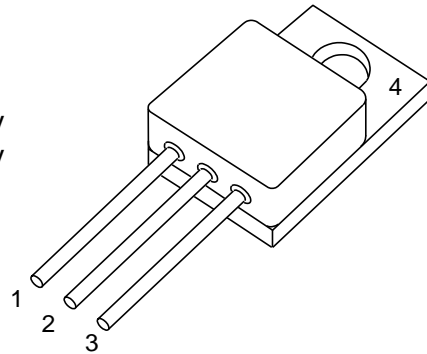


**HiRel RadHard Power-MOS**

- Low  $R_{DS(on)}$
- Single Event Effect (SEE) hardened  
 LET 85, Range: 118 $\mu$ m      LET 55, Range: 90 $\mu$ m  
 $V_{GS} = -10V, V_{DS} = 250V$        $V_{GS} = -15V, V_{DS} = 250V$   
 $V_{GS} = -15V, V_{DS} = 120V$        $V_{GS} = -20V, V_{DS} = 160V$
- Total Ionisation Dose (TID) hardened  
 100 kRad approved
- Hermetically sealed
- N-channel



Type	Marking	Pin Configuration				Package
		1	2	3	4	
BUY25CS45B-01	-	D	S	G	Not connected	TO-254AA

**Maximum Ratings**

Parameter	Symbol	Values	Unit
Drain Source Voltage	$V_{DS}$	250	V
Gate Source Voltage	$V_{GS}$	+/- 20	V
Drain Gate Voltage	$V_{DG}$	250	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
Junction Temperature	$T_J$	-55 to + 150	$^\circ\text{C}$
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.	max.	
<b>DC Characteristics</b>				
Breakdown Voltage Drain to Source $I_D = 0.25\text{mA}$ , $V_{GS} = 0\text{V}$	$B_{VDSS}$	250	-	V
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 $V_{DS} = 0\text{V}$ , $V_{GS} = +/- 20\text{V}$	$I_{GSS}$	-	+/-100	nA
Drain Current $V_{DS} = 200\text{V}$ , $V_{GS} = 0\text{V}$	$I_{DSS}$	-	25	$\mu\text{A}$
Drain Source On Resistance <sup>1)</sup> $V_{GS} = 10\text{V}$ , $I_D = 29\text{A}$	$r_{DS(ON)}$	-	0.05	$\Omega$
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 $V_{DD} = 50\% V_{DS}$ , $I_D = 29\text{A}$ , $R_G = 4.7\Omega$	$t_{d(ON)}$	-	50	ns
Rise Time $V_{DD} = 50\% V_{DS}$ , $I_D = 29\text{A}$ , $R_G = 4.7\Omega$	$t_r$	-	95	ns
Turn-off Delay Time $V_{DD} = 50\% V_{DS}$ , $I_D = 29\text{A}$ , $R_G = 4.7\Omega$	$t_{d(OFF)}$	-	80	ns
Fall Time $V_{DD} = 50\% V_{DS}$ , $I_D = 29\text{A}$ , $R_G = 4.7\Omega$	$t_f$	-	75	ns
Reverse Recovery Time $V_{DD} < 50\% V_{DS}$ , $I_D = 45\text{A}$	$t_{rr}$	-	600	ns
Common Source Input Capacitance $V_{DS} = 100\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$	$C_{iss}$	3.5	6.5	nF
Common Source Output Capacitance $V_{DS} = 100\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$	$C_{oss}$	250	400	pF
Common Source Reverse Transfer Capacitance $V_{DS} = 100\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$	$C_{rss}$	5	20	pF
Total Gate Charge $V_{DD} = 50\% V_{DS}$ , $V_{GS} = 10\text{V}$ , $I_D = 45\text{A}$	$Q_G$	-	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.	
<b>DC Characteristics</b>				
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 $V_{DS} = 200\text{V}, V_{GS} = 0\text{V}$	$I_{DSS}$	-	250	$\mu\text{A}$
Drain Source On Resistance <sup>1)</sup> $V_{GS} = 10\text{V}, I_D = 29\text{A}$	$r_{DS(ON)}$	-	0.09	$\Omega$

**Notes.:**

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

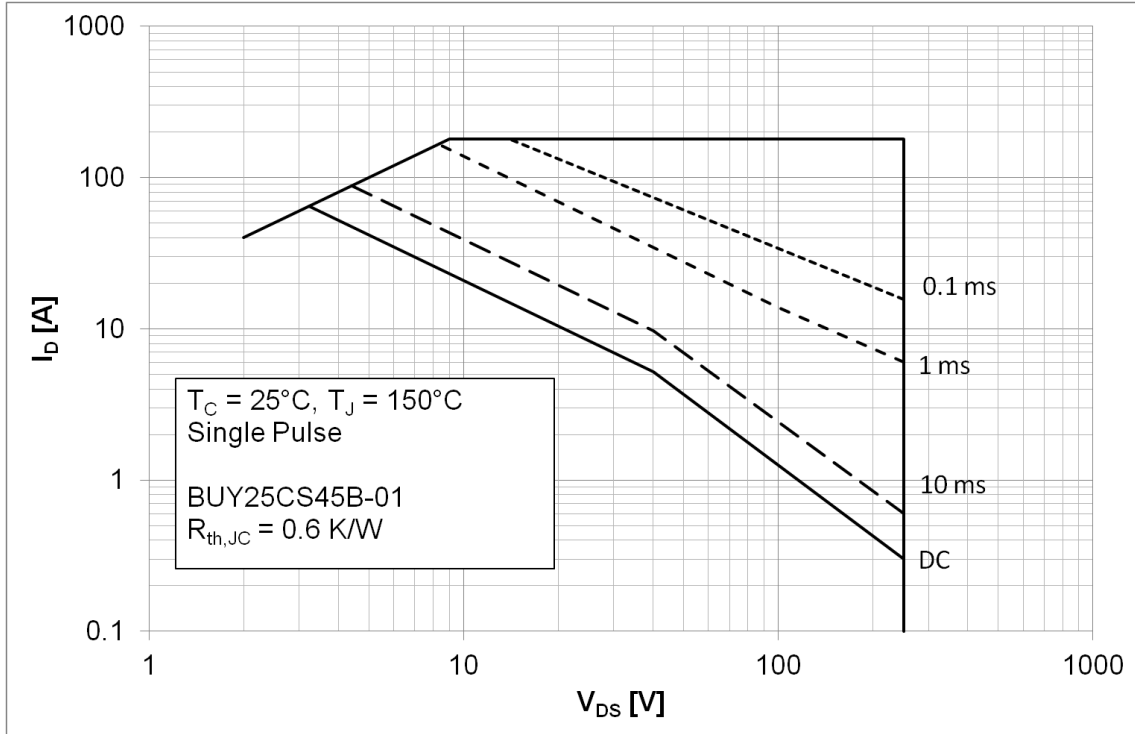
**Electrical Characteristics**

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

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

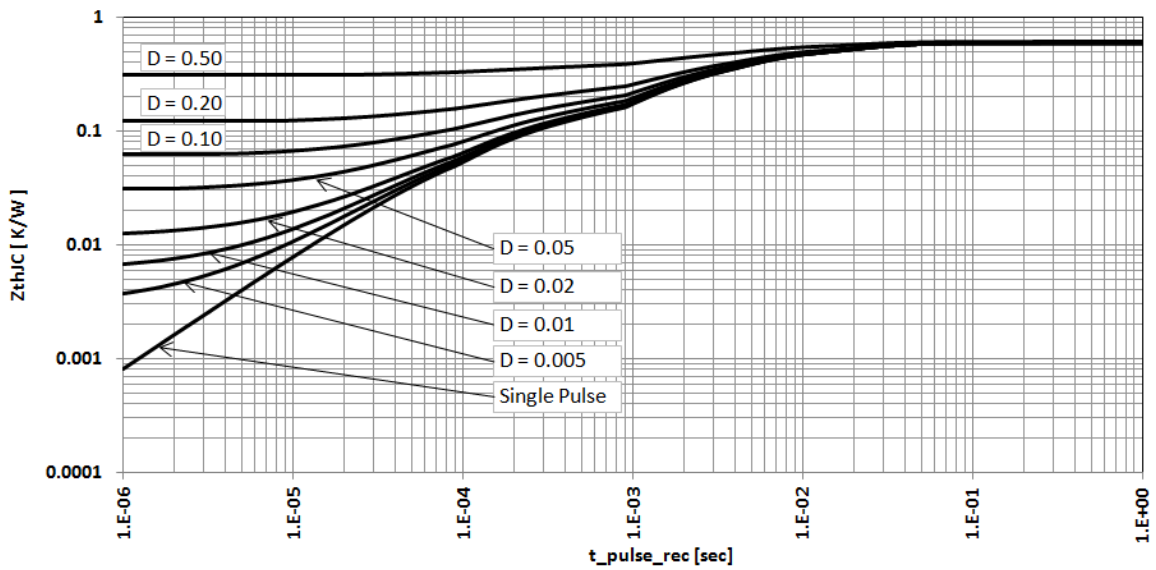
### 1 Safe operating area

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



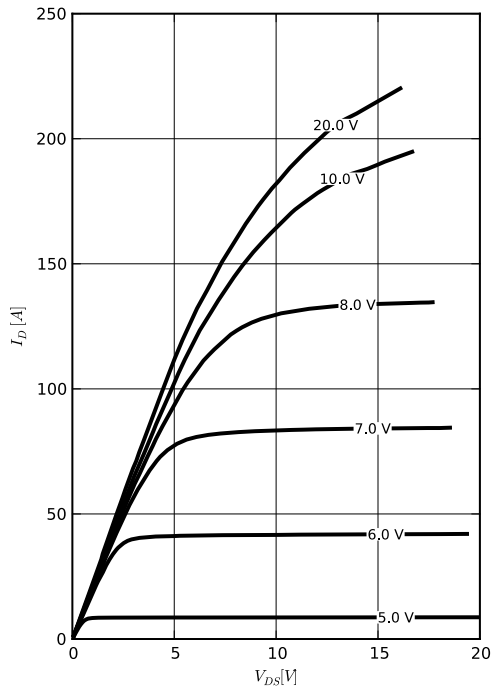
### 2 Max. transient thermal impedance

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



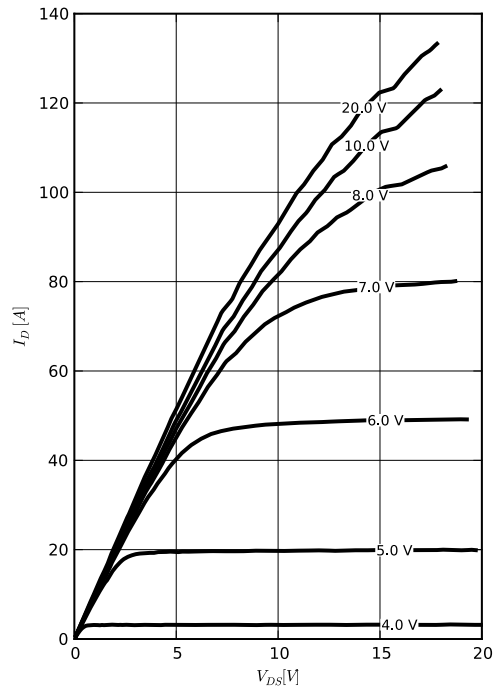
**3 Typ. output characteristics**

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



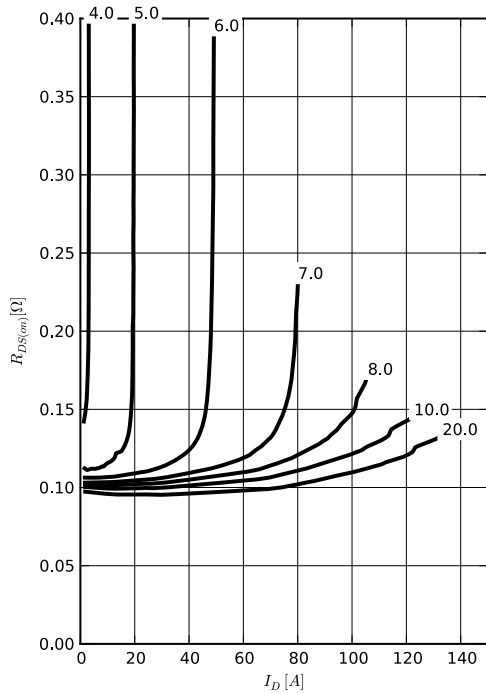
**4 Typ. output characteristics**

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



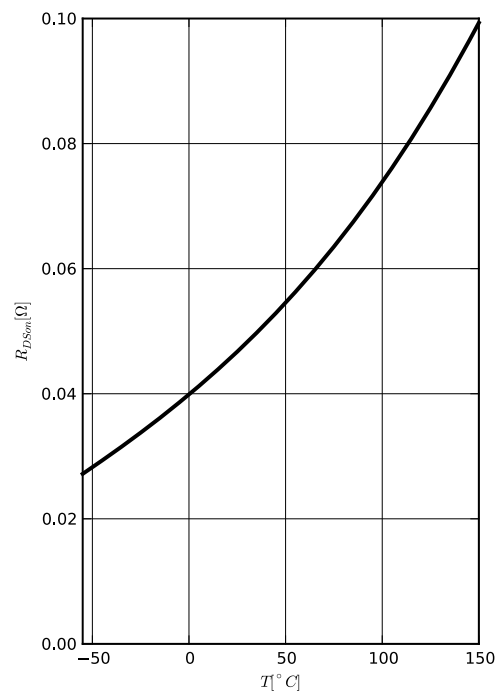
**5 Typ. drain-source on-state resistance**

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



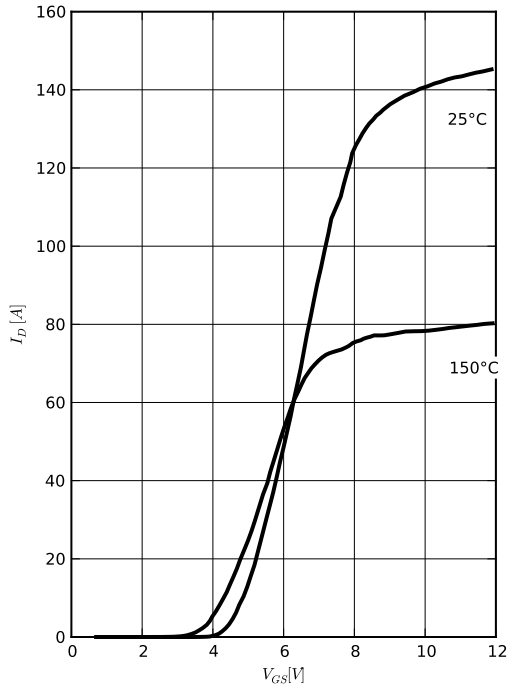
**6 Typ. drain-source on-state resistance**

$R_{DS(on)} = f(T_j)$   
 $I_D = 29\text{A}$



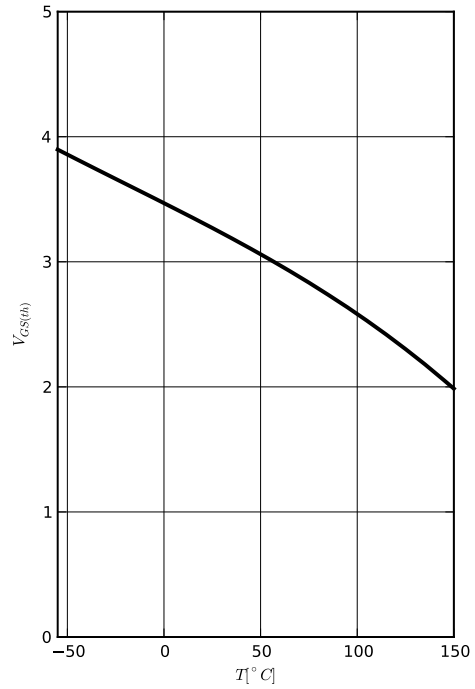
**7 Typ. transfer characteristics**

$I_D = f(V_{GS}); |V_{DS}| > 2 |I_D| R_{DS(on)max}$   
parameter:  $T_j$



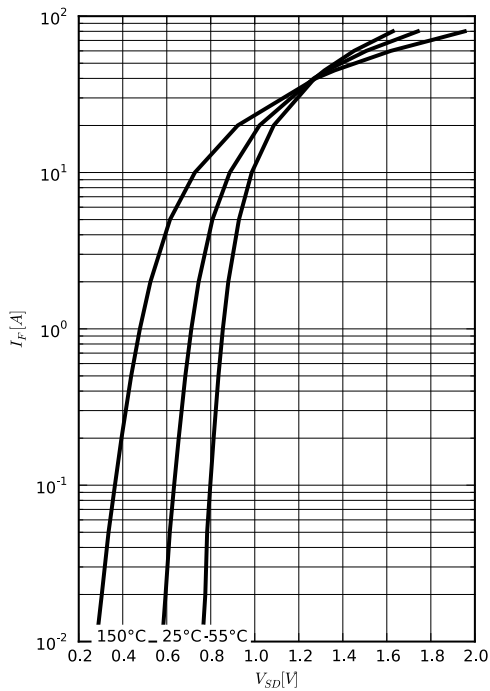
**8 Typ. gate threshold voltage**

$I_D = f(T_j)$   
 $I_D = 1mA$



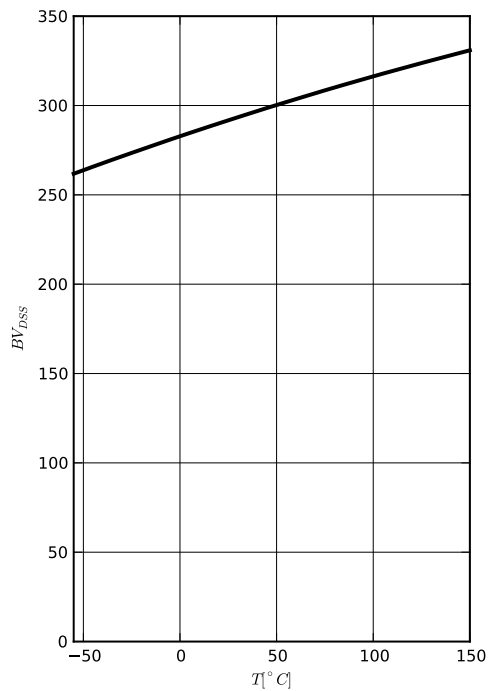
**9 Typ. forward characteristics of reverse diode**

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



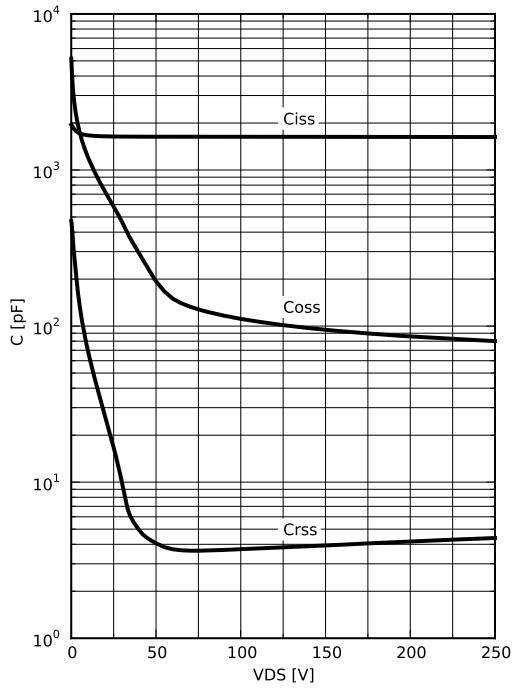
**10 Typ. drain-source breakdown voltage**

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



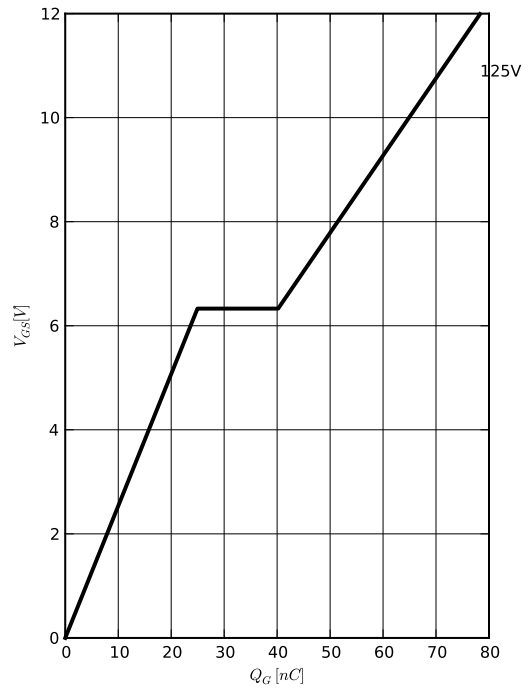
**11 Typ. capacitances**

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

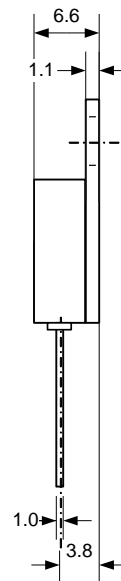
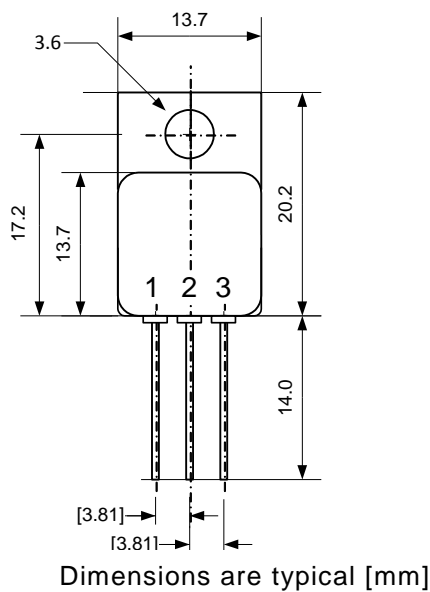


**12 Typ. gate charge**

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



## TO-254AA Package



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