

BRCS90P03DP

Rev.A .May.-2019

TO-252 P

P-CHANNEL MOSFET in a TO-252 Plastic Package.

/ Absolute Maximum Ratings(Ta=25)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-30	V
Drain Current		I_D	-90	A
Drain Current - Pulsed		I_{DM}	-360	A
Gate-Source Voltage		V_{GS}	± 20	V
Single Pulsed Avalanche Energy		E_{AS}	514	mJ
Avalanche current, single pulse		I_{AS}	-39	A
Power Dissipation		$P_{tot}(T_c=25)$	83	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$
Junction-to-Ambient	t 10s	$R_{\theta JA}$	27	/W
Junction-to-Ambient	Steady-State		59	
Junction-to-Case	Steady-State	$R_{\theta JC}$	1.5	

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=-1mA$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V$ $V_{GS}=0V$ $T_a=25$			-1.0	μA
		$V_{DS}=-30V$ $V_{GS}=0V$ $T_a=125$			-200	μA
Gate-Body Leakage Current, Forward	I_{GSS}	$V_{GS}=\pm 20V$ $V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=-250\mu A$	-1.2		-2.2	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V$ $I_D=-20A$		4.4	6	m Ω
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_F=-24A$			-1.2	V
Input Capacitance	C_{iss}	$V_{DS}=-25V$ $V_{GS}=0V$ $f=1.0MHz$		4700		pF
Output Capacitance	C_{oss}			570		
Reverse Transfer Capacitance	C_{rss}			510		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-15V$ $I_D=-90A$ $V_{GS}=-10V$ $R_{GEN}=3.5\Omega$		35		ns
Turn-On Rise Time	t_r			10		
Turn-Off Delay Time	$t_{d(off)}$			70		
Turn-Off Fall Time	t_f			20		

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate to source charge	Q_{gs}	$V_{DD}=-24V, I_D=-90A,$ $V_{GS}=0 \text{ to } -10V$		42	55	nC
Gate to drain charge	Q_{gd}			10	20	nC
Gate charge total	Q_g			100	130	nC
Gate plateau voltage	$V_{plateau}$			-5.3		V
Diode continuous forward current ²⁾	I_S	$T_C=25^\circ C$			-90	A
Diode pulse current ²⁾	$I_{S,pulse}$				-360	A
Reverse recovery time ²⁾	t_{rr}	$V_R=-15V, I_F=-50A,$ $di_F/dt =-100A/\mu s$		50		nS
Reverse recovery charge ²⁾	Q_{rr}			70		nC

1) Current is limited by bondwire; with an $R_{\theta JC} = 1.1K/W$ the chip is able to carry -143A at 25°C.

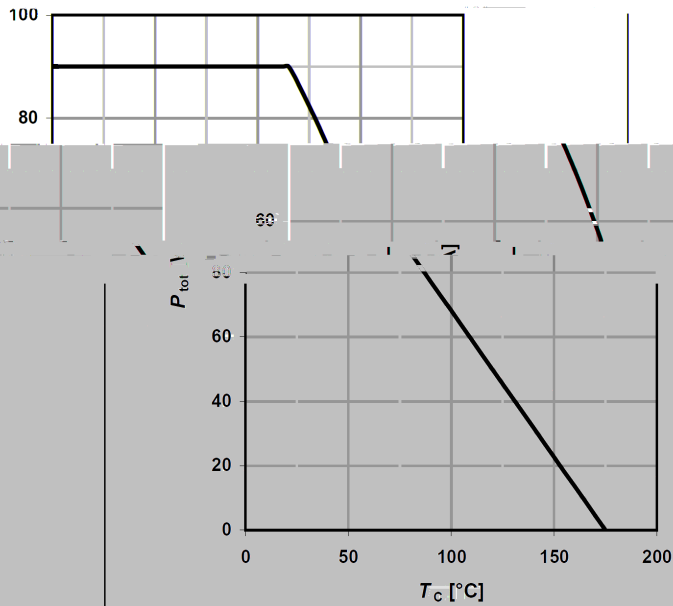
2) Defined by design. Not subject to production test.

3) Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

/ Electrical Characteristic Curve

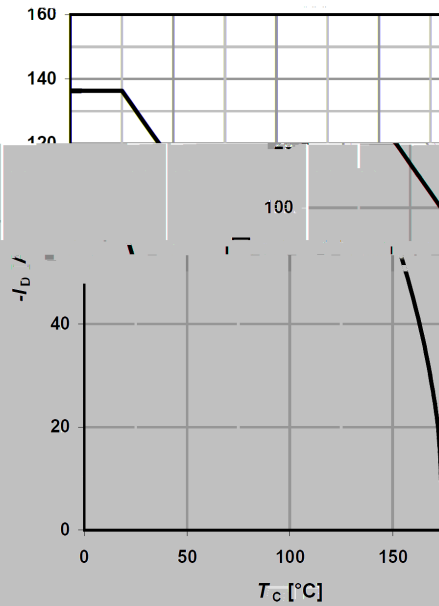
1 Power dissipation

$$P_{\text{tot}} = f(T_c); V_{\text{GS}} \leq -6V$$



2 Drain current

$$I_D = f(T_c); V_{\text{GS}} \leq -6V$$



3 Safe operating area

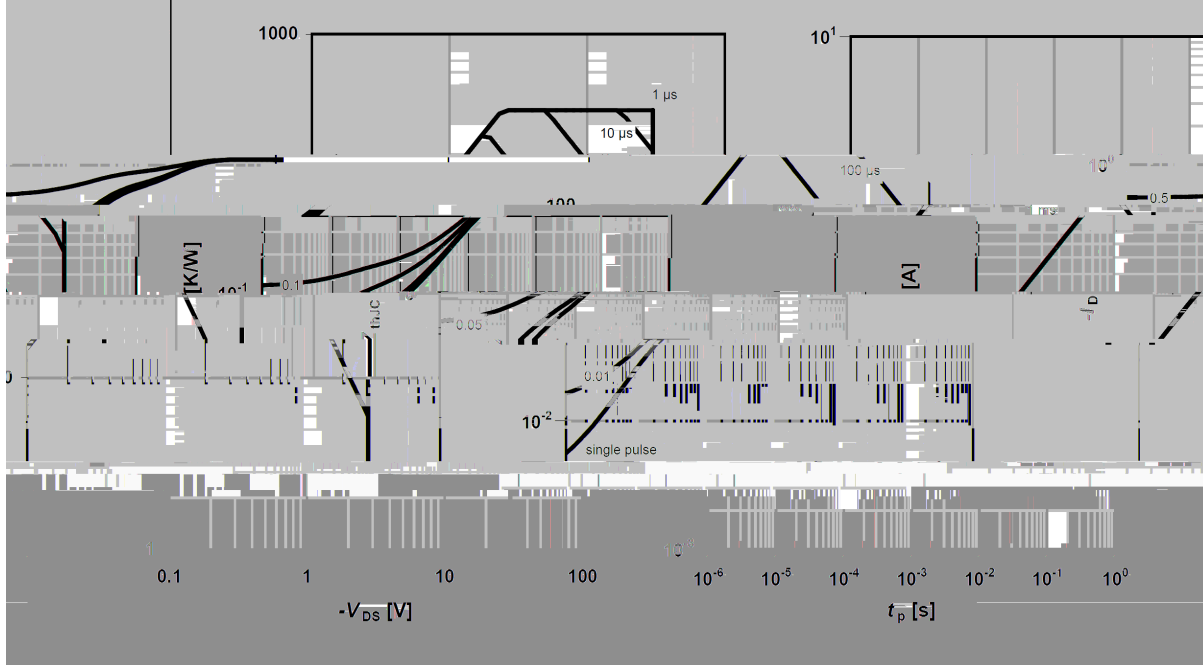
$$I_D = f(V_{\text{DS}}); T_c = 25^\circ\text{C}; D = 0$$

parameter: t_p

4 Max. transient thermal impedance

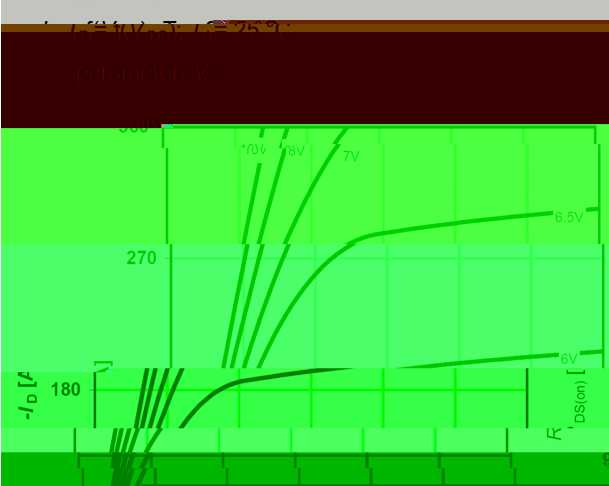
$$Z_{\text{thJC}} = f(t_p)$$

parameter: $D = t_p/T$

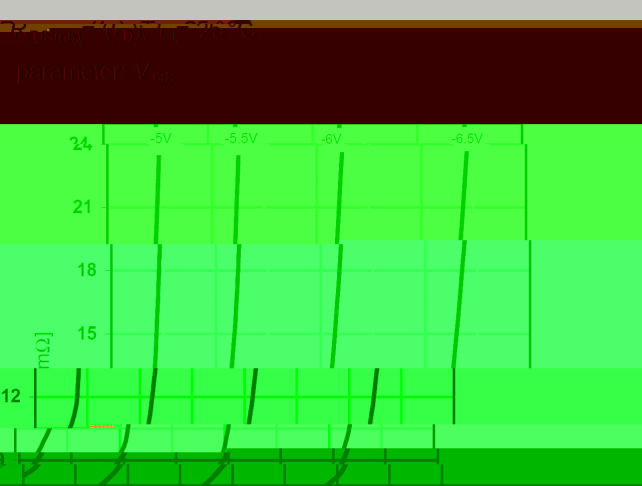


/ Electrical Characteristic Curve

5 Typ. output characteristics

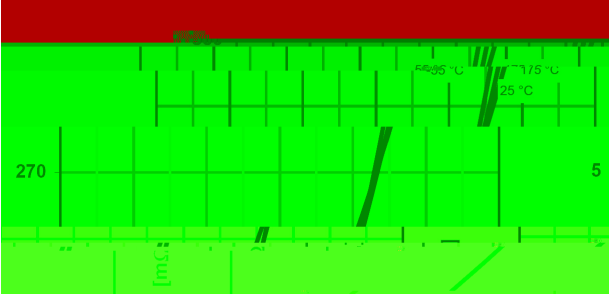


6 Typ. drain-source on-state resistance



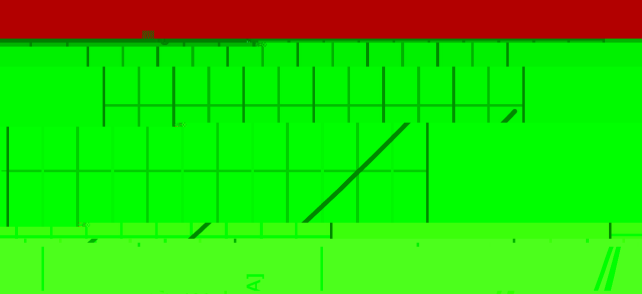
$I_D = f(V_{GS}, V_{DS})$

parameter: T_J

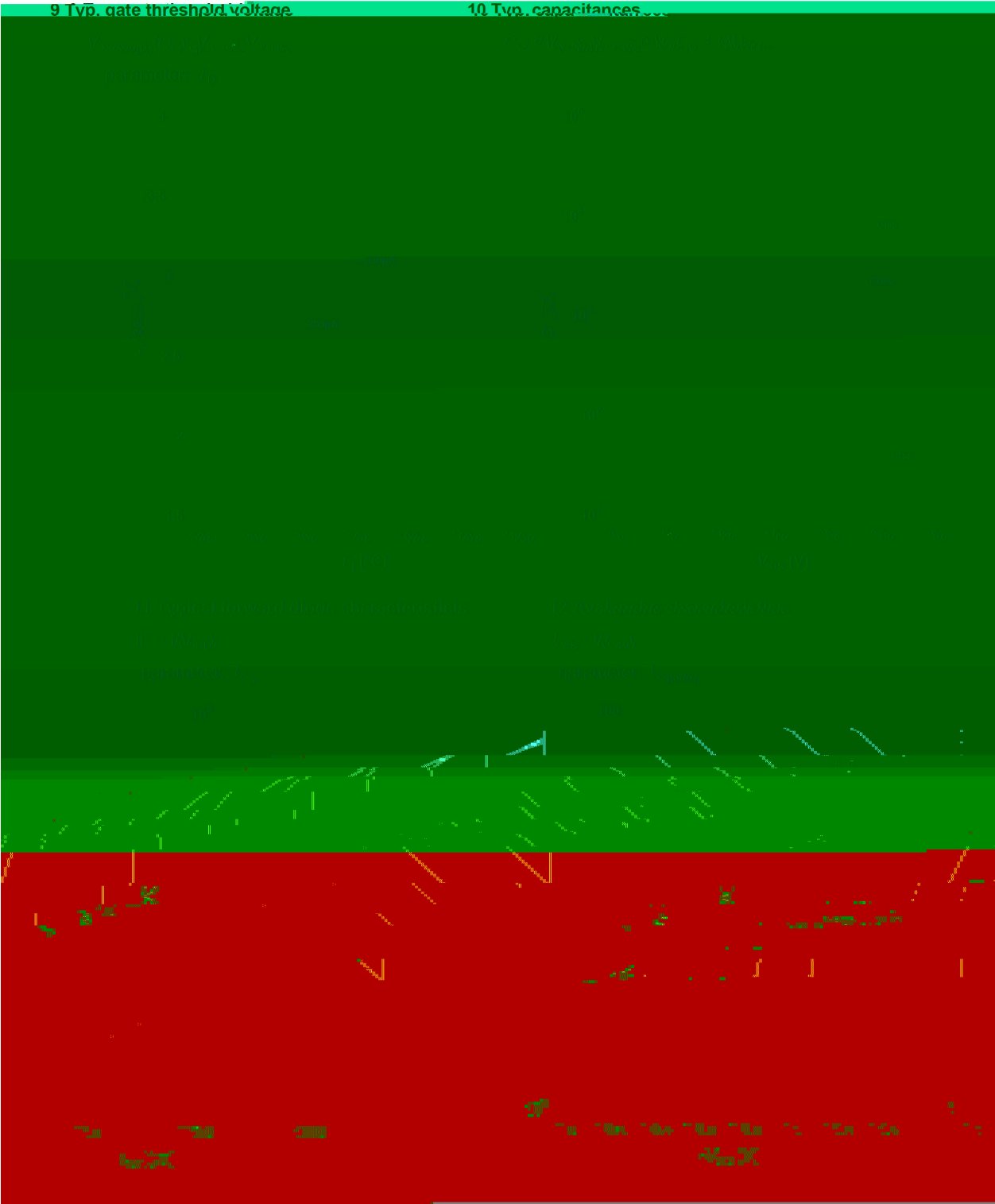


7 Typ. drain-source on-state resistance

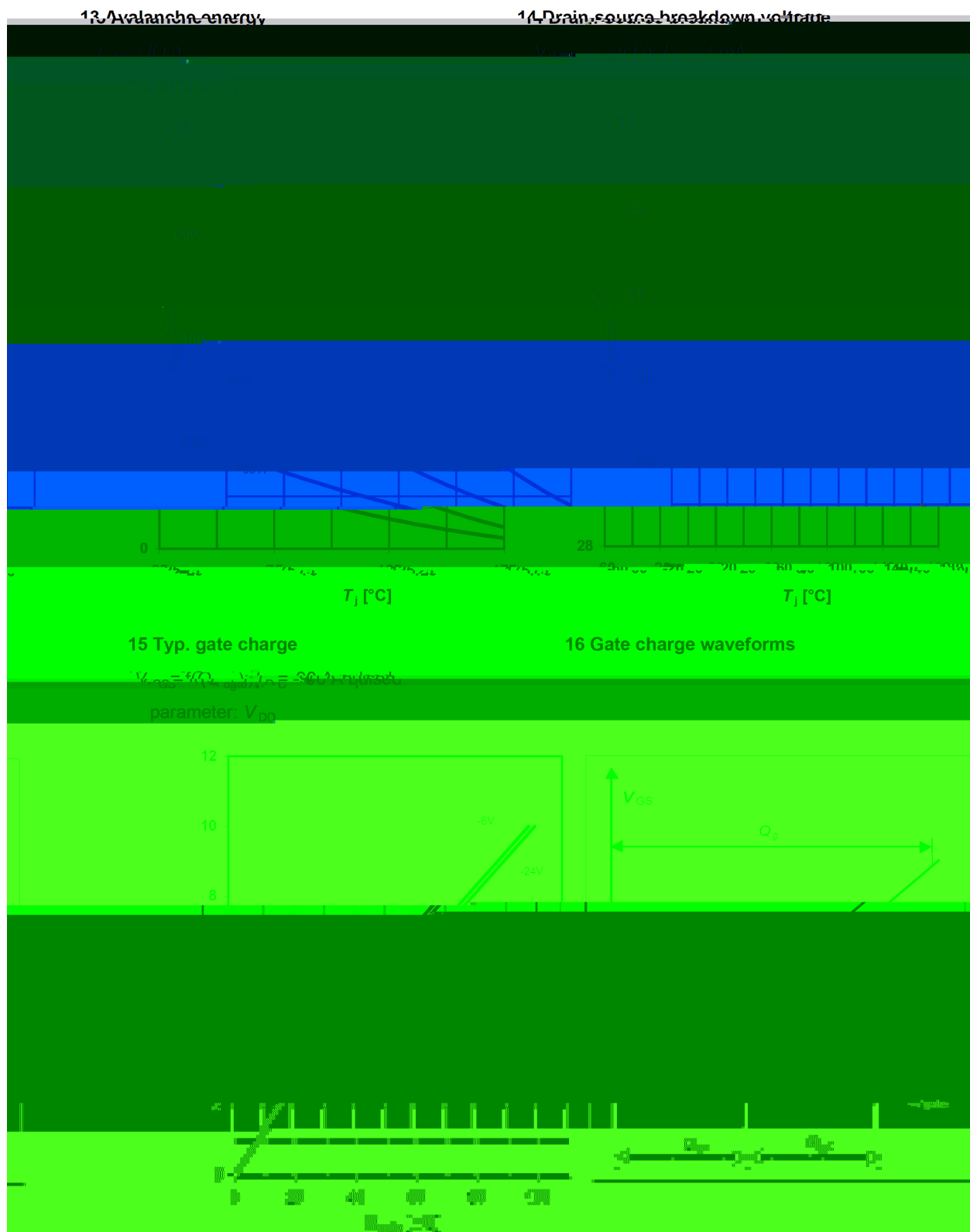
$R_{DS(on)} = f(I_D); I_D = 90A; V_{GS} = 10V$



/ Electrical Characteristic Curve

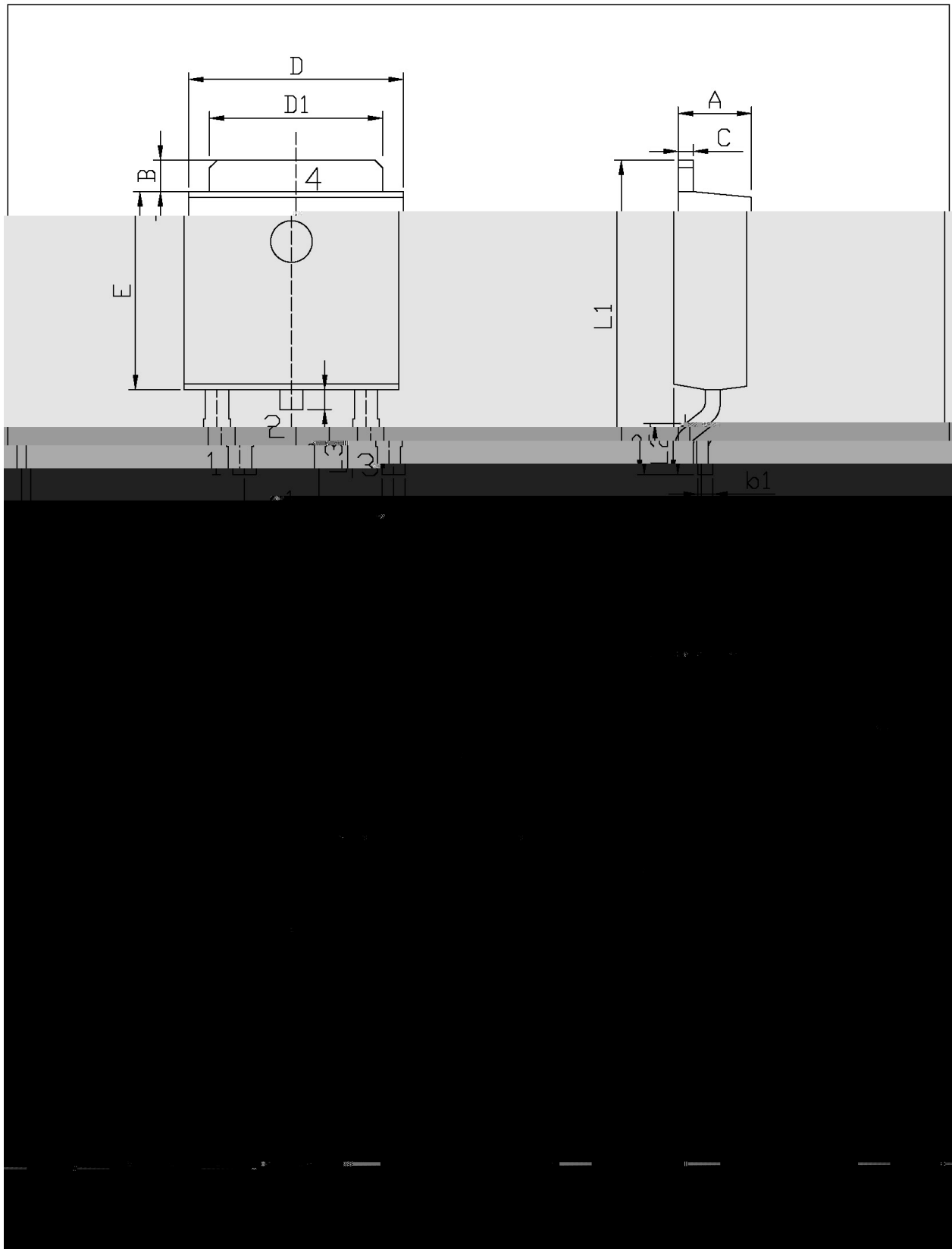


/ Electrical Characteristic Curve

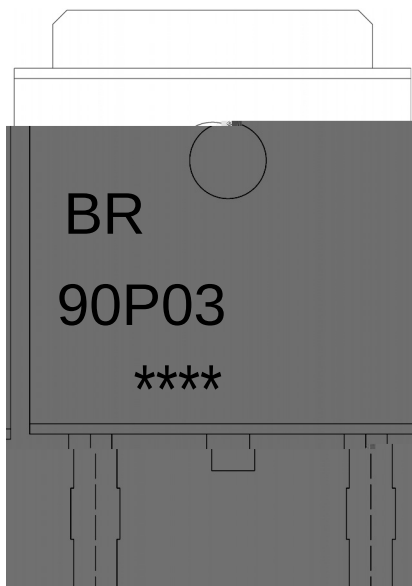




/ Package Dimensions



/ Marking Instructions



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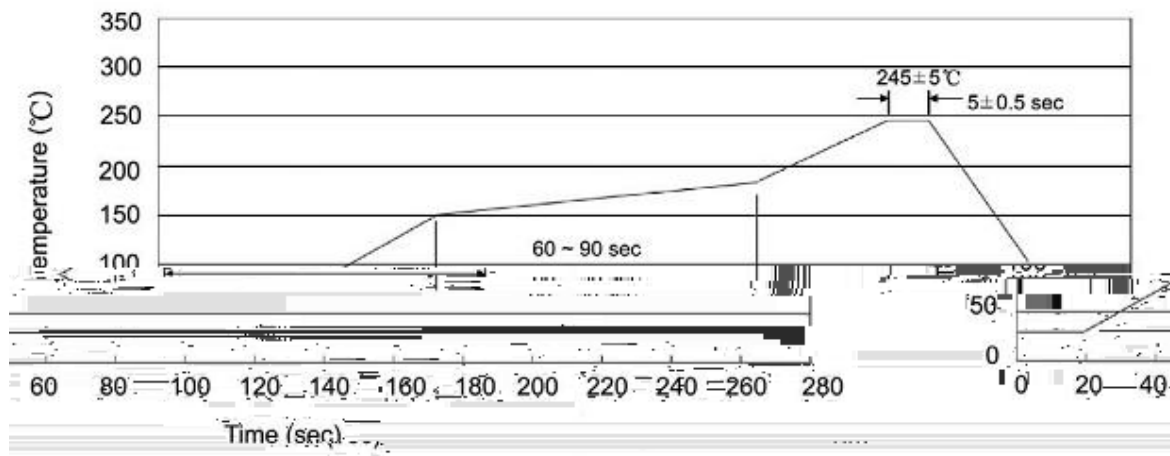
90P03

Note:

BR: Company Code

90P03: Product Type.

****: 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 , Time:60~90sec. |
| 2 | 245±5 | | 5±0.5sec; | | 2.Peak Temp.:245±5 , Duration:5±0.5sec. |
| 3 | | 2 | 10 | /sec. | 3. Cooling Speed: 2~10 /sec. |

/ Resistance to Soldering Heat Test Conditions

260±5

10±1 sec.

Temp.:260±5℃

Time:10±1 sec

/ Packaging SPEC.
/ BULK

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
TO-252	2,500	2	5,000	5	25,000	13 ×16	360×360×50	385×257×392

/ TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Tube 只/套管	Tubes/Inner Box 套管/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Tube 套管	Inner Box 盒	Outer Box 箱
TO-251/252	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

/ Notices