Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

OptiMOS® -T PN Half Bridge

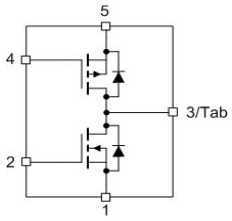
Product Summary

	P	N	
V_{DS}	-30	55	V
$R_{DS(on),max}$ [5)]	12.7	11.7	mΩ
I_D	-40	40	A

Features

- Dual p- and n-channel MOSFET
- Automotive AEC Q101 qualified
- Green package (RoHS compliant)
- Ultra low $R_{DS(on)}$
- 150 °C operating temperature

PG-TO263-5-1



Type	Package	Marking
BTS7904B	PG-TO263-5-1	7904B

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value		Unit
			P	N	
Continuous drain current [1)]	I_D	T_C=25 °C	-40	40	A
		T_C=100 °C	-40	40	
Pulsed drain current [2)]	$I_{D,pulse}$	T_C=25 °C	-160	160	
Avalanche energy, single pulse [2)]	E_{AS}	I_D=±20 A	350	200	mJ
Avalanche current, single pulse	I_{AS}		-40	40	A
Gate source voltage	V_{GS}		-16 / +5	+16 / -16 [3)]	V
Power dissipation [2)]	P_{tot}	T_C=25 °C	96	69	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150		°C
IEC climatic category; DIN IEC 68-1			55/150/56		

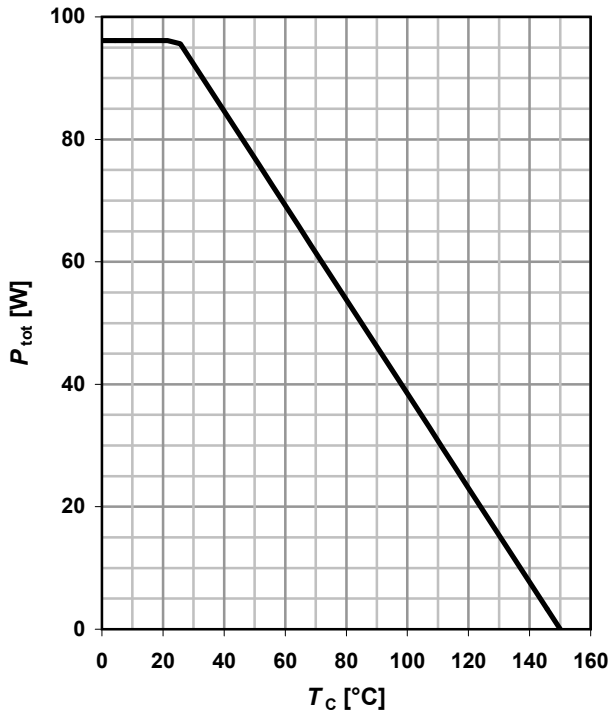
Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Thermal characteristics							
Thermal resistance, junction - case	P	R_{thJC}		-	-	1.3	K/W
	N			-	-	1.8	
SMD version, device on PCB		R_{thJA}	minimal footprint	-	-	62	
			6 cm^2 cooling area[4)]	-	-	45	
Electrical characteristics, at T_j=25 °C, unless otherwise specified							
Static characteristics							
Drain-source breakdown voltage	P	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=-1 mA	-30	-	-	V
	N		V_{GS}=0 V, I_D=1 mA	55	-	-	
Gate threshold voltage	P	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-70 µA	-1	-1.5	-2.1	
	N		V_{DS}=V_{GS}, I_D=40 µA	1.2	1.7	2.2	
Zero gate voltage drain current	P	I_{DSS}	V_{DS}=-18 V, V_{GS}=0 V, T_j=25 °C	-	-0.01	-1	µA
			V_{DS}=-18 V, V_{GS}=0 V, T_j=125 °C	-	-1	-100	
	N		V_{DS}=18 V, V_{GS}=0 V, T_j=25 °C	-	0.01	1	
			V_{DS}=18 V, V_{GS}=0 V, T_j=125 °C	-	1	100	
Gate-source leakage current	P	I_{GSS}	V_{GS}=-16 V, V_{DS}=0 V	-	-10	-100	nA
	N		V_{GS}=16 V, V_{DS}=0 V	-	1	100	
Drain-source on-state resistance[5)]	P	$R_{DS(on)}$	V_{GS}=-10 V, I_D=-20 A	-	6.9	12.7	mΩ
	N		V_{GS}=10 V, I_D=20 A	-	9.4	11.7	
	P		V_{GS}=-4.5 V, I_D=-12.5 A	-	17.2	20.7	
	N		V_{GS}=4.5 V, I_D=20 A	-	16.5	20.2	

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Dynamic characteristics							
Input capacitance	P	C_{iss}	V_{GS}=0 V, V_{DS}=±25 V, f=1 MHz	-	3900	5200	pF
	N			-	4600	6100	
Output capacitance	P	C_{oss}		-	1000	1300	
	N			-	570	760	
Reverse transfer capacitance	P	C_{rss}		-	850	1300	
	N			-	550	820	
Turn-on delay time	P	$t_{d(on)}$	V_{DD}=15 V, V_{GS}=10 V N: I_D=30 A, R_G=2 Ω P: I_D=-30 A, R_G=2 Ω	-	22	-	ns
	N			-	15	-	
Rise time	P	t_r		-	94	-	
	N			-	77	-	
Turn-off delay time	P	$t_{d(off)}$		-	104	-	
	N			-	31	-	
Fall time	P	t_f		-	150	-	
	N			-	8	-	
Gate Charge Characteristics[2)]							
Gate to source charge	P	Q_{gs}	V_{DD}=-24 V, I_D=-40 A, V_{GS}=0 to - 10 V	-	-12	-16	nC
Gate to drain charge		Q_{gd}		-	-30	-45	
Switching charge		Q_g		-	-80	-121	
Gate plateau voltage		$V_{plateau}$		-	-3.0	-	
Gate to source charge	N	Q_{gs}	V_{DD}=44 V, I_D=40 A, V_{GS}=0 to 10 V	-	20	27	
Gate to drain charge		Q_{gd}		-	32	48	
Gate charge		Q_g		-	82	123	
Gate plateau voltage		$V_{plateau}$			4.2		

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Reverse Diode							
Diode continuous forward current[2)]	P	I_S	T_C=25 °C	-	-	-40	A
	N					40	
Diode pulse current	P	$I_{S,pulse}$		-	-	-160	
	N					160	
Diode forward voltage	P	V_{SD}	V_{GS}=0 V, I_F=-40 A, T_j=25 °C	-	-1.00	-1.2	V
	N		V_{GS}=0 V, I_F=40 A, T_j=25 °C	-	0.90	1.2	
Reverse recovery time[2)]	P	t_{rr}	V_R=15 V, I_F=I_S, di_F/dt=400 A/µs	-	41	-	ns
	N			-	47	-	
Reverse recovery charge[2)]	P	Q_{rr}		-	-40	-	nC
	N			-	50	-	

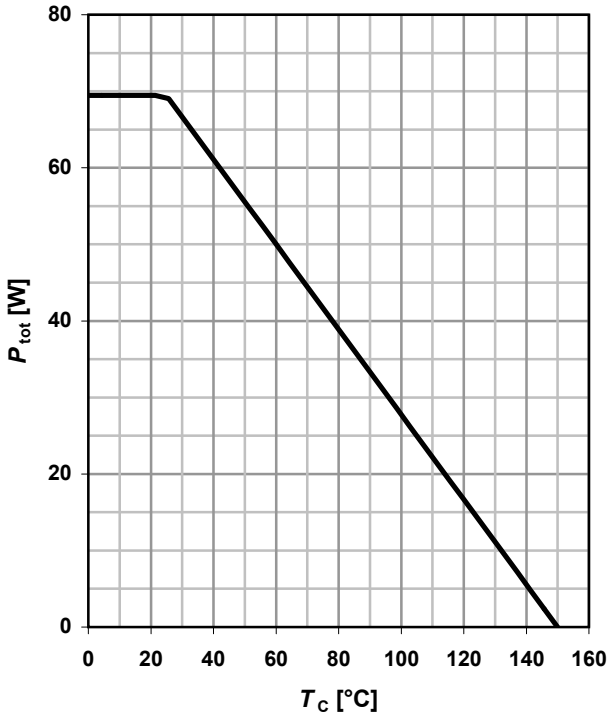
1 Power dissipation (P)

$P_{tot}=f(T_C)$, $V_{GS}\geq 6$ V



2 Power dissipation (N)

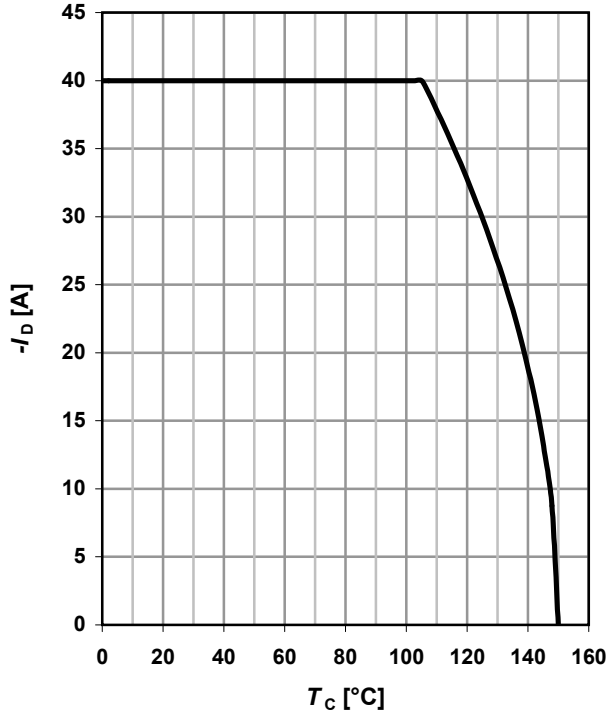
$P_{tot}=f(T_C)$, $V_{GS}\geq 6$ V



3 Drain current (P)

$I_D=f(T_C)$

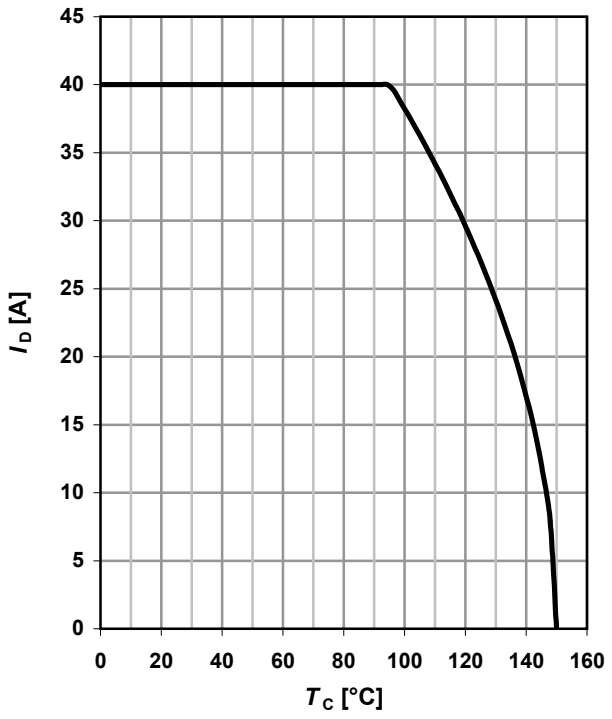
parameter: $V_{GS}\geq 6$ V



4 Drain current (N)

$I_D=f(T_C)$

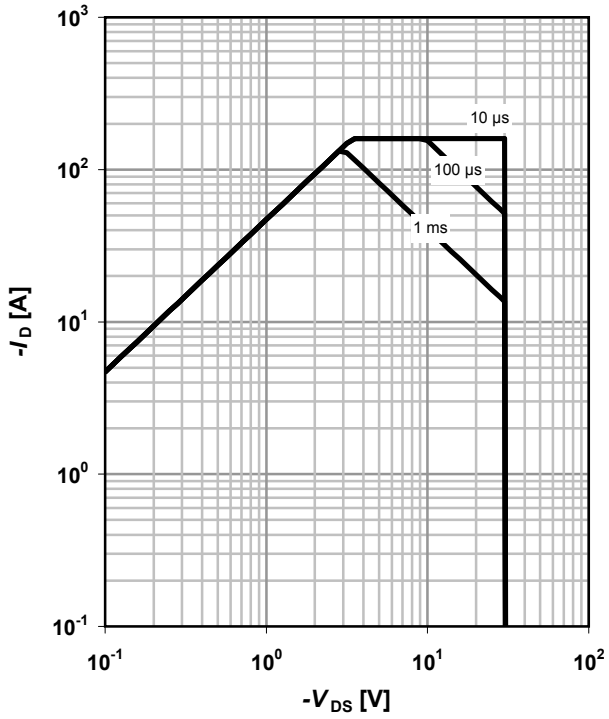
parameter: $V_{GS}\geq 6$ V



5 Safe operating area (P)

I_D=f(V_{DS}); T_C=25 °C; D=0

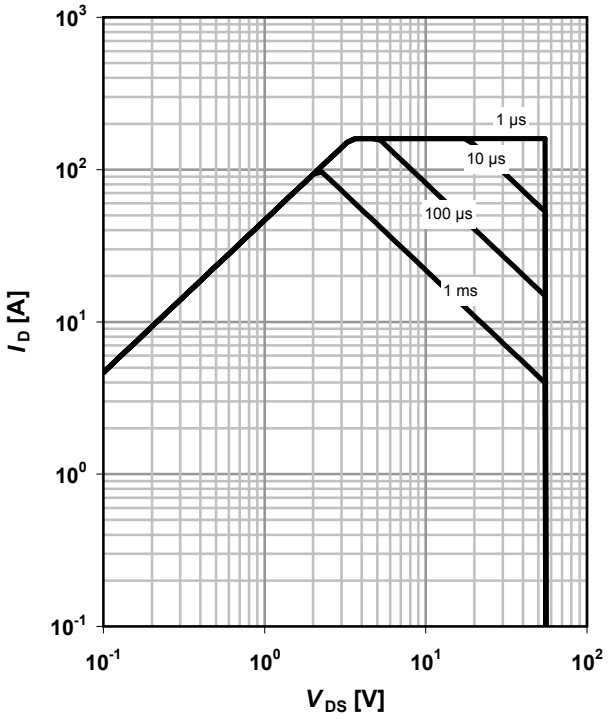
parameter: t_p



6 Safe operating area (N)

I_D=f(V_{DS}); T_C=25 °C; D=0

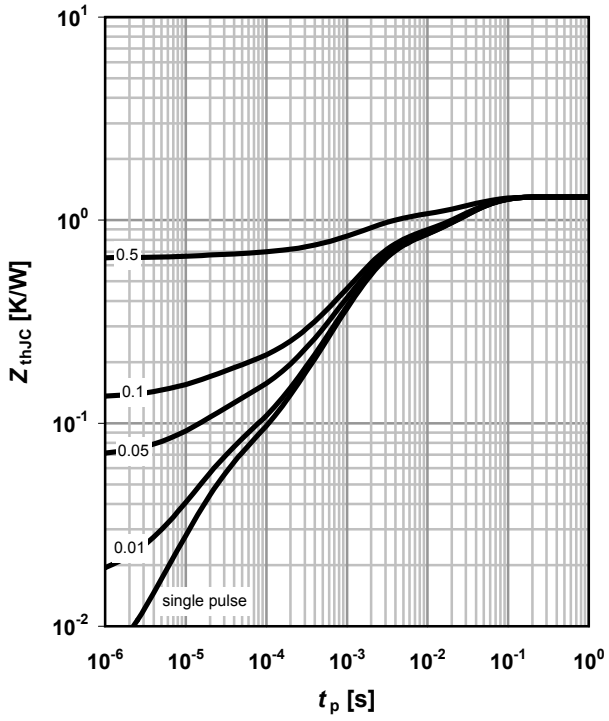
parameter: t_p



7 Max. transient thermal impedance (P)

Z_{thJC}=f(t_p)

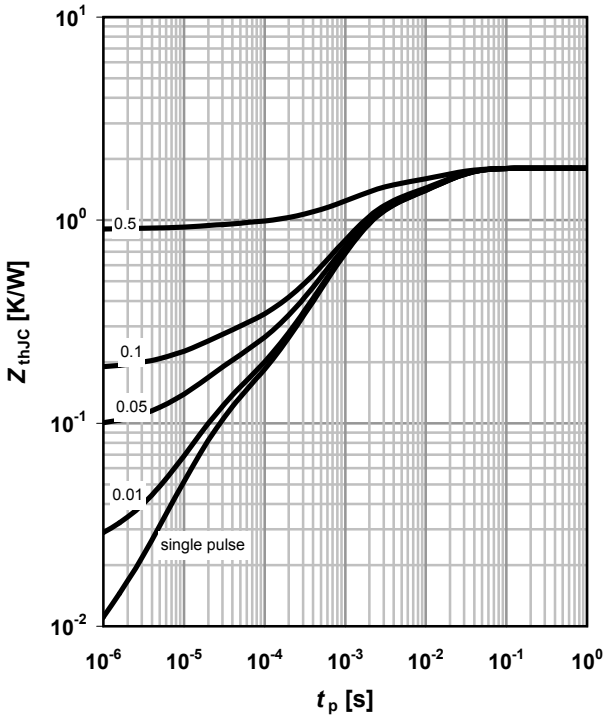
parameter: $D=t_p/T$



8 Max. transient thermal impedance (N)

Z_{thJC}=f(t_p)

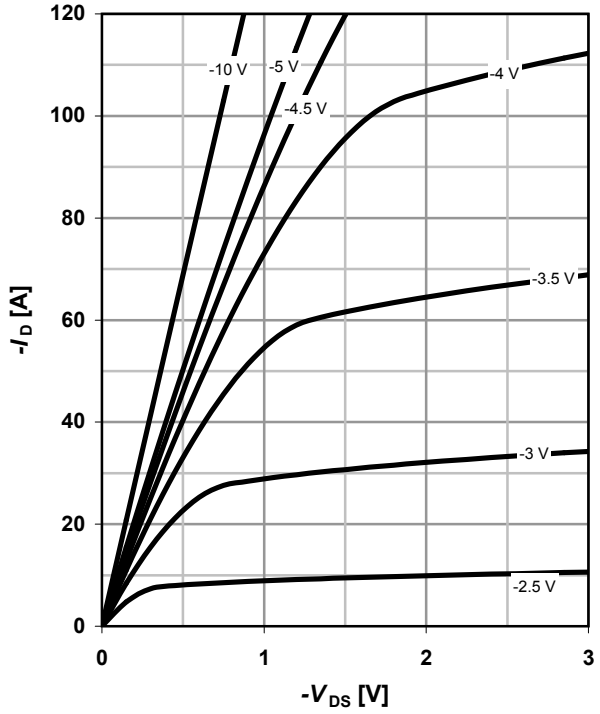
parameter: $D=t_p/T$



9 Typ. output characteristics (P)

I_D=f(V_{DS}); T_j=25 °C

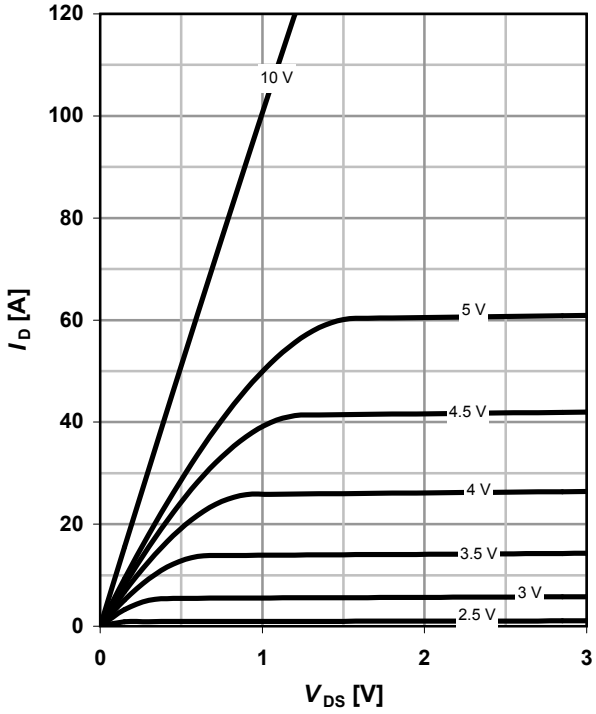
parameter: V_{GS}



10 Typ. output characteristics (N)

I_D=f(V_{DS}); T_j=25 °C

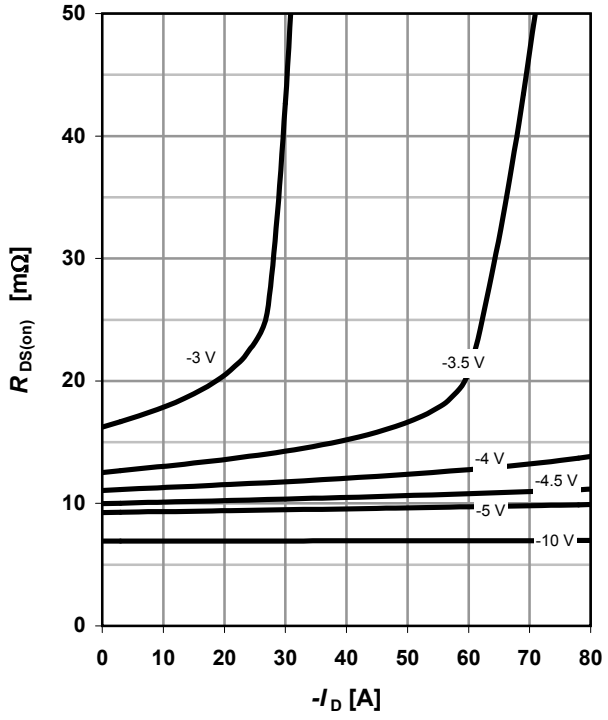
parameter: V_{GS}



11 Typ. drain-source on resistance (P)[5)]

$R_{DS(on)}$=f(I_D); T_j=25 °C

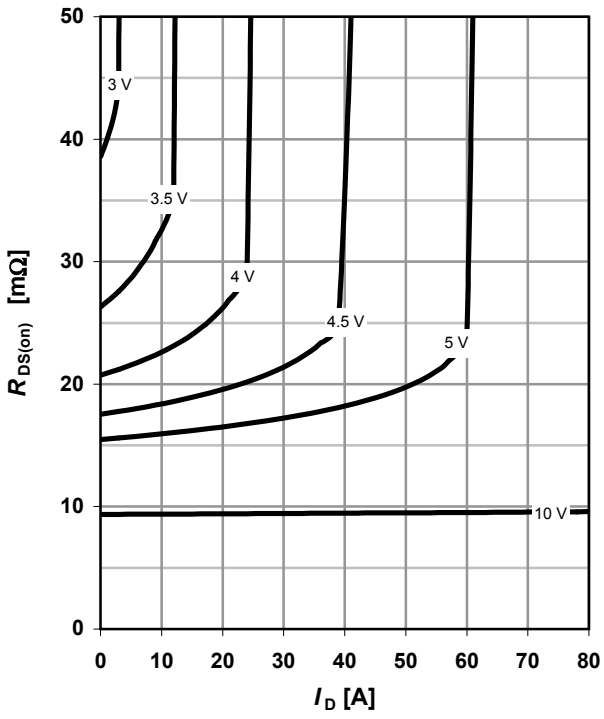
parameter: V_{GS}



12 Typ. drain-source on resistance (N)[5)]

$R_{DS(on)}$=f(I_D); T_j=25 °C

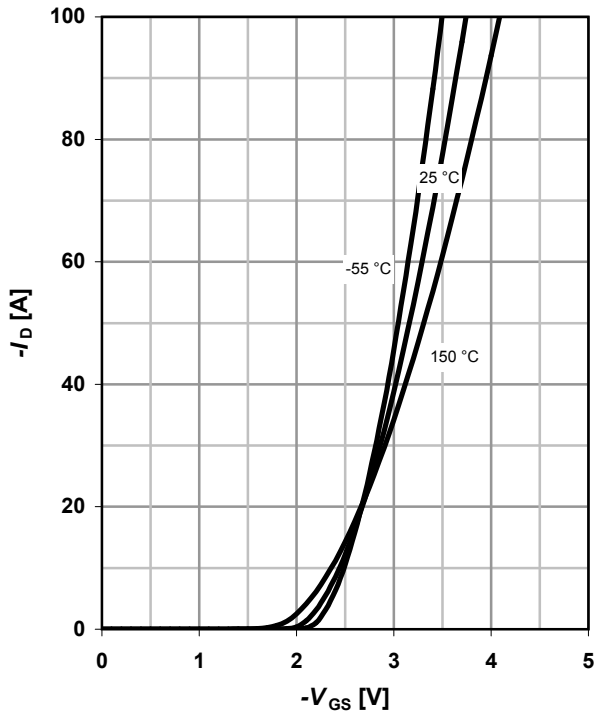
parameter: V_{GS}



13 Typ. transfer characteristics (P)

I_D=f(V_{GS}); V_{DS}=-6 V

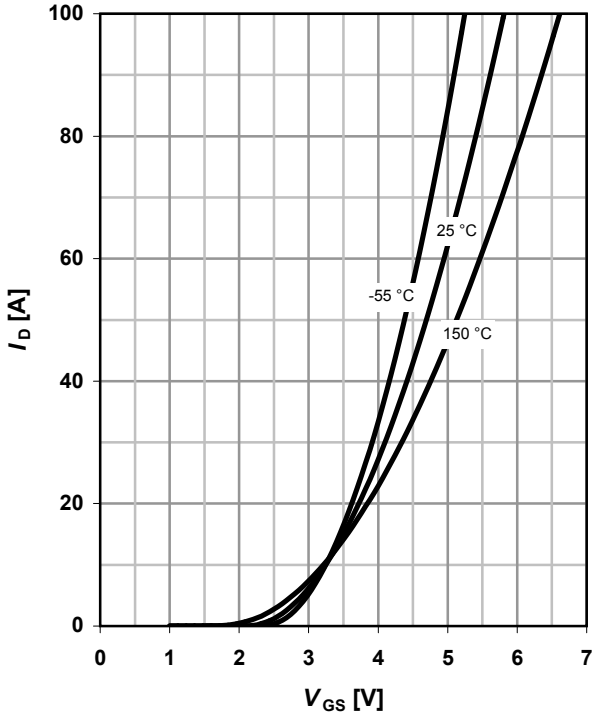
parameter: T_j



14 Typ. transfer characteristics (N)

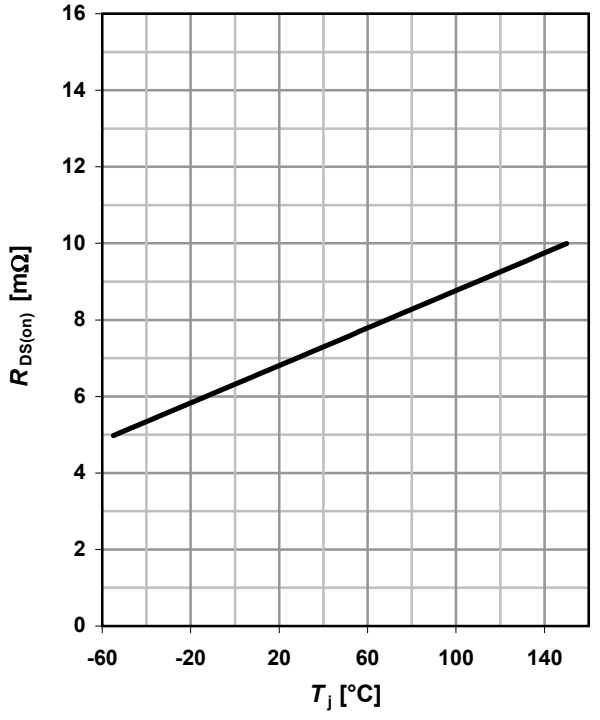
I_D=f(V_{GS}); V_{DS}=6 V

parameter: T_j



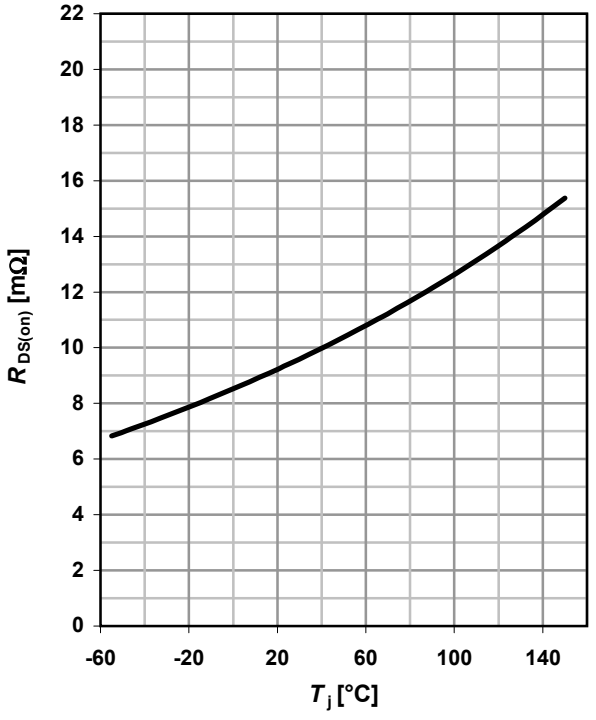
15 Drain-source on-state resistance (P)[5)]

$R_{DS(on)}$=f(T_j); I_D=-20 A; V_{GS}=-10 V



16 Drain-source on-state resistance (N)[5)]

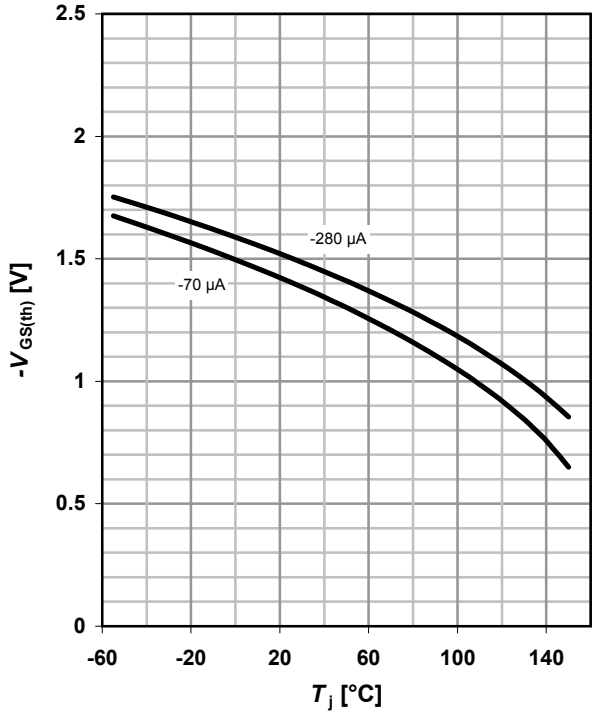
$R_{DS(on)}$=f(T_j); I_D=20 A; V_{GS}=10 V



17 Typ. gate threshold voltage (P)

$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$

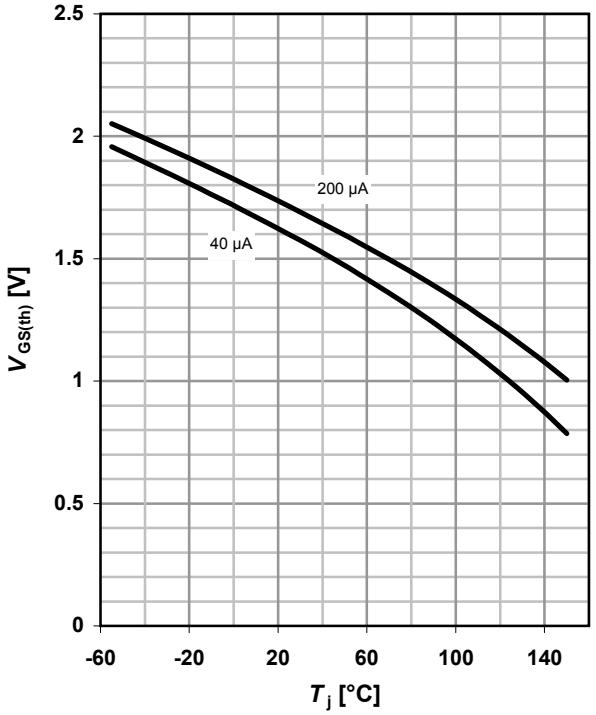
parameter: I_D



18 Typ. gate threshold voltage (N)

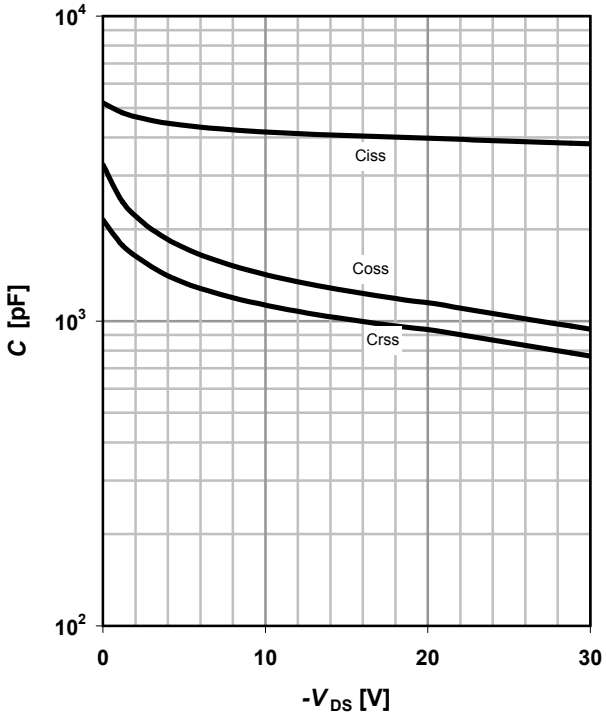
$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$

parameter: I_D



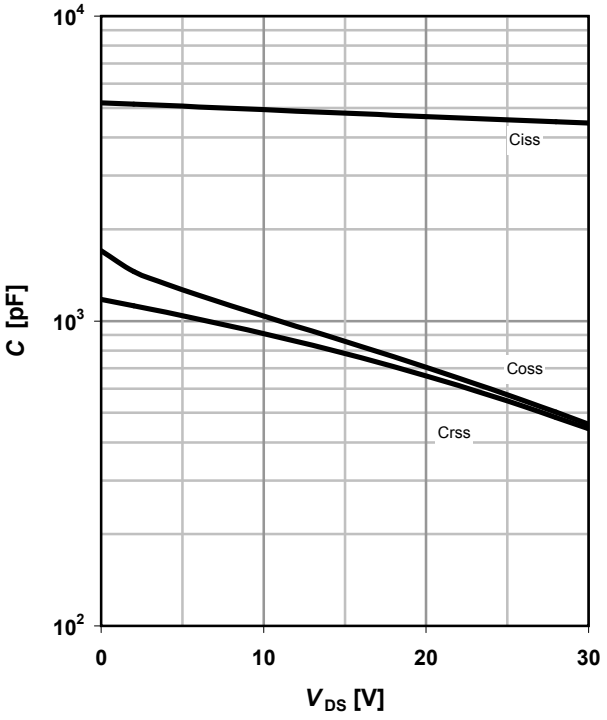
19 Typ. capacitances (P)

$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



20 Typ. capacitances (N)

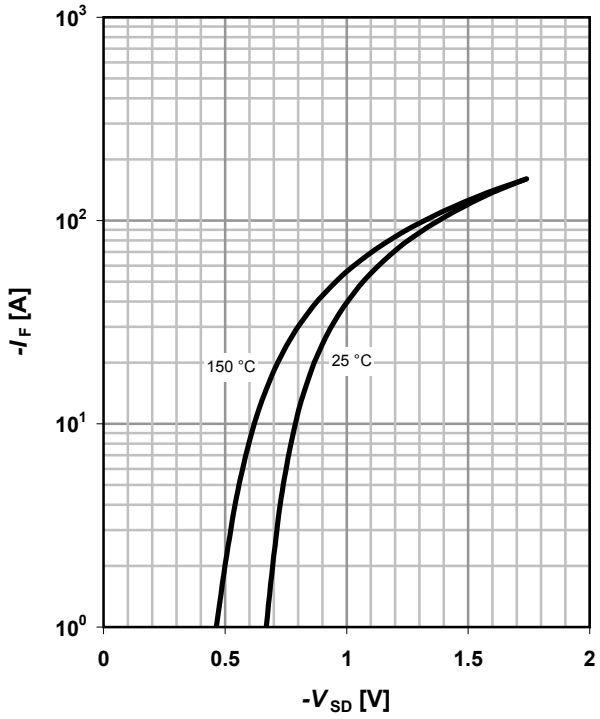
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



21 Forward characteristics of reverse diode (P)

$I_F=f(V_{SD})$

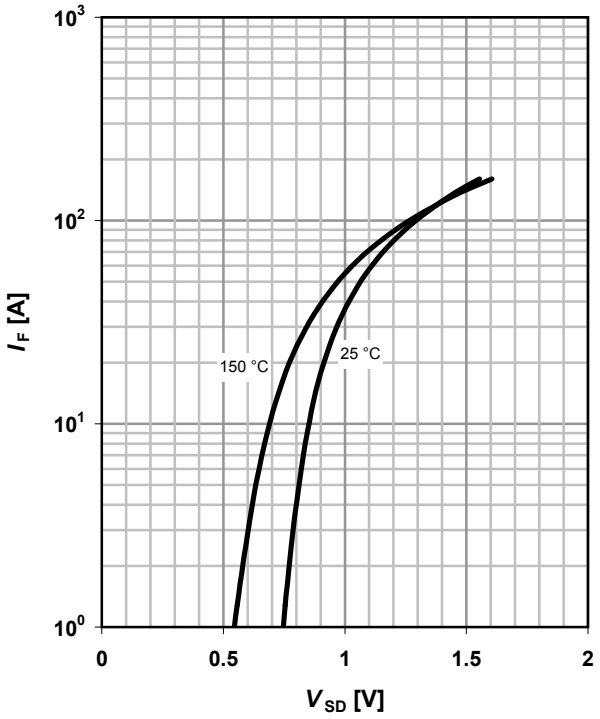
parameter: T_j



22 Forward characteristics of reverse diode (N)

$I_F=f(V_{SD})$

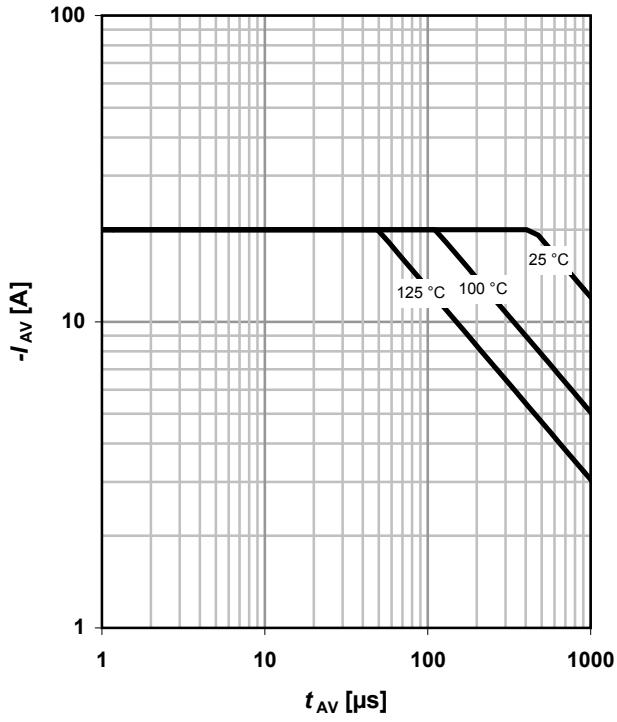
parameter: T_j



23 Avalanche characteristics (P)

$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$

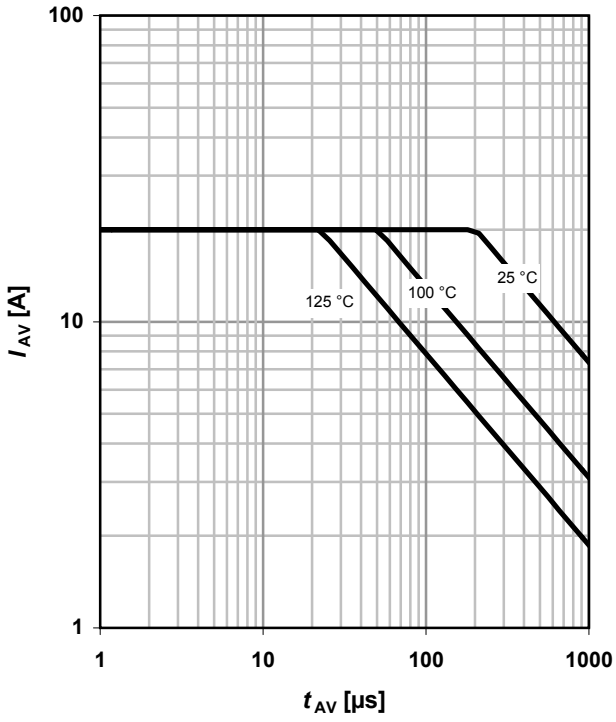
parameter: $T_{j(start)}$



24 Avalanche characteristics (N)

$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$

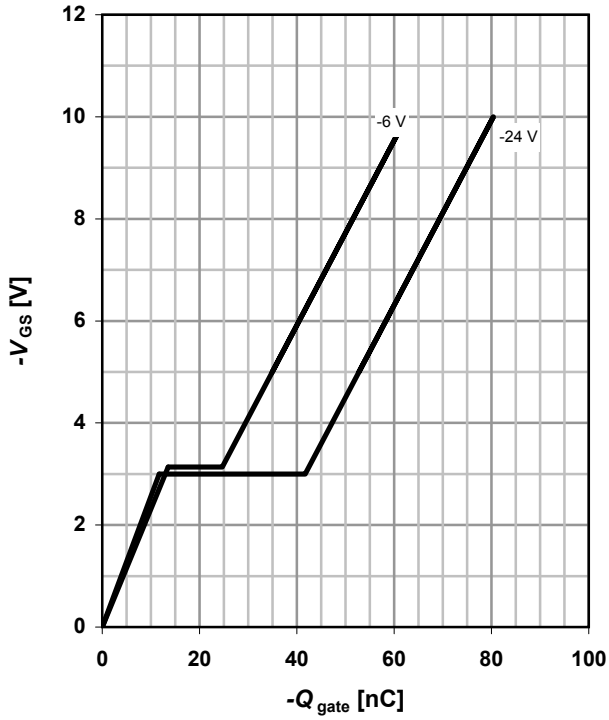
parameter: $T_{j(start)}$



25 Typ. gate charge (P)

V_{GS}=f(Q_{gate}); I_D=-40 A pulsed

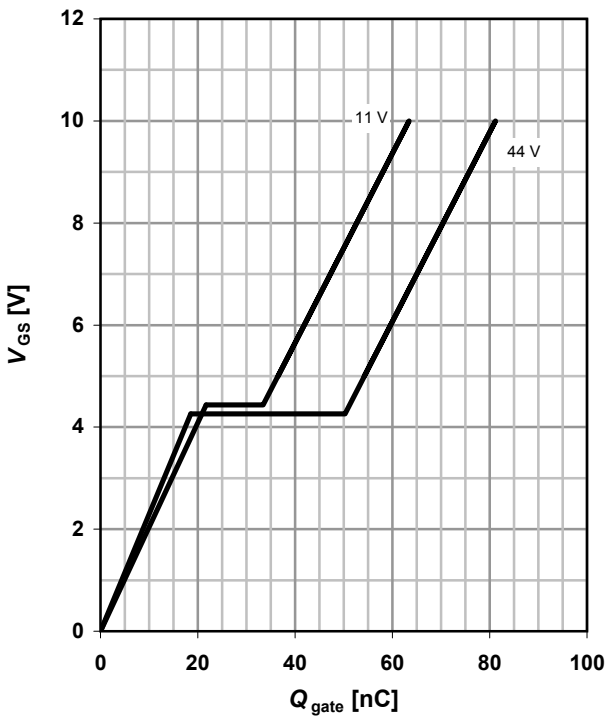
parameter: V_{DD}



26 Typ. gate charge (N)

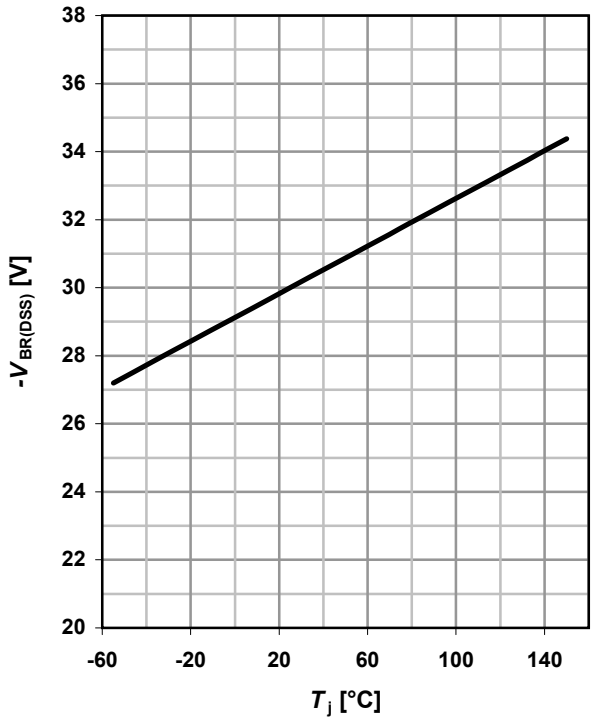
V_{GS}=f(Q_{gate}); I_D=40 A pulsed

parameter: V_{DD}



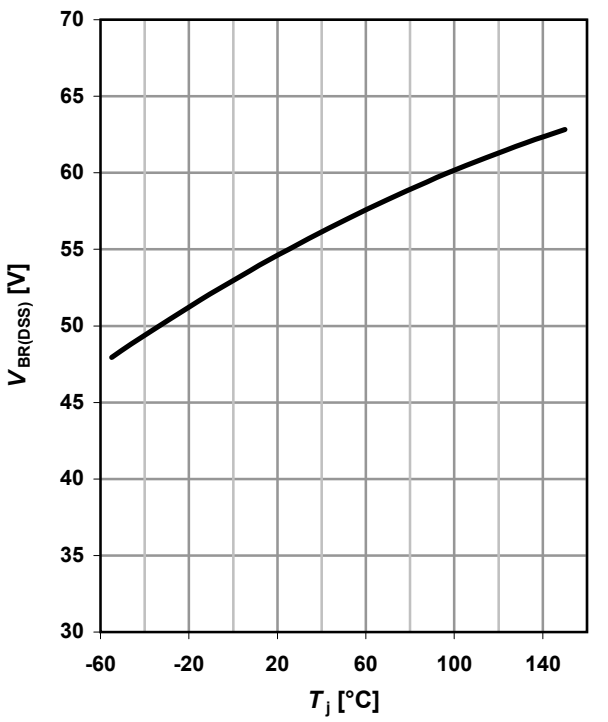
27 Drain-source breakdown voltage (P)

$V_{BR(DSS)}$=f(T_j); I_D=-1 mA



28 Drain-source breakdown voltage (N)

$V_{BR(DSS)}$=f(T_j); I_D=1 mA



Published by
Infineon Technologies AG
81726 Munich, Germany

Legal Disclaimer
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein,
any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non‑infringement of intellectual property rights of any third party.

Information
For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (**www.infineon.com**).

Warnings
Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.
Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life.

Revision History

Version	Date	Changes

[1] Current is limited by bondwire.

With an RthJC(HS)=1.3K/W the HS chip is able to carry ID=-80A at 25°C.

With an RthJC(LS)=1.8K/W the LS chip is able to carry ID=63A at 25°C.

For detailed information see Application Note ANPS071E at www.infineon.com/optimos

[2] Defined by design, not subject to production tests

[3] Qualified at -5V and +16V.

[4] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

[5] Rdson defined from Source pin to Drain back side of the package