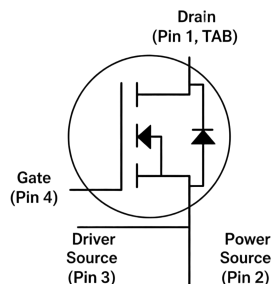


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	1700	V
I_D	100	A
$R_{DS(ON)}$	26	m Ω
Q_G	168	nC



TO-247-4L

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Low impedance package with driver source pin
- Easy to parallel and simple to drive

Applications

- Motor Driver
- Compressor Inverter
- Photovoltaic (PV) Inverter
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)

Absolute Maximum Ratings (at $T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	1700	V
Gate-source Voltage	V_{GS}	-10/+22	V
Drain Current (continuous; $T_c=25^{\circ}\text{C}$)	I_D	100	A
Drain Current (continuous; $T_c=100^{\circ}\text{C}$)		75	
Drain Current (pulsed)	I_{DM}	200	A
Power Dissipation ($T_c=25^{\circ}\text{C}$)	P_D	500	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^{\circ}\text{C}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.3	$^{\circ}\text{C/W}$
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	40	

Electrical Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics (at T _C =25°C unless otherwise specified)						
Drain-Source Breakdown Voltage	B _{VDS}	V _{GS} =0V; I _D =250uA	1700	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1700V; V _{GS} =0V; T _J =25°C	-	5	100	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =-10/+20V; V _{DS} =0V	-	10	250	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} ; I _{DS} =10mA	2	3	4	V
Recommended Turn-on Voltage	V _{GS(on)}	Static	-	18	-	V
Recommended Turn-off Voltage	V _{GS(off)}		-	-5	-	V
Static Drain-Source on Resistance	R _{DS(on)}	V _{GS} =18V; I _D =50A	-	26	33	mΩ
		V _{GS} =18V; I _D =50A; T _J =175°C	-	44	-	
Dynamic characteristics (at T _C =25°C unless otherwise specified)						
Input Capacitance	C _{iss}	V _{DS} =1200V; f=1MHz; V _{AC} =25mV	-	6460	-	pF
Output Capacitance	C _{oss}		-	198	-	
Reverse Transfer Capacitance	C _{rss}		-	16	-	
Transconductance	g _{fs}	V _{DS} =20V; I _D =50A	-	52	-	S
C _{oss} Stored Energy	E _{OSS}	V _{DS} =1200V; f=1MHz	-	152	-	uJ
Turn-on Energy	E _{on}	V _{DS} =1200V; V _{GS} =-5/+18V; I _D =50A; Load=150μH; R _{g(ext)} =2.5Ω; T _J =175°C	-	2.12	-	mJ
Turn-off Energy	E _{off}		-	0.75	-	
Total Gate Charge	Q _G	V _{DS} =1200V; V _{GS} =-5/+18V; I _D =50A;	-	168	-	nC
Gate-Source Charge	Q _{GS}		-	52	-	
Gate-Drain Charge	Q _{GD}		-	50	-	
Internal Gate Resistor	R _{Gint}	f=1MHz; V _{AC} =25mV	-	2.5	-	Ω
Turn-on Delay Time	t _{d(on)}	V _{DS} =1200V; V _{GS} =-5/+18V; I _D =50A; Load=150μH; R _{g(ext)} =2.5Ω;	-	54	-	ns
Rise Time	t _r		-	35	-	
Turn-off Delay Time	t _{d(off)}		-	65	-	
Fall Time	t _f		-	23	-	

Reverse SiC Diode Characteristics(at $T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{FSD}	$V_{GS}=0V$; $I_F=37.5A$; $T_J=25^\circ\text{C}$	-	3.2	6	V
		$V_{GS}=0V$; $I_F=37.5A$; $T_J=175^\circ\text{C}$	-	2.9	6	
Continuous Diode Forward Current	I_S	$V_{GS}=0V$; $T_C=25^\circ\text{C}$	-	100	-	A
Reverse Recovery Time	t_{RR}	$V_R=1200V$; $V_{GS}=-5V$; $I_F=50A$; $di/dt=1900A/\mu s$; $T_J=175^\circ\text{C}$	-	102	-	ns
Reverse Recovery Charge	Q_{RR}		-	718	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	20	-	A

Typical Characteristics

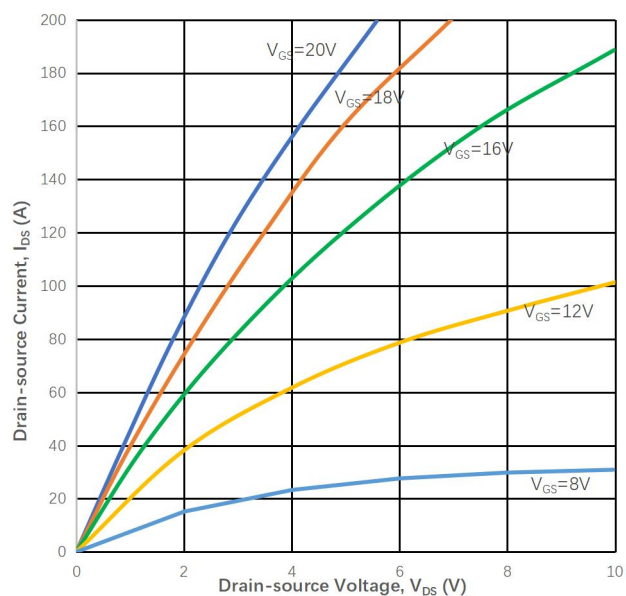


Fig 1
Output Characteristics ($T_J = 25^\circ\text{C}$)

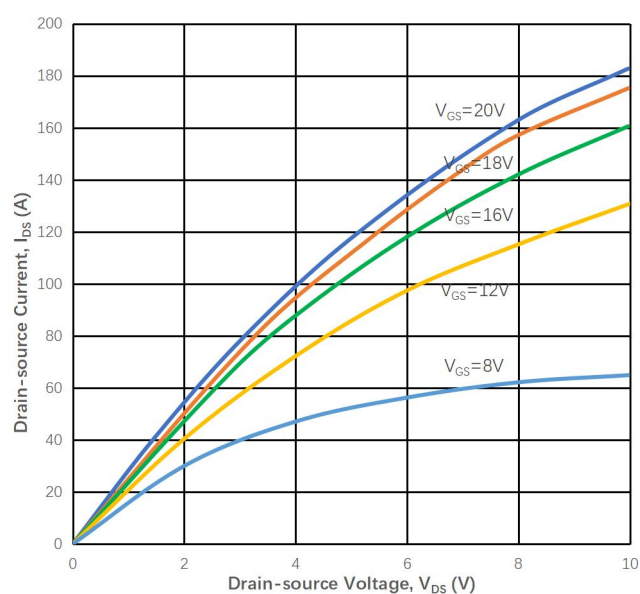


Fig 2
Output Characteristics ($T_J = 175^\circ\text{C}$)

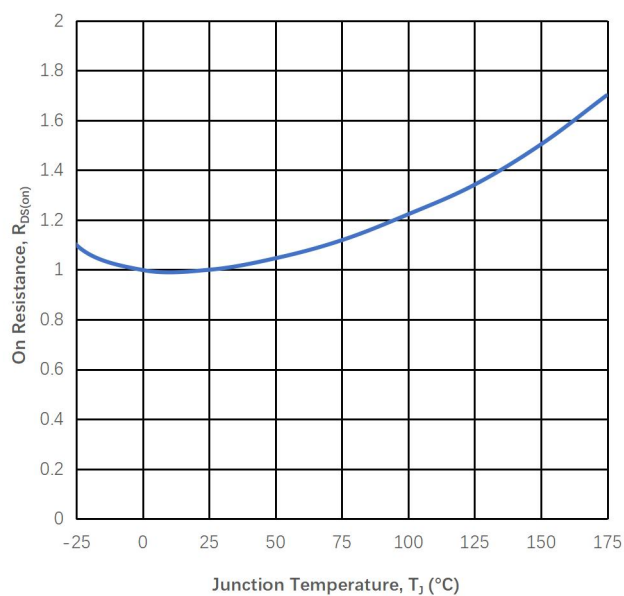


Fig 3
Normalized On-resistance vs. Temperature

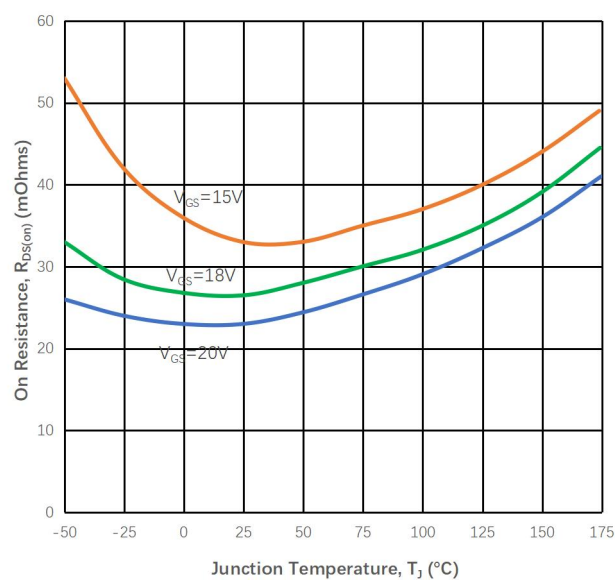


Fig 4
On-resistance vs. Temperature

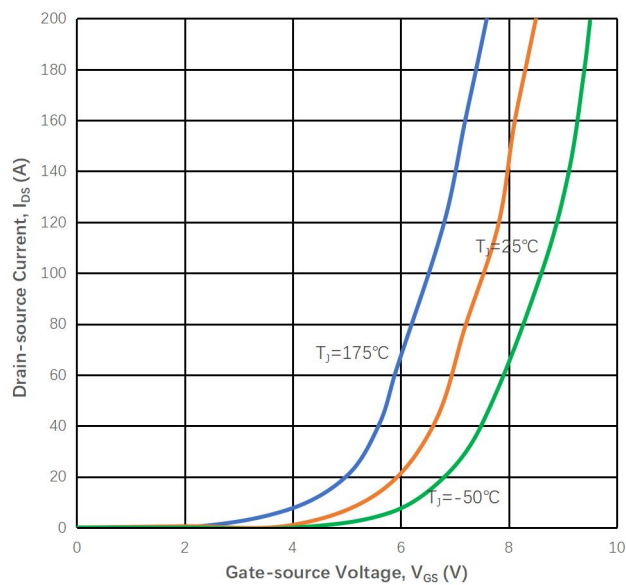


Fig 5
Transfer Characteristic

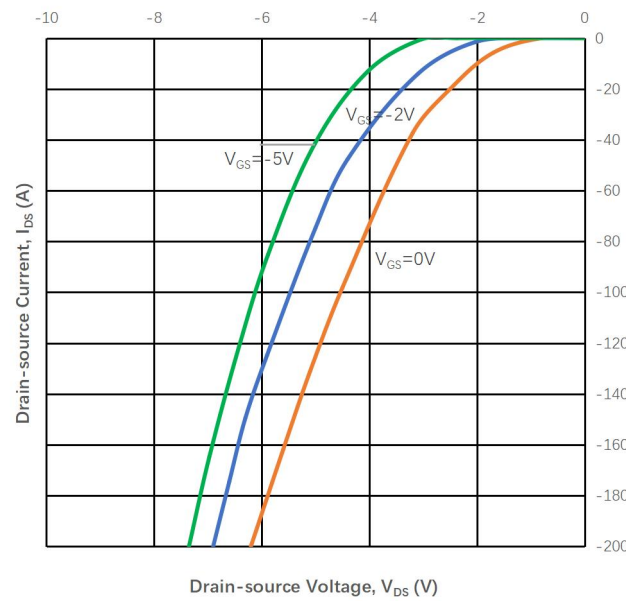


Fig 6
Body Diode Characteristic at 25°C

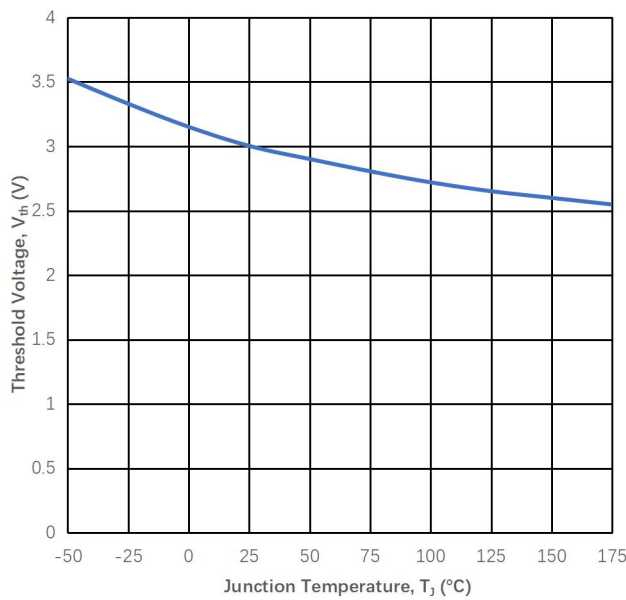


Fig 7
Threshold Voltage vs. Temperature

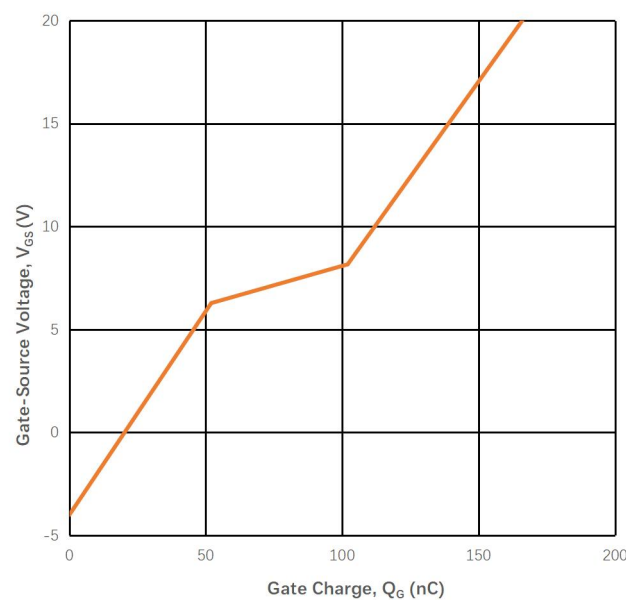


Fig 8
Gate Charge Characteristics

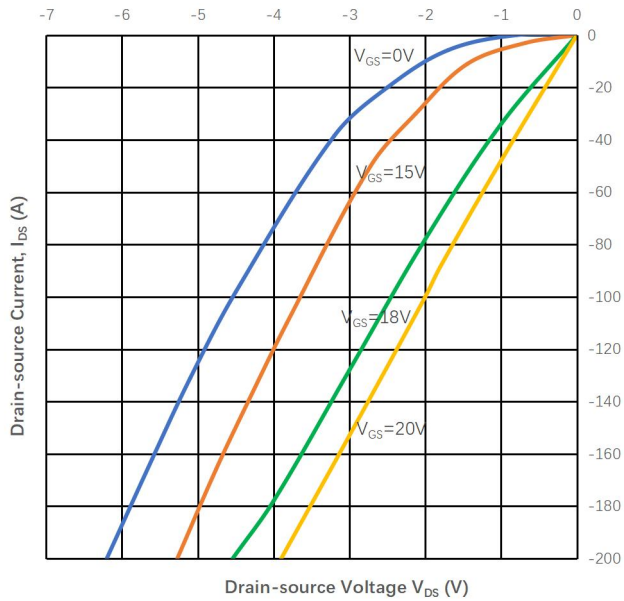


Fig 9
3rd Quadrant Characteristic at 25°C

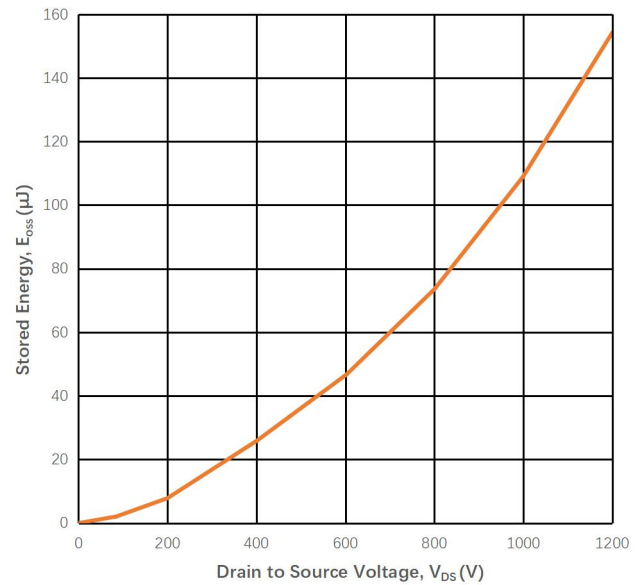


Fig 10
Output Capacitor Stored Energy

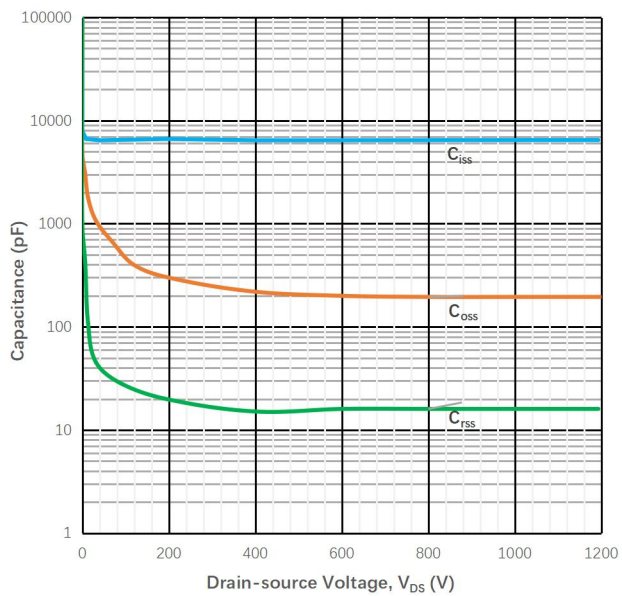


Fig 11
Capacitances vs. Drain-source

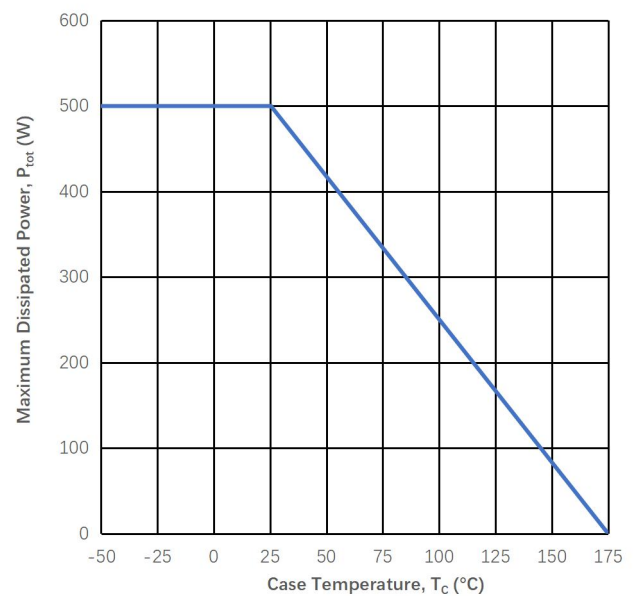


Fig 12
Max Power Dissipation Derating vs T_c

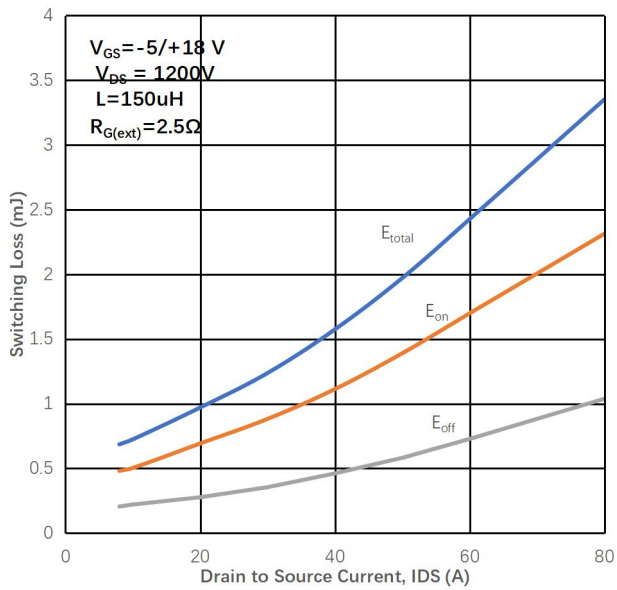


Fig 13
Switching Energy vs. Drain Current

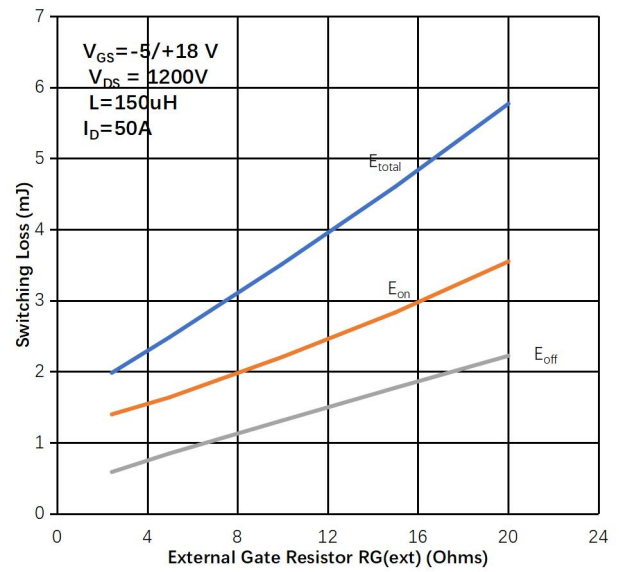


Fig 14
Switching Energy vs. $R_{G(ext)}$

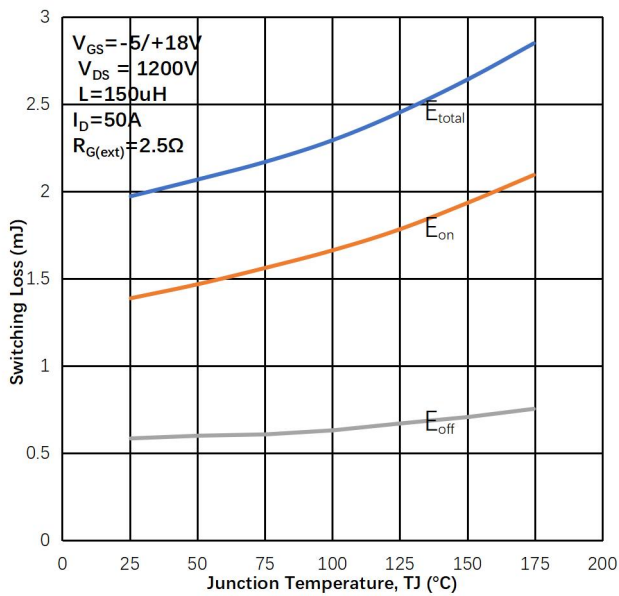


Fig 15
Switching Energy vs. Temperature

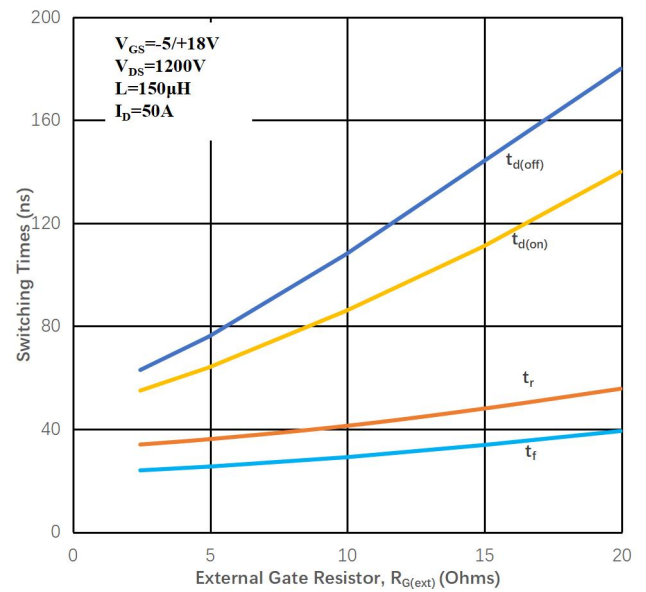


Fig 16
Switching Times vs. $R_{G(ext)}$

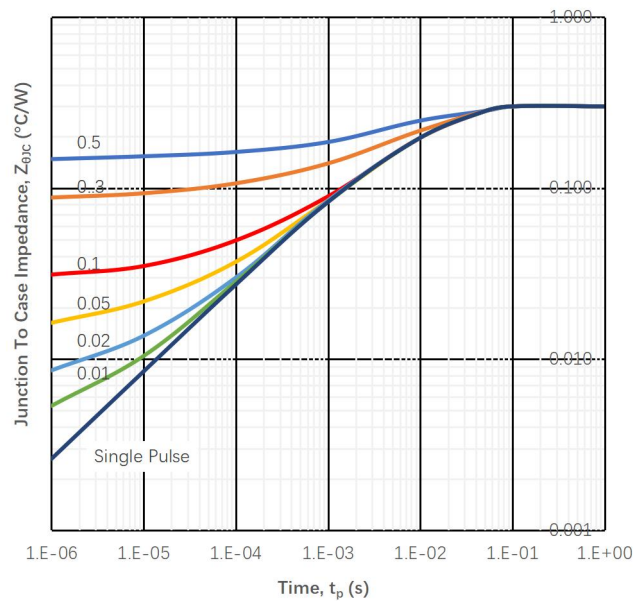


Fig 17
Transient Thermal Impedance

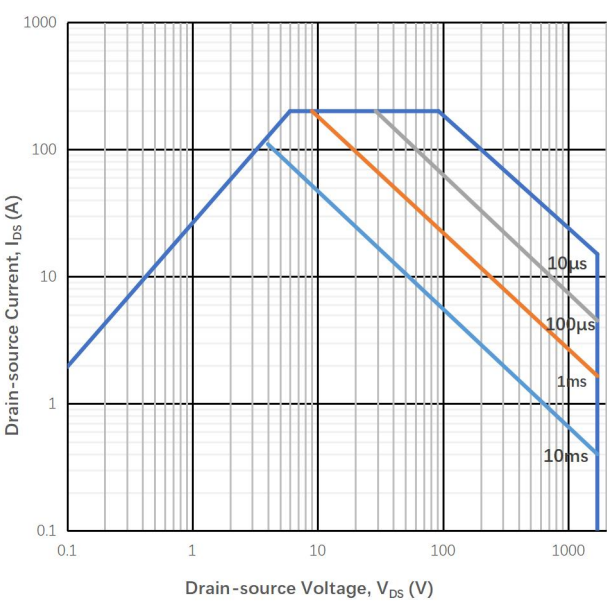
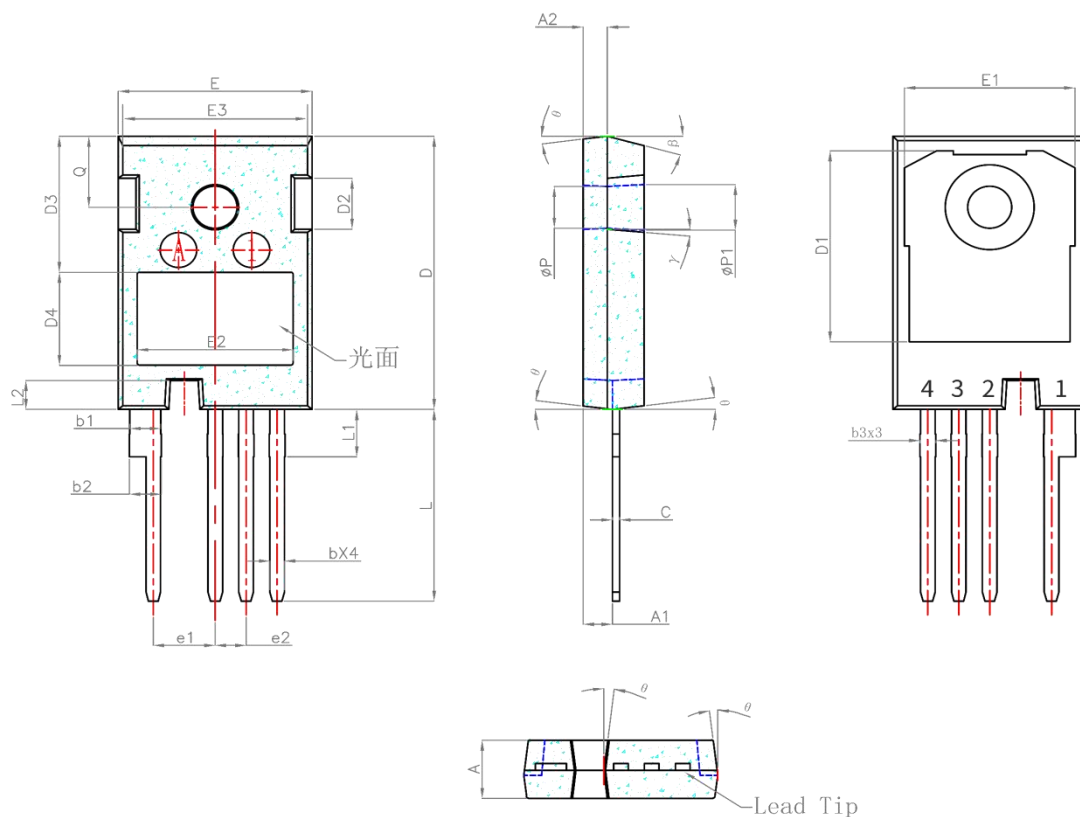


Fig 18
Safe Operating Area

Package Outlines(Unit:mm)

TO-247-4L



Symbol	Millimeters			Symbol	Millimeters		
	Min.	Type.	Max.		Min.	Type.	Max.
A	4.80	5.00	5.20	e2	2.39	2.54	2.69
A1	2.25	2.40	2.55	E	15.70	15.90	16.10
A2	1.85	2.00	2.15	E1	13.80	14.00	14.20
b	1.15	1.20	1.25	E2	12.80 Type.		
b1	2.40	2.55	2.70	E3	12.80	13.00	13.20
b2	2.48	2.63	2.78	L	16.32	16.52	16.72
b3	1.13	1.28	1.43	L1	3.87	4.07	4.27
c	0.55	0.60	0.65	L2	2.30	2.50	2.70
D	-	23.50	23.70	ϕP	3.45	3.60	-
D1	16.20	16.50	16.80	$\phi P1$	3.90 Type.		
D2	4.40 Type.			Q	6.01	6.11	6.21
D3	11.61	11.71	11.81	θ	7°		
D4	8.00 Type.			β	15°		
e1	4.93	5.08	5.23	γ	5°		

Pin	Symbol	Description
1	D	Drain
2	S	Power Source
3	S	Driver Source
4	G	Gate
mb	D	Mounting Base; Connected to Drain

Note:

1. All metal surfaces are Sn plated (matte), except area of cut.
2. Burr or mold flash size (0.5 mm) is not included in the dimensions.

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