



## 1200V/40A/80mΩ Silicon Carbide Power MOSFET

### Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to parallel and simple to drive
- Avalanche Ruggedness

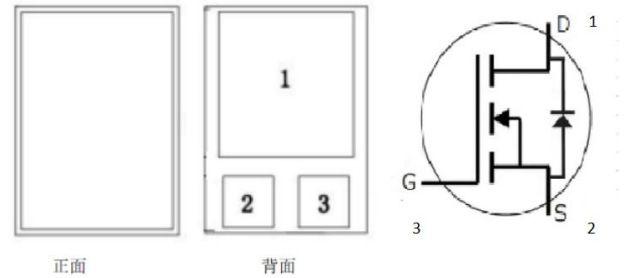
Key Characteristics		
$V_{DS}$	1200	V
$I_D, T_C = 25^\circ\text{C}$	40	A
$R_{DS(on)}$	80	mΩ

### Benefits

- Very tight variation of on-resistance vs. temperature
- Very fast and robust intrinsic body diode
- Low capacitance
- Easy to drive

### Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
  - Battery Chargers
- Motor Drives
- Pulsed Power applications



Part No.	Package Type	Marking
G1M080120S	SMD1.0	G1M080120S

**Maximum Ratings**

Parameter	Symbol	Test Condition	Value	Unit
Drain - Source Voltage	$V_{DSmax}$	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	1200	V
Gate - Source Voltage	$V_{GSmax}$	Absolute maximum values	-10/+25	V
Gate - Source Voltage	$V_{GSop}$	Recommended operational values	-5/+20	V
Continuous Drain Current	$I_D$	$V_{GS} = 20\text{ V}, T_C = 25^\circ\text{C}$	40	A
		$V_{GS} = 20\text{ V}, T_C = 100^\circ\text{C}$	25.4	
Pulsed Drain Current	$I_{D(pulse)}$	Pulse width $t_p$ limited by $T_{jmax}$	160	A
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}, T_J=150^\circ\text{C}$	237	W
Operating Junction and Storage Temperature	$T_j, T_{stg}$		-55 to +220	$^\circ\text{C}$
Solder Temperature	$T_L$	1.6mm (0.063") from case for 10s	260	$^\circ\text{C}$

**Reverse Diode Characteristics**

Parameter	Symbol	Test Conditions	Numerical			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_{SD} = 10\text{ A}, T_J=25^\circ\text{C}$	-	3.25		V
Continuous Diode Forward Current	$I_S$	$T_C=25^\circ\text{C}$		40		A
Reverse Recovery Time	$t_{rr}$	$V_{GS}=-5\text{V}$ $I_{SD}=20\text{A}, di/dt=100\text{A}/\mu\text{s}$ $V_{DD}=800\text{V}, T_J=25^\circ\text{C}$	-	67		ns
Reverse Recovery Charge	$Q_{rr}$		-	46		nC
Peak Reverse Recovery Current	$I_{rrm}$			-1.2		A

**Electrical Characteristics**

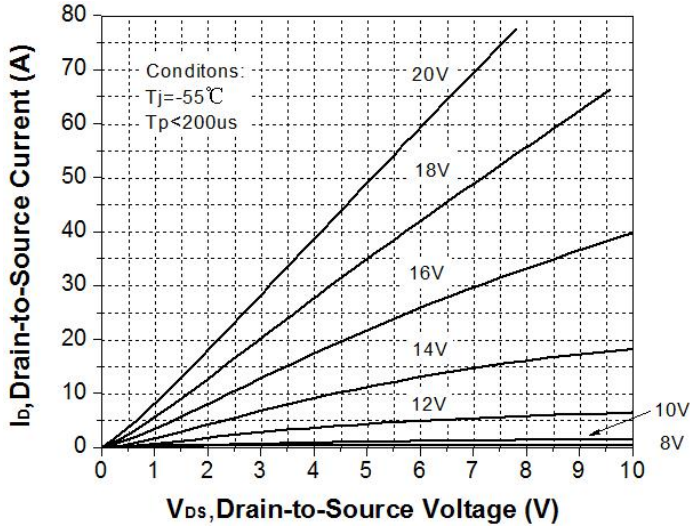
Parameter	Symbol	Test Conditions	Numerical			Unit
			Min.	Typ.	Max.	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	1200			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	3	4		
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$		1	100	$\mu\text{A}$
		$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}, T_J = 150^\circ\text{C}$		10		$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 20\text{ V}, I_D = 20\text{ A}$		80	100	mΩ
		$V_{GS} = 20\text{ V}, I_D = 20\text{ A}, T_J = 150^\circ\text{C}$		100		mΩ
Transconductance	$g_{fs}$	$V_{DS} = 20\text{ V}, I_{DS} = 20\text{ A}$		10.0		S
		$V_{DS} = 20\text{ V}, I_{DS} = 20\text{ A}, T_J = 150^\circ\text{C}$		10.3		
Input capacitance	$C_{iss}$	$V_{GS} = 0\text{ V},$ $V_{DS} = 1000\text{ V}$ $f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$		1816		pF
Output capacitance	$C_{oss}$			142		
Reverse transfer capacitance	$C_{rss}$			24		
$C_{oss}$ Stroed Energy	$E_{OSS}$			71		
Avalanche Energy, Single Pulse	$E_{AS}$	$I_D = 20\text{ A}, V_{DD} = 50\text{ V}$		1.08		J
Turn-on switching energy	$E_{ON}$	$V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}$ $I_D = 20\text{ A}, R_{G(ext)} = 6.8\ \Omega$ $L = 5.6\text{ mH}$		1.6		mJ
Turn-off switching energy	$E_{OFF}$			0.4		
Turn-on delay time	$T_{d(on)}$	$V_{DD} = 800\text{ V},$ $V_{GS} = -5/20\text{ V}$ $I_D = 20\text{ A},$ $R_{G(ext)} = 2.5\ \Omega$ $R_L = 40\ \Omega$		20		ns
Rise time	$T_r$			33		
Turn-off delay time	$T_{d(off)}$			21		
Fall Time	$t_f$			31		
Internal Gate Resistance	$R_{G(int)}$	$F = 1\text{ MHz}, V_{AC} = 25\text{ mV}$		5.7		Ω
Gate to Source charge	$Q_{gs}$	$V_{DS} = 800\text{ V}$ $V_{GS} = 6/20\text{ V}$ $I_D = 20\text{ A}$		26		nC
Gate to Drain charge	$Q_{gd}$			51		
Total gate charge	$Q_g$			102		

**Thermal Characteristics**

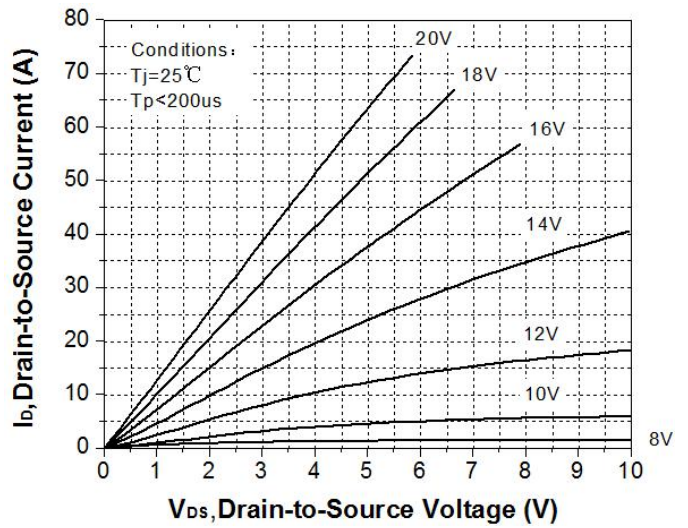
Parameter	Symbol	Test Conditions	Numerical			Unit
			Min.	Typ.	Max.	
Thermal Resistance from Junction to Case	$R_{th(jc)}$		-	0.32		$^\circ\text{C}/\text{W}$

**Performance Graphs**

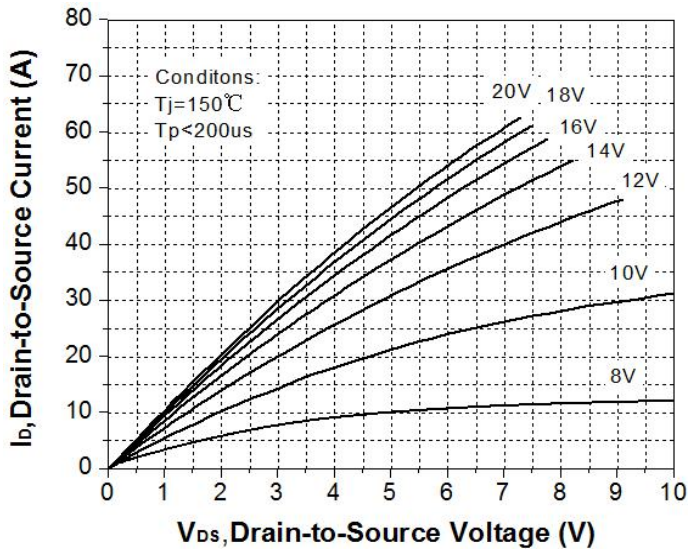
1) Output Characteristics  $T_j = -55\text{ }^\circ\text{C}$ :



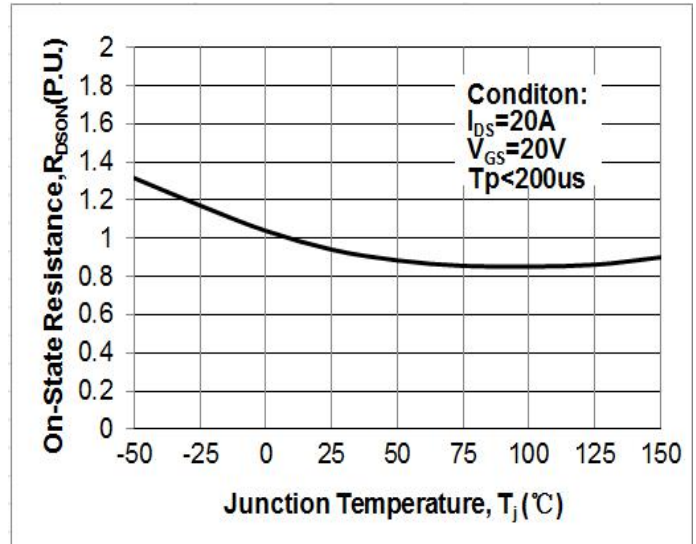
2) Output Characteristics  $T_j = 25\text{ }^\circ\text{C}$ :



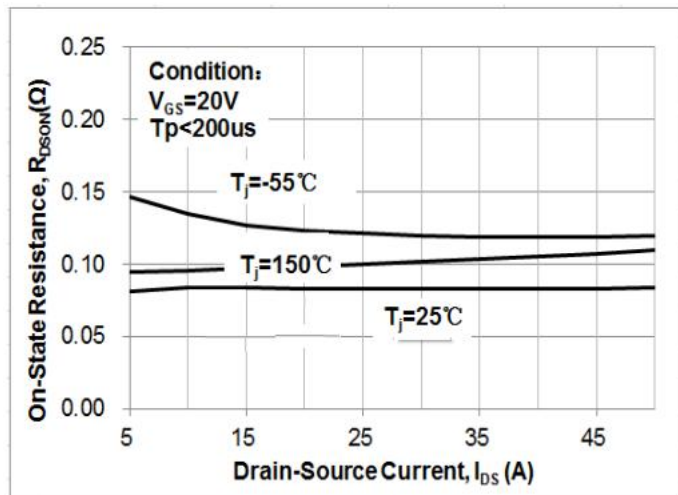
3) Output Characteristics  $T_j = 150\text{ }^\circ\text{C}$ :



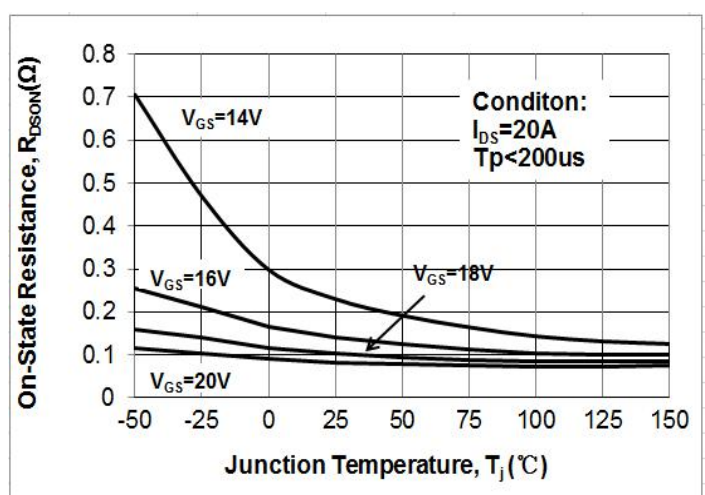
4) Normalized On-Resistance vs. Temperature



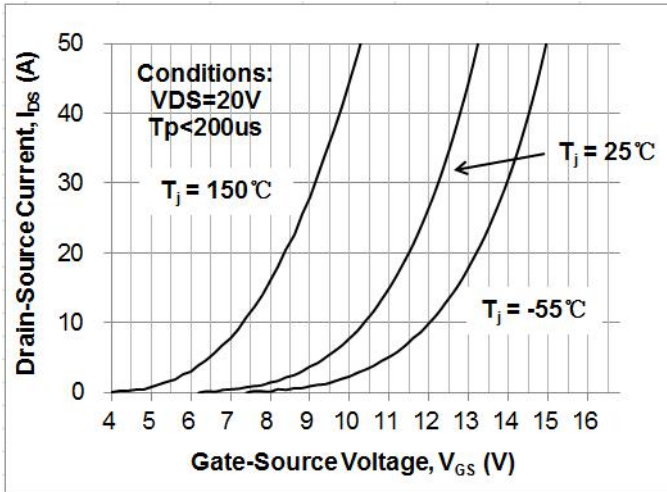
5) On-Resistance vs. Drain Current For Various Temperatures



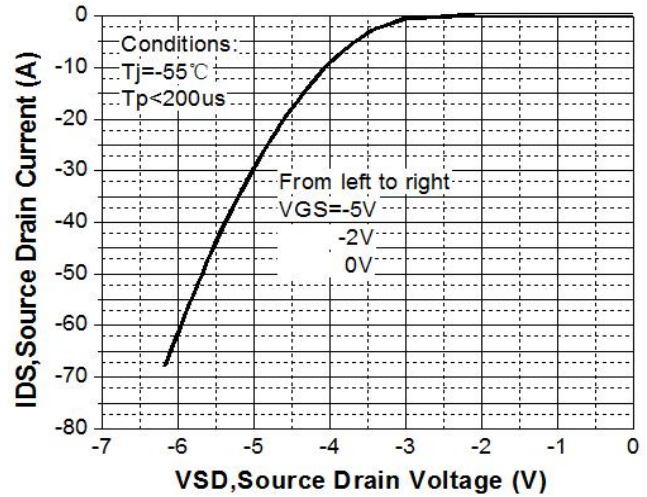
6) On-Resistance vs. Drain Current For Various Gate Voltage



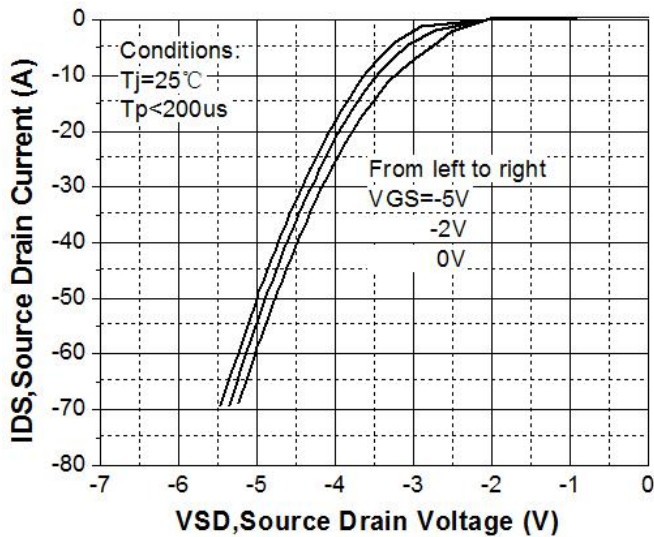
7) Transfer Characteristic for Various Junction Temperatures



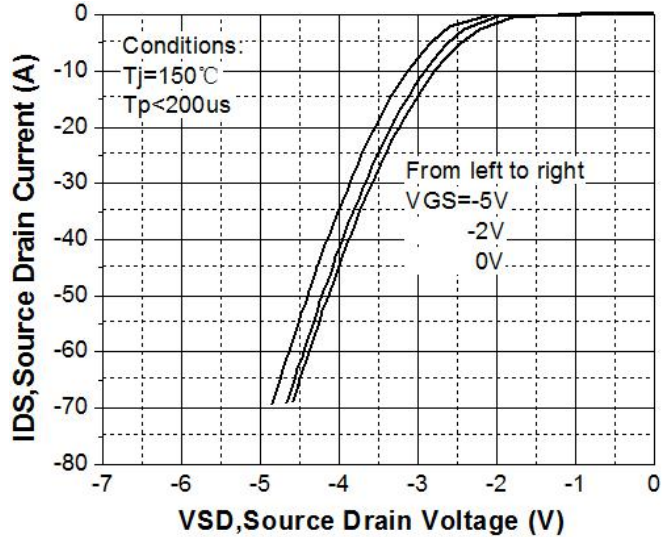
8) body Diode Characteristic at  $-55^\circ C$



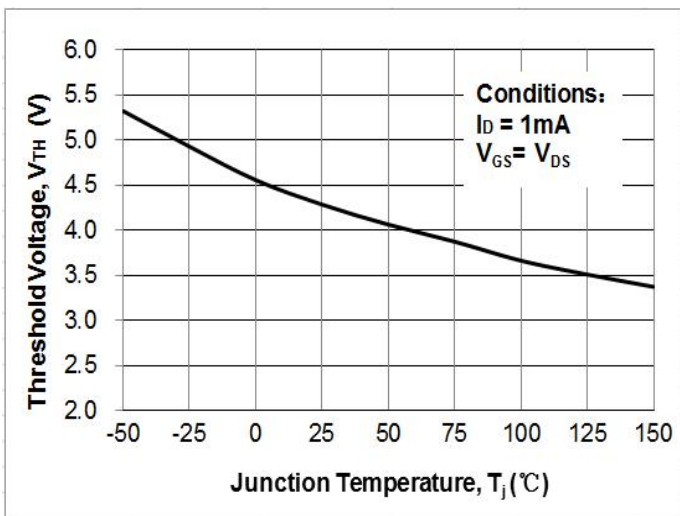
9) body Diode Characteristic at  $25^\circ C$



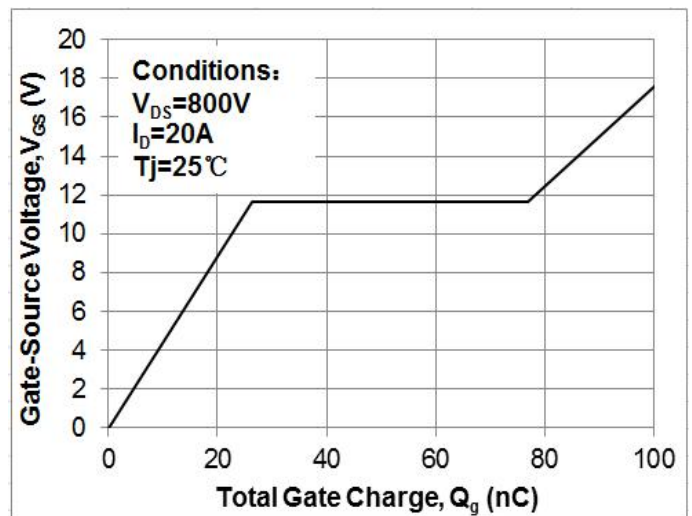
10) body Diode Characteristic at  $150^\circ C$



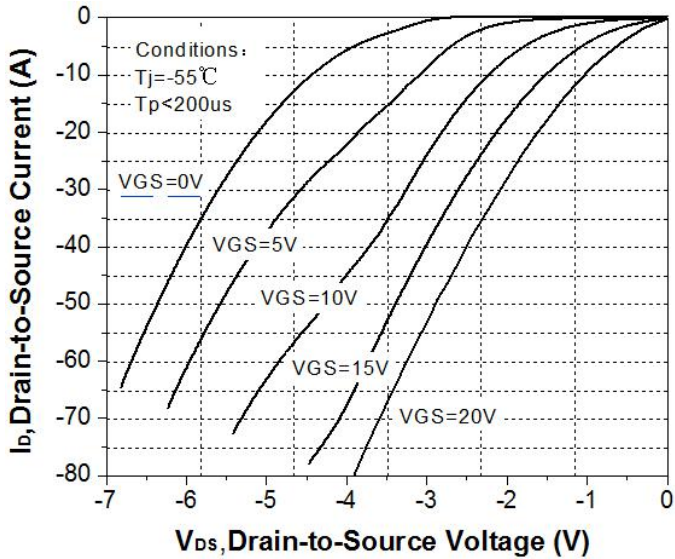
11) Threshold Voltage vs. Temperature



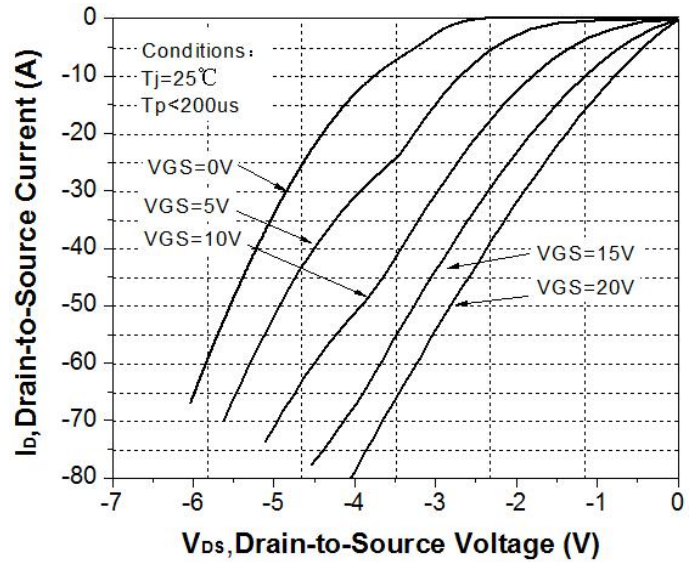
12) Gate Charge Characteristics



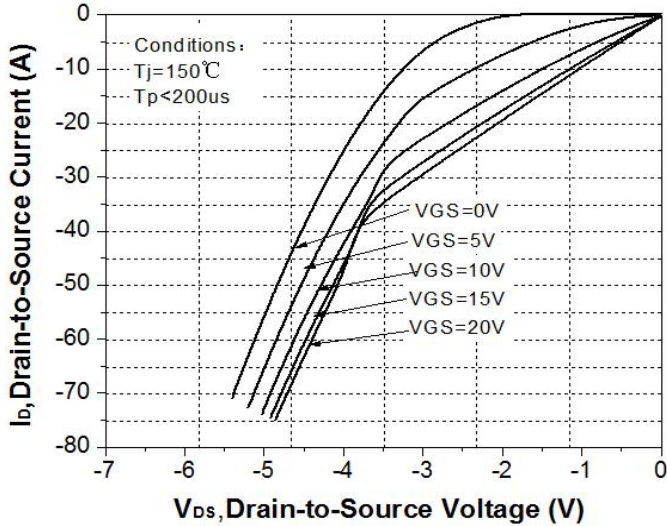
13) 3rd Quadrant Characteristic at -55°C



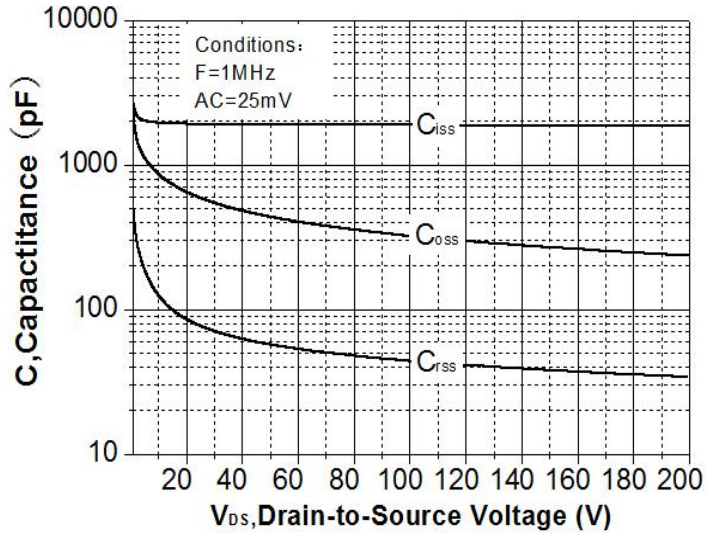
14) 3rd Quadrant Characteristic at 25°C



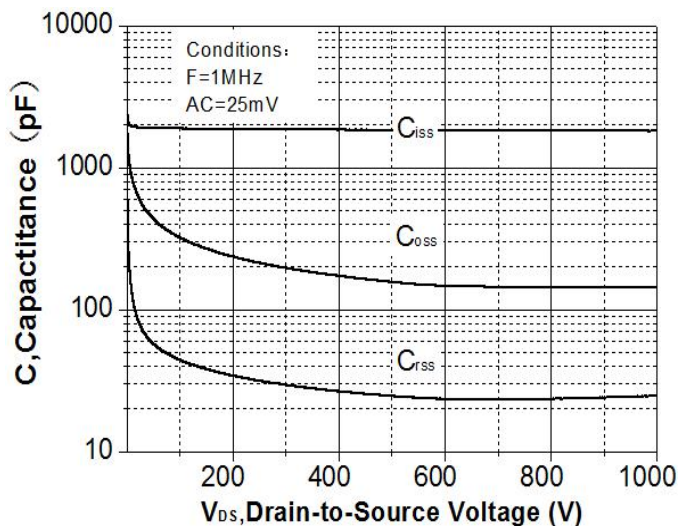
15) 3rd Quadrant Characteristic at 150°C



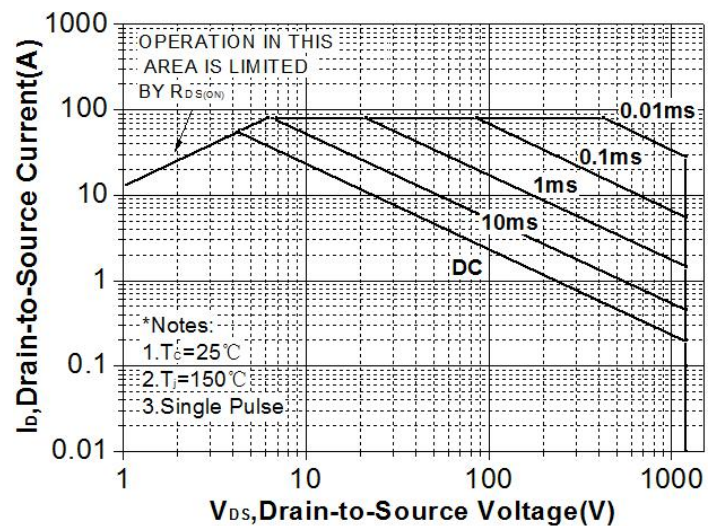
16) Capacitances vs. Drain-Source Voltage (0-200V)



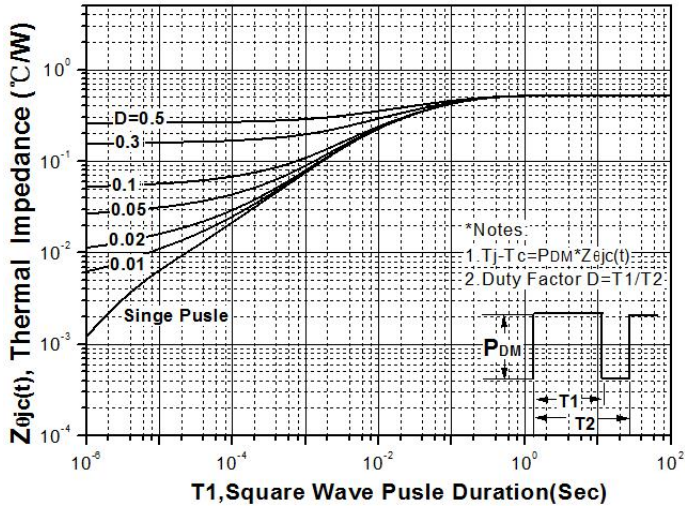
17) Capacitances vs. Drain-Source Voltage (0-1000V)



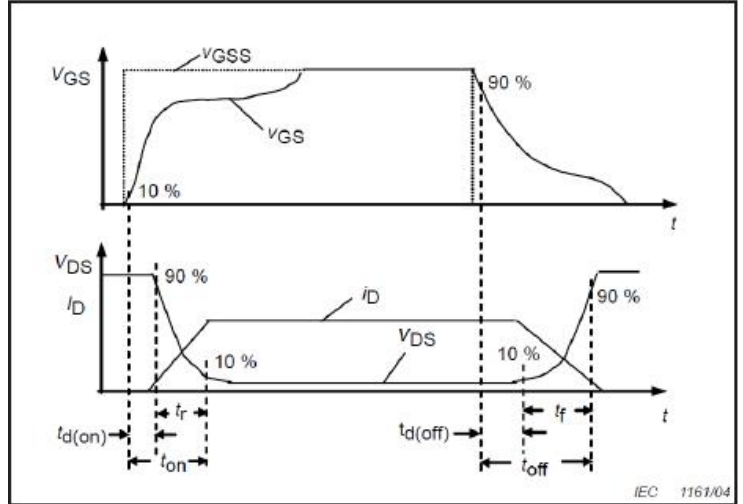
18) Safe Operating Area



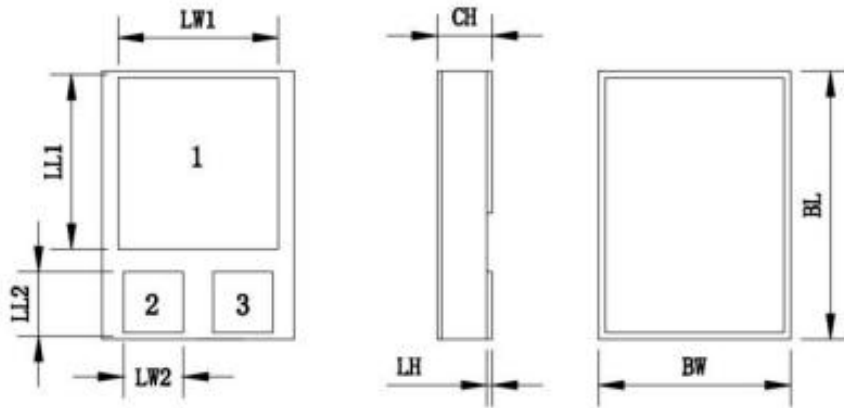
19) Transient Thermal Impedance (Junction-Case)



20) Switching Times Definition



Package SMD1.0



SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
BL	15.7	16.06	LW1	9.38	9.68
BW	11.25	11.61	LW2	3.4	3.7
CH	3.5	3.6	LL1	10.39	10.69
LH	0.17	0.43	LL2	3.85	4.15

**Note:** The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC(RoHS2). RoHS Certification and other certifications can be obtained from GPT sales representatives or GPT website: <http://globalpowertech.cn/English/index.asp>

**GPT's Alibaba Online Store is available now! You can place order with one click and get direct delivery from manufacturer in short time. For more info about products and price, please reach us at:**

<https://globalpowertech.en.alibaba.com/>

**More product datasheets and company information can be found in:**

<http://globalpowertech.cn/English/index.asp>

