

100V N-Channel Enhancement Mode MOSFET

Voltage 100 V **$R_{DS(ON),max}$** < 5.0 m Ω

Current 120 A **Q_G (TYP)** 40.5 nC

Feature

- $R_{DS(ON),max}$ < 5.0 m Ω at $V_{GS} = 10$ V, $I_D = 50$ A
- $R_{DS(ON),max}$ < 7.0 m Ω at $V_{GS} = 6$ V, $I_D = 25$ A
- High switching speed
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

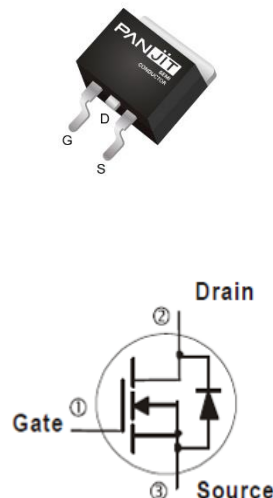
Mechanical Data

- Case: TO-263 package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 1.38 grams

Application

- SR solutions of Power supply, BMS, BLDC motor driver switch.

TO-263



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

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (Note 3)	$T_C = 25^\circ\text{C}$	I_D	120	A
	$T_C = 100^\circ\text{C}$		76	
Pulsed Drain Current (Note 6)	$T_C = 25^\circ\text{C}$	I_{DM}	480	A
Single Pulse Avalanche Current (Note 5)		I_{AS}	50	A
Single Pulse Avalanche Energy (Note 5)		E_{AS}	318	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	138	W
	$T_C = 100^\circ\text{C}$		55	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	$^\circ\text{C}$

Thermal Characteristics

PARAMETER		SYMBOL	MAXIMUM	UNITS
Thermal Resistance	Junction-to-Case (Bottom)	$R_{\theta JC}$	0.9	$^\circ\text{C/W}$
	Junction-to-Ambient (Note.4)	$R_{\theta JA}$	60	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0 V, I _D =250 μA	100	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =270 μA	1.8	2.8	3.8	
Drain-Source On-State Resistance (Note 1)	R _{DS(on)}	V _{GS} =10 V, I _D =50 A	-	4.3	5.0	mΩ
		V _{GS} =6 V, I _D =25 A	-	5.4	7.0	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100 V, V _{GS} =0 V	-	-	1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20 V, V _{DS} =0 V	-	-	±100	nA
Transfer characteristics (Note 1)	g _{fs}	V _{DS} =10 V, I _D =50 A	-	100	-	S
Gate Resistance	R _g	f =1.0 MHz	-	0.8	1.6	Ω
Dynamic (Note 6)						
Total Gate Charge	Q _g	V _{DS} =50 V, I _D =50 A, V _{GS} =10 V	-	40.5	53	nC
Gate-Source Charge	Q _{gs}		-	15	-	
Gate-Drain Charge	Q _{gd}		-	6	-	
Gate Plateau Voltage	V _{plateau}		-	5	-	V
Input Capacitance	C _{iSS}	V _{DS} =50 V, V _{GS} =0 V, f=250 kHz	-	3010	3910	pF
Output Capacitance	C _{oSS}		-	1080	1400	
Reverse Transfer Capacitance	C _{rSS}		-	14	-	
Output Charge	Q _{oSS}	V _{DS} =50 V, V _{GS} =0 V	-	85	110	nC
Turn-On Delay Time	t _{d(on)}	V _{DD} =50 V, I _D =50 A, V _{GS} =10 V, R _G =3.0 Ω (Note 2)	-	16	-	ns
Rise Time	t _r		-	6	-	
Turn-Off Delay Time	t _{d(off)}		-	25	-	
Fall Time	t _f		-	6	-	
Drain-Source Diode						
Diode Forward Voltage	V _{SD}	I _S =50 A, V _{GS} =0 V	-	0.9	1.2	V
Reverse Recovery Charge (Note 6)	Q _{rr}	I _F =50 A, V _{DD} =50 V di/dt=100 A/μs	-	85	170	nC
Reverse Recovery Time (Note 6)	T _{rr}		-	56	112	ns

NOTES :

1. Pulse width $\leq 300\text{ }\mu\text{s}$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3. The maximum drain current calculated by maximum junction temperature and thermal impedance. It can be varied by application and environment.
4. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz.square pad of copper.
5. E_{AS} is calculated based on the condition of $L = 1.0\text{ mH}$, $I_{AS} = 25.2\text{ A}$, $V_{DD} = 50\text{ V}$, $V_{GS} = 10\text{ V}$. 100% test at $L = 0.1\text{ mH}$, $I_{AS} = 50\text{ A}$ in production.
6. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTIC CURVES

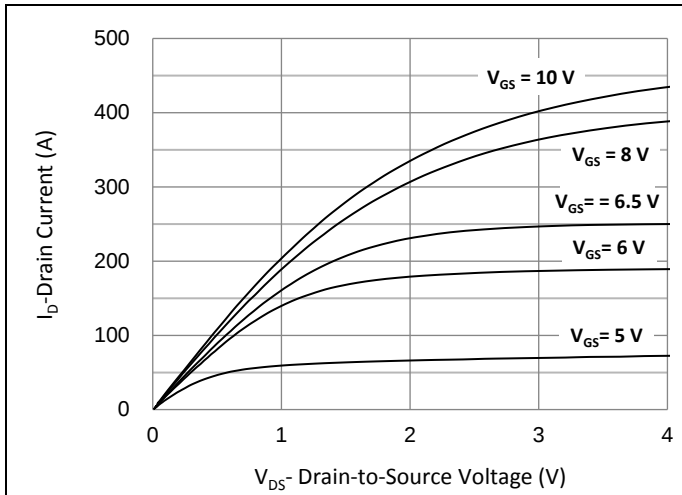


Fig.1 Output Characteristics

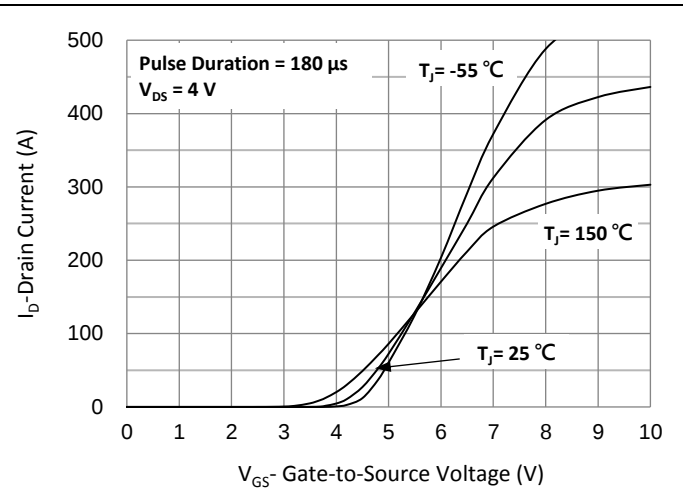


Fig.2 Transfer Characteristics

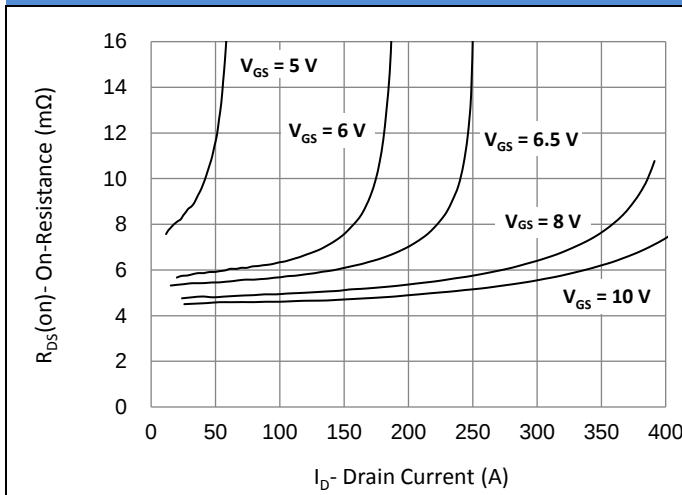


Fig.3 On-Resistance vs. Drain Current

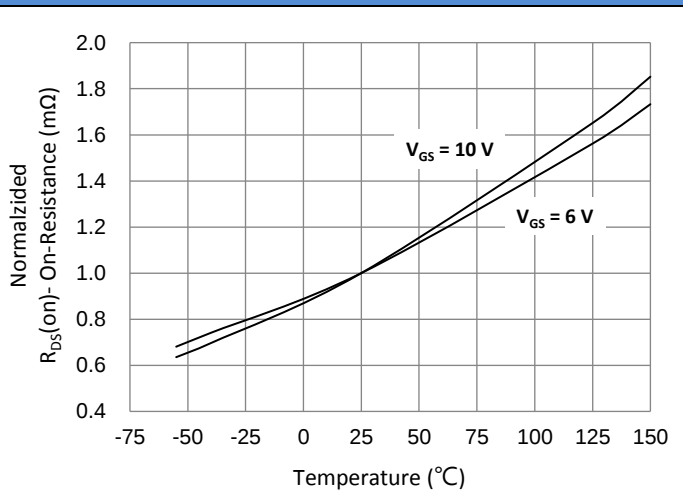


Fig.4 On-Resistance vs. Junction temperature

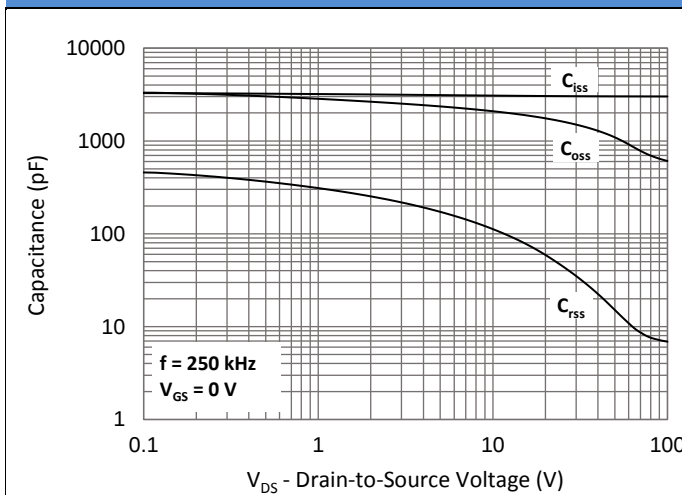


Fig.5 Capacitance vs. Drain-Source Voltage

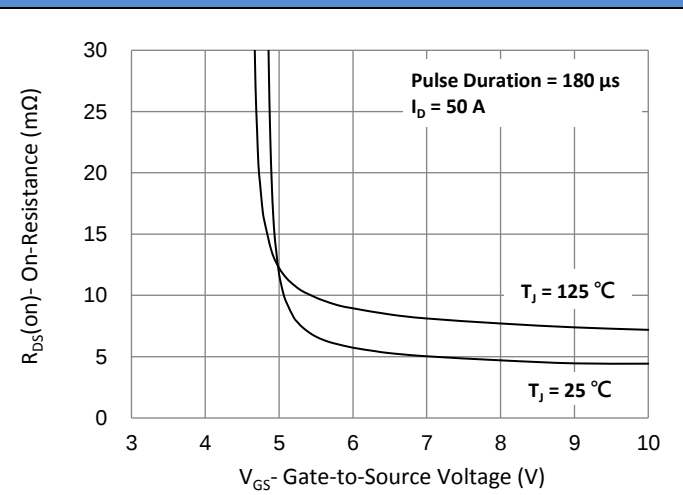


Fig.6 On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTIC CURVES

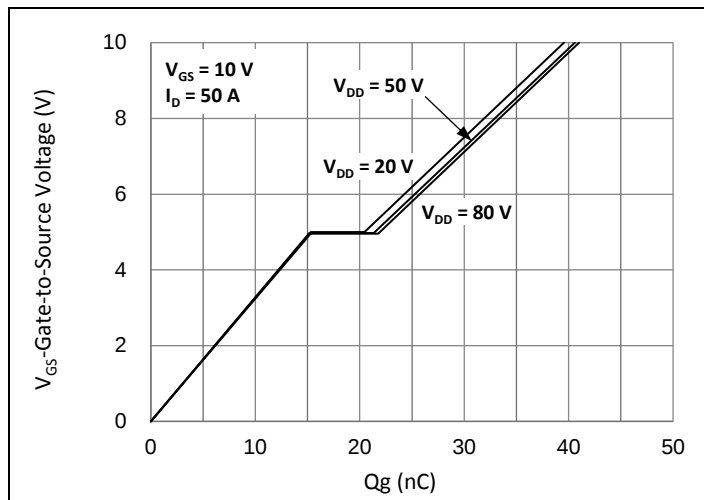


Fig.7 Gate-Charge Characteristics

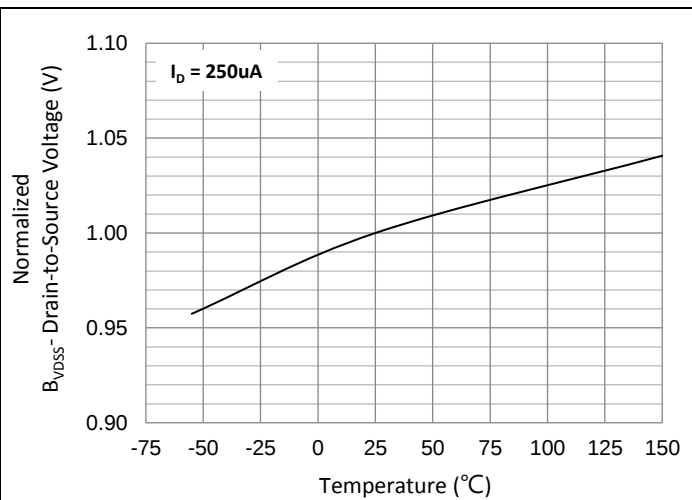


Fig.8 Breakdown Voltage Variation vs. Temperature

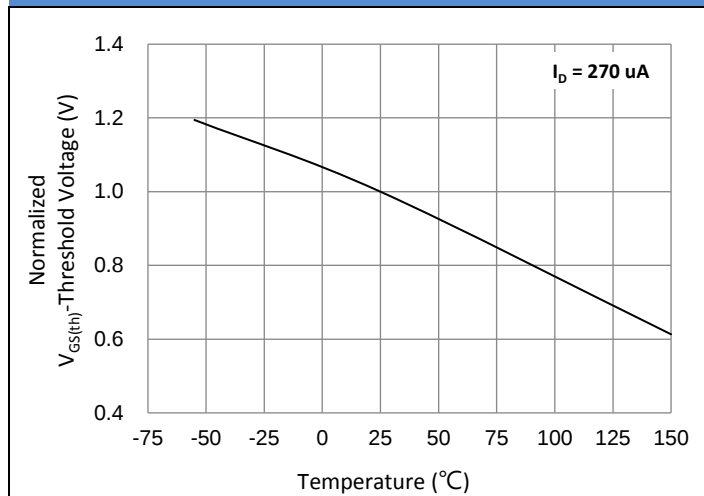


Fig.9 Threshold Voltage Variation with Temperature

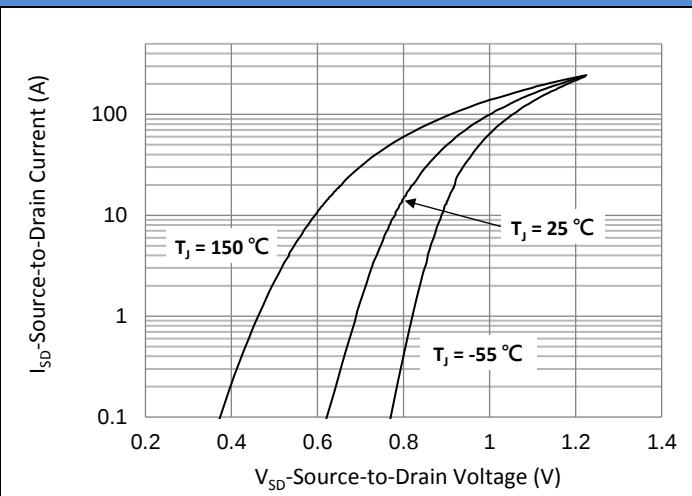


Fig.10 Source-Drain Diode Forward Voltage

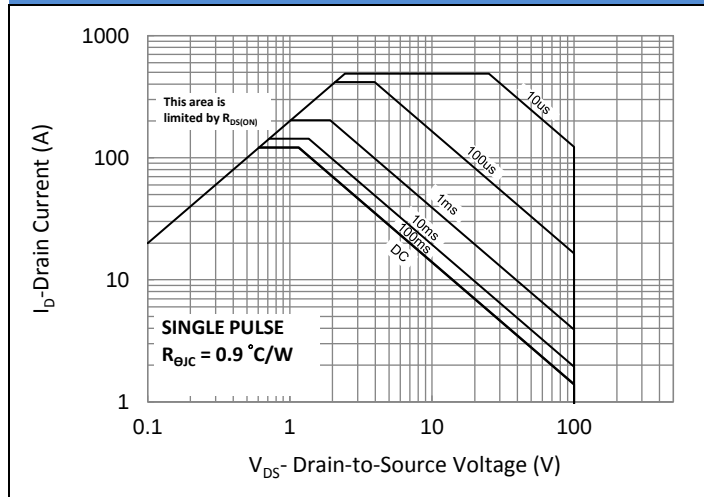


Fig.11 Maximum Safe Operating Area

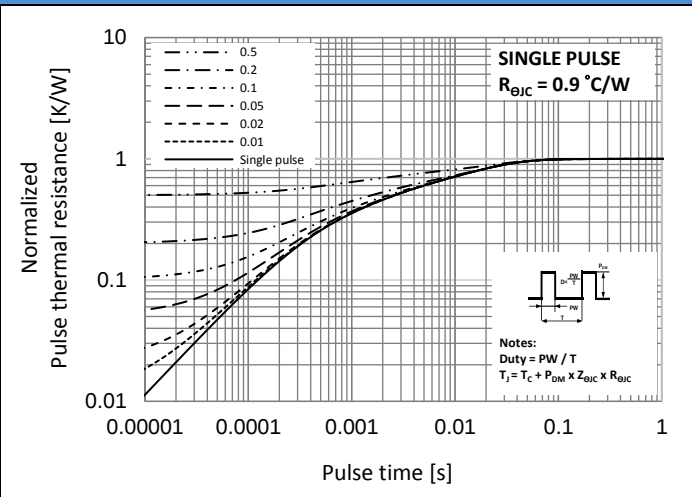


Fig.12 Normalized Transient Thermal Impedance

TYPICAL CHARACTERISTIC CURVES

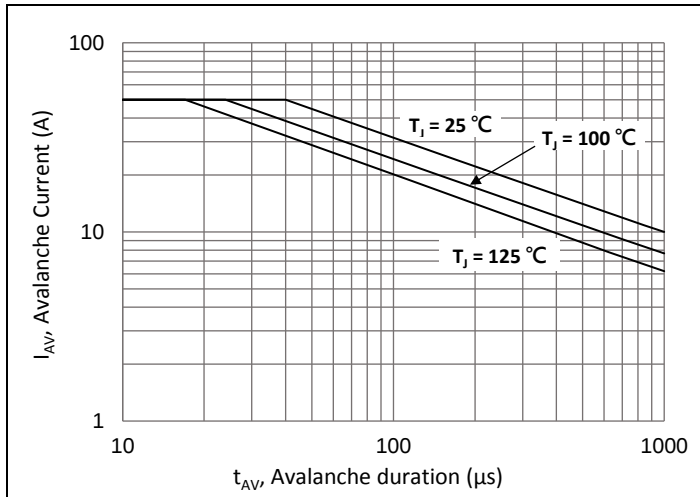


Fig.13 Avalanche Characteristics

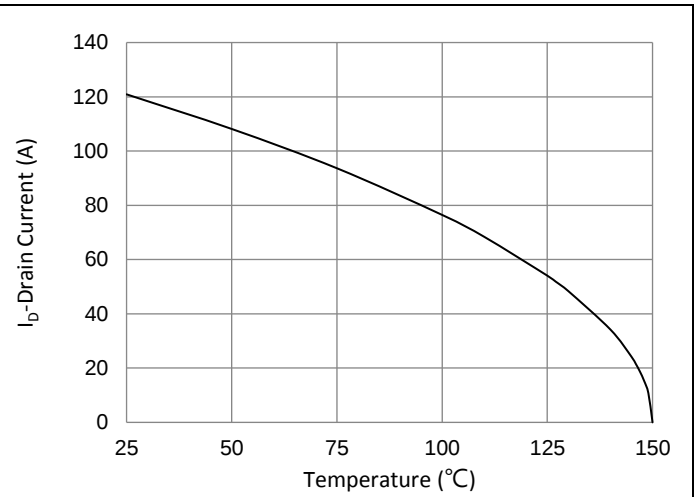


Fig.14 Drain Current vs. Case Temperature

Product and Packing Information

Part No.	Package Type	Packing Type	Marking
PSMB050N10NS2	TO-263	50pcs / Tube 800pcs / Reel	050N10NS

Packaging Information & Mounting Pad Layout

TO-263 Dimension	Unit: inch(mm)	TO-263 Pad Layout	Unit: inch(mm)

Marking Diagram

PJ
050N10NS
YWLL x

Y = Year Code
W = Week Code (A~Z)
LL = Lot Code (00~99)
x = Production Line Code

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