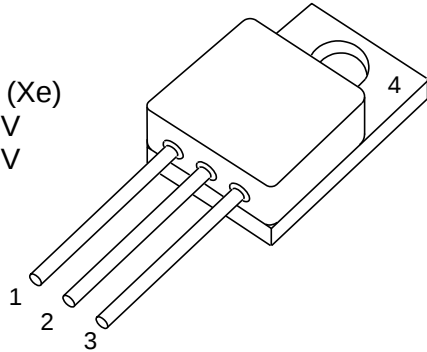


HiRel RadHard Power-MOS

- Low $R_{DS(on)}$
- Single Event Effect (SEE) hardened
 LET 73, Range: 253 μ m (Xe) LET 55, Range: 95 μ m (Xe)
 $V_{GS} = -10V, V_{DS} = 150V$ $V_{GS} = -15V, V_{DS} = 150V$
 $V_{GS} = -15V, V_{DS} = 80V$ $V_{GS} = -20V, V_{DS} = 100V$
- Total Ionisation Dose (TID) hardened
 100 kRad approved
- Hermetically sealed
- N-channel
-  **ESA Space Qualified**
 ESA/SCC Detail Spec. No.: 5205/031
 Type Variant No. 04



Type	Marking	Pin Configuration				Package
		1	2	3	4	
BUY15CS45B-01	-	D	S	G	Not connected	TO-254AA

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain Source Voltage	V_{DS}	150	V
Gate Source Voltage	V_{GS}	+/- 20	V
Drain Gate Voltage	V_{DG}	150	V
Continuous Drain Current $T_C = 25\text{ }^{\circ}\text{C}$ $T_C = 100\text{ }^{\circ}\text{C}$	I_D	45 29	A
Continuous Source Current	I_S	45	A
Drain Current Pulsed, t_p limited by T_{jmax}	I_{DM}	180	Apk
Total Power Dissipation ¹⁾	P_{tot}	208	W
Operating and Storage Temperature	T_{op}	-55 to + 150	$^{\circ}\text{C}$
Avalanche Energy	E_{AS}	380	mJ

Thermal Characteristics

Thermal Resistance (Junction to Case)	R_{thJC}	0.6	K/W
Soldering Temperature	T_{sol}	250	$^{\circ}\text{C}$

Notes.:

1) For $T_S \leq 25^{\circ}\text{C}$. For $T_S > 25^{\circ}\text{C}$ derating is required.

Electrical Characteristics, at $T_A=25^\circ\text{C}$; unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Breakdown Voltage Drain to Source $I_D = 0.25\text{mA}$, $V_{GS} = 0\text{V}$	BV_{DSS}	150	-	-	V
Temperature Coefficient of B_{VDSS}	$\Delta BV_{DSS}/\Delta T_J$	-	0.20	-	V/°C
Gate Threshold Voltage $I_D = 1.0\text{mA}$, $V_{DS} \geq V_{GS}$	$V_{GS(th)}$	2.0	-	4.0	V
Gate to Source Leakage Current $V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	I_{GSS}	-	-	+/-100	nA
Drain Current $V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}	-	-	25	μA
Drain Source On Resistance ¹⁾ $V_{GS} = 10\text{V}$, $I_D = 35\text{A}$	$R_{DS(ON)}$	-	23	27	mΩ
Source Drain Diode, Forward Voltage ^{1), 2)} $V_{GS} = 0\text{V}$, $I_S = 45\text{A}$	V_{SD}	-	-	1.4	V
AC Characteristics					
Turn-on Delay Time $V_{DD} = 50\% V_{DS}$, $I_D = 35\text{A}$, $R_G = 4.7\Omega$	$t_{d(ON)}$	-	25	45	ns
Rise Time $V_{DD} = 50\% V_{DS}$, $I_D = 35\text{A}$, $R_G = 4.7\Omega$	t_r	-	35	95	ns
Turn-off Delay Time $V_{DD} = 50\% V_{DS}$, $I_D = 35\text{A}$, $R_G = 4.7\Omega$	$t_{d(OFF)}$	-	50	60	ns
Fall Time $V_{DD} = 50\% V_{DS}$, $I_D = 35\text{A}$, $R_G = 4.7\Omega$	t_f	-	20	100	ns
Reverse Recovery Time $V_{DD} < 50\% V_{DS}$, $I_D = 45\text{A}$	t_{rr}	-	310	350	ns
Common Source Input Capacitance $V_{DS} = 100\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	C_{iss}	2.0	4.0	6.0	nF
Common Source Output Capacitance $V_{DS} = 100\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	C_{oss}	360	480	600	pF
Common Source Reverse Transfer Capacitance $V_{DS} = 100\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	C_{rss}	60	83	100	pF
Gate Resistance	R_G	-	0.8	-	Ω
Total Gate Charge $V_{DD} = 50\% V_{DS}$, $V_{GS} = 10\text{V}$, $I_D = 45\text{A}$	Q_G	-	75	100	nC

Notes:

- 1) Pulsed Measurement: Pulse Width < 300 μs , Duty Cycle < 2.0%.
2) Measured within 2.0 mm of case.

Electrical Characteristics

 at $T_A=125^{\circ}\text{C}$; unless otherwise specified

Parameter	Symbol	Values		Unit
		min.	max.	
DC Characteristics				
Gate Threshold Voltage $I_D = 1.0\text{mA}$, $V_{DS} \geq V_{GS}$	$V_{GS(th)}$	1.5	-	V
Gate to Source Leakage Current $V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	I_{GSS}	-	+/-200	nA
Drain Current $V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}	-	250	μA
Drain Source On Resistance ¹⁾ $V_{GS} = 10\text{V}$, $I_D = 45\text{A}$	$r_{DS(on)}$	-	53	m Ω

Notes:

 1) Pulsed Measurement: Pulse Width < 300 μs , Duty Cycle < 2.0%.

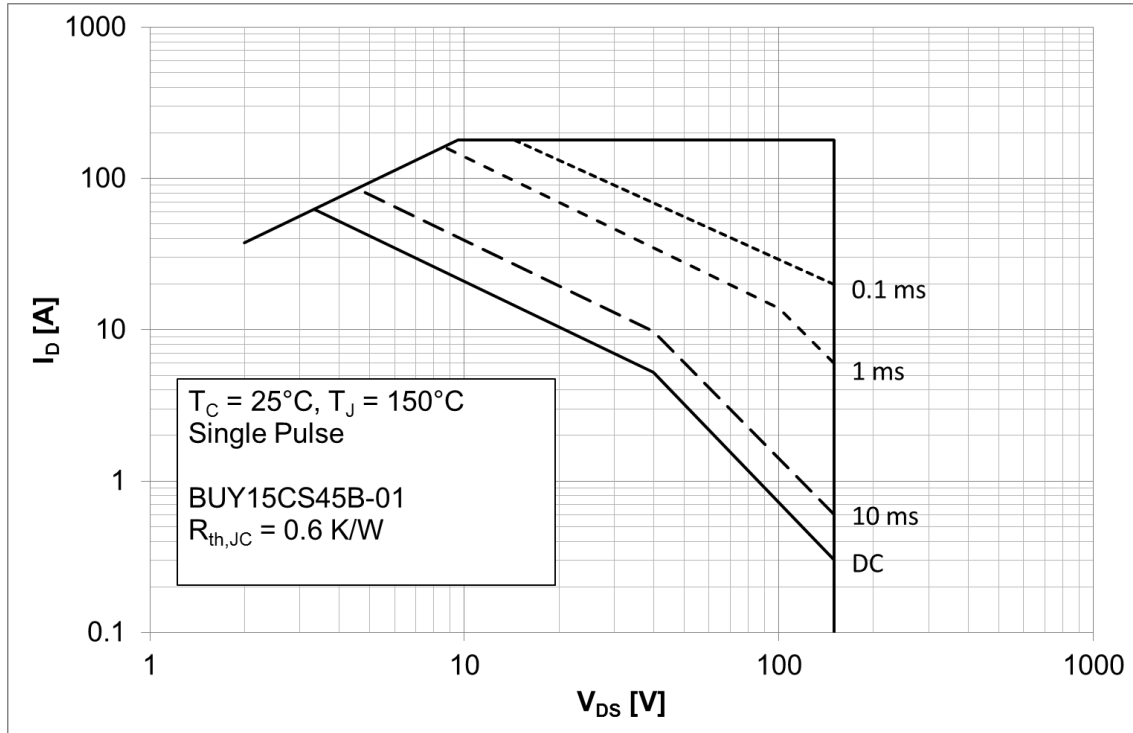
Electrical Characteristics

 at $T_A=-55^{\circ}\text{C}$; unless otherwise specified

Parameter	Symbol	Values		Unit
		min.	max.	
DC Characteristics				
Gate Threshold Voltage $I_D = 1.0\text{mA}$, $V_{DS} \geq V_{GS}$	$V_{GS(th)}$	-	5.0	V

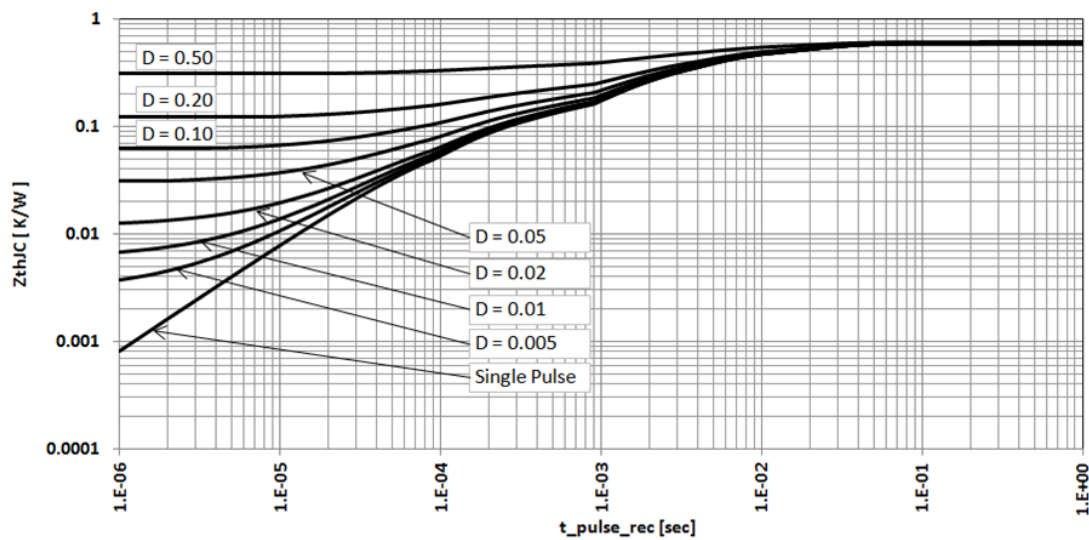
1 Safe operating area

$I_D = f(V_{DS}); T_C = 25^\circ\text{C}$
parameter: t_p



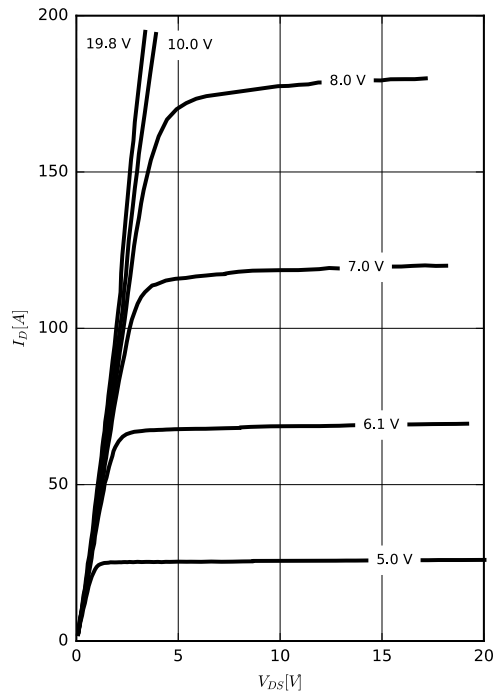
2 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$
parameter: $D = t_p/T$

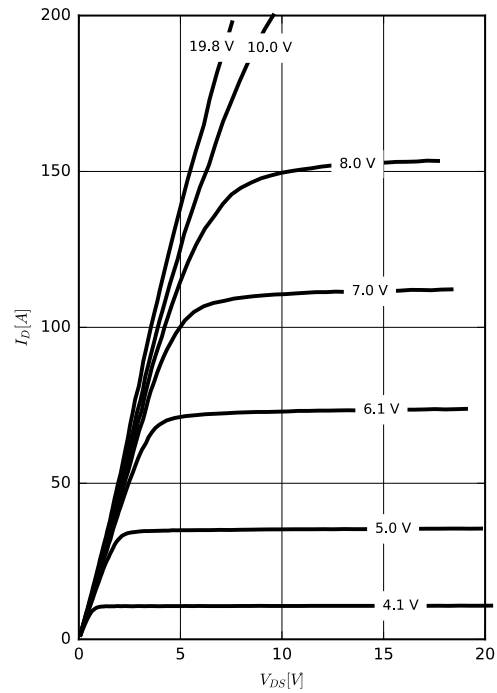


3 Typ. output characteristics

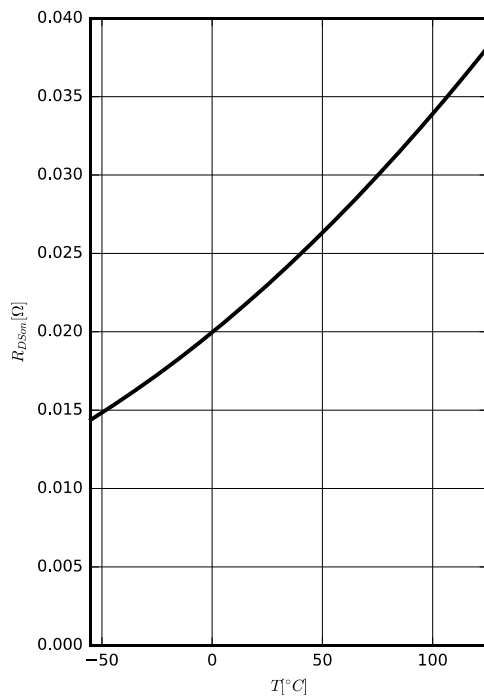
$I_D = f(V_{DS}); T_j = 25\text{ °C}$
parameter: V_{GS}


4 Typ. output characteristics

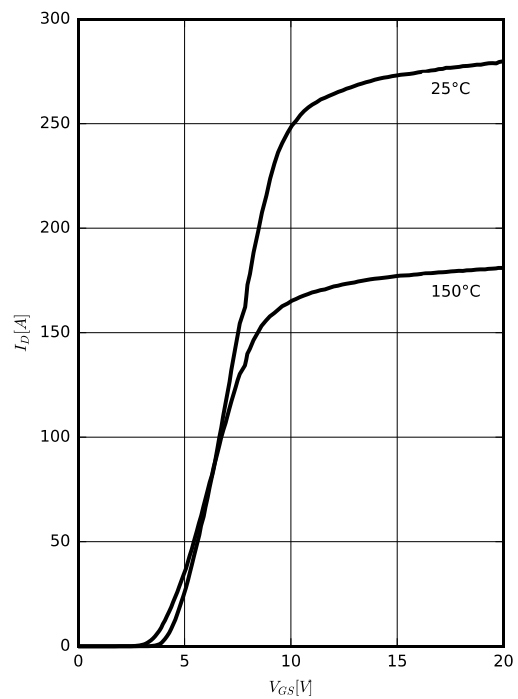
$I_D = f(V_{DS}); T_j = 150\text{ °C}$
parameter: V_{GS}


5 Typ. drain-source on-state resistance

$R_{DS(on)} = f(T_j)$
 $I_D = 35\text{ A}$


6 Typ. transfer characteristics

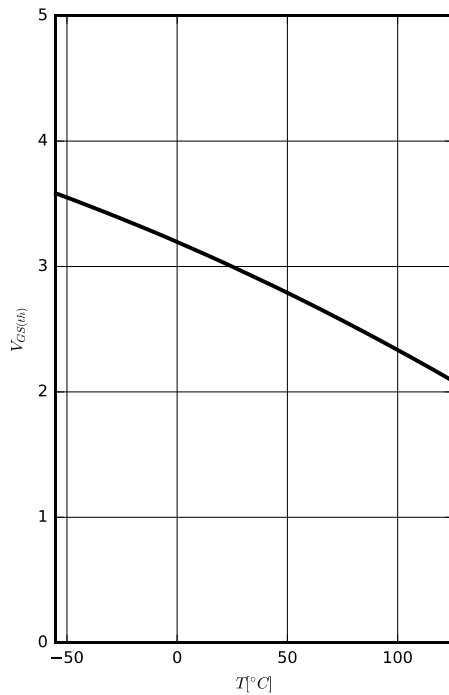
$I_D = f(V_{GS}); V_{DS} = 10\text{ V}$
parameter: T_j



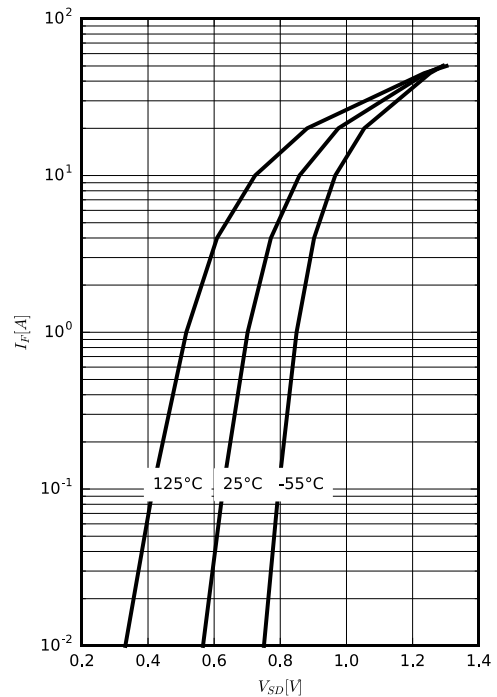
7 Typ. gate threshold voltage

$$I_D = f(T_j)$$

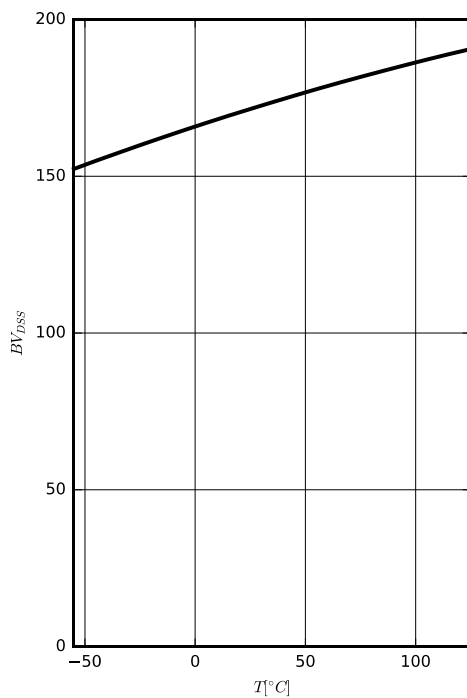
$$I_D = 1\text{mA}$$


8 Typ. forward characteristics of reverse diode

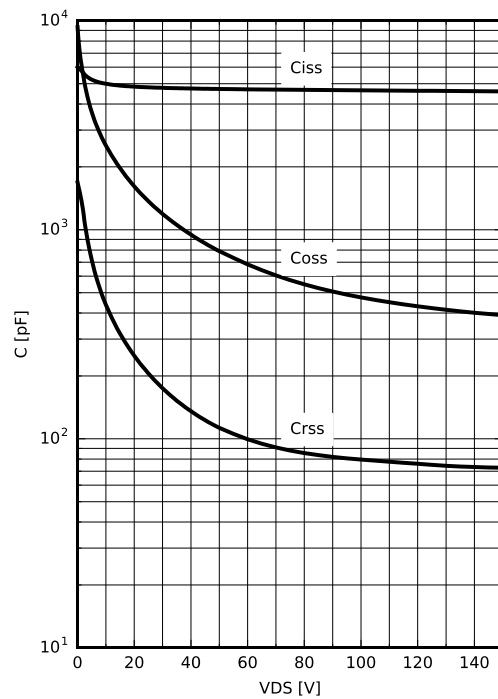
$$I_F = f(V_{SD}); \text{ parameter: } T_j$$


9 Typ. drain-source breakdown voltage

$$BV_{DSS} = f(T_j); I_D = 250\mu\text{A}$$

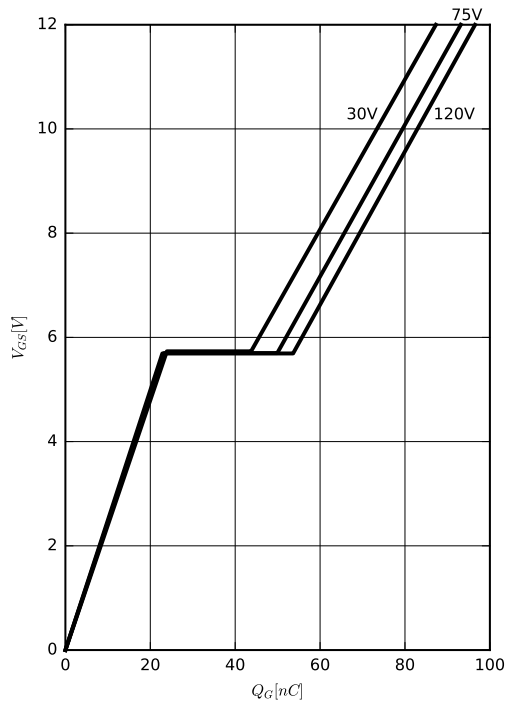

10 Typ. capacitances

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

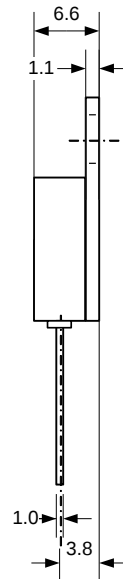
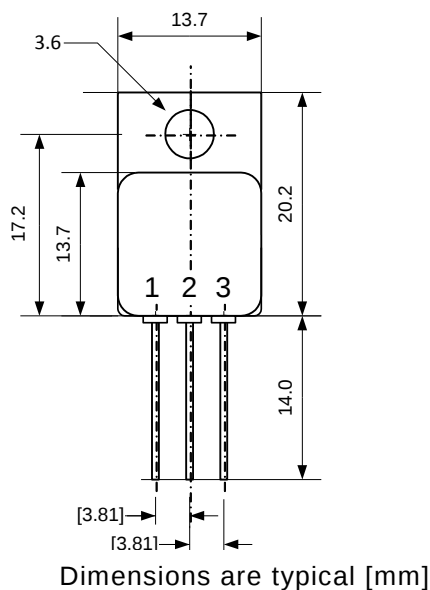


11 Typ. gate charge

$V_{GS} = f(Q_{gate})$; $I_D = 45.0\text{ A}$ pulsed
parameter: V_{DD}



TO-254AA Package



Edition 2016-09
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85579 Neubiberg, Germany
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