

TO-252 SiC N MOS
SiC N-CHANNEL MOSFET in a TO-252 Plastic Package.

$V_{DS}=650V$ f S „ 9 G Ñ • † (e

/ Absolute Maximum Ratings(Tc=25)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Continuous DC Drain Current for $R_{th(j-c,typ.)}$, Limited by $T_{VJ(max)}$	$I_D(Tc=25)$	20	A
	$I_D(Tc=100)$	14.4	A
Peak Drain Current, tp Limited by $T_{VJ(max)}$	I_{DM}	34.5	A
Gate-Source Max Voltage	$V_{GS,max}$	-10/+22	V
Gate-Source Operate Voltage	$V_{GS,op}$	0/+15	V
Single Pulse Avalanche Energy	E_{AS}	28	mJ
Power Dissipation or $R_{th(j-c,typ.)}$	$P_D(Tc=25)$	82	W
Operating and Storage Temperature Range	T_{VJ}, T_{STG}	-55 to 175	
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j-c)}$	1.83	/W

/ Electrical Characteristics(Tc=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=100\mu A$	650			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=3.5mA$	3		5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V$ $V_{GS}=0V$		0.1	20	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=22V$ $V_{DS}=0V$			250	nA
Source-Gate Leakage Current	I_{SGS}	$V_{GS}=-10V$ $V_{DS}=0V$			250	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=15V$ $I_D=10A$		160	208	m Ω
		$V_{GS}=15V$ $I_D=10A$ $T_{VJ}=175$		164		
		$V_{GS}=18V$ $I_D=10A$		124	180	
		$V_{GS}=18V$ $I_D=10A$ $T_{VJ}=175$		150		
Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_S=5A$		3.5		V
Continuous DC Source Current	I_S			17		A
Peak Reverse Drain Current,	I_{SM}			32		A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V$, $I_{SD}=10A$, $V_R=400V$, $di/dt=1.5kA/us$		6.9		ns
Reverse Recovery Charge	Q_{rr}			26		nC
Peak Reverse Recovery Current	I_{rrm}			4.8		A
Reverse Recovery Energy	E_{rr}			0.24		μJ

/ Electrical Characteristics(Tc=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V$ $L=600\mu H$ $V_{DD}=400V$ $I_D=10A$ $R_g=2.2$		21.2		ns
Turn-On Rise Time	t_r			14.4		
Turn-Off Delay Time	$t_{d(off)}$			27.0		
Turn-Off Fall Time	t_f			14.2		
Turn-On Switching Loss	E_{on}			106		μJ
Turn-Off Switching Loss	E_{off}			24		
Total Switching Energy	E_{tot}			130		
Gate resistance	R_g	$V_{AC}=25mV$ $f=1MHz$		28.5		Ω
Input Capacitance	C_{iss}	$V_{DS}=400V$ $V_{GS}=0V$ $f=1MHz$		438		pF
Output Capacitance	C_{oss}			30		
Reverse Transfer Capacitance	C_{rss}			2.7		
Total Gate Charge	Q_g	$V_{GS}=0/15V,$ $V_{DS}=400V,$ $I_D=10A$		14.5		nC
Gate Source Charge	Q_{gs}			5.5		
Gate Drain Charge	Q_{gd}			2.2		

/ Electrical Characteristic Curve

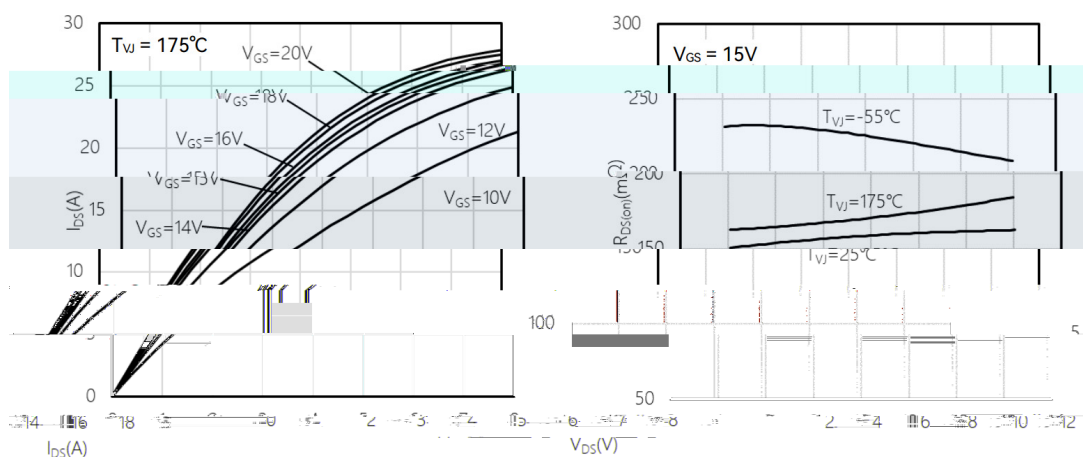
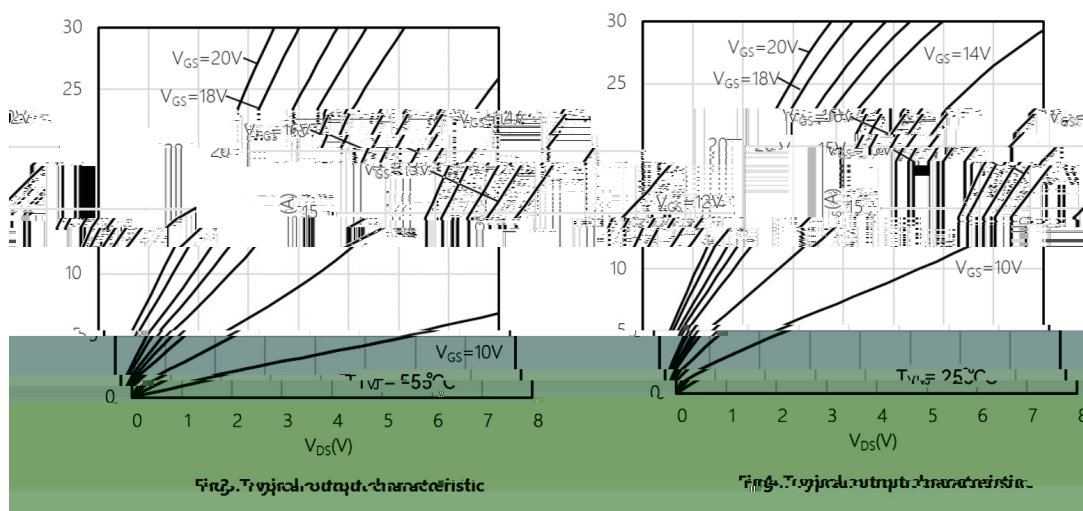
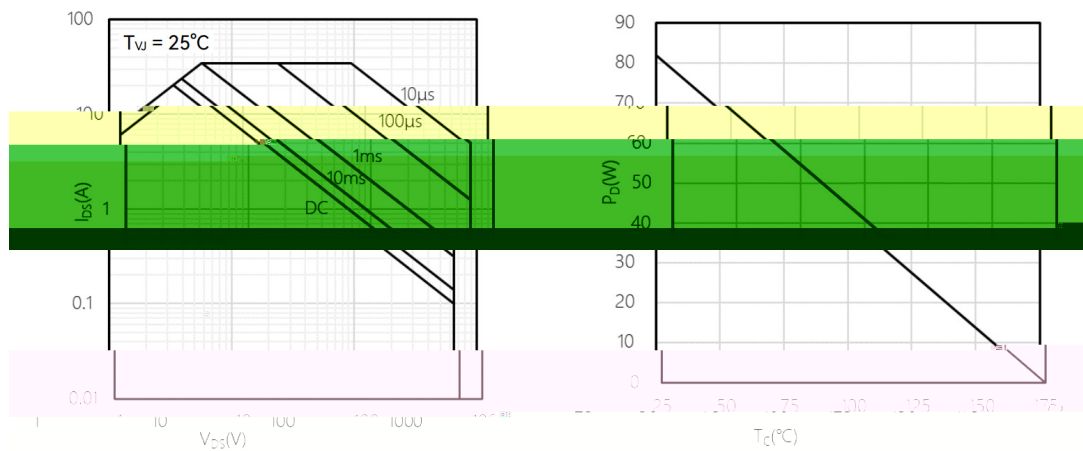
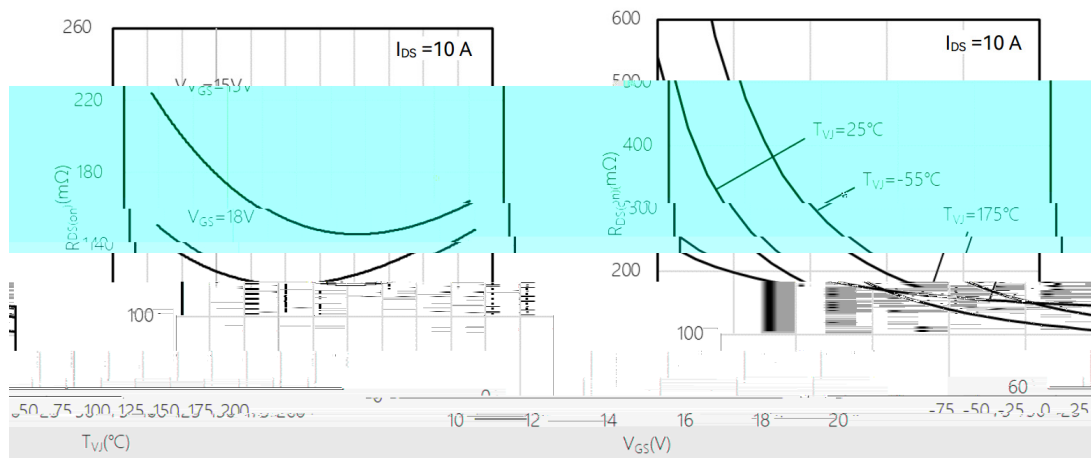


Fig2. Typical output characteristic

Fig5. Typical output characteristic

Fig6. Typical output characteristic

/ Electrical Characteristic Curve



Typical on-state resistance as a function of temperature

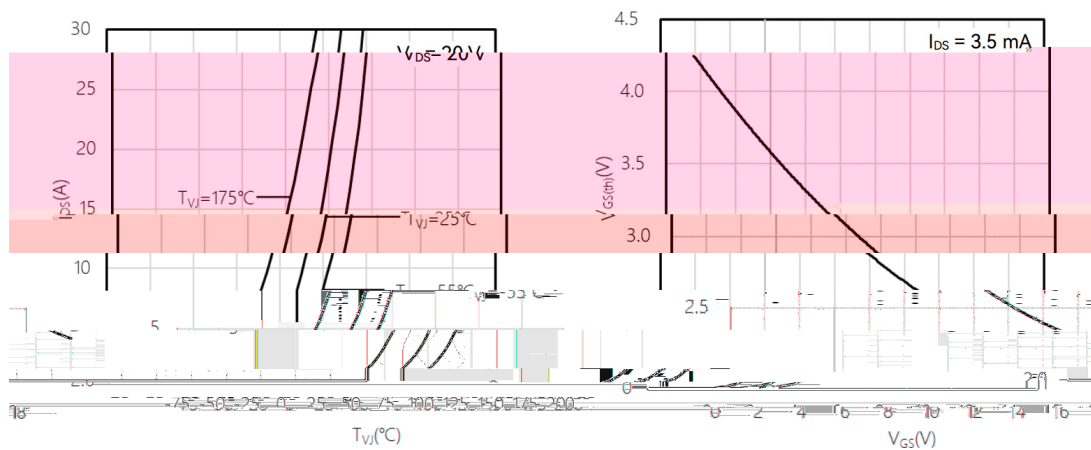
Fig8. Typical on-state resistance as a function of V_{GS} Fig7. Typical on-state resistance as a function of T_{VJ} 

Fig10. Typical gate-source threshold voltage as a function of junction temperature

Fig9. Typical transfer characteristic

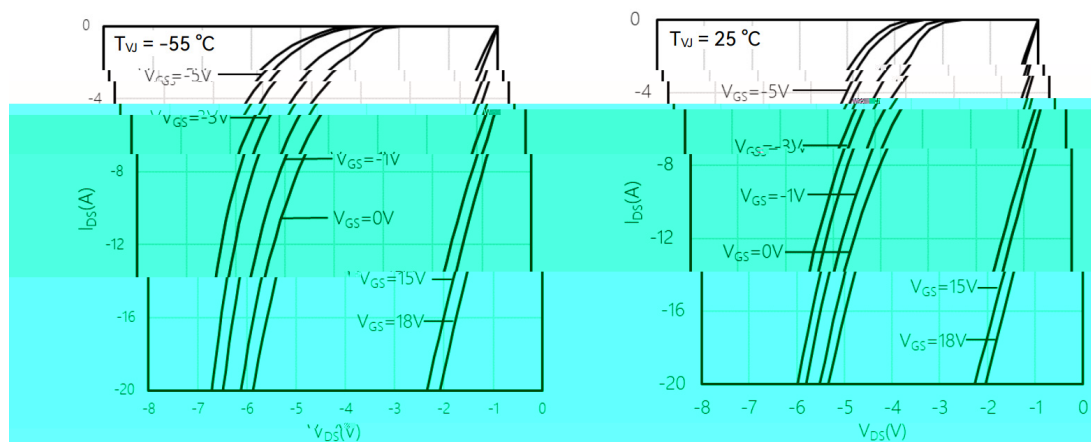


Fig11. Typical reverse drain current as a function of reverse drain voltage

Fig12. Typical reverse drain current as a function of reverse drain voltage

/ Electrical Characteristic Curve

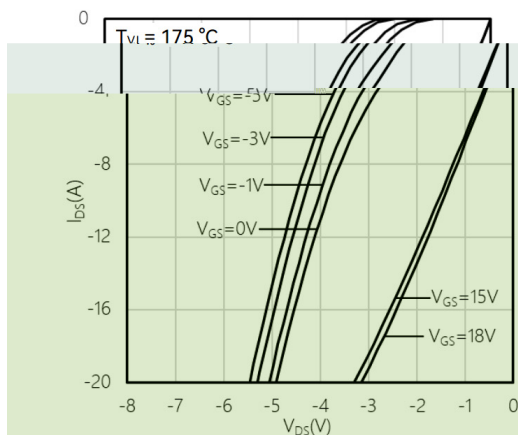


Fig13. Typical reverse drain current as function of reverse drain voltage

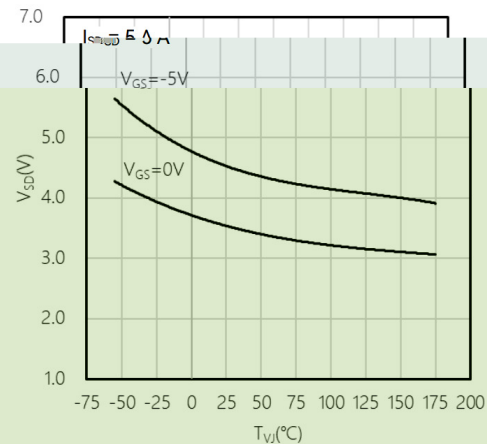


Fig14. Typical reverse drain voltage as function of junction temperature

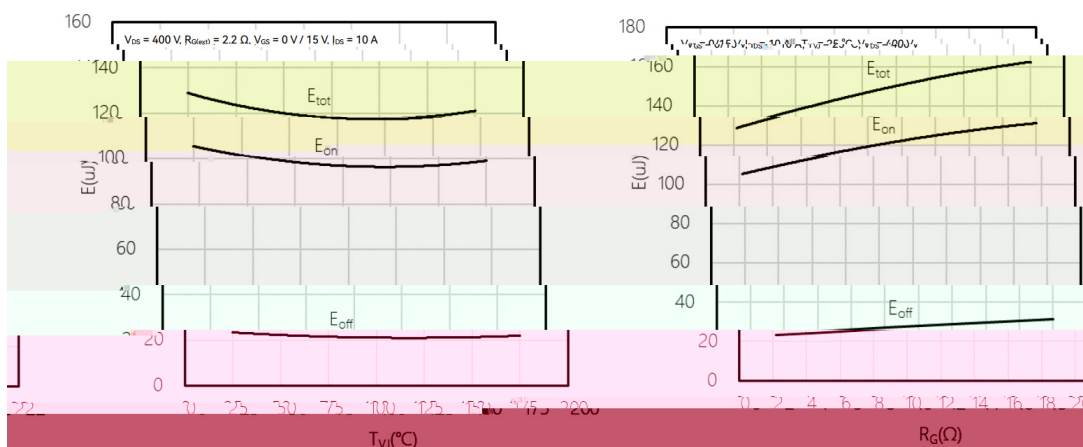


Fig15. Typical switching energy losses as function of junction temperature

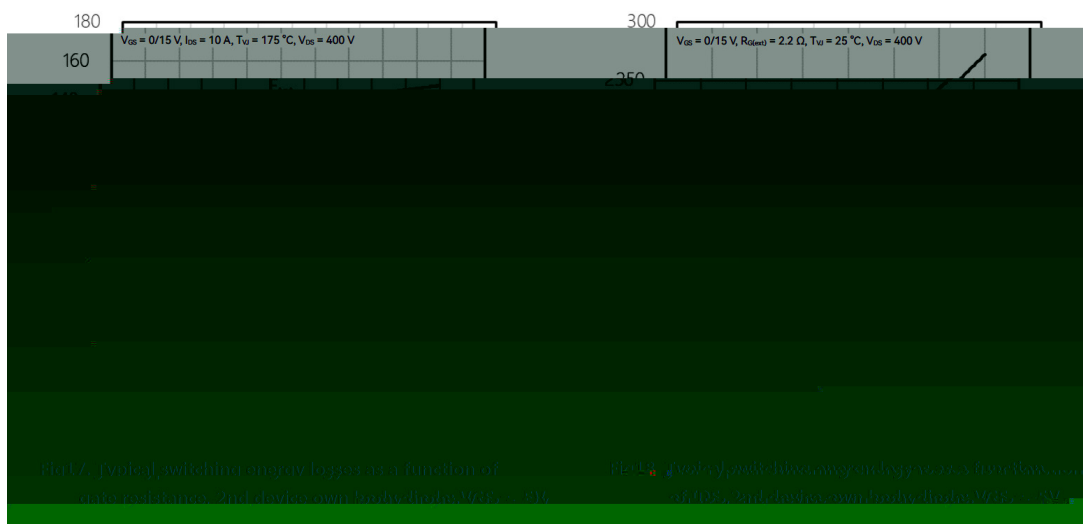


Fig16. Typical switching energy losses as function of gate resistance

Fig17. Typical switching energy losses as function of gate resistance

/ Electrical Characteristic Curve

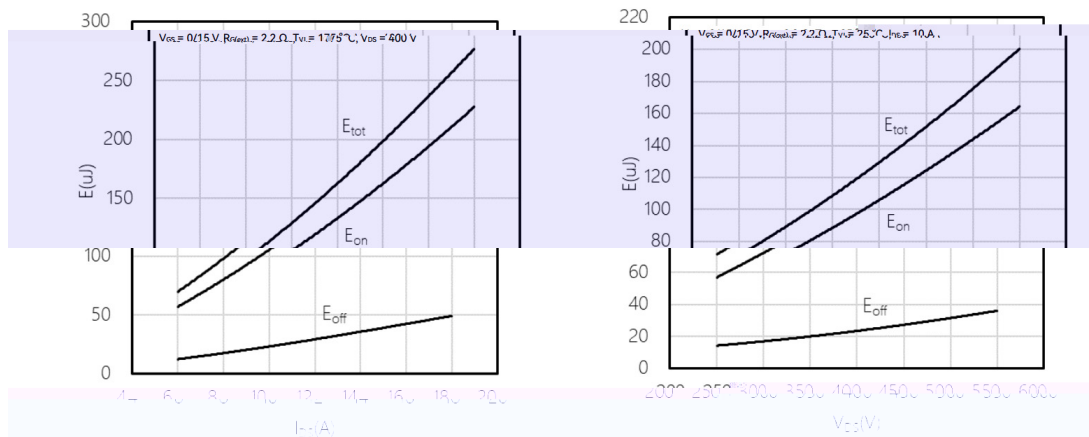


Fig19: Typical switching energy losses as a function of V_{DS} , 2nd device own body diode: $V_{GS} = -5V$

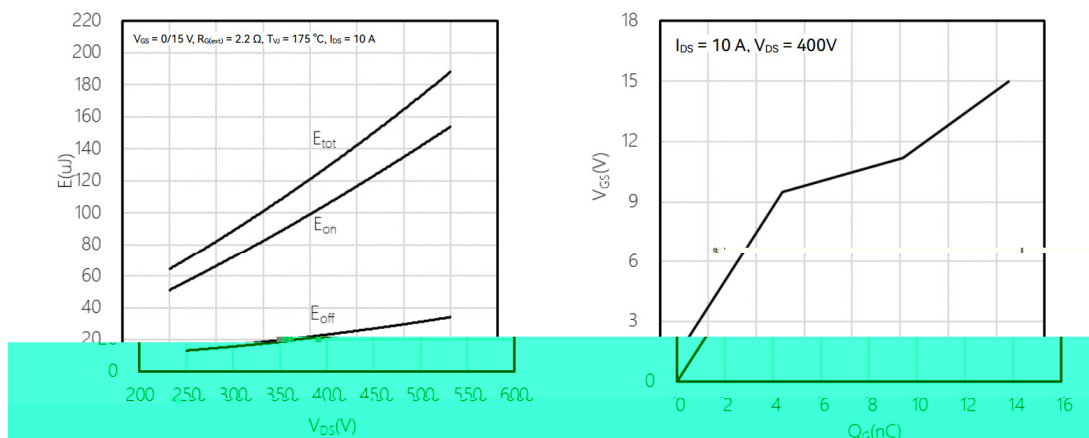


Fig20: Typical switching energy losses as a function of V_{DS} , 2nd device own body diode: $V_{GS} = -5V$

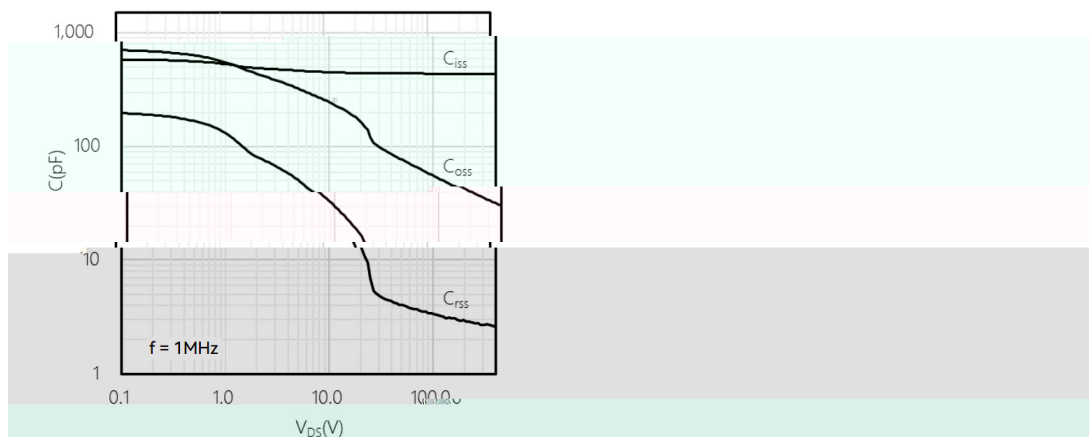


Fig21: Typical capacitance as a function of drain-source voltage

/ Electrical Characteristic Curve

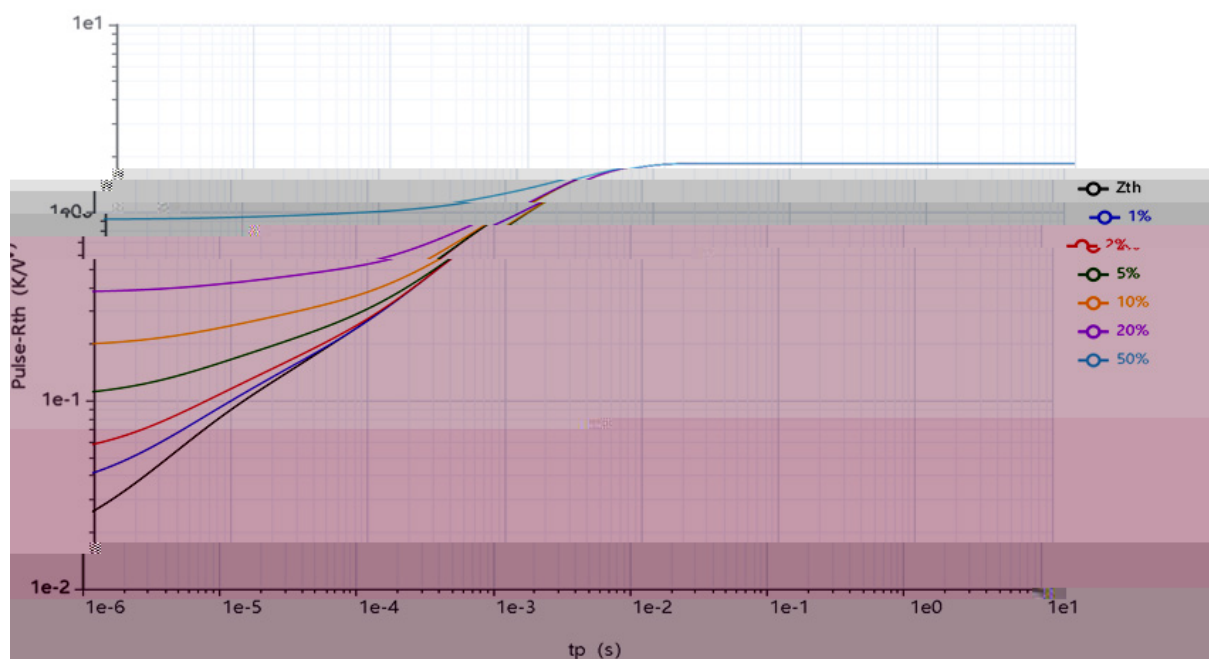
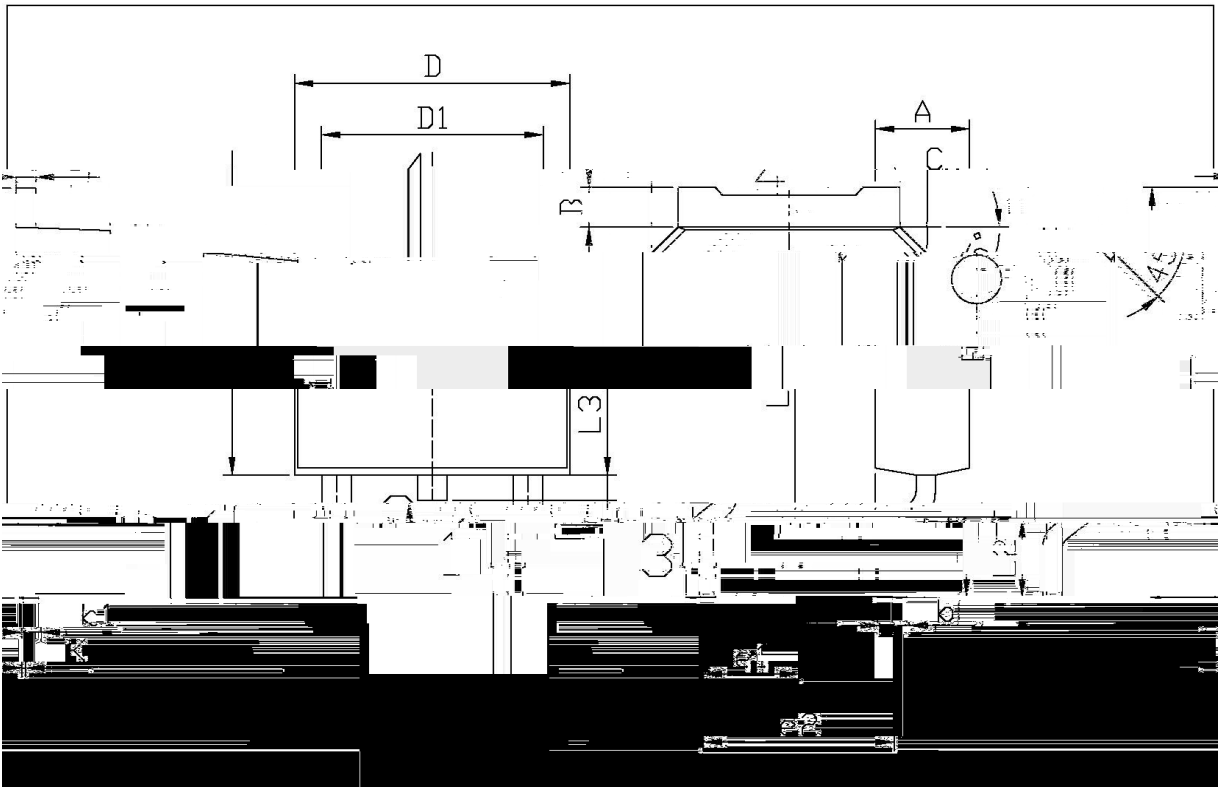


Fig24. Transient thermal resistance (MOSFET)

/ Package Dimensions



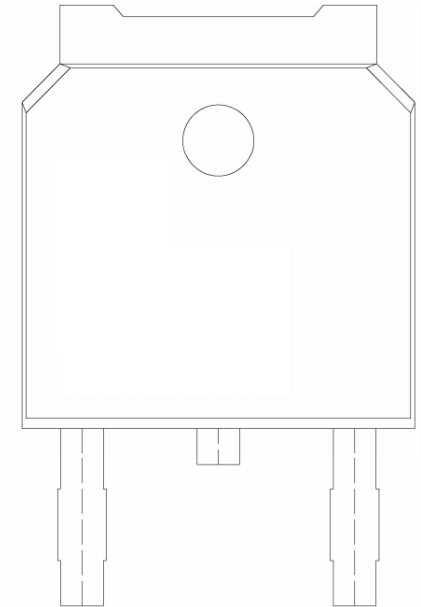
单位: mm

Dimensions In Millimeters			Dimensions In Millimeters		
Symbol	Min	Max	Symbol	Min	Max
A	5.95	6.25	A1	2.20	2.40
B	1.25	2.24	B1	0.95	1.05
C	0.50	0.73	C1	0.70	0.80
D	0.55	0.85	D1	0.45	0.55
D1	0.15	0.55	L2	1.70	2.00
L3	0.60	0.90	L3	6.45	6.75
K	0.00	0.10	D1	5.10	5.50

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/ Marking Instructions



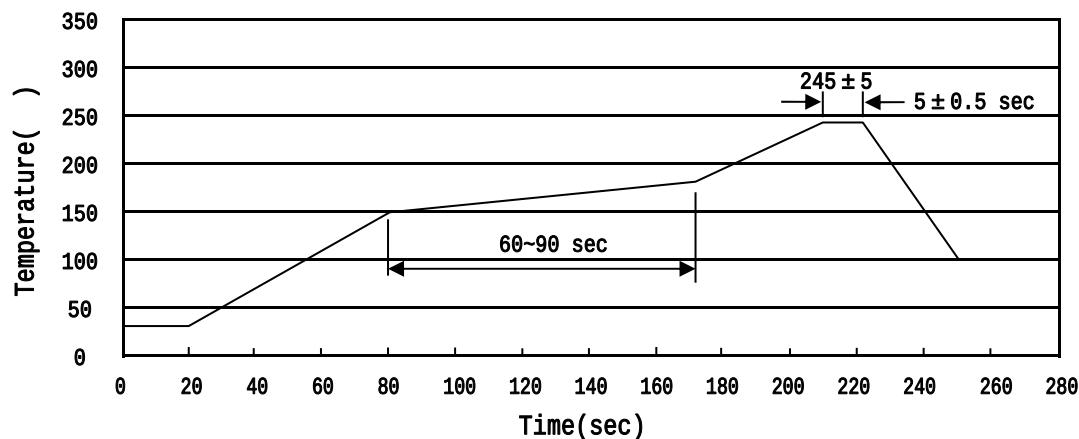
BR

65R180Z

SC

Note:

BR: Company Code


() / 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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