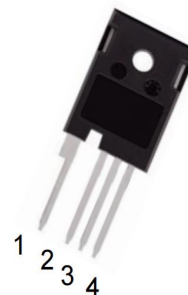




1.Features

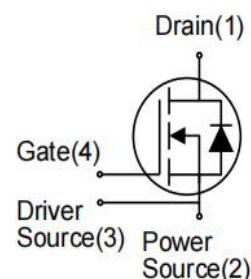
- V_{DS} 1200V
- I_D 66A
- $R_{DS(ON)}$ 36 m Ω @ $V_{GS}=15V$

TO-247-4



2.Mechanical Data

- Case:Molded Plastic,TO-247-4;
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable per MIL-STD-750,Method-2026.
- Marking: marked on body.
- Mounting Position : Any.



3.Maximum Ratings and Electrical Characteristics

Rating at 25°C Ambient temperature unless otherwise specified

Characteristics	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	1200	V
Drain Current Continuous	I_D	$V_{GS} = 15V, T_C=25^{\circ}C$	66
		$V_{GS} = 15V, T_C=100^{\circ}C$	47
Peak Drain Current Pulse with t_p limited by T_{jmax}	I_{DM}	144	A
Gate-Source Voltage AC ($f > 1$ Hz)	V_{GSmax}	-10/+25	V
Recommend Gate-Source Voltage	V_{GSop}	-4/+15	V
Power Dissipation	P_{tot}	288	W
Maximum Junction Temperature	T_J	-55~175	$^{\circ}C$
Storage Temperature Range	T_{stg}	-55~175	$^{\circ}C$
Thermal Resistance from Junction to Case	$R_{th(j-c)}$	0.52	$^{\circ}C/W$
Thermal resistance from Junction to Ambient	$R_{th(j-a)}$	45	$^{\circ}C/W$



Characteristics	Symbol	Test conditions	Min	TYP	Max	Unit	
Static Characteristics							
Drain -Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=0.1mA$	1200	-	-	V	
Gate Threshold Voltage	$T_j=25^\circ C$	$V_{GS}=V_{DS}, I_D=10mA$	-	2.9	-	V	
	$T_j=175^\circ C$		-	2.0	-		
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=15V, V_{DS}=0V$	-	-	250	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=1200V, V_{GS}=0V$	-	1	50	μA	
Drain-Source On-State Resistance	$T_j=25^\circ C$	$V_{GS}=15V, I_D=40A$	-	36	55	m Ω	
	$T_j=175^\circ C$		-	62	95		
	$T_j=25^\circ C$	$V_{GS}=18V, I_D=40A$	-	31	-		
	$T_j=175^\circ C$		-	60	-		
Transconductance	$T_j=25^\circ C$	$V_{DS}=15V, I_D=40A$	-	14	-	S	
	$T_j=175^\circ C$		-	11	-		
Dynamic Characteristics							
Gate-Source Charge	Q_{gs}	$V_{DS}=800V, V_{GS}=-4/15V$ $I_D=40A$	-	29.5	-	nC	
Gate-Drain Charge	Q_{gd}		-	16	-		
Total Gate Charge	Q_g		-	87	-		
Input Capacitance	C_{iss}	$V_{DS}=1000V$ $V_{GS}=0V$ $f=100KHz, V_{AC}=25mV$	-	2605	-	pF	
Output Capacitance	C_{oss}		-	89	-		
Reverse Transfer Capacitance	C_{rss}		-	7	-		
Internal Gate Resistance	$R_{G(int)}$	$f=1MHz, V_{AC}=25mV$	-	1.4	-	Ω	
Switching Characteristics							
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=800V, V_{GS}=-4V/15V$ $I_D=40A, R_G=5\Omega$ $L=294\mu H$	-	6	-	ns	
Turn-on Rise Time	t_r		-	26	-		
Turn-off Delay Time	$t_{d(off)}$		-	23	-		
Turn-off Fall Time	t_f		-	10	-		
Turn-On Energy	E_{on}		-	400	-	μJ	
Turn-Off Energy	E_{off}		-	196	-		
Total switching energy	E_{tot}	-	596	-			
Drain-Source Diode Characteristics							
Diode Forward Voltage	$T_j=25^\circ C$	V_{SD}	$V_{GS}=-4V, I_{SD}=20A$	-	4.1	-	V
	$T_j=175^\circ C$			-	3.6	-	
Continuous Diode Forward	$T_j=25^\circ C$	I_S	$V_{GS}=-4V$	-	64	-	A
Diode pulse Current, @pulse width tp limited by		$I_S, pulse$	$V_{GS}=-4V$	-	195	-	A
Reverse Recovery Time		T_{rr}	$V_{GS}=-4V, I_{SD}=40A,$ $V_R=800V,$ $di/dt=3200A/\mu s$	-	16	-	ns
Reverse Recovery Charge		Q_{rr}		-	216	-	nC
Peak reverse recovery current		I_{rrm}		-	22	-	A



4. Rating And Characteristic Curves

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

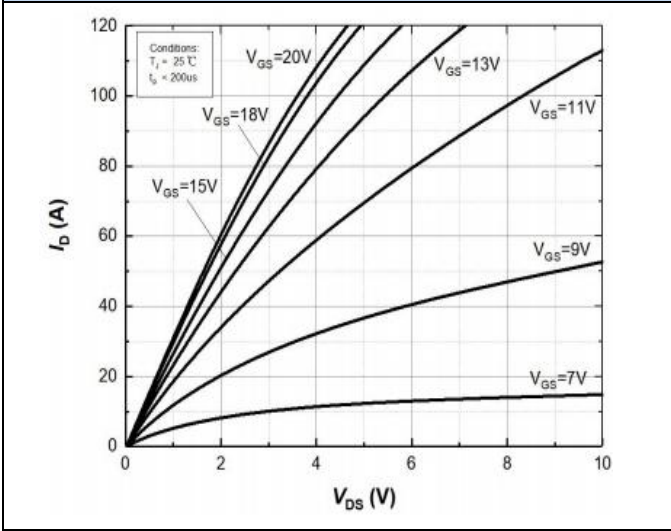


Fig.2 Output Characteristics $T_J=175^\circ\text{C}$

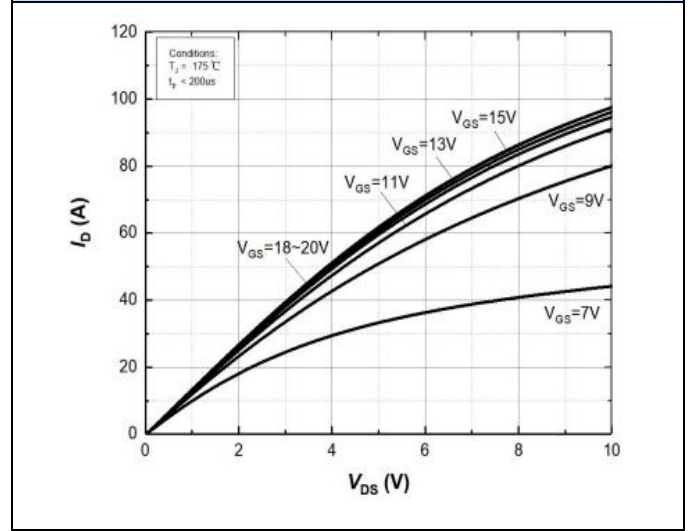


Fig.3 Normalized On-Resistance vs. Temperature

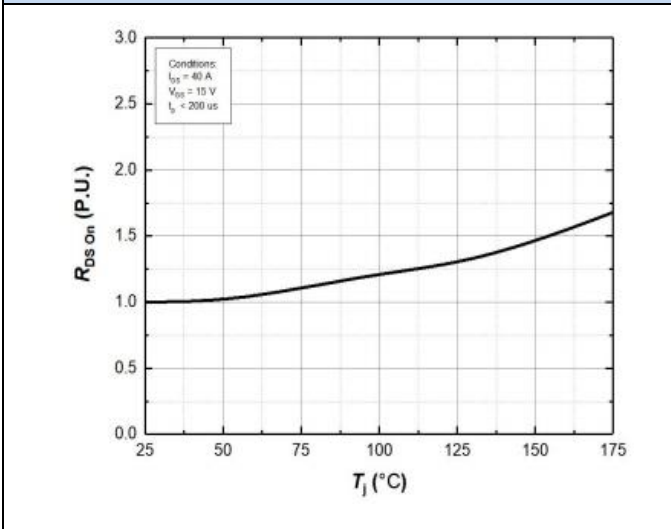


Fig.4 On-Resistance vs. Drain current for Various Temperature

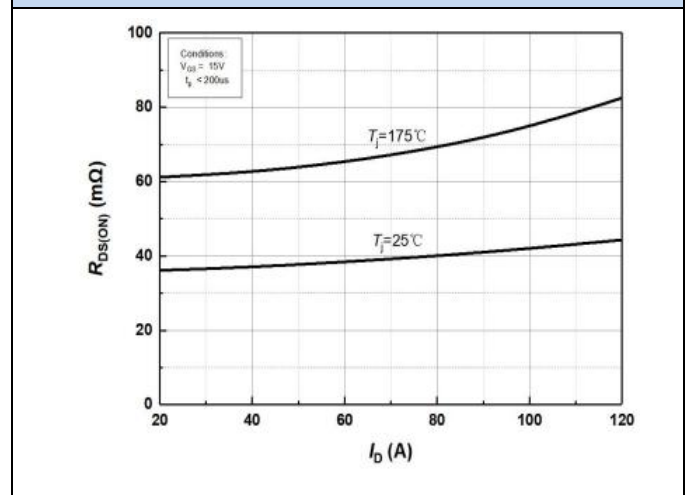


Fig.5 On-Resistance vs. Temperature for Various Gate Voltage

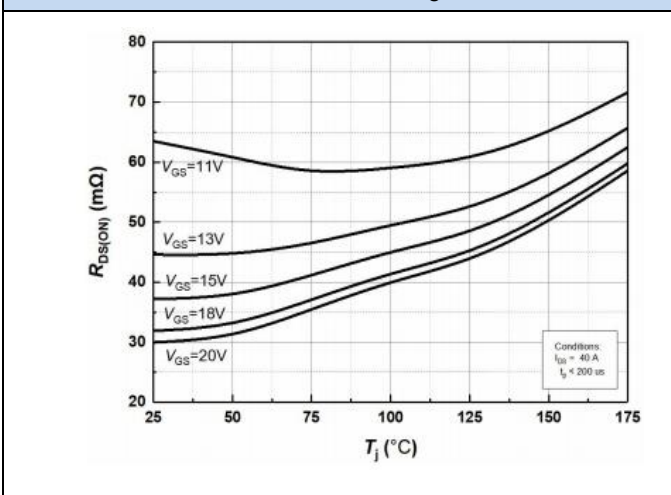


Fig.6 Transfer Characteristics for Various Junction Temperatures

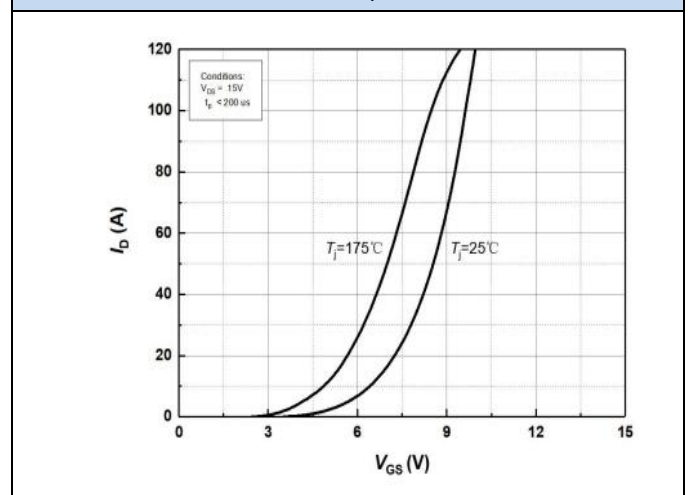




Fig.7 Body Diode Characteristics at $T_j=25^\circ\text{C}$

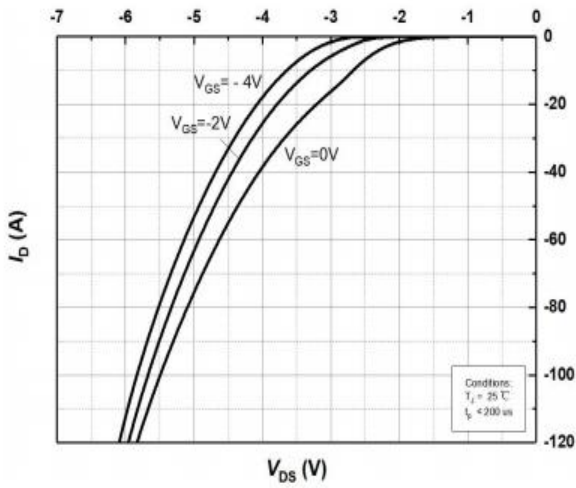


Fig.8 Body Diode Characteristics at $T_j=175^\circ\text{C}$

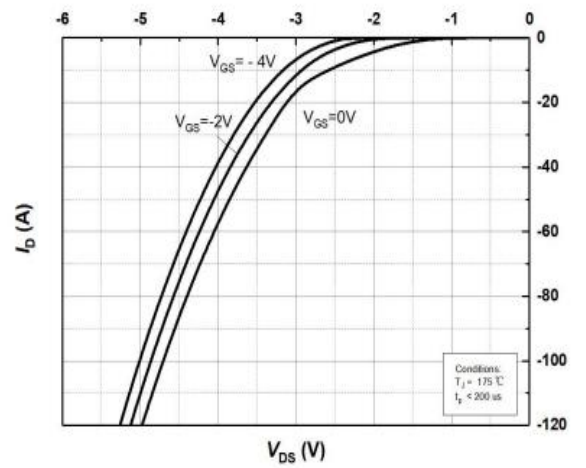


Fig.9 Threshold Voltage vs. Temperature

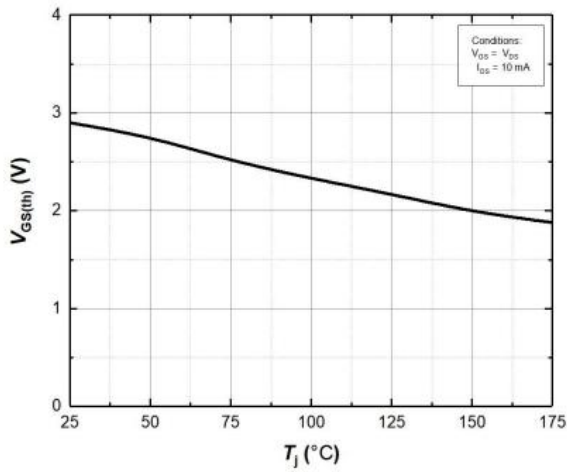


Fig.10 Gate Charge Characteristics

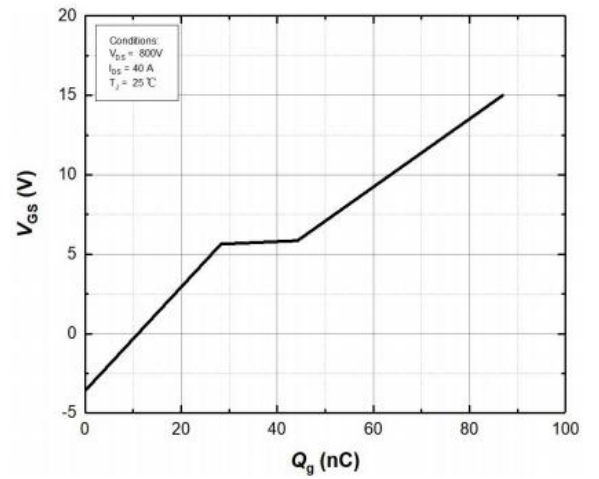


Fig.11 3rd Quadrant Characteristic at $T_j=25^\circ\text{C}$

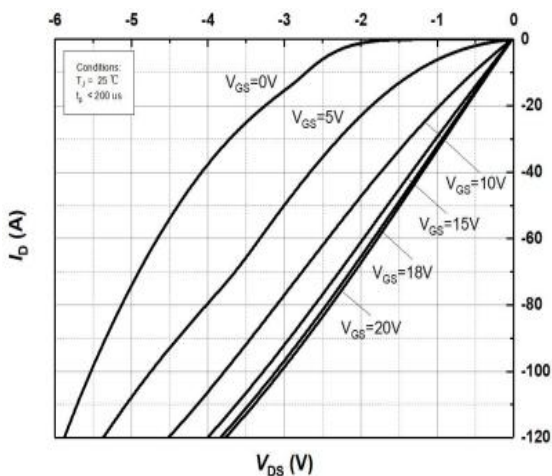


Fig.12 3rd Quadrant Characteristic at $T_j=175^\circ\text{C}$

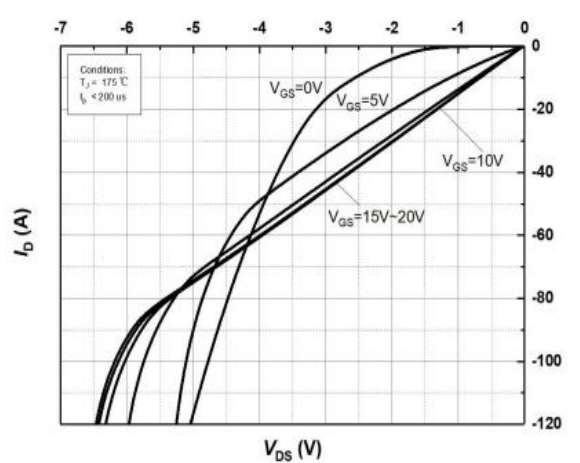




Fig.13 Capacitances vs. Drain-Source Voltage (0 – 1000V)

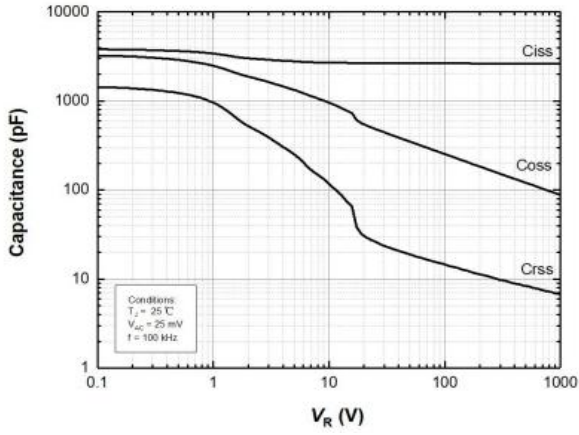


Fig.14. Continuous Drain Current Derating vs Case Temperature

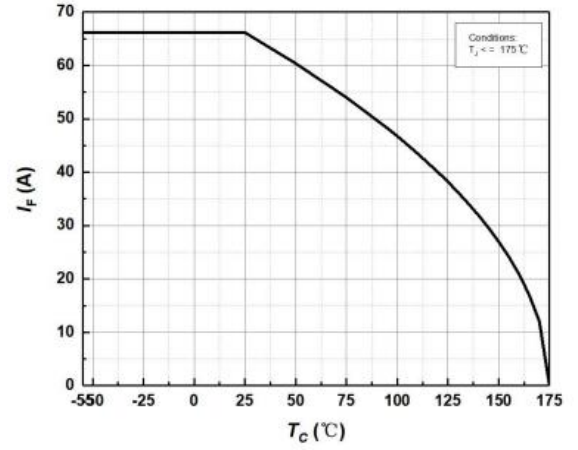


Fig.15 Transient Thermal Impedance (Junction – Case)

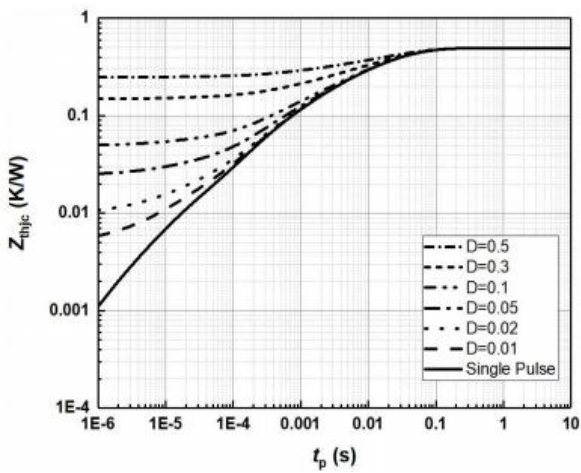


Fig.16 Maximum Power Dissipation Derating vs. Case Temperature

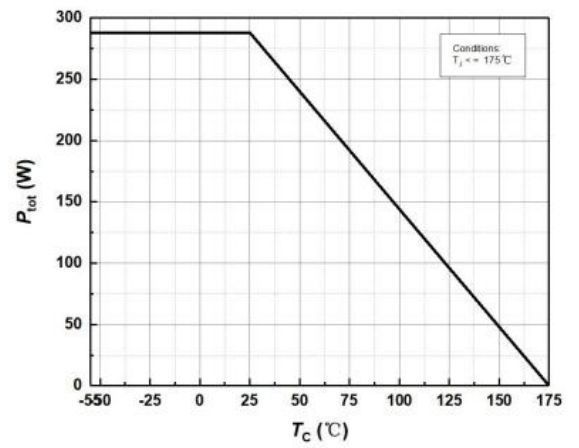


Fig.17 Output Capacitor Stored Energy

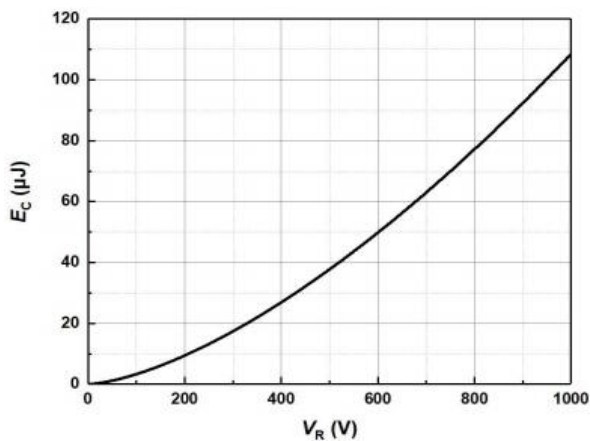


Fig.18 Safe Operating Area

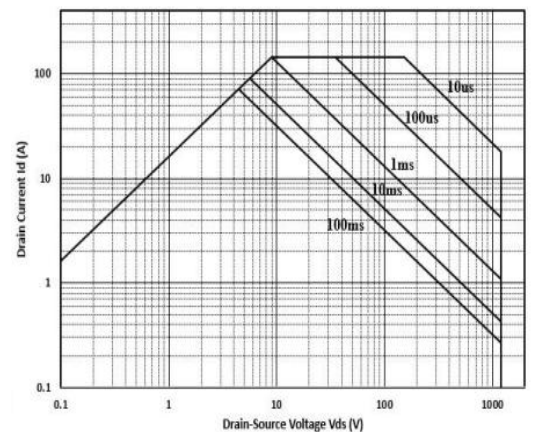




Fig.19 Clamped Inductive Switching Energy vs. Drain Current($V_{DD} = 600V$)

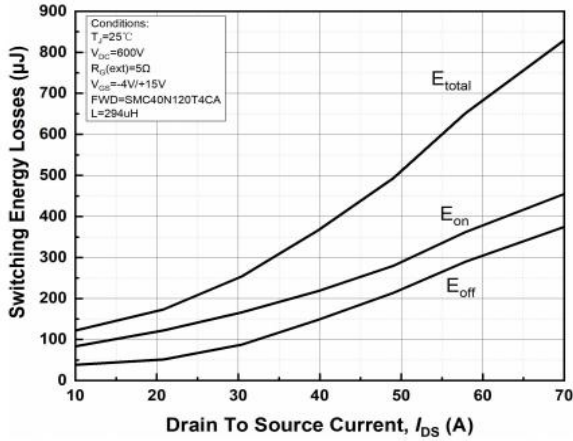


Fig.20 Clamped Inductive Switching Energy vs. Drain Current($V_{DD} = 800V$)

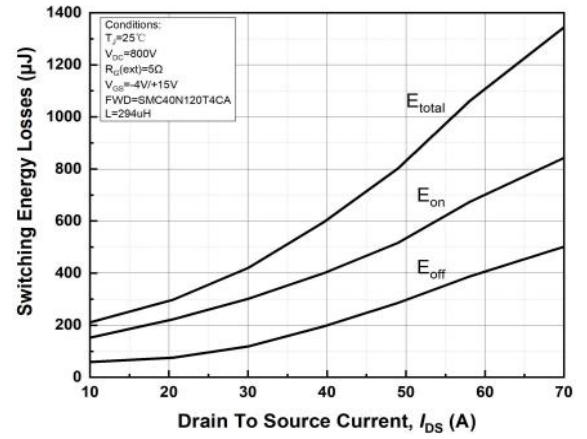


Fig.21 Clamped Inductive Switching Energy vs. $R_{G(ext)}$

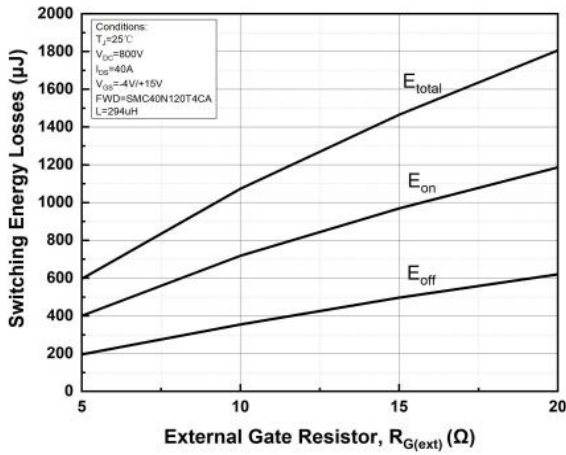
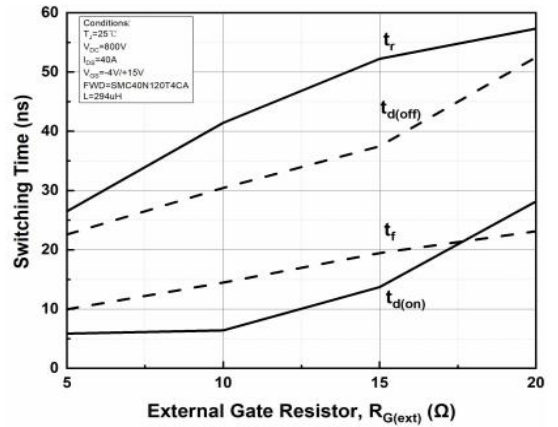


Fig.22 Switching Times vs. $R_{G(ext)}$

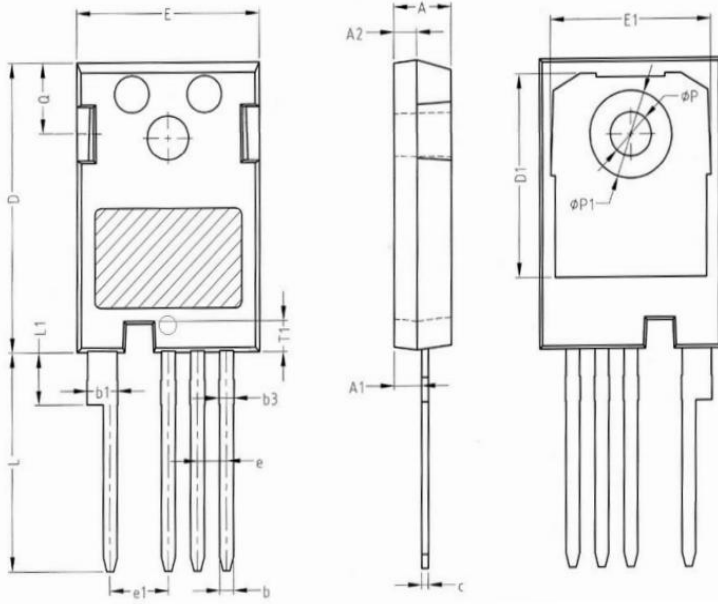




SC040N120J4

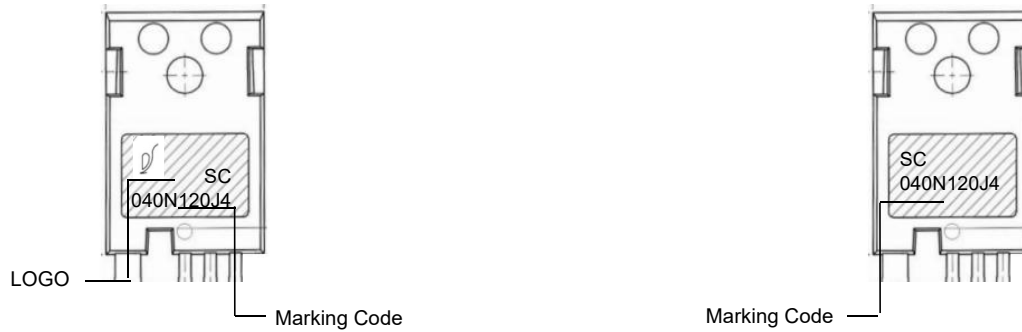
1200V 66A N-CHANNEL POWER MOSFET

5. Dimensions



DIM	Unit(inch)		Unit(mm)	
	MIN	MAX	MIN	MAX
A	0.189	0.205	4.80	5.20
A1	0.087	0.103	2.21	2.61
A2	0.071	0.087	1.80	2.20
b	0.042	0.054	1.06	1.36
b1	0.092	0.115	2.33	2.93
b3	0.042	0.063	1.07	1.60
c	0.020	0.030	0.51	0.75
D	0.917	0.929	23.30	23.60
D1	0.640	0.663	16.25	16.85
E	0.620	0.635	15.74	16.14
E1	0.540	0.564	13.72	14.32
T1	0.093	0.104	2.35	2.65
e	2.54 BSC			
e1	5.08 BSC			
Q	0.216	0.240	5.49	6.09
L	0.680	0.704	17.27	17.87
L1	0.157	0.173	3.99	4.39
θp	0.134	0.150	3.40	3.80
θp1	7.19 REF			

6. Part Marking System



7. Package Information

Package	Packing Type	Quantity(pcs)
TO-247-4L	Tube	25



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