

BCBF170N1000P1

N-Channel Silicon Carbide Power MOSFET

1700 V, 5 A , 1000 mΩ



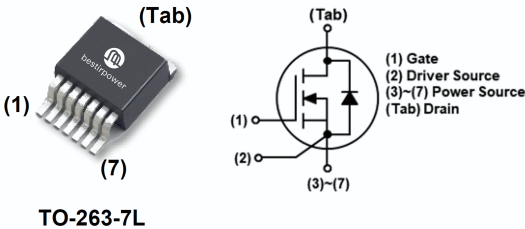
Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Resistant to Latch-Up
- Halogen Free, RoHS Compliant

BV_{DSS} , T _c =25°C	I_D , T _c =25°C	R_{DS(on)} ,typ	Q_g ,typ
1700 V	5 A	1000 mΩ	16.2 nC

Applications

- LED Lighting Power Supplies
- High Voltage DC/DC Converters
- Industrial Power Supplies
- HVAC



Absolute Maximum Ratings (T_J = 25°C unless otherwise noted)

Symbol	Parameter		Value	Unit
V _{DSS}	Drain to Source Voltage		1700	V
V _{GSmax}	Gate to Source Voltage (AC f> 1Hz)		-10 / +25	V
V _{GSop}	Recommended Operation Value		-5 / +20	V
I _D	Drain Current	V _{GS} =15V, (T _C = 25°C)	5	A
		V _{GS} =15V, (T _C = 100°C)	3.5	
		V _{GS} =20V, (T _C = 25°C)	8.6	
I _{DM}	Drain Current	Pulse Width tp Limited by TJmax	9.9	A
P _D	Power Dissipation	(T _C = 25°C), ,T _J =175 C	51	W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to 175	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction to Case, Max.	2.94	°C/W
T _{sold}	Soldering temperature, wave soldering only allowed at leads	260	°C

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$	1700	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 1700\text{ V}, V_{GS} = 0\text{ V}$	-	1	100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = +20\text{ V}$	-	-	250	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 0.5\text{ mA}$	2	3.1	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 20\text{ V}, I_D = 2\text{ A}$	-	1000	1200	mΩ
		$V_{GS} = 20\text{ V}, I_D = 2\text{ A}$	-	2100	-	

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 1200\text{ V}$ $f = 1.0\text{ MHz}, V_{AC} = 25\text{ mV}$	-	182	-	pF
C_{oss}	Output Capacitance		-	11.2	-	
C_{rss}	Reverse Capacitance		-	1.8	-	
E_{oss}	Stored Energy in Output Capacitance		-	9.3	-	μJ
$Q_{g(tot)}$	Total Gate Charge	$V_{DS} = 1200\text{ V}, I_D = 2\text{ A}$ $V_{GS} = -5\text{ V} / +20\text{ V}$	-	16.2	-	nC
Q_{gs}	Gate to Source Charge		-	2.6	-	
Q_{gd}	Gate to Drain "Miller" Charge		-	12.7	-	
R_G	Internal Gate Resistance	$f = 1.0\text{ MHz}, V_{AC} = 25\text{ mV}$	-	5	-	Ω

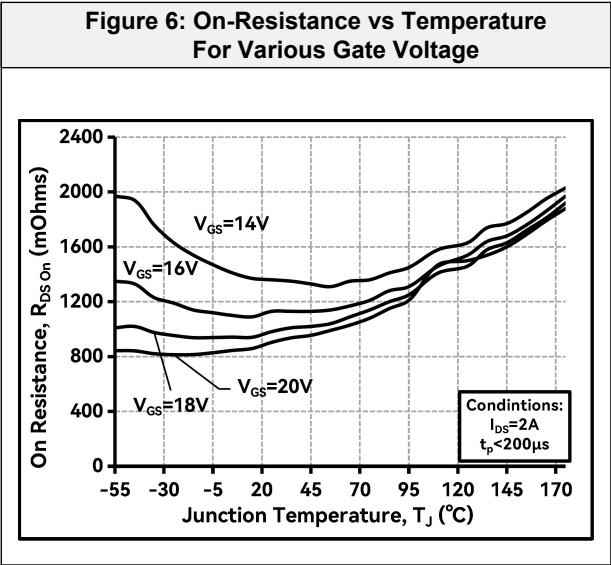
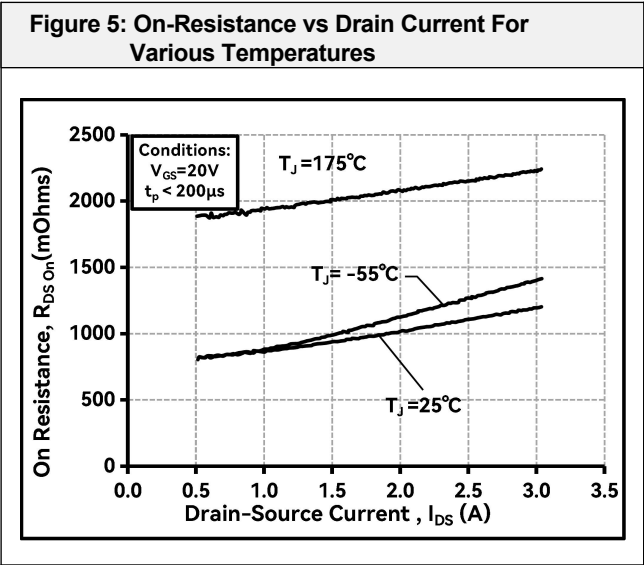
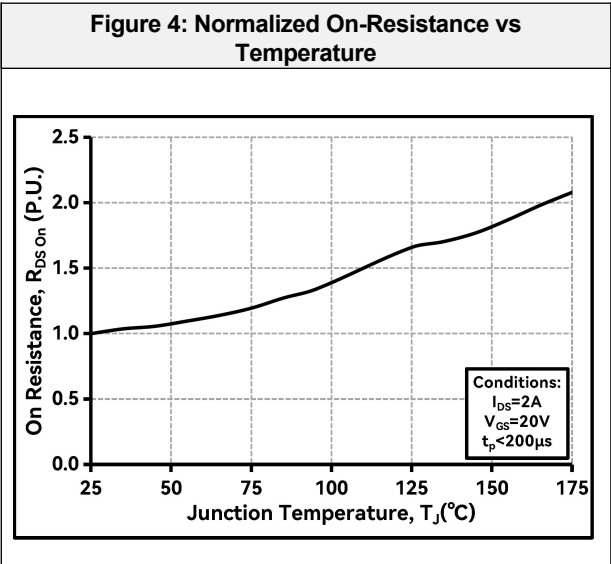
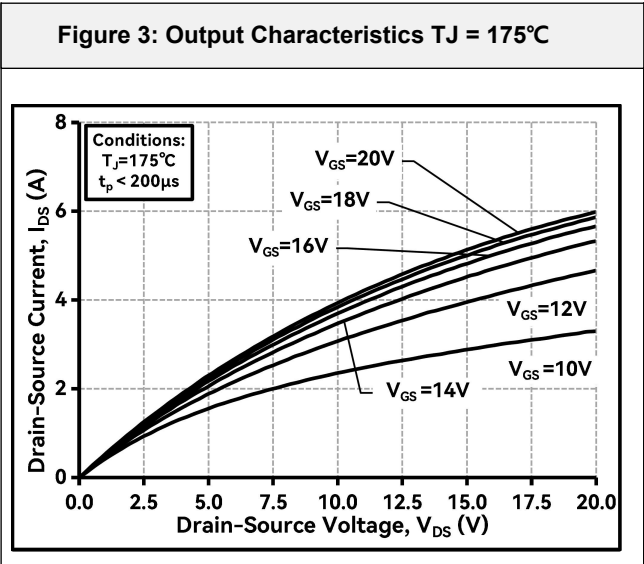
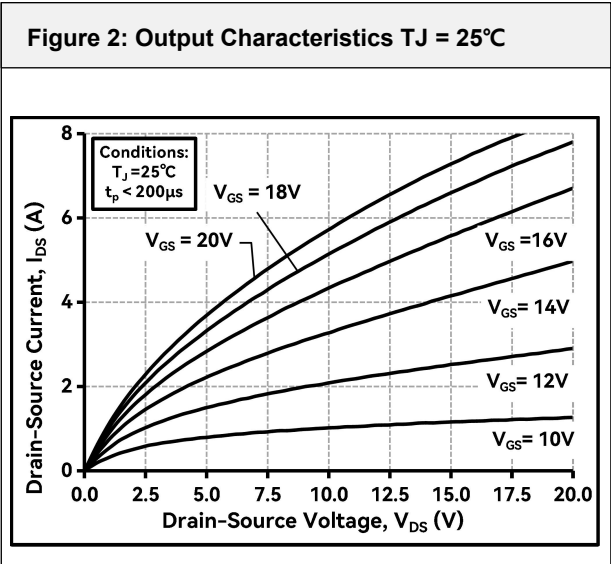
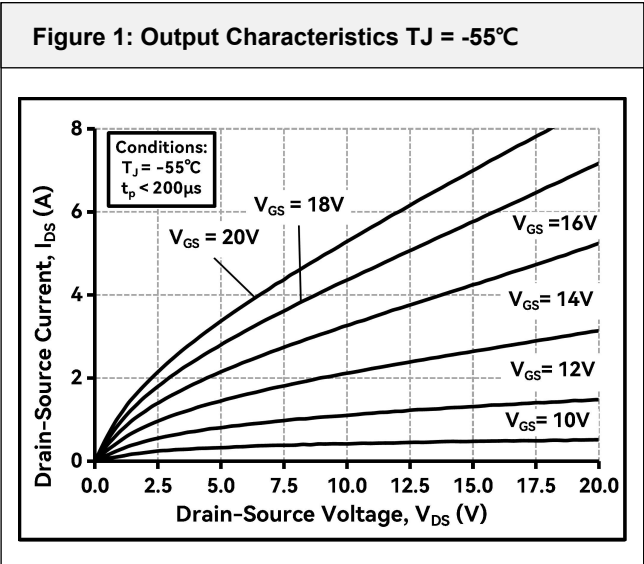
Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 1200\text{ V}, I_D = 2\text{ A}$ $V_{GS} = -5\text{ V} / +20\text{ V}$, $R_{G(ext)} = 2.2\text{ }\Omega$ $L = 10\text{ mH}$	-	17	-	ns
t_r	Turn-On Rise Time		-	15	-	
$t_{d(off)}$	Turn-Off Delay Time		-	16	-	
t_f	Turn-Off Fall Time		-	94	-	
E_{on}	Turn-on Switching Energy		-	58.4	-	μJ
E_{off}	Turn-off Switching Energy		-	1.7	-	

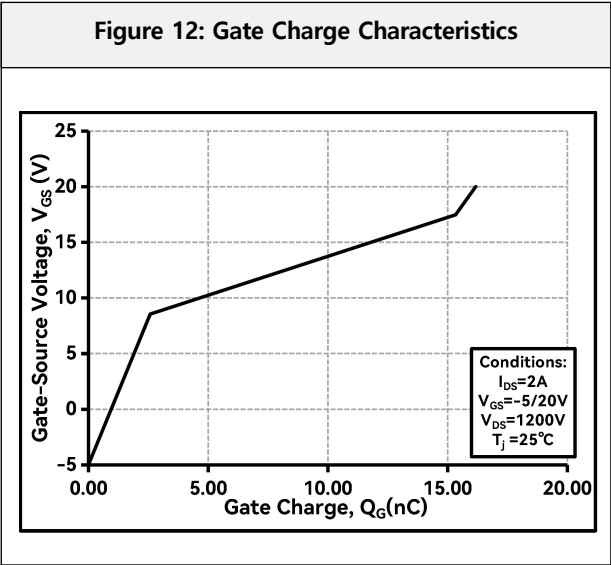
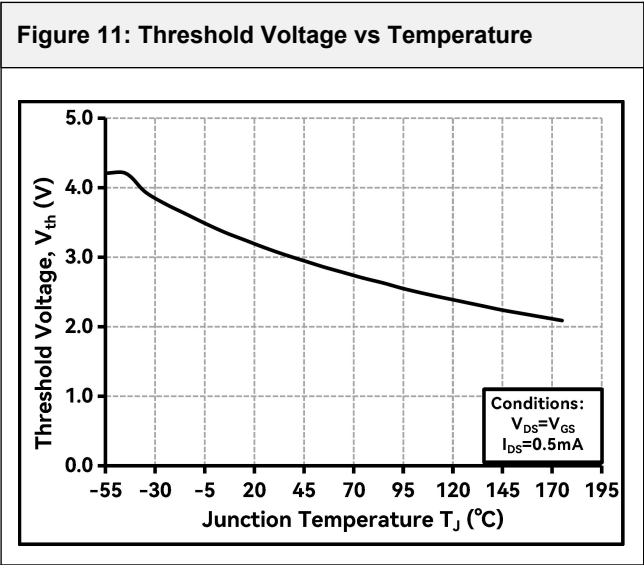
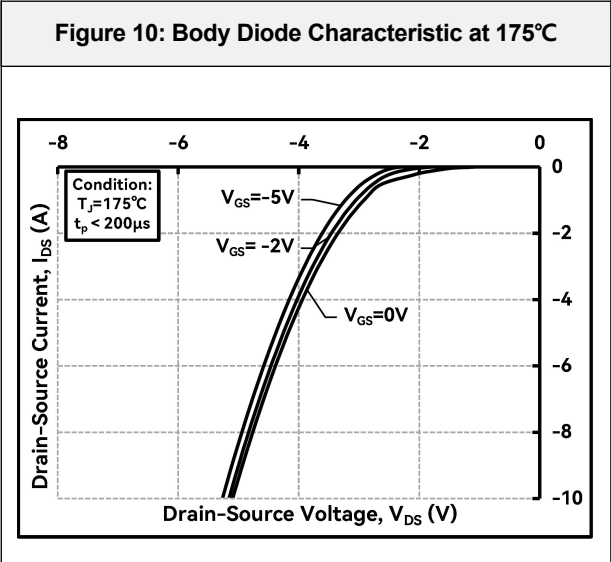
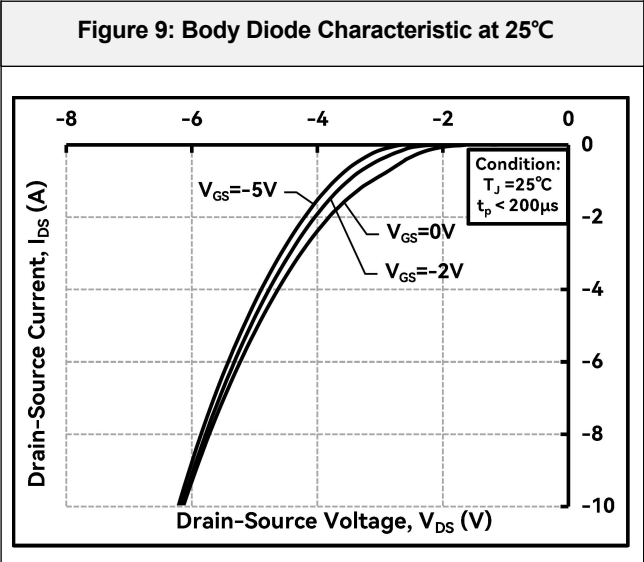
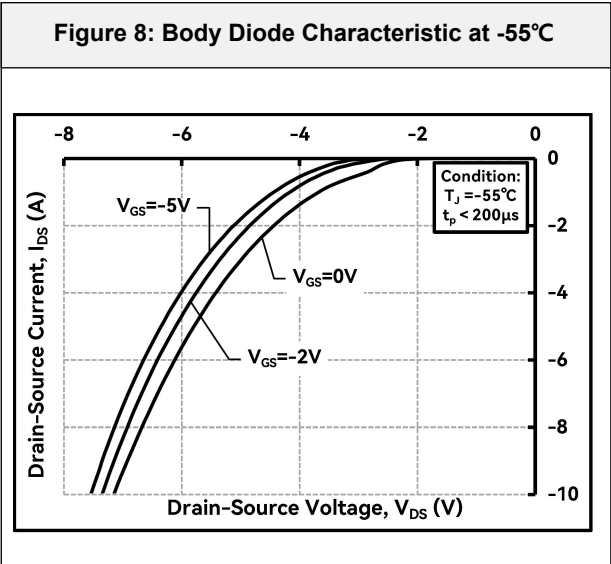
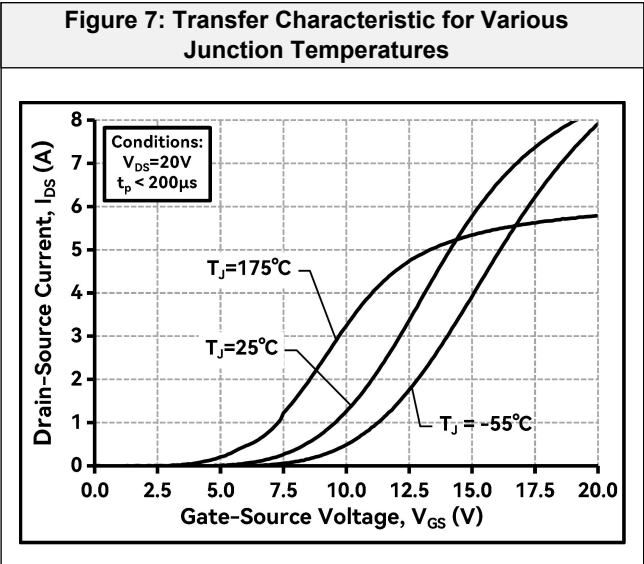
Source-Drain Diode Characteristics

I_S	Maximum Continuous Diode Forward Current		-	5	-	A
V_{SD}	Diode Forward Voltage	$V_{GS} = -5\text{ V}, I_S = 1\text{ A}$	-	3.8	-	V
I_{rm}	Peak Reverse Recovery Current	$V_{DS} = 1200\text{ V}, I_S = 2\text{ A}$, $V_{GS} = -5\text{ V}, \text{dif}/\text{dt} = 235\text{ A}/\mu\text{s}$	-	4.6	-	A
t_{rr}	Reverse Recovery Time		-	15.1	-	ns
Q_{rr}	Reverse Recovery Charge		-	37.4	-	nC

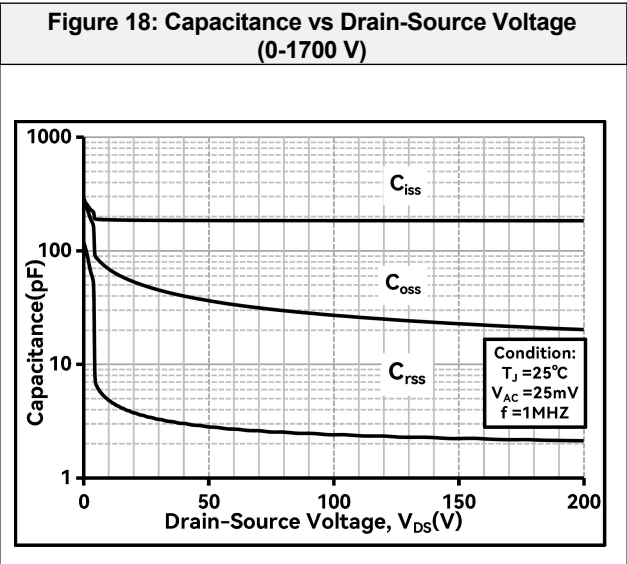
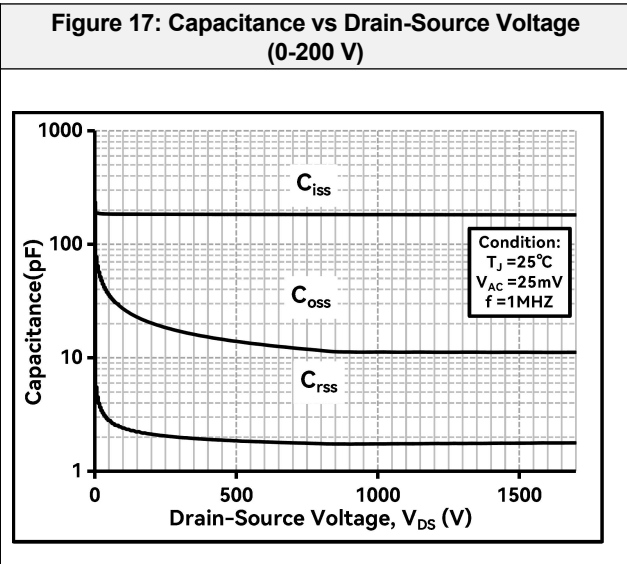
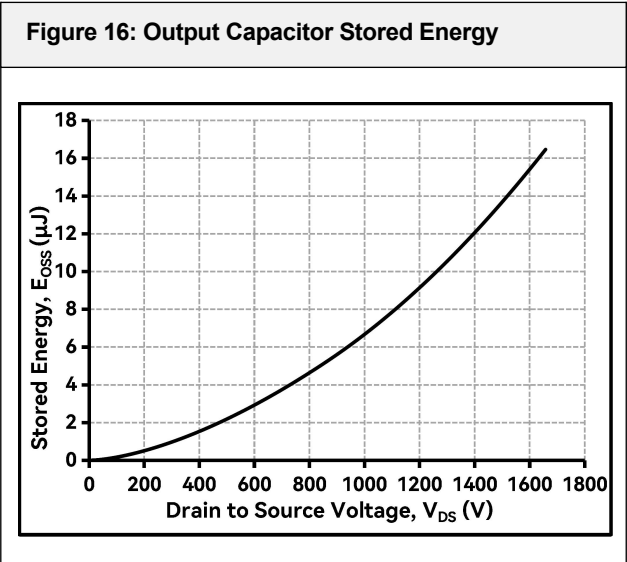
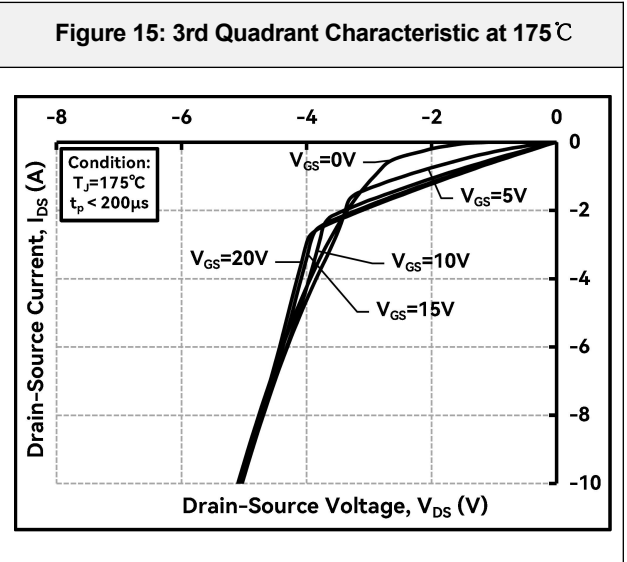
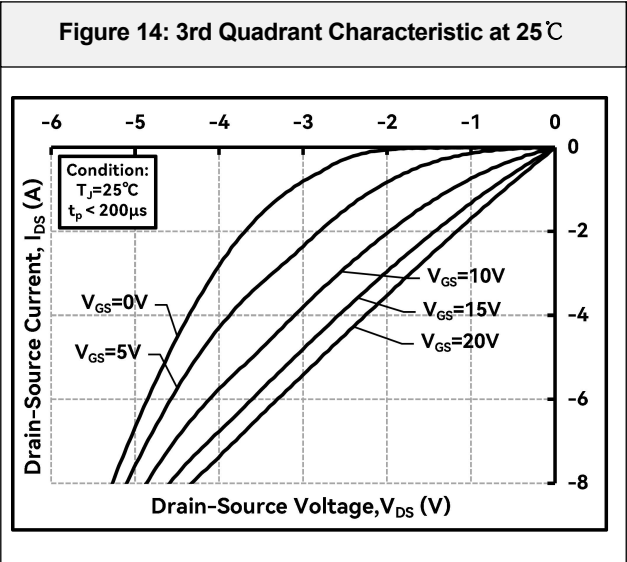
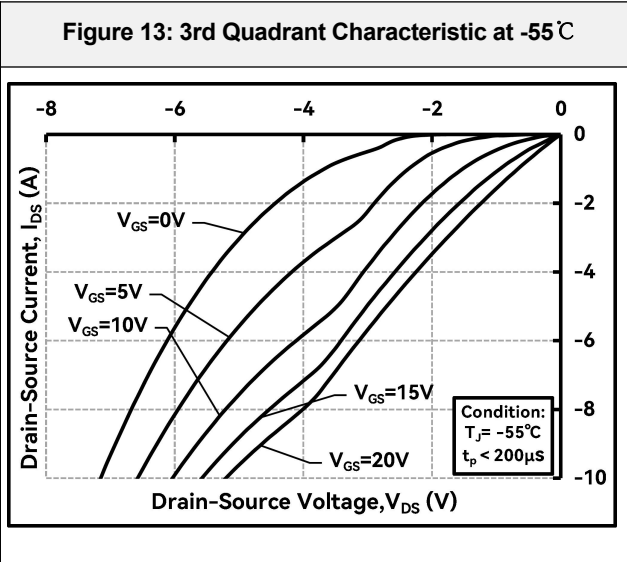
Typical Performance Characteristics



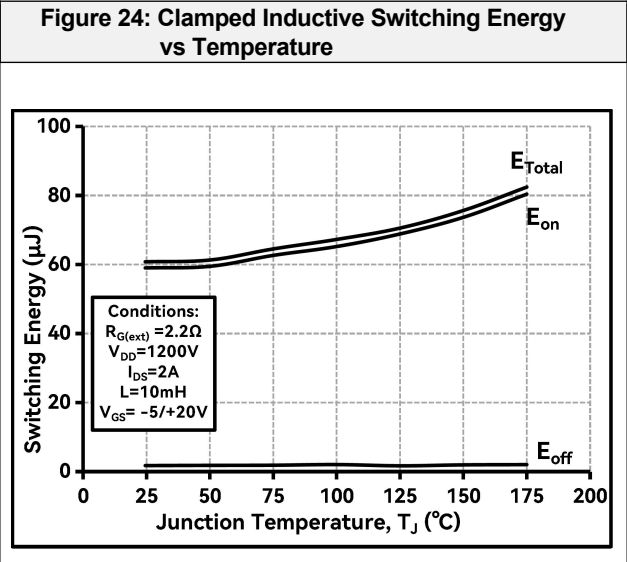
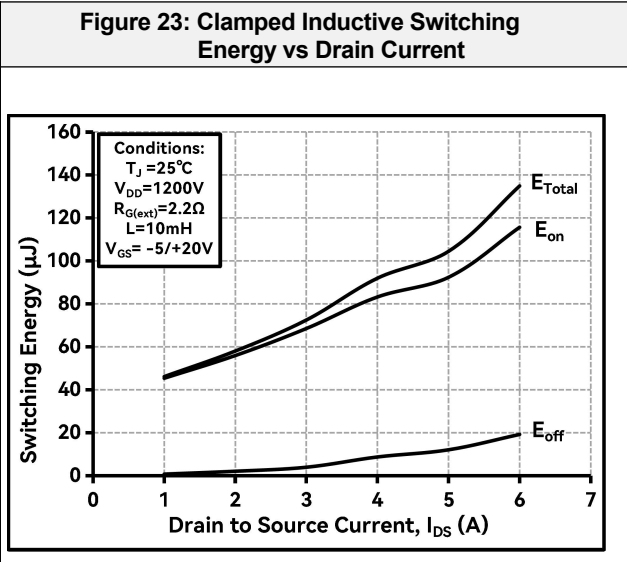
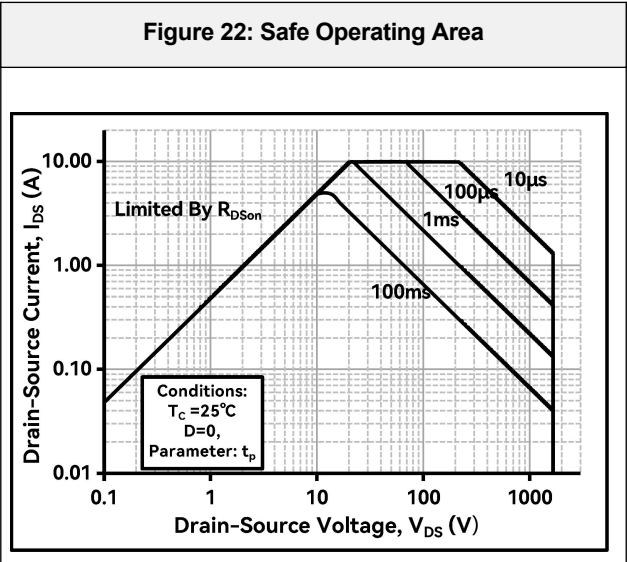
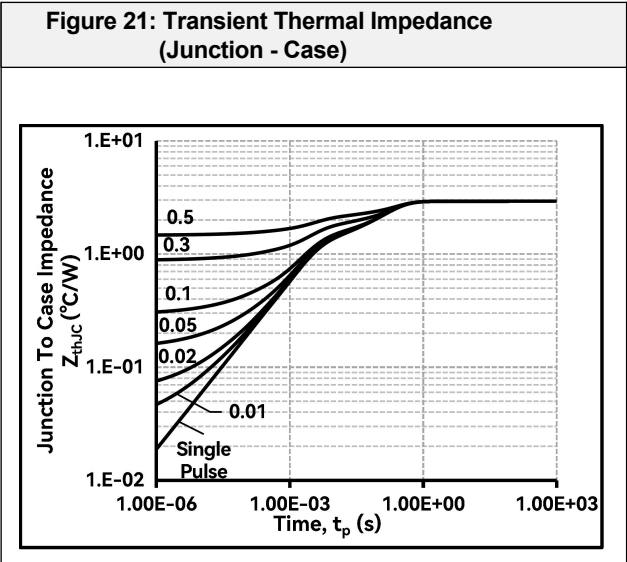
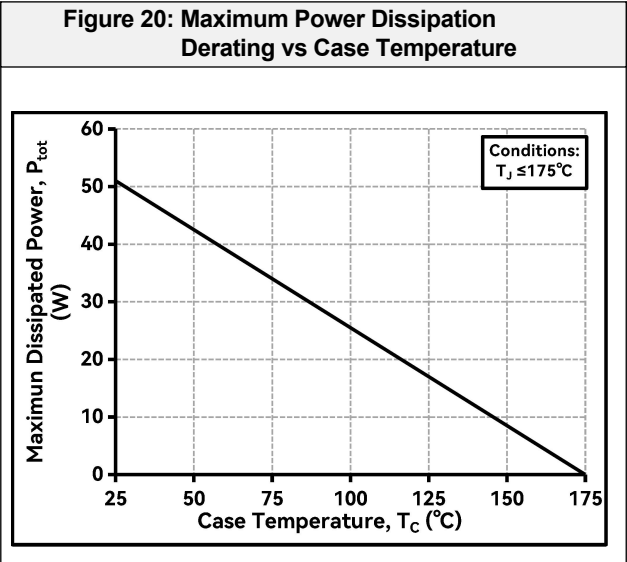
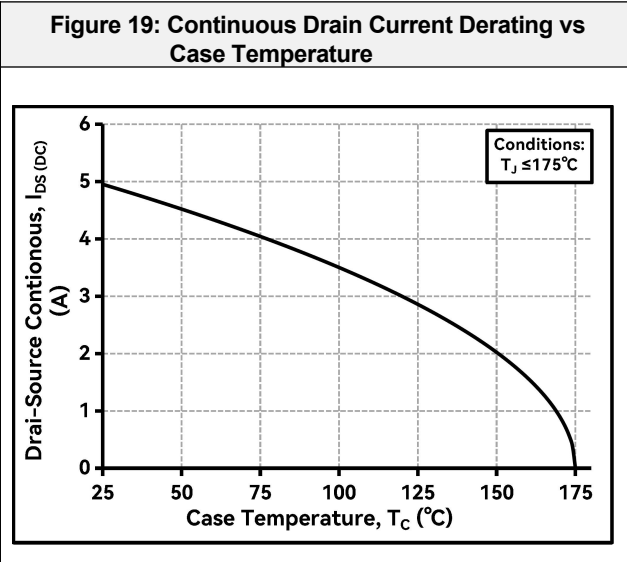
Typical Performance Characteristics



Typical Performance Characteristics



Typical Performance Characteristics



Typical Performance Characteristics

Figure 25: Clamped Inductive Switching Energy vs $R_{G(ext)}$

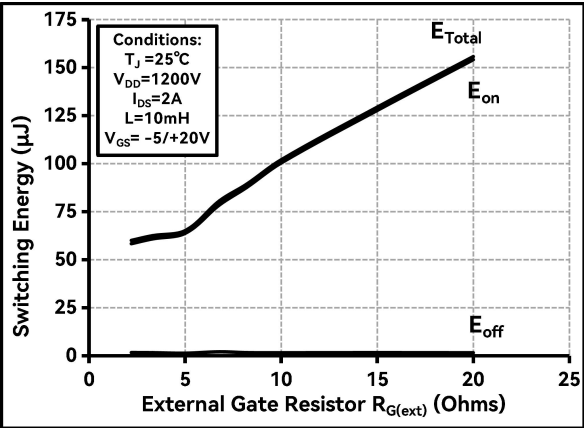
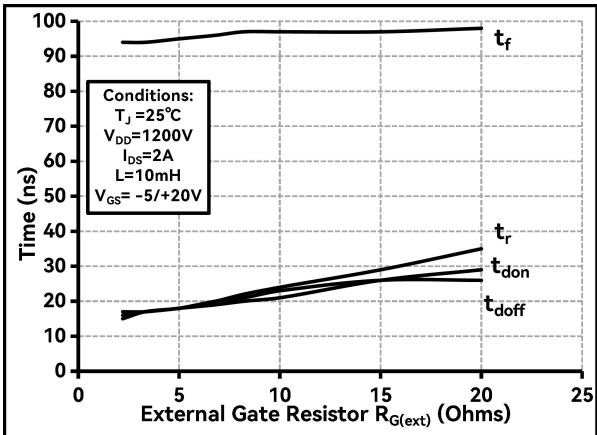
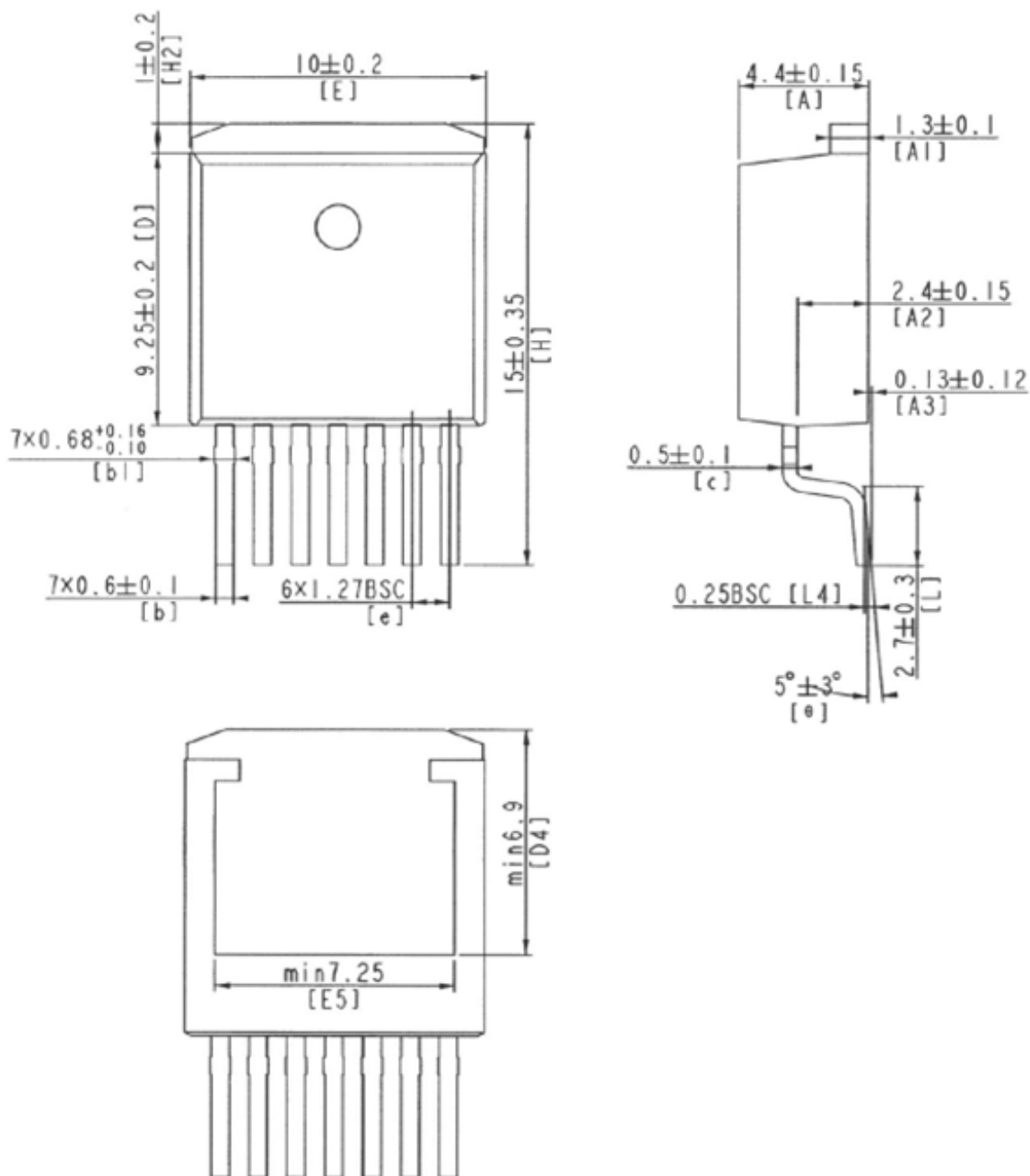


Figure 26: Switching Times vs $R_{G(ext)}$



Package Outlines

TO263-7



* Dimensions in millimeters

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BCBF170N1000P1	BCBF170N1000P1	TO263-7	Tape & Reel	800 units

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