

BRD65R1K2T

Rev.A Apr.-2025

/ Descriptions

TO-252 N 650V

N-CHANNEL 650V Super-Junction Power MOSFET in a TO-252 Plastic Package.

/ Features

$R_{DS(on)}$ C_{rss}

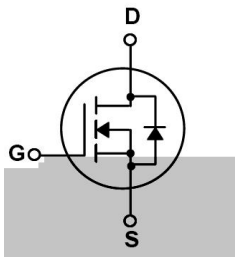
Low $R_{DS(on)}$, low gate charge, low C_{rss} , fast switching, HF Product.

/ Applications

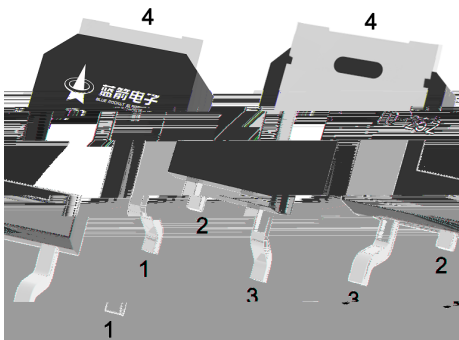
DC/DC

Suited for low voltage applications such as automotive, DC/DC Converters, and high efficiency switching for power management in portable and battery operated products.

/ Equivalent Circuit



/ Pinning



PIN1 G

PIN 2 D

PIN 3 S

PIN 4 D

/ Marking

See Marking Instructions.

/ Absolute Maximum Ratings($T_a=25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Drain Current	$I_D(T_c=25^\circ\text{C})$	4	A
Drain Current - Pulsed	I_{DM}	16	A
Gate-Source Voltage	V_{GS}	± 30	V
Single Pulsed Avalanche Energy	E_{AS}	70.2	mJ
Avalanche Current	I_{AS}	3.6	A
Power Dissipation	$P_D(T_c=25^\circ\text{C})$	56.5	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	
Junction-to-Ambient	$R_{\theta JA}$	55	$^\circ\text{C/W}$
Junction-to-Case	$R_{\theta JC}$	2.2	$^\circ\text{C/W}$

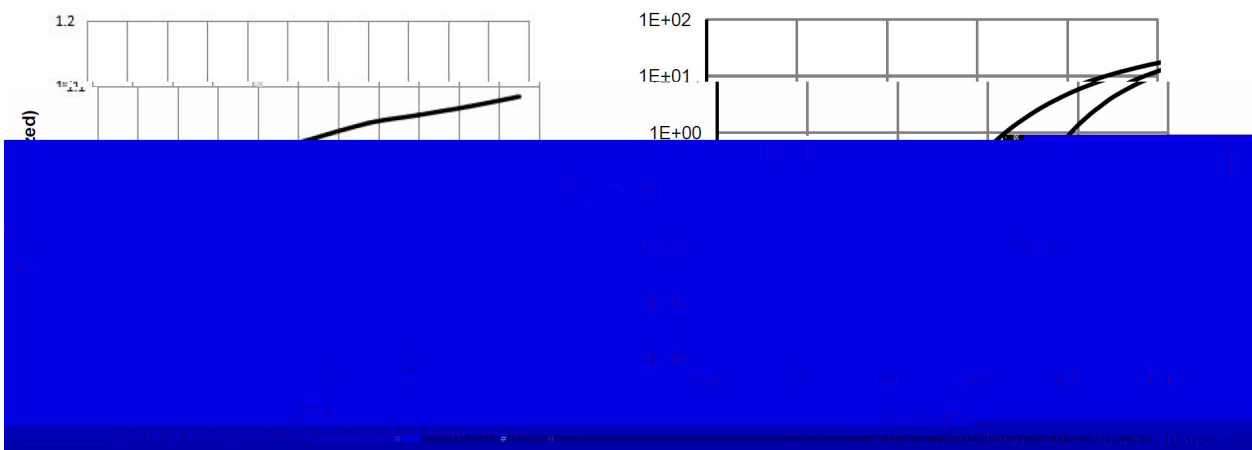
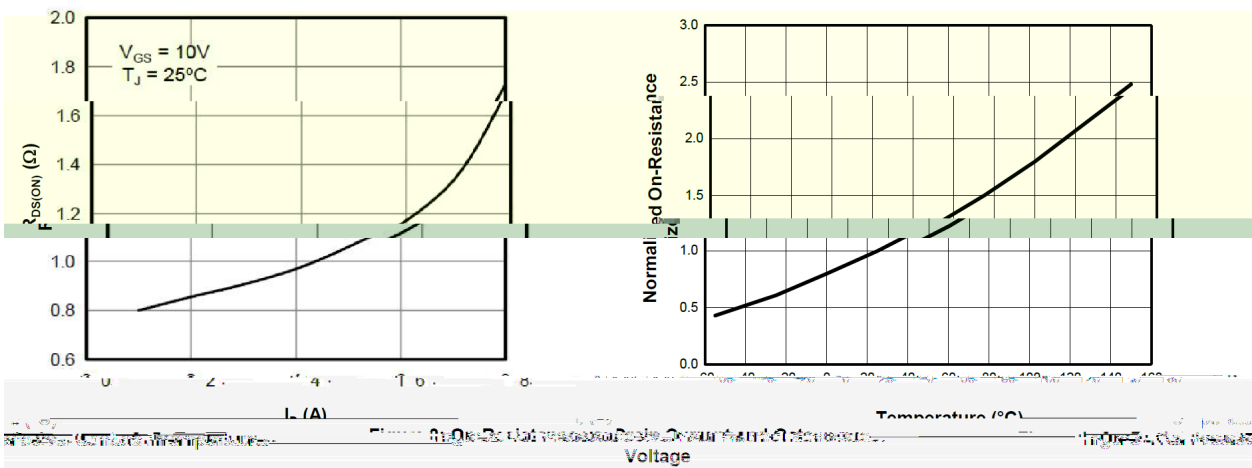
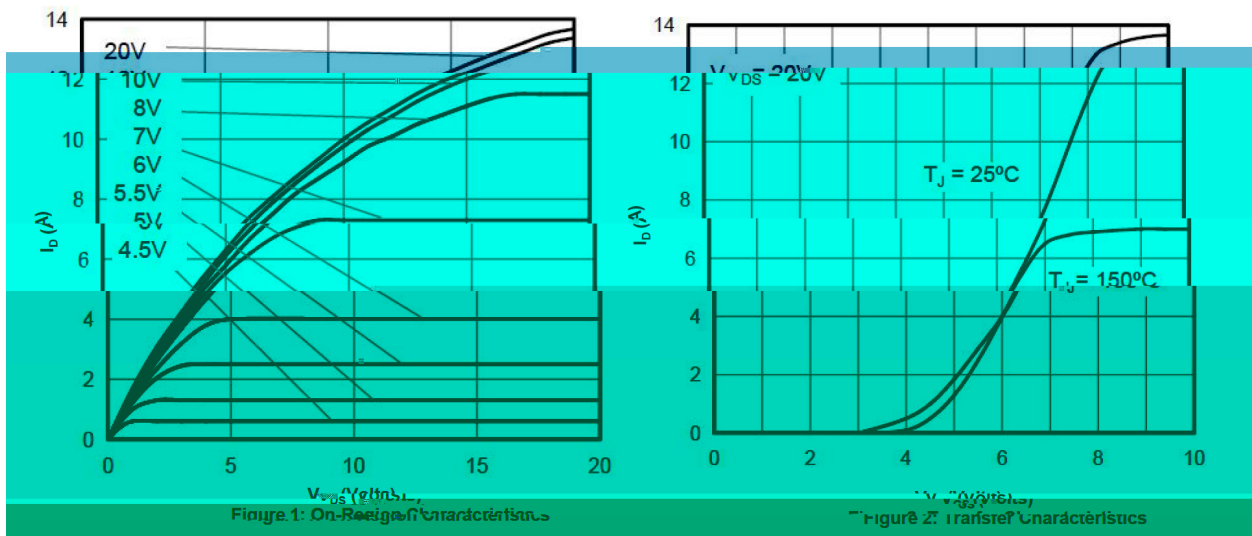
/ Electrical Characteristics($T_a=25^\circ\text{C}$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DS}	$V_{GS}=0V$ $I_D=250\mu A$	650			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V$ $V_{GS}=0V$ $T_J=25^\circ\text{C}$			1.0	μA
Gate-Body Leakage Current, Forward	I_{GSS}	$V_{GS}=\pm 30V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	2.5	3.3	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=0.5A$		945	1200	m Ω
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_{SD}=1A$ $T_J=25^\circ\text{C}$			1.2	V
Gate Resistance	R_g	$V_{GS}=0V$ $f=1.0\text{MHz}$		19.6		Ω
Input Capacitance	C_{iss}	$V_{DS}=25V$ $V_{GS}=0V$ $f=1.0\text{MHz}$		195		pF
Output Capacitance	C_{oss}			320		pF
Reverse Transfer Capacitance	C_{rss}			6.5		pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=400V$ $I_D=2A$ $V_{GS}=10V$ $R_G=25\Omega$		26.7		ns
Turn-On Rise Time	t_r			22.5		ns
Turn-Off Delay Time	$t_{d(off)}$			35.8		ns
Turn-Off Fall Time	t_f			29.1		ns

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Diode Forward Current	I_S				4	A
Total Gate Charge	Q_g	$V_{DS}=520V \quad I_D=2A$ $V_{GS}=10V$		7.9		nC
Gate-Source Charge	Q_{gs}			2.0		nC
Gate-Drain Charge	Q_{gd}			1.9		nC
Reverse recovery time	T_{rr}	$V_R=400V, I_F=2A,$ $dI_F/dt=100A/\mu s$		119		ns
Reverse recovery charge	Q_{rr}			0.7		uC

/ Electrical Characteristic Curve



/ Electrical Characteristic Curve

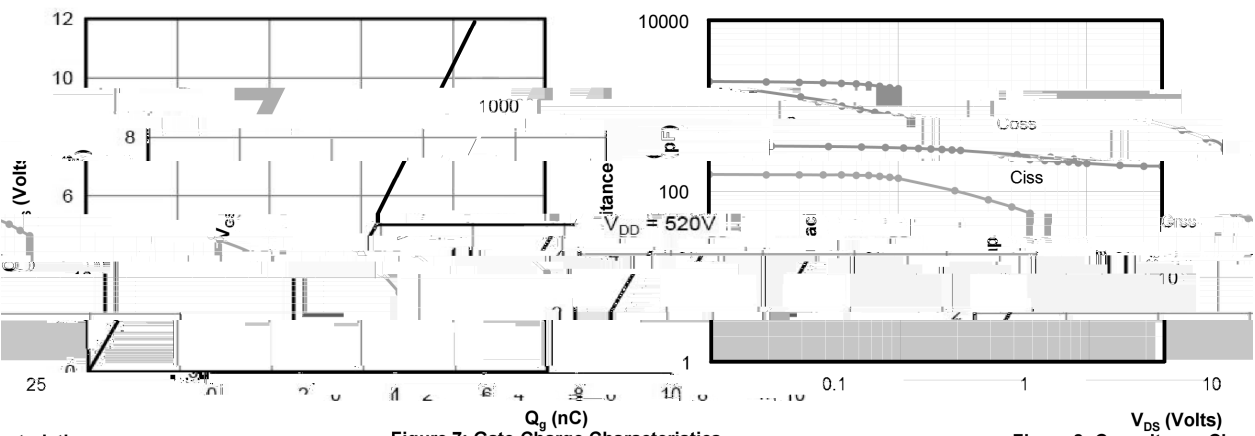


Figure 7: Gate Charge Characteristic



Figure 8: Output Characteristics

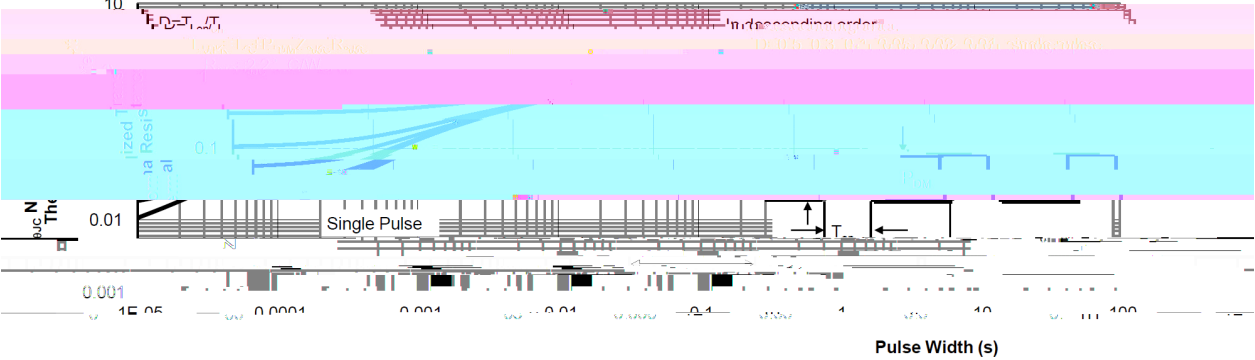
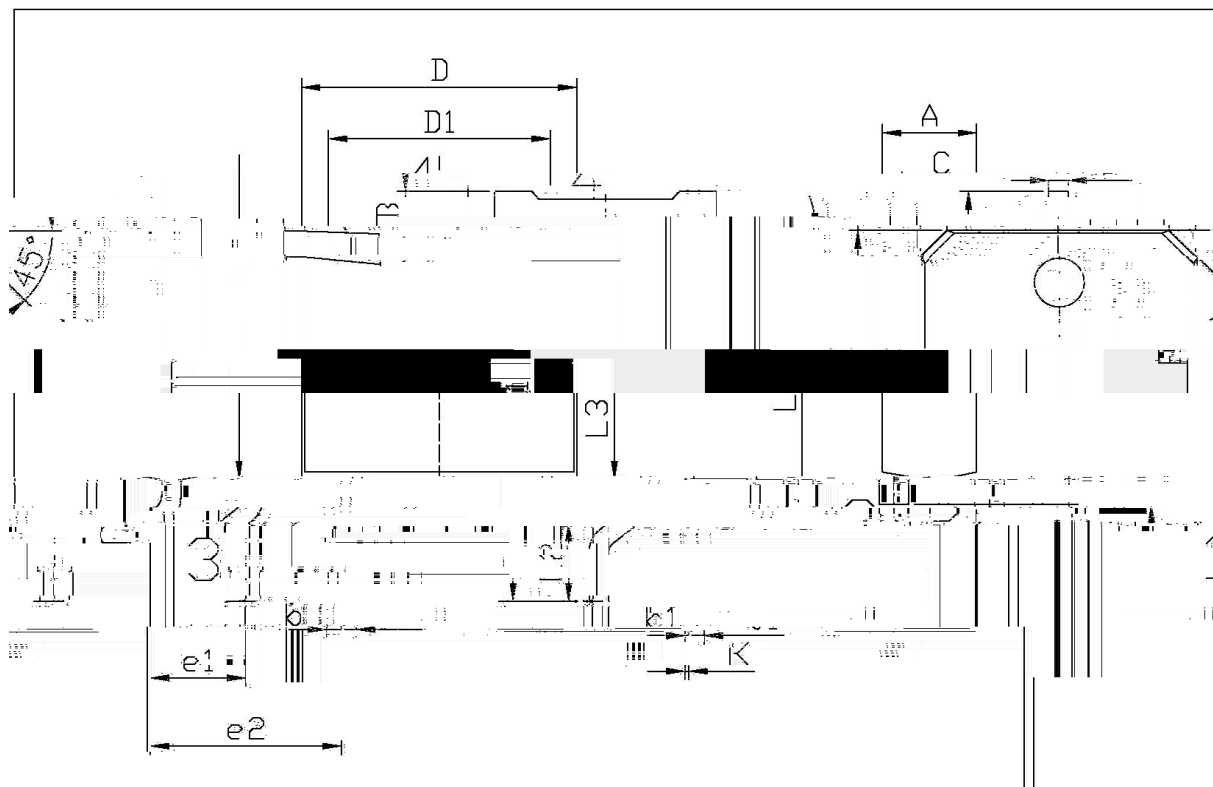


Figure 10: Normalized Maximum Transient Thermal Impedance

/ Package Dimensions



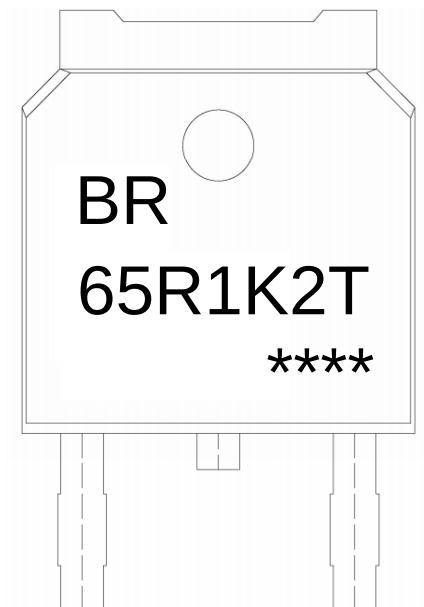
单位: mm

Symbol		Dimensions In Millimeters		Symbol		Dimensions In Millimeters	
95	6.25	A	2.20	2.40	E	5.00	
24	2.34	B	0.95	1.25	e1	2.00	
43	4.73	b	0.70	0.90	e2	4.40	
5	10.35	51	0.45	0.55	L1	9.80	
C	0.45	0.55	?	1.70	?	0.00	
L3	0.60	0.90	D1	6.45	6.75		
K	0.00	0.10	D1	5.10	5.50		

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/ Marking Instructions



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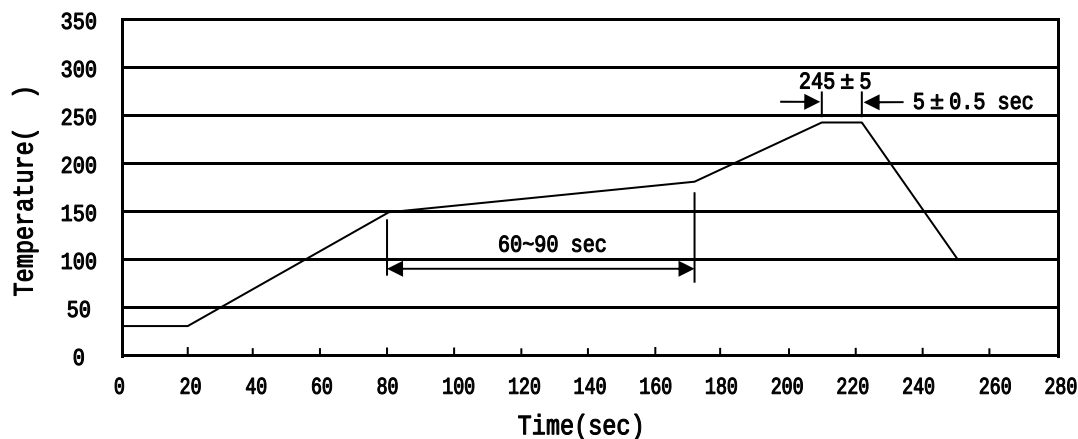
Note:

BR: Company Code

65R1K2T: Product Type Code

****: Lot No. Code, code change with Lot No

() / Temperature Profile for IR Reflow Soldering(Pb-Free)



Note:

- | | | | | | |
|---|-------|-----|----|------------|---|
| 1 | 150 | 180 | 60 | 90sec; | 1.Preheating:150~180 °C, Time:60~90sec. |
| 2 | 245±5 | | | 5±0.5sec; | 2.Peak Temp.:245±5 °C, Duration:5±0.5sec. |
| 3 | | | 2 | 10 °C/sec. | 3. Cooling Speed: 2~10 °C/sec. |

/ Resistance to Soldering Heat Test Conditions

260±5 10±1 sec. Temp.:260±5 Time:10±1 sec

/ Packaging SPEC.

/ REEL

Package Type	Units					Dimension (unit mm ³)		
	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Reel	Inner Box	Outer Box
TO-252	2,500	2	5,000	6	30,000	13 ×16	360×360×50	380×335×366

/ TUBE

Package Type	Units					Dimension (unit mm ³)		
	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Tube	Inner Box	Outer Box
TO-251/252	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

/ Notices

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