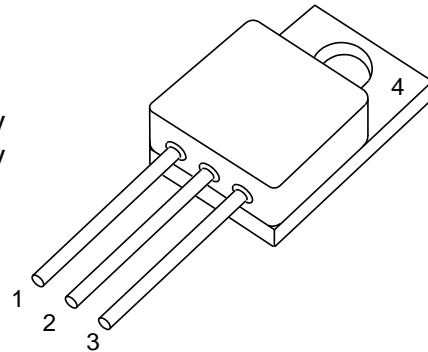


HiRel RadHard Power-MOS

- Low $R_{DS(on)}$
- Single Event Effect (SEE) hardened
 LET 85, Range: 118 μ m LET 55, Range: 90 μ 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 ¹⁾	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.	typ.	max.	
DC Characteristics					
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 $V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	I_{GSS}	-	-	± 100	nA
Drain Current $V_{DS} = 200\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}	-	-	25	μA
Drain Source On Resistance ¹⁾ $V_{GS} = 10\text{V}$, $I_D = 29\text{A}$	$r_{DS(ON)}$	-	-	0.05	Ω
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 $V_{DD} = 50\% V_{DS}$, $I_D = 29\text{A}$, $R_G = 4.7\Omega$	$t_{d(ON)}$	-	25	50	ns
Rise Time $V_{DD} = 50\% V_{DS}$, $I_D = 29\text{A}$, $R_G = 4.7\Omega$	t_r	-	20	95	ns
Turn-off Delay Time $V_{DD} = 50\% V_{DS}$, $I_D = 29\text{A}$, $R_G = 4.7\Omega$	$t_{d(OFF)}$	-	55	80	ns
Fall Time $V_{DD} = 50\% V_{DS}$, $I_D = 29\text{A}$, $R_G = 4.7\Omega$	t_f	-	7	75	ns
Reverse Recovery Time $V_{DD} < 50\% V_{DS}$, $I_D = 45\text{A}$	t_{rr}	-	530	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	-	70	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 $V_{DS} = 200\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}	-	250	μA
Drain Source On Resistance ¹⁾ $V_{GS} = 10\text{V}$, $I_D = 29\text{A}$	$r_{DS(ON)}$	-	0.09	Ω

Notes.:

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

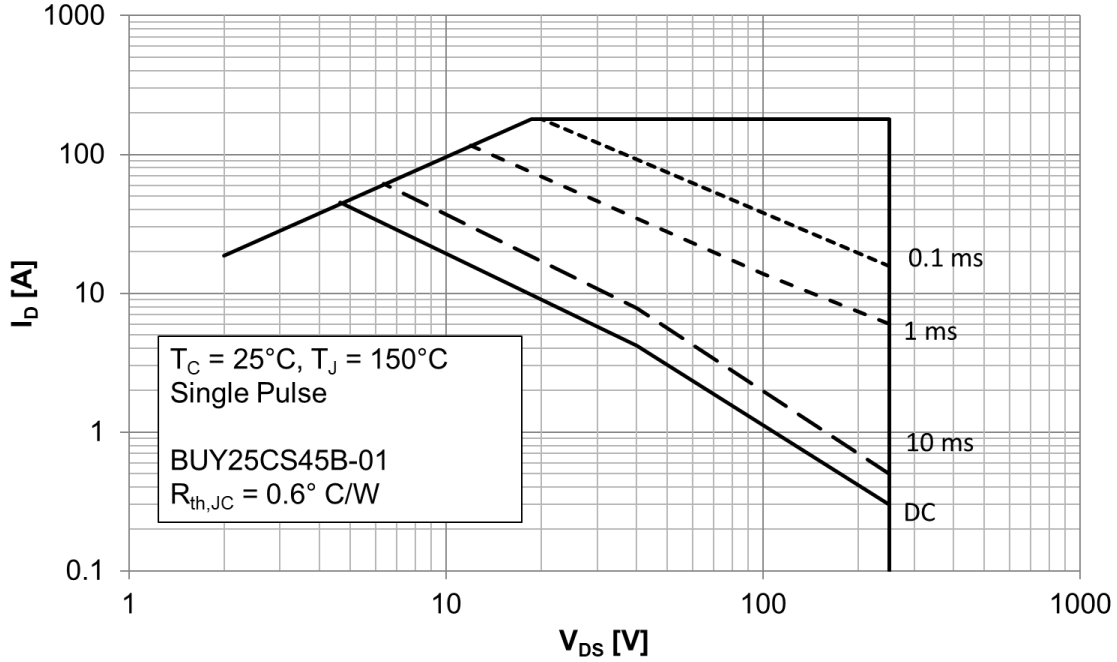
Electrical Characteristics

 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

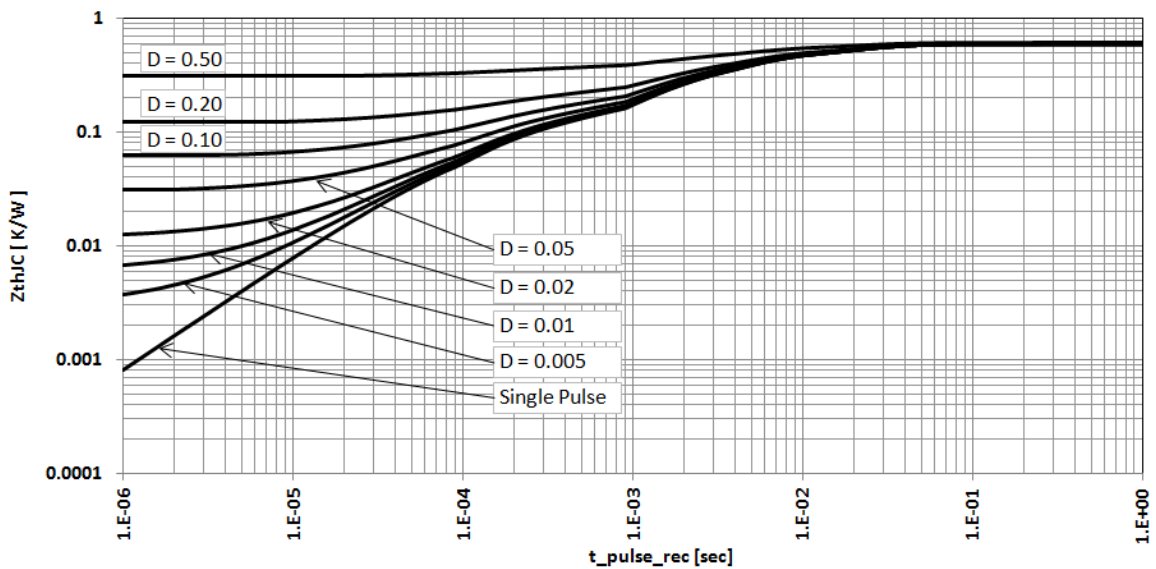
1 Safe operating area

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



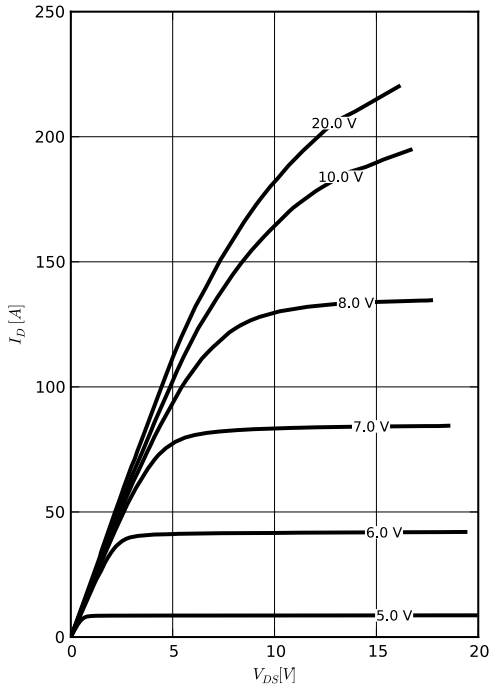
2 Max. transient thermal impedance

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



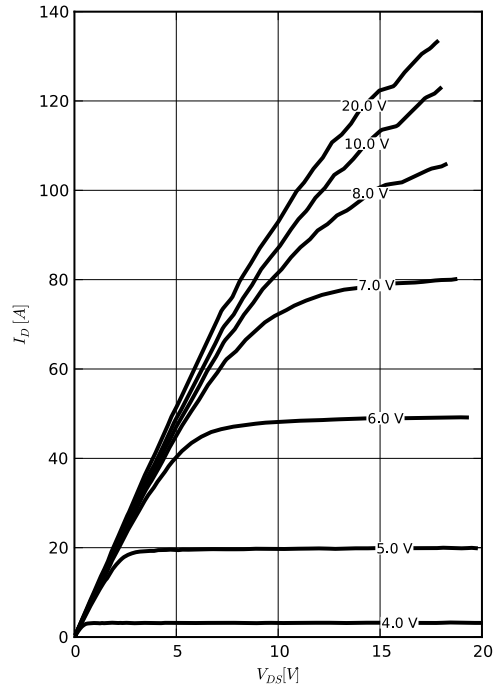
3 Typ. output characteristics

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



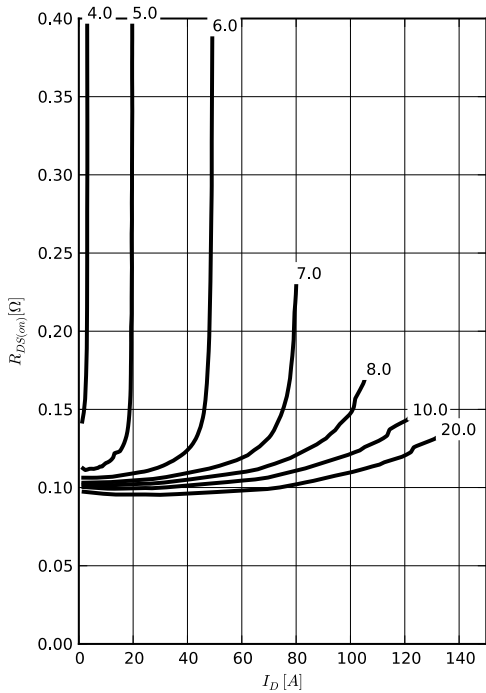
4 Typ. output characteristics

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



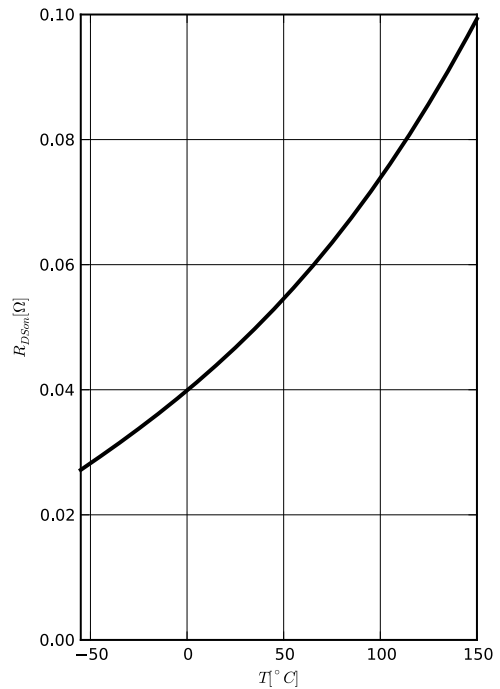
5 Typ. drain-source on-state resistance

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



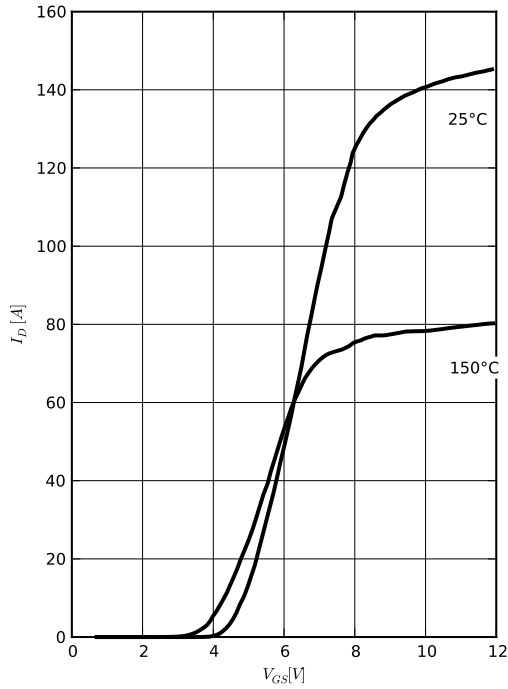
6 Typ. drain-source on-state resistance

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



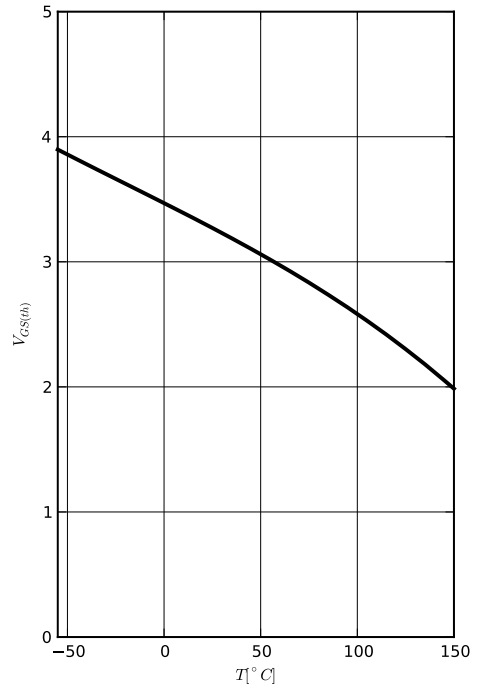
7 Typ. transfer characteristics

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



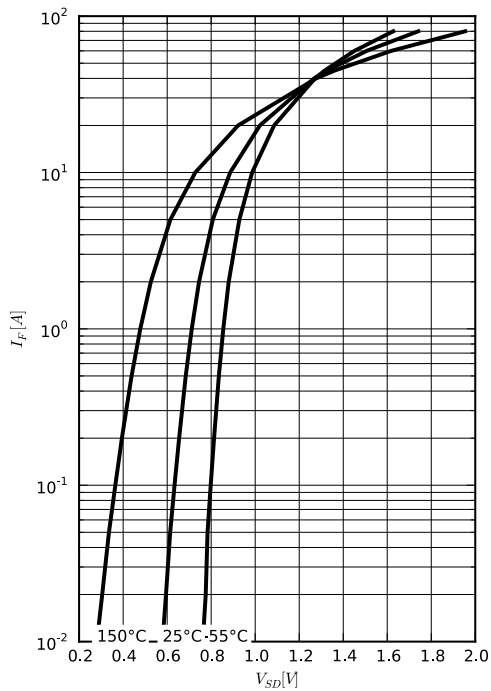
8 Typ. gate threshold voltage

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



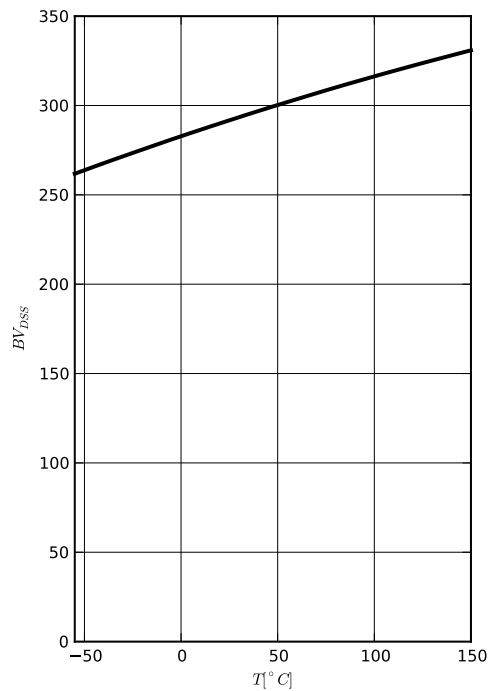
9 Typ. forward characteristics of reverse diode

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



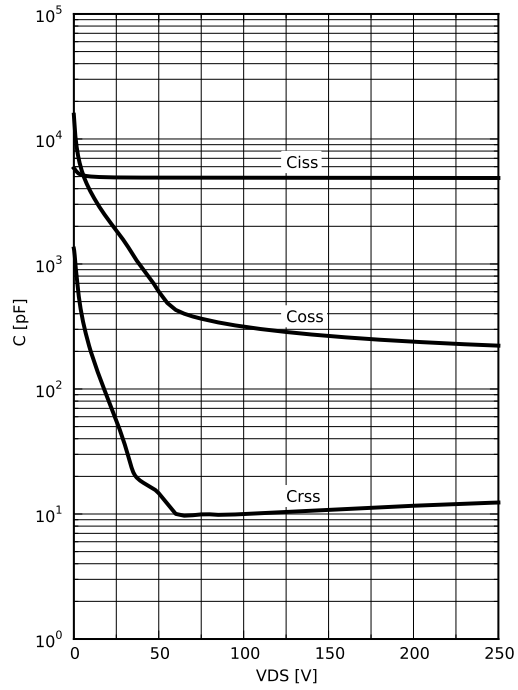
10 Typ. drain-source breakdown voltage

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



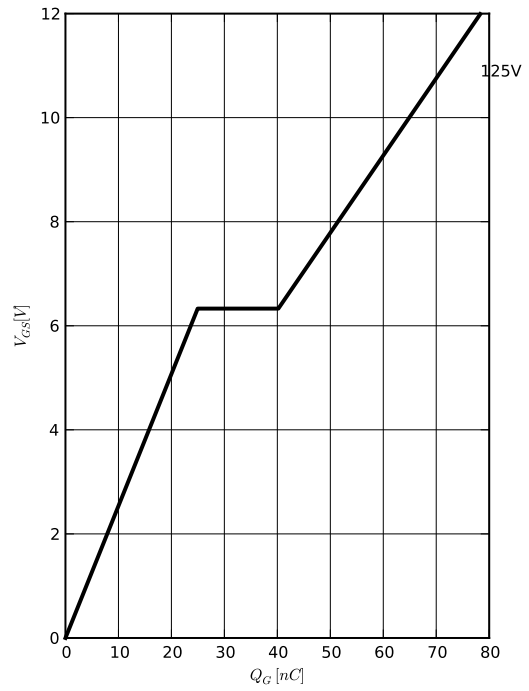
11 Typ. capacitances

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

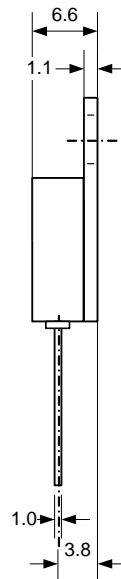
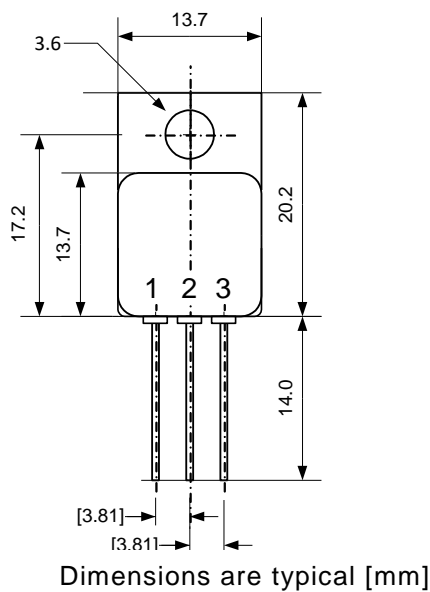


12 Typ. gate charge

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



TO-254AA Package



Edition 2019-09
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 85579 Neubiberg, Germany
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