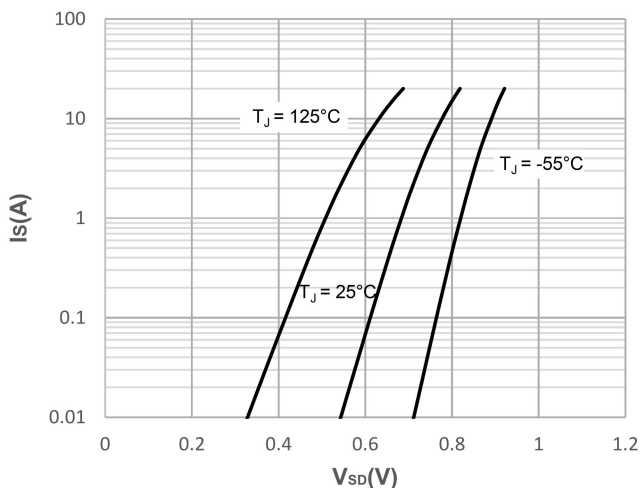
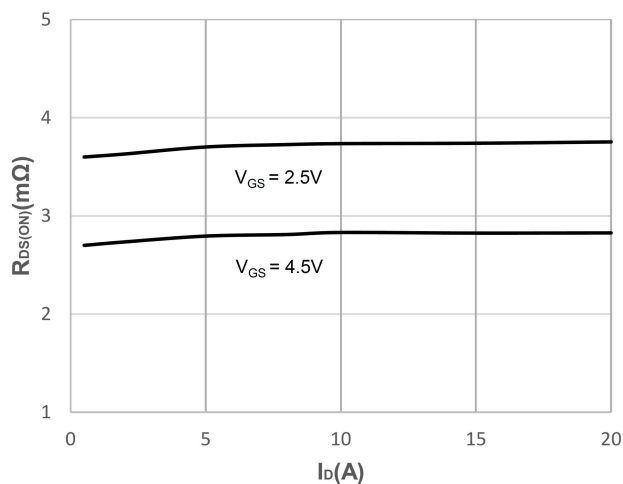
- The EAS test condition is $V_{DD}=15V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

Typical Characteristics



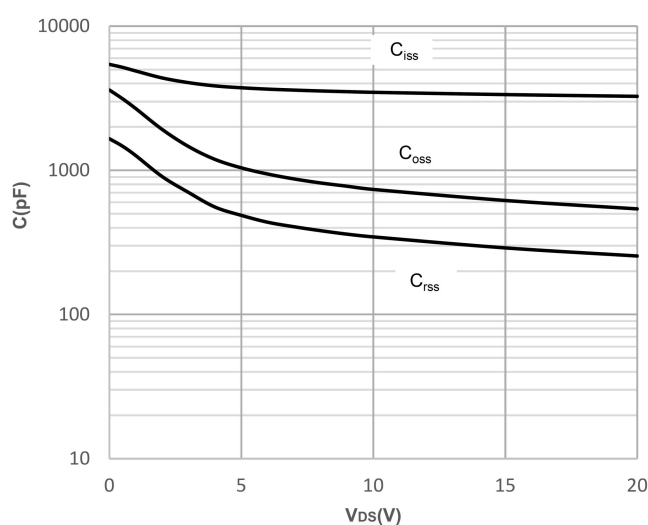
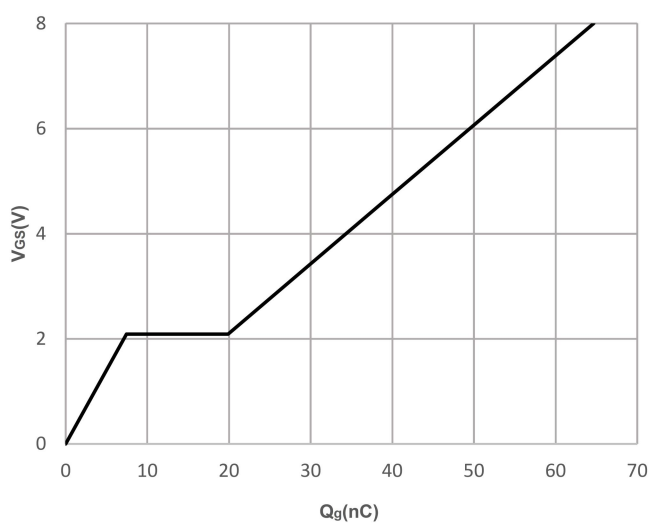
Output Characteristics

Typical Transfer Characteristics



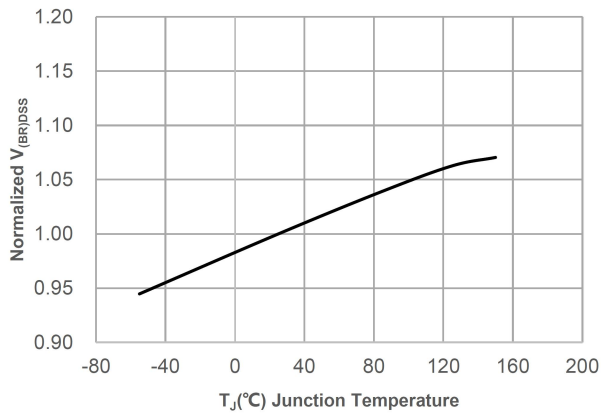
On-resistance vs. Drain Current

Body Diode Characteristics

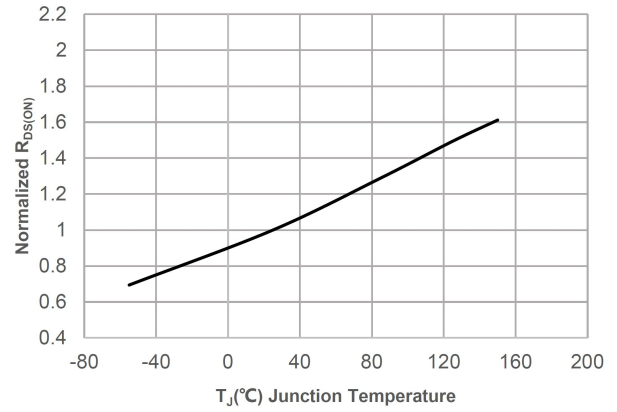


Gate Charge Characteristics

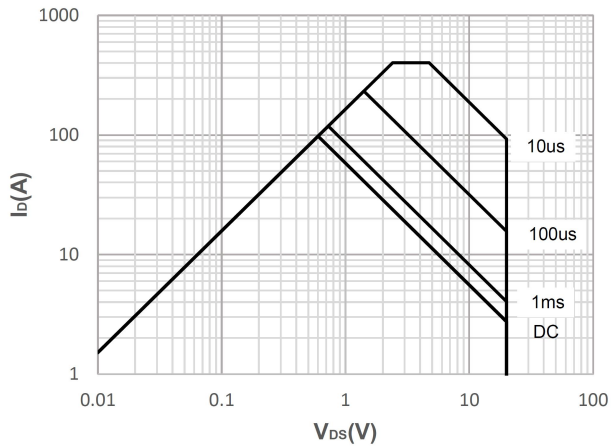
Capacitance Characteristics



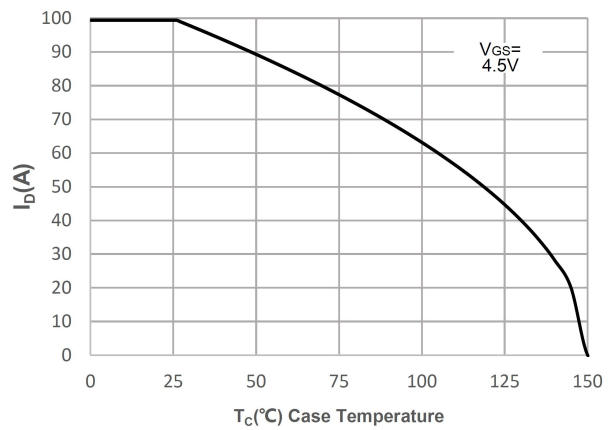
Normalized Breakdown Voltage vs. Junction Temperature



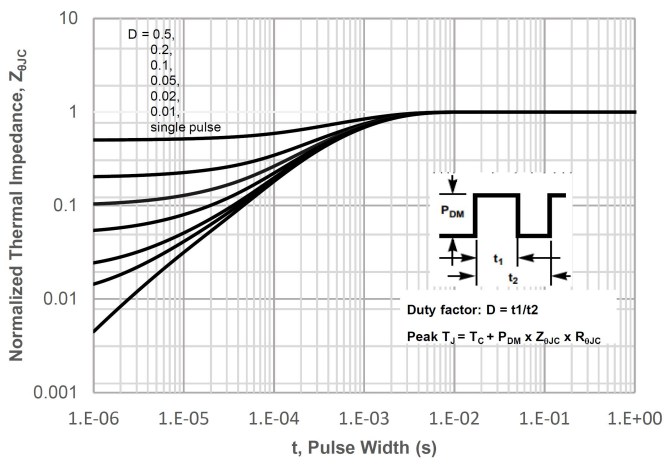
Normalized on Resistance vs. Junction Temperature



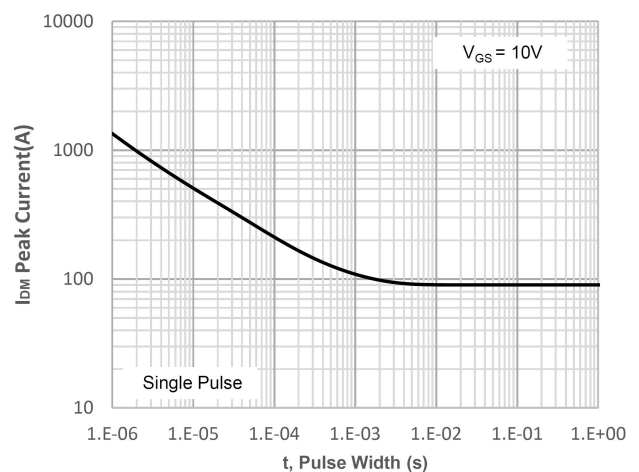
Maximum Safe Operating Area



Maximum Continuous Drain Current vs. Case Temperature



Normalized Maximum Transient Thermal Impedance



Peak Current Capacity

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

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