
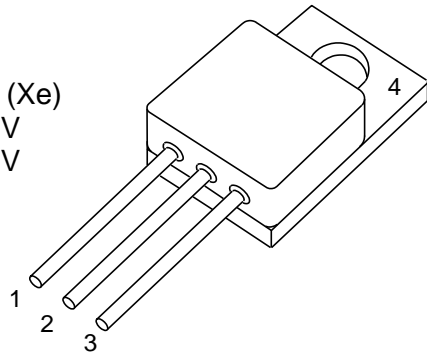


**HiRel RadHard Power-MOS**

- Low  $R_{DS(on)}$
- Single Event Effect (SEE) hardened  
 LET 73, Range: 253 $\mu$ m (Xe)      LET 55, Range: 95 $\mu$ 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 <sup>1)</sup>	$P_{tot}$	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.	
<b>DC Characteristics</b>					
Breakdown Voltage Drain to Source $I_D = 0.25\text{mA}$ , $V_{GS} = 0\text{V}$	$BV_{DSS}$	150	-	-	V
Temperature Coefficient of $BV_{DSS}$	$\Delta BV_{DSS}/\Delta T_J$	-	0.20	-	V/ $^\circ\text{C}$
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 $V_{DS} = 0\text{V}$ , $V_{GS} = \pm 20\text{V}$	$I_{GSS}$	-	-	$\pm 100$	nA
Drain Current $V_{DS} = 120\text{V}$ , $V_{GS} = 0\text{V}$	$I_{DSS}$	-	-	25	$\mu\text{A}$
Drain Source On Resistance <sup>1)</sup> $V_{GS} = 10\text{V}$ , $I_D = 35\text{A}$	$R_{DS(ON)}$	-	23	27	m $\Omega$
Source Drain Diode, Forward Voltage <sup>1), 2)</sup> $V_{GS} = 0\text{V}$ , $I_S = 45\text{A}$	$V_{SD}$	-	-	1.4	V

<b>AC Characteristics</b>					
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	-	$\Omega$
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 $\mu\text{s}$ , 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 $V_{DS} = 0\text{V}, V_{GS} = +/- 20\text{V}$	$I_{GSS}$	-	+/-200	nA
Drain Current $V_{DS} = 120\text{V}, V_{GS} = 0\text{V}$	$I_{DSS}$	-	250	$\mu\text{A}$
Drain Source On Resistance <sup>1)</sup> $V_{GS} = 10\text{V}, I_D = 45\text{A}$	$r_{DS(on)}$	-	53	$\text{m}\Omega$

**Notes:**

 1) Pulsed Measurement: Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2.0%.

**Electrical Characteristics**

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

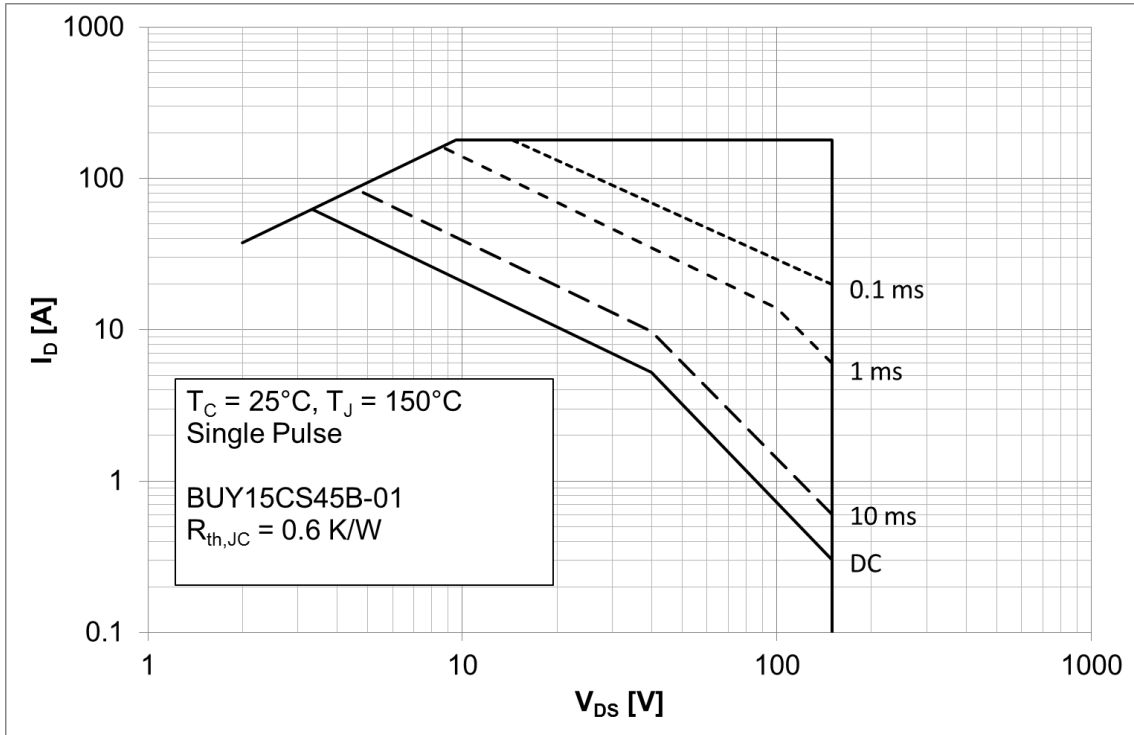
Parameter	Symbol	Values		Unit
		min.	max.	

**DC Characteristics**

Gate Threshold Voltage $I_D = 1.0\text{mA}, V_{DS} \geq V_{GS}$	$V_{GS(th)}$	-	5.0	V
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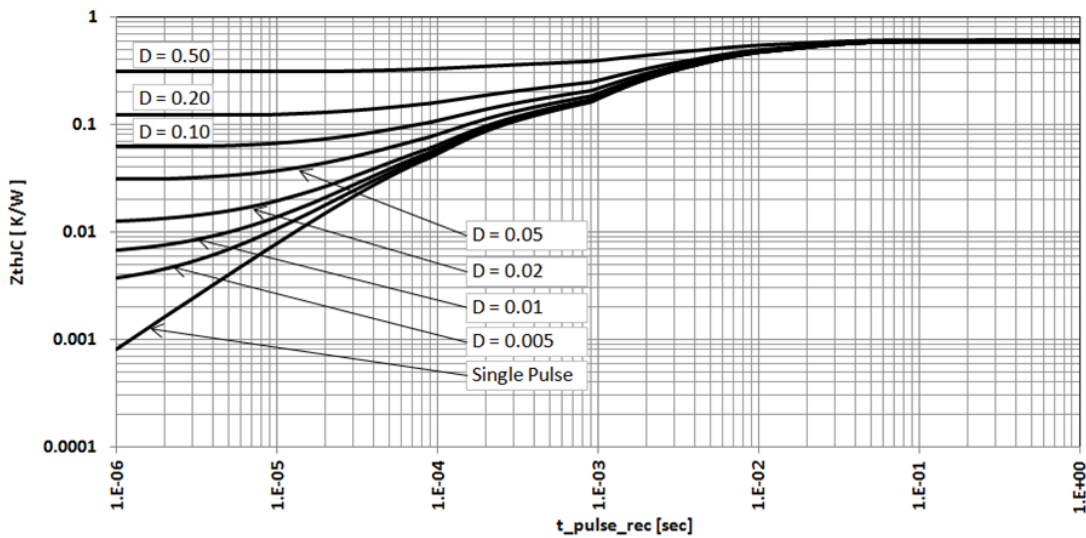
### 1 Safe operating area

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



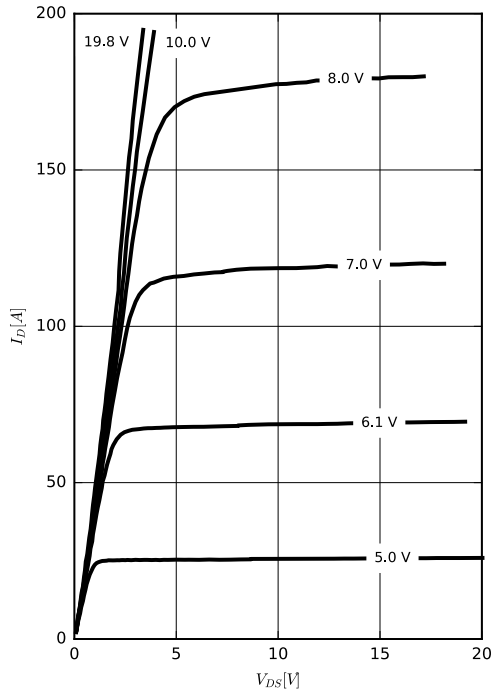
### 2 Max. transient thermal impedance

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



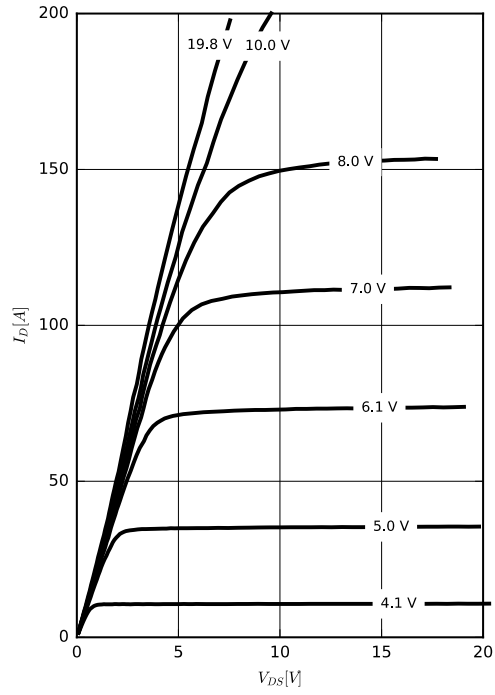
**3 Typ. output characteristics**

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



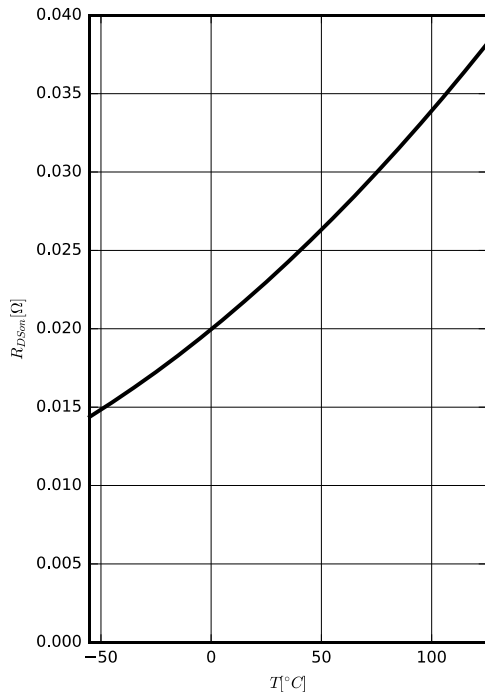
**4 Typ. output characteristics**

$I_D = f(V_{DS}); T_j = 150\text{ }^\circ\text{C}$   
parameter:  $V_G$



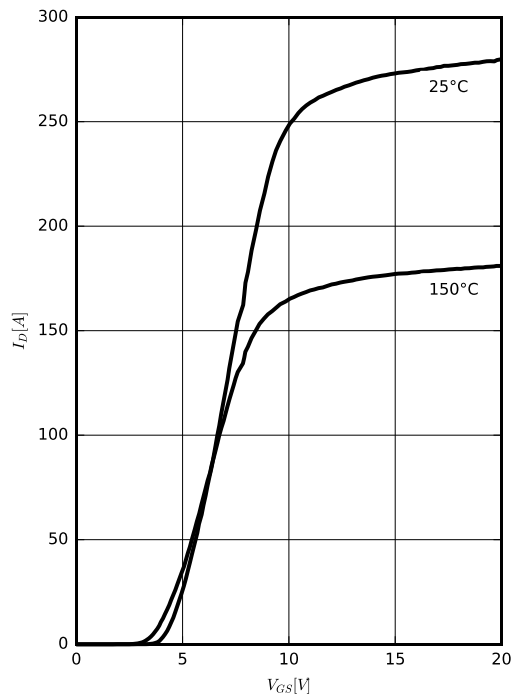
**5 Typ. drain-source on-state resistance**

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



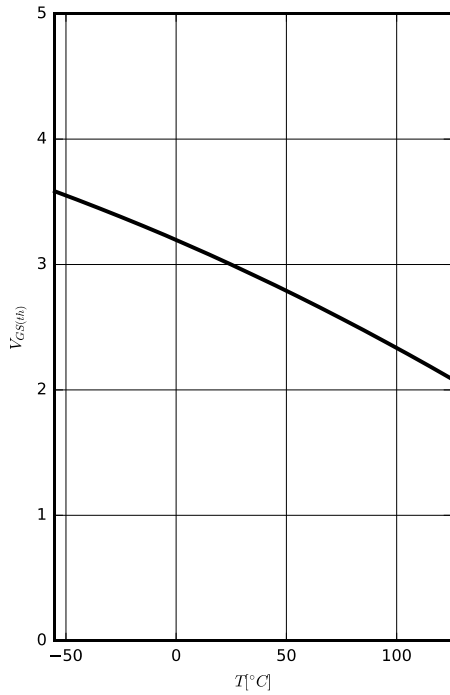
**6 Typ. transfer characteristics**

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



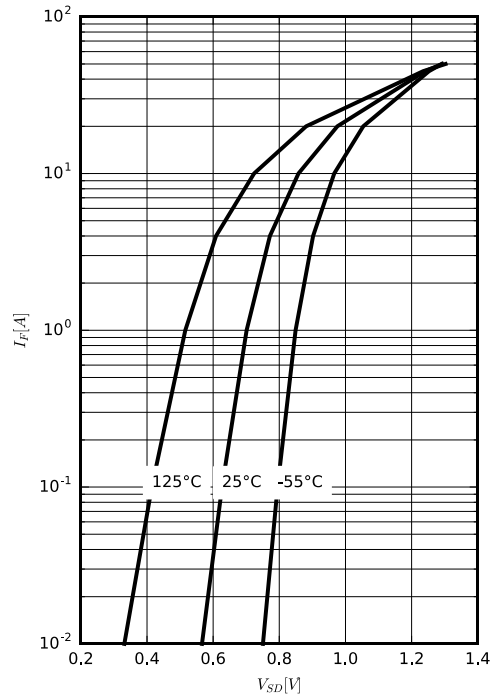
7 Typ. gate threshold voltage

$I_D = f(T_j)$   
 $I_D = 1\text{ mA}$



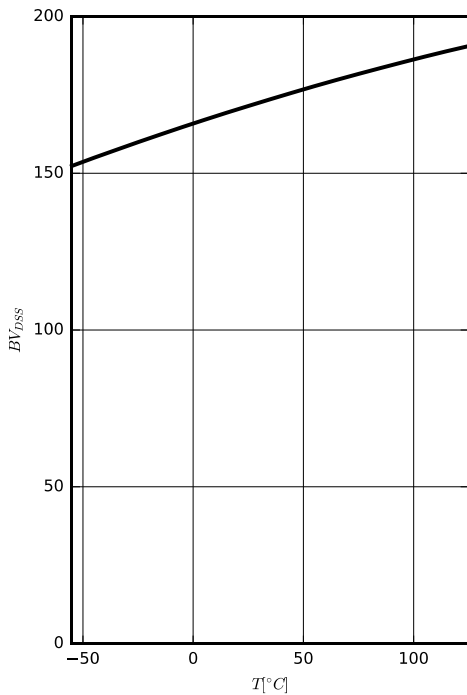
8 Typ. forward characteristics of reverse diode

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



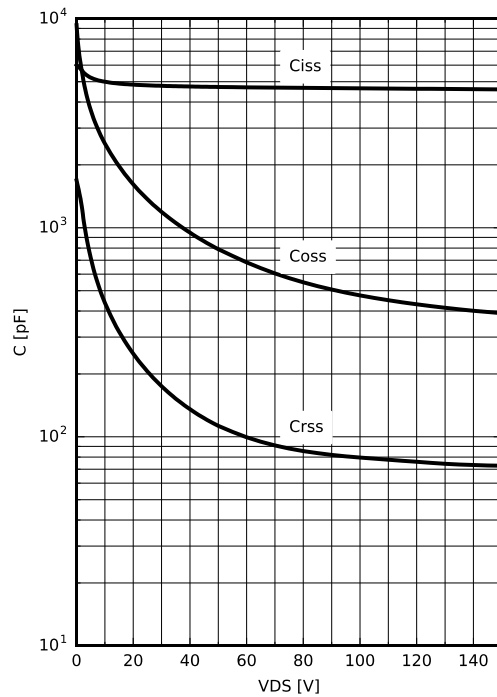
9 Typ. drain-source breakdown voltage

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



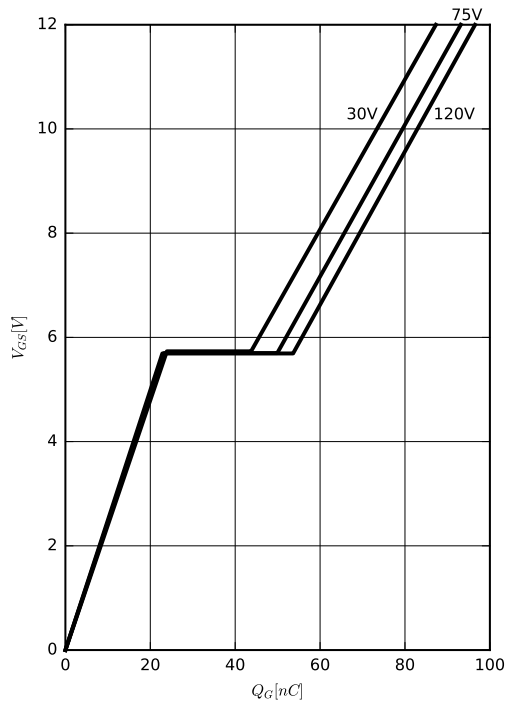
10 Typ. capacitances

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

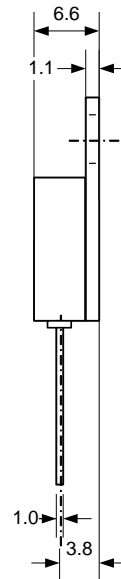
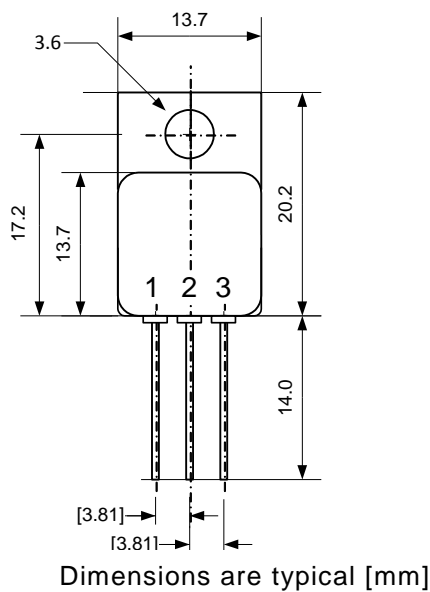


### 11 Typ. gate charge

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



### TO-254AA Package



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