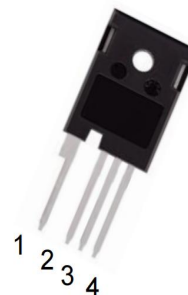




1.Features

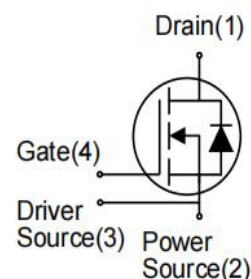
- V_{DS} 650V
- I_D 70A
- $R_{DS(ON)}$ 36 m Ω @ $V_{GS}=18V$

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 Cambient temperature unless otherwise specified

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GSmax}	-8/+20	V
Recommend Gate-Source Voltage		V_{GSop}	-4/+18	V
Drain Current Continuous	$T_C=25^{\circ}C$	I_D	70	A
	$T_C=100^{\circ}C$		49	
PeakDrain Current @Pulse with tp limited by Tjmax at 1 ms		I_{DM}	121	A
Power Dissipation		P_{tot}	214	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		$R_{th(j-c)}$	0.7	$^{\circ}C/W$
Thermal resistance from Junction to Ambient		$R_{th(j-a)}$	40	$^{\circ}C/W$



Characteristics		Symbol	Test conditions	Min	TYP	Max	Unit
Static Characteristics							
Drain -Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V,I _D =0.1mA	650	-	-	V
Gate-Source Leakage Current		I _{GSS}	V _{GS} = 18V,V _{DS} =0V	-	-	250	nA
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} = 650V,V _{GS} = 0V	-	1	50	uA
Gate Threshold Voltage	T _J =25°C	V _{GS (th)}	V _{GS} = V _{DS} , I _D =12mA	-	2.7	-	V
	T _J =175°C			-	1.9	-	
Drain-Source On-State Resistance	T _J =25°C	R _{DS(on)}	V _{GS} =15V, I _D =20A	-	44	-	mΩ
	T _J =175°C			-	52	-	
	T _J =25°C		V _{GS} =18V, I _D =20A	-	36	56	
	T _J =175°C			-	47	-	
Transconductance	T _J =25°C	gfs	V _{DS} = 18V, I _D = 20A		15		S
	T _J =175°C				14		
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} =600V V _{GS} =0V f = 1MHz, V _{AC} = 25mV	-	1525	-	pF
Output Capacitance		C _{oss}		-	115	-	
Reverse Transfer Capacitance		C _{rss}		-	3.3	-	
Gate-Source Charge		Q _{gs}	V _{DS} =400V, V _{GS} =-4/18V I _D =20A	-	19	-	nC
Gate-Drain Charge		Q _{gd}		-	21	-	
Total Gate Charge		Q _g		-	80	-	
nternal Gate Resistance		R _{G(int)}	f=1 MHz, V _{AC} = 25mV	-	1.4	-	Ω
Switching Characteristics							
Turn-on Delay Time		t _{d(on)}	V _{DD} =400V, V _{GS} =-4V/18V I _D =20A ,R _G = 5Ω L = 294μH	-	2	-	ns
Turn-on Rise Time		t _r		-	12	-	
Turn-off Delay Time		t _{d(off)}		-	17	-	
Turn-off Fail Time		t _f		-	5	-	
Turn-On Energy		E _{on}		-	24	-	uJ
Turn-Off Energy		E _{off}		-	18	-	
Total switching energy		E _{tot}		-	42	-	
Drain-Source Diode Characteristics							
Diode Forward Voltage	T _J =25°C	V _{SD}	V _{GS} =-4V, I _{SD} =10A	-	4	-	V
	T _J =175°C			-	3.5	-	
Continuous Diode Forward	T _c =25°C	I _S	V _{GS} =-4V	-	44	-	A
Diode pulse Current @pulse width tp limited by Tjmax		I _{S, pulse}	V _{GS} = -4V	-	121	-	
Reverse Recovery Time		T _{rr}	V _{GS} =-4V, I _{SD} =20A,	-	13	-	ns
Reverse Recovery Charge		Q _{rr}	V _R =400V,	-	121	-	nC
Peak reverse recovery current		I _{rrm}	di/dt=2800A/μs	-	17	-	A



4. Rating And Characteristic Curves

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

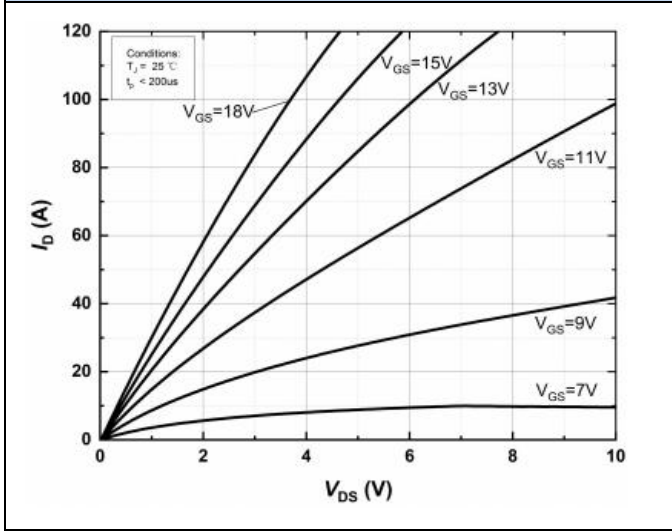


Fig.2 Output Characteristics $T_J=175^{\circ}\text{C}$

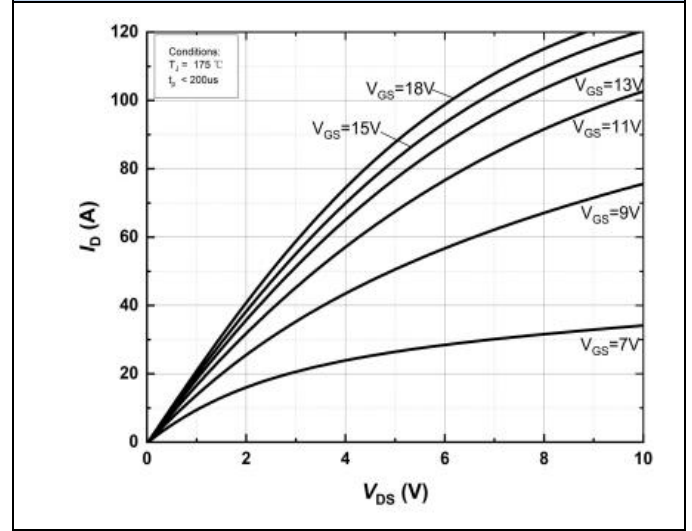


Fig.3 Normalized On-Resistance vs. Temperature

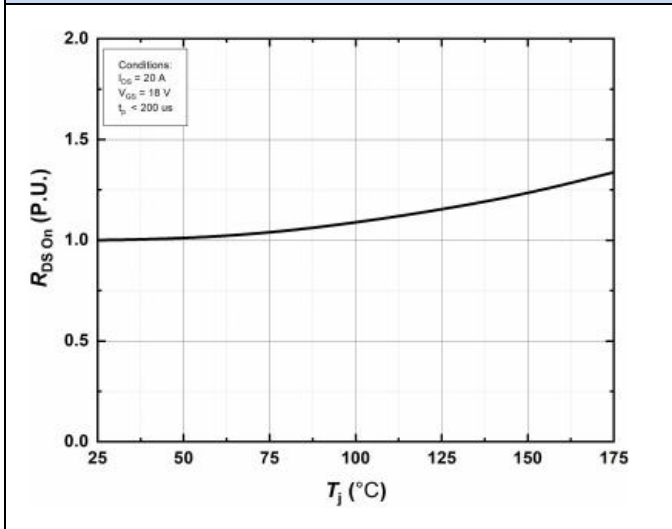


Fig.4 On-Resistance vs. Drain current for Various Temperature

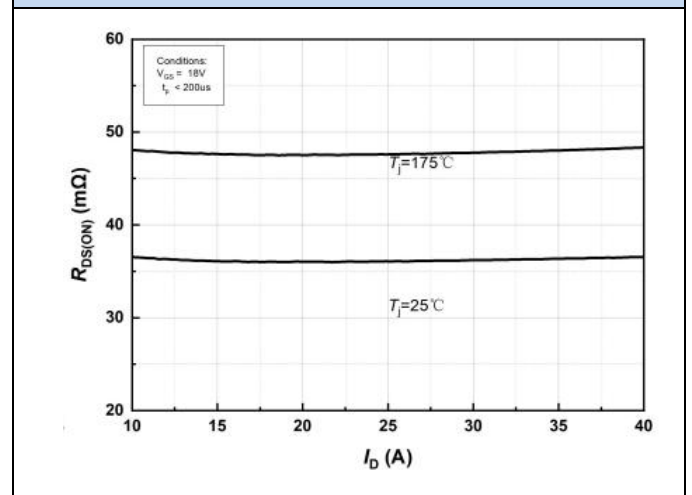


Fig.5 On-Resistance vs. Temperature for Various Gate Voltage

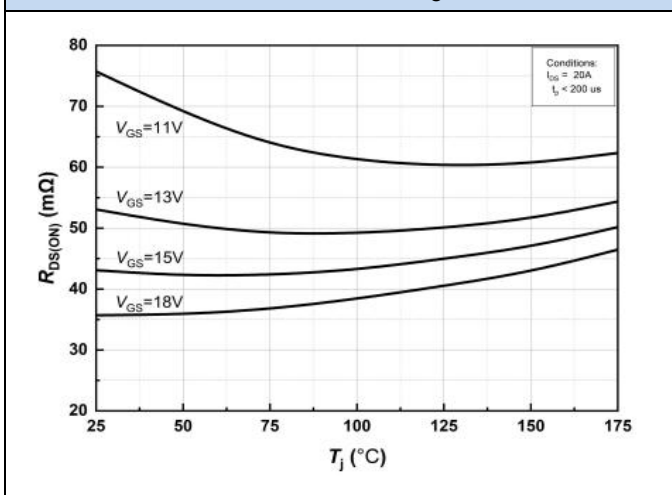


Fig.6 Transfer Characteristics for Various Junction Temperatures

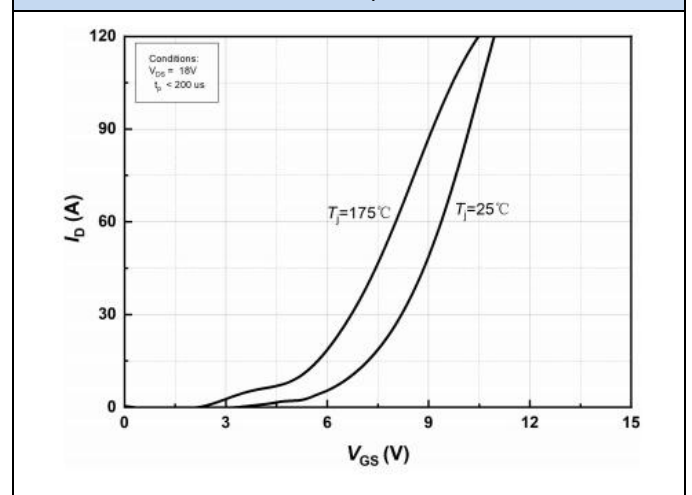




Fig.7 Body Diode Characteristics at $T_j=25^\circ\text{C}$

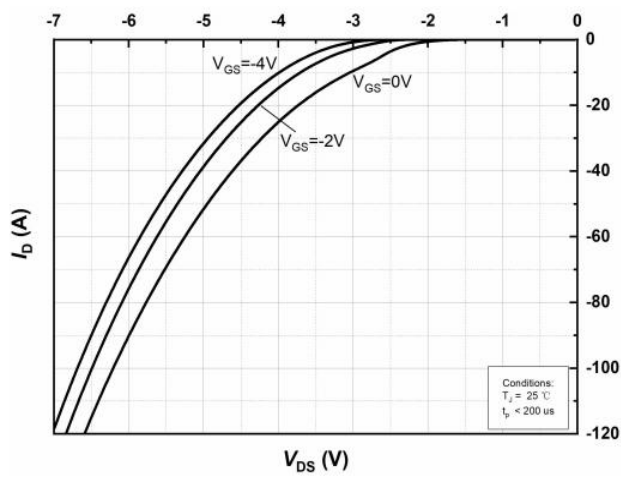


Fig.8 Body Diode Characteristics at $T_j=175^\circ\text{C}$

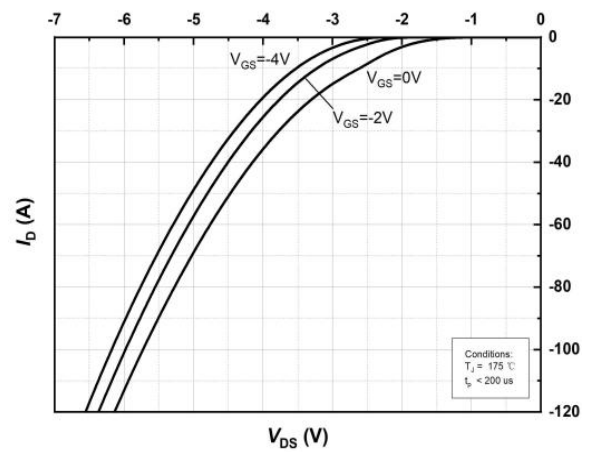


Fig.9 Threshold Voltage vs. Temperature

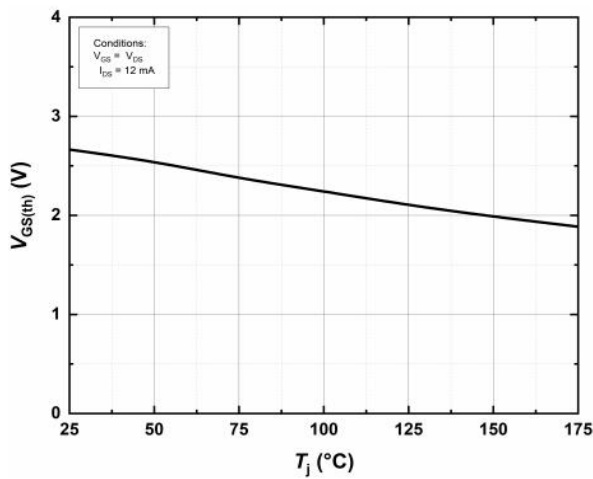


Fig.10 Gate Charge Characteristics

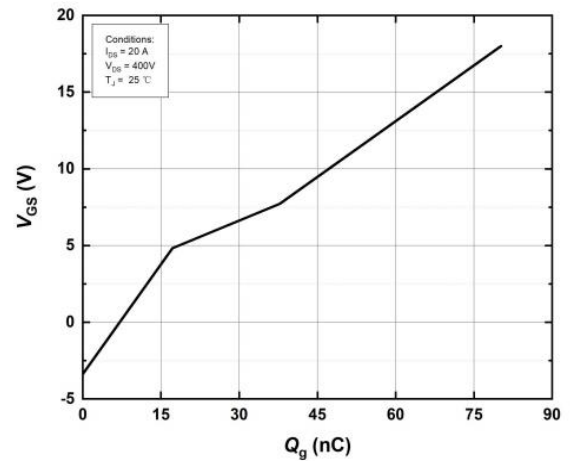


Fig.11 3rd Quadrant Characteristic at $T_j=25^\circ\text{C}$

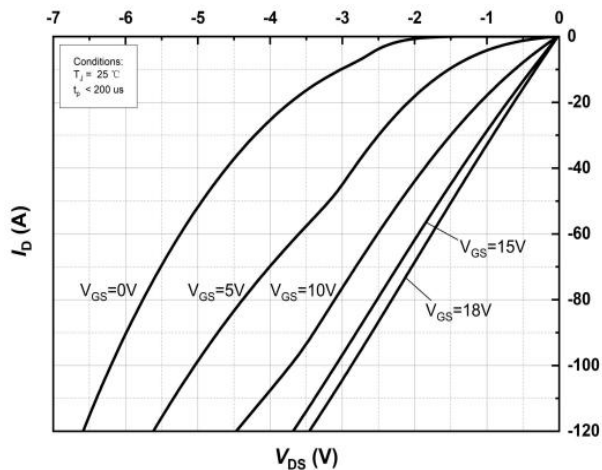


Fig.12 3rd Quadrant Characteristic at $T_j=175^\circ\text{C}$

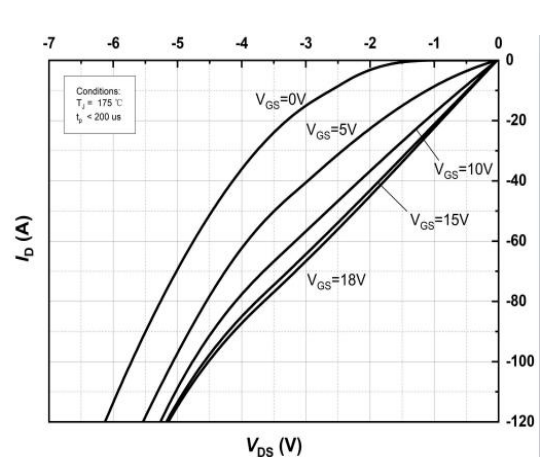




Fig.13 Capacitances vs. Drain-Source Voltage (0 – 600V)

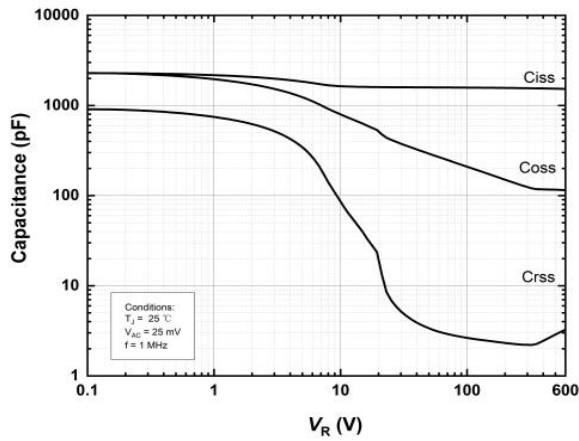


Fig.14. Continuous Drain Current Derating vs Case Temperature

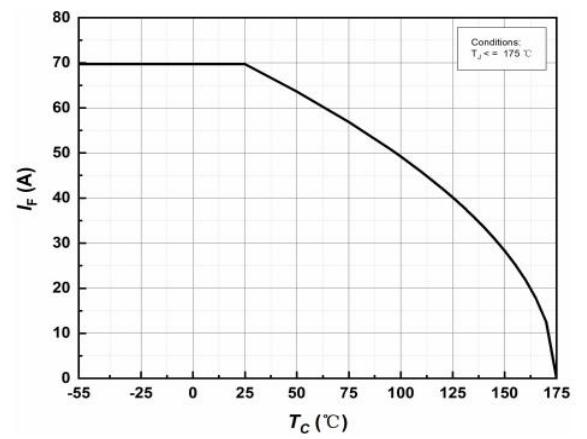


Fig.15 Transient Thermal Impedance (Junction – Case)

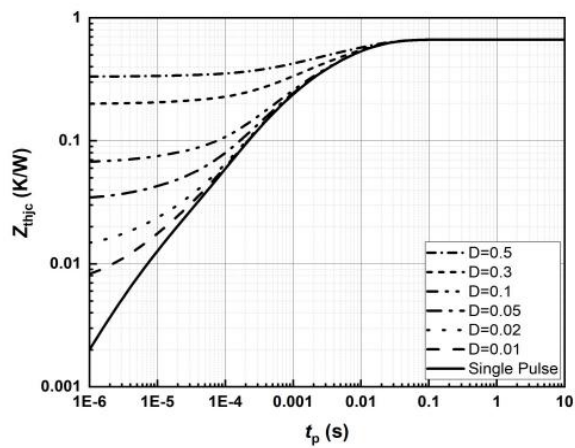


Fig.16 Maximum Power Dissipation Derating vs. Case Temperature

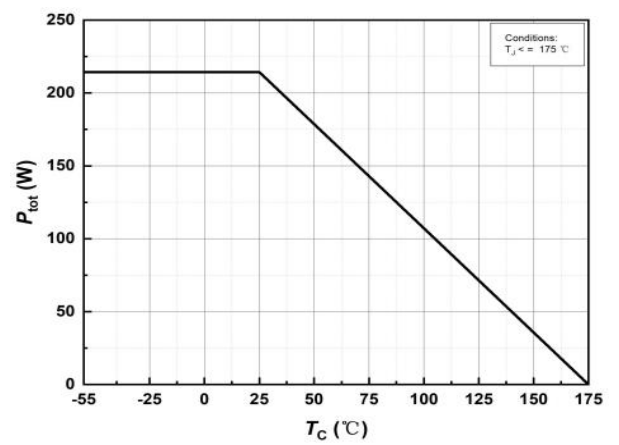


Fig.17 Output Capacitor Stored Energy

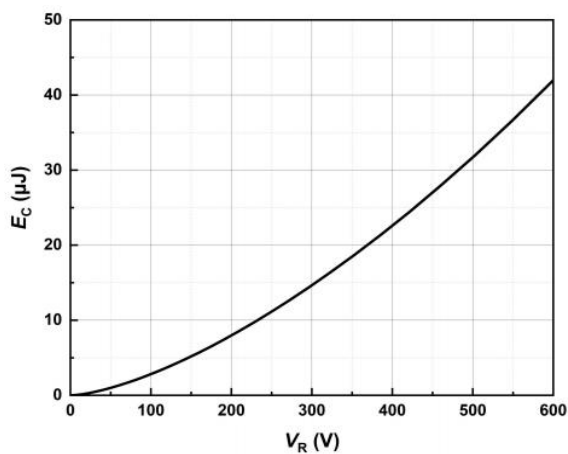


Fig.18 Safe Operating Area

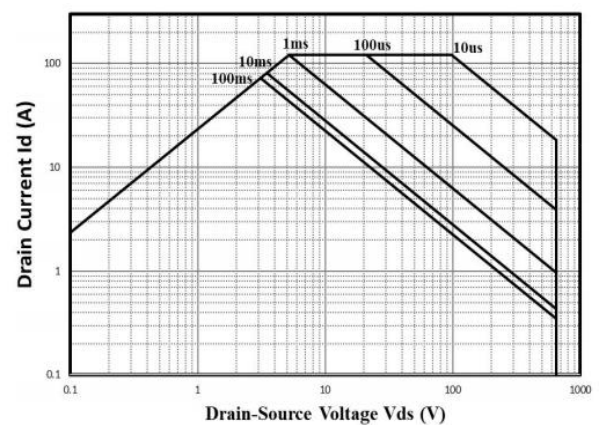




Fig.19 Clamped Inductive Switching Energy vs. Drain Current($V_{DD} = 400V$)

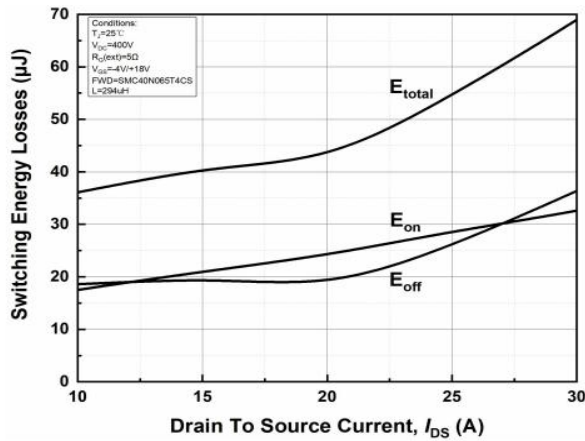


Fig.20 Clamped Inductive Switching Energy vs. Drain Current $R_{G(ext)}$

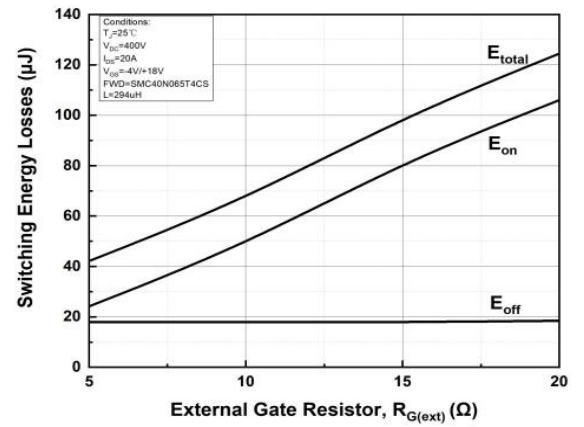
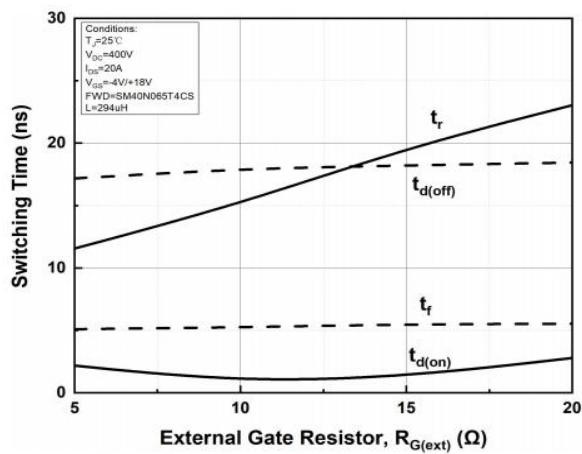


Fig.21 Clamped Inductive Switching Energy vs. $R_{G(ext)}$

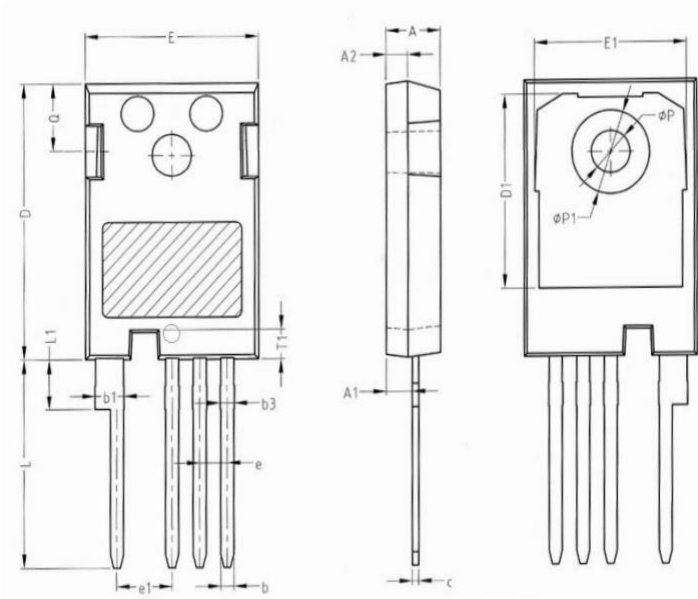




SC40N065J4

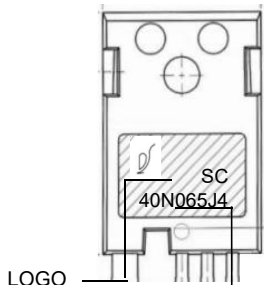
650V 70A N-CHANNEL SiC MOSFET

5.Dimensions



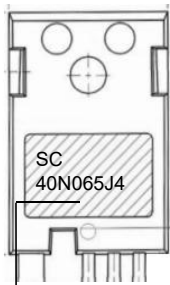
DIM	Unit(inch)		Unit(mm)	
	MIN	MAX	MIN	MAX
A	0.189	0.205	4.80	5.21
A1	0.087	0.103	2.21	2.61
A2	0.071	0.087	1.80	2.20
b	0.042	0.052	1.06	1.33
b1	0.092	0.116	2.33	2.94
b3	0.042	0.063	1.07	1.60
c	0.020	0.030	0.51	0.75
D	0.917	0.929	23.30	23.60
D1	0.640	0.663	16.25	16.85
E	0.620	0.635	15.74	16.14
E1	0.528	0.564	13.40	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
theta_p	0.134	0.150	3.40	3.80
theta_p1	7.19 REF			

6. Part Marking System



LOGO

Marking Code



Marking Code

7. Package Information

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



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