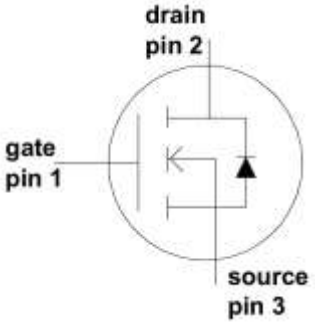
APC60R030WMF

Super-junction Power Mosfet

DATA SHEET

Feature

- 600V,80A
  $R_{DS(ON)}$ <30mΩ@V_{GS}=10V
- Ultra-fast body didode
- Good Reliability
- 100% UIS and Isolation tested
- RoHs compliant



Application

- Swith Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

TO-247-3L

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
60R030	APC60R030WMF	TO-247-3L	-	-	600 per box

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GSS}	±30	V
Continuous Drain Current (T_a =25℃) (1)	I_D	80	A
Continuous Drain Current (T_a =100℃) (1)	I_D	50	A
Pulsed Drain Currenr (1) (2)	I_{DM}	240	A
Single Pulsed Avalanche Energy (3)	E_{AS}	3920	mJ
Power Dissipation	P_D	417	W
MOSFET dv/dt ruggedness	dV/dT	40	V/ns
Reverse diode dv/dt	dV/dT	40	V/ns
Thermal Resistance from Junction to Ambient,Steady-State(4)	$R_{\theta JA}$	32	℃/W
Thermal Resistance from Junction to Case,Steady-State (4)	$R_{\theta JC}$	0.3	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

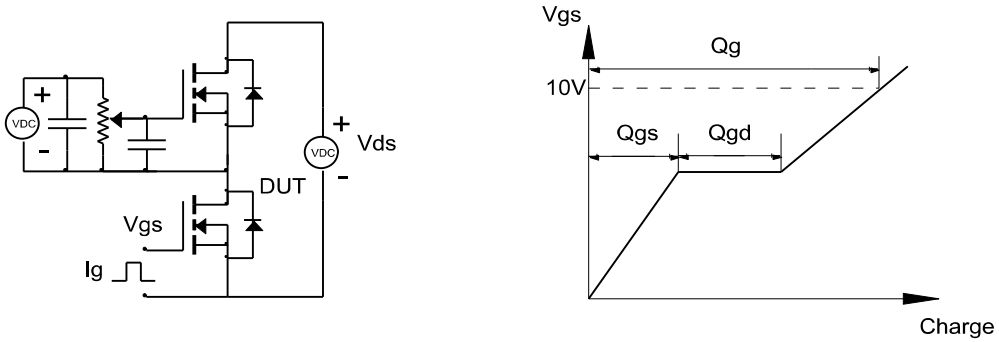
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D =1mA	600	-	-	V
		V_{GS} = 0V, I_D =1mA T_j=125℃	-	650	-	
Zero gate voltage drain current	I_{DSS}	V_{DS} =600V, V_{GS} = 0V,T_j=25℃	-	-	1	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±30V,V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =2mA	2.5	3.3	4.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =20A	-	25	30	mΩ
Gate Resistance	R_G	f=1.0MHZ open drain	-	6.8	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =50V, V_{GS} =0V, f =100KHz	-	7699	-	pF
Output Capacitance	C_{oss}		-	3091	-	
Reverse Transfer Capacitance	C_{rss}		-	2.1	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=480V, I_D=40A, R_G=25Ω,VGS=10V	-	56	-	ns
Turn-on rise time	t_r		-	18.5	-	
Turn-off delay time	$t_{d(off)}$		-	973	-	
Turn-off fall time	t_f		-	62.5	-	
Total Gate Charge	Qg	VDS=480V, ID=40A, VGS=10V	-	272	-	nC
Gate-Source Charge	Qgs		-	32.6	-	
Gate-Drain Charge	Qgd		-	159	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{DS}	V_{GS} =0V, I_S=80A	-	0.87	-	V
Maximum Continuous Body-Diode Forward Currnet	I_S				80	A
Maximum Pulsed Body-Diode Forward Currnet(1)	I_{SM}				240	A
Peak Reverse Recovery Current	I_{rrm}	V_R=400V,IF=40A,di_F/dt=100A/us	-	16	-	A
Reverse Recovery Time	Q_{rr}		-	1.487	-	uC
Reverse Recovery Charge	T_{rr}		-	170	-	ns

Notes:

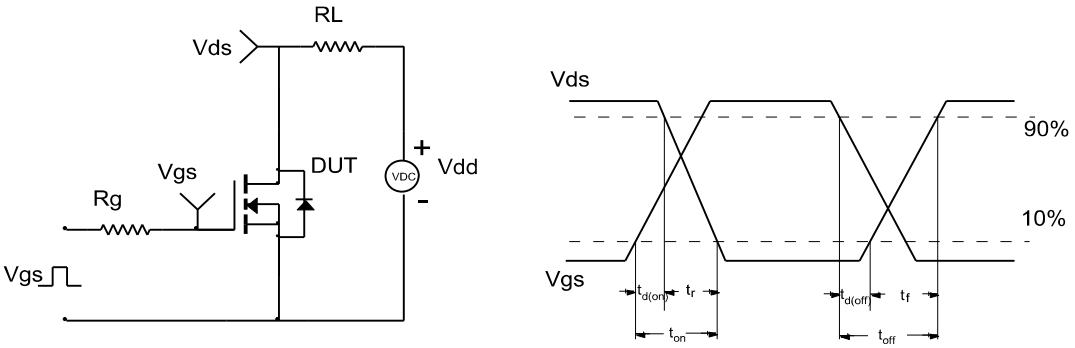
1. The max drain current rating limited by package and maximum junction temperature
2. Repetitive Rating:Pulse width limited by maximum junction temperature
3. EAS Condition:T_J=25℃,V_{DD}=150V,R_G=25Ω,L=10mH,I_{AS}=28A
4. Mount on minimum PCB layout

Test Circuit and Waveform

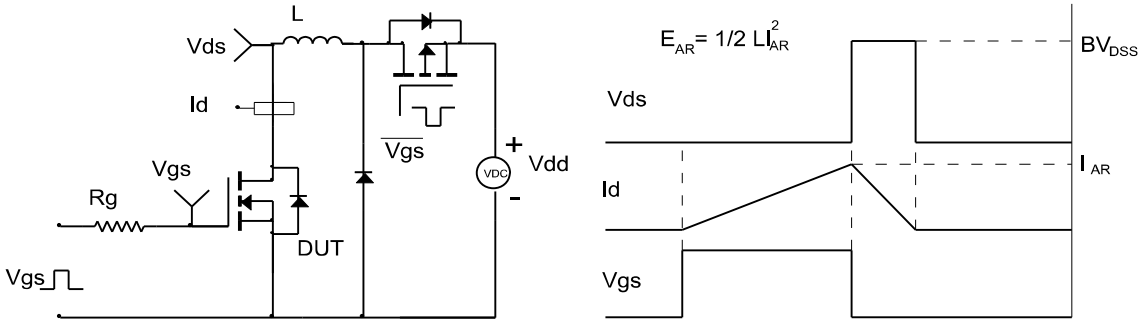
Gate Charge Test Circuit & Waveform



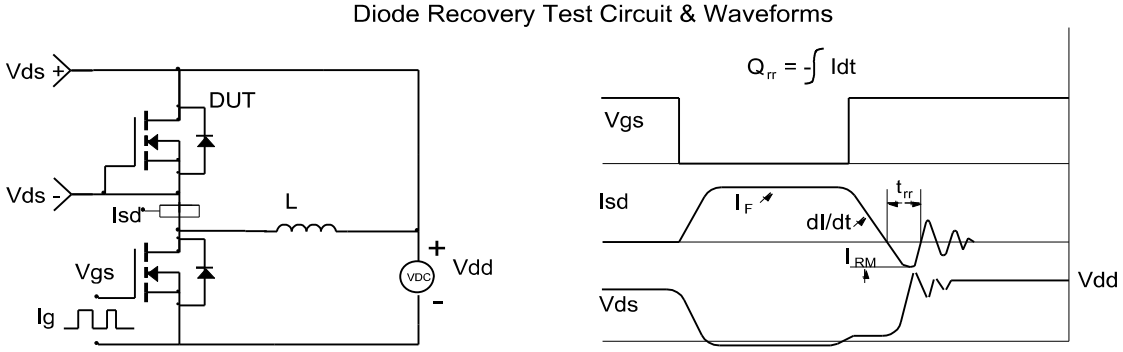
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Electrical Characteristics Diagrams

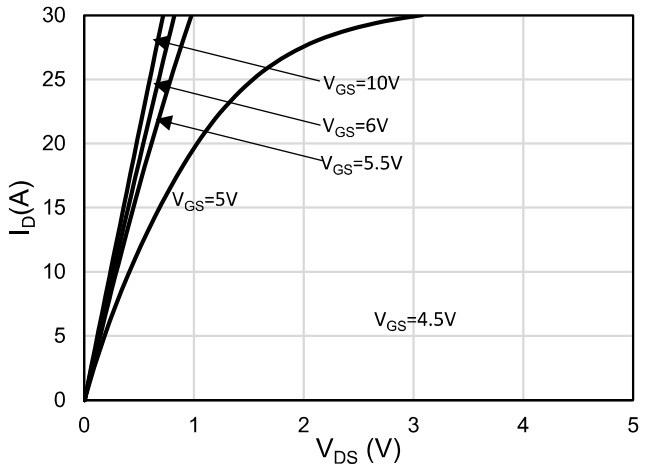


Figure 1: On-Region Characteristics

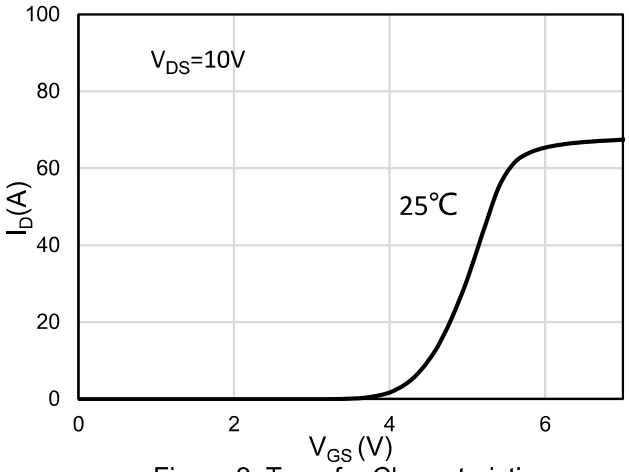


Figure 2: Transfer Characteristics

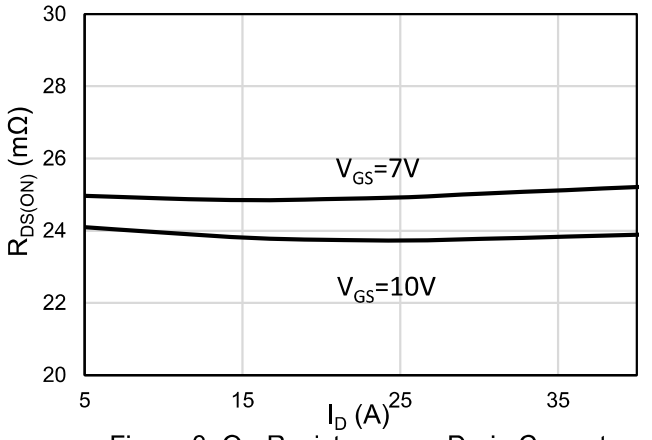


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

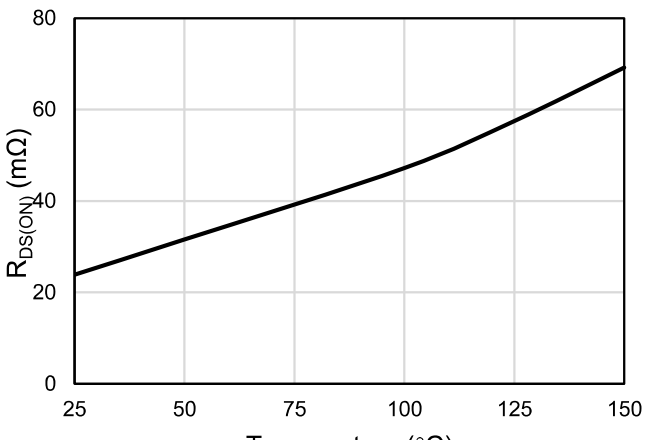


Figure 4: On-Resistance vs. Junction Temperature

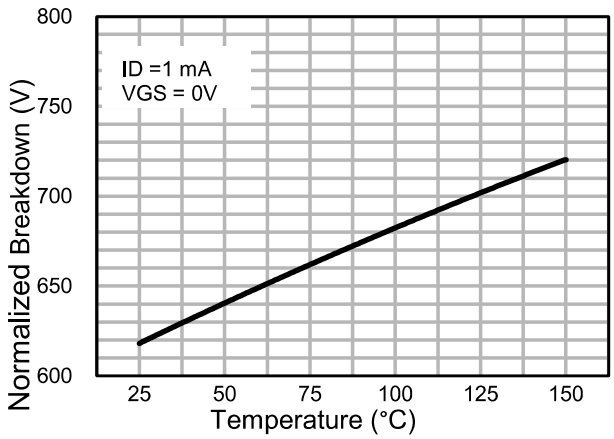


Figure 4: Breakdown Voltage vs. Junction Temperature

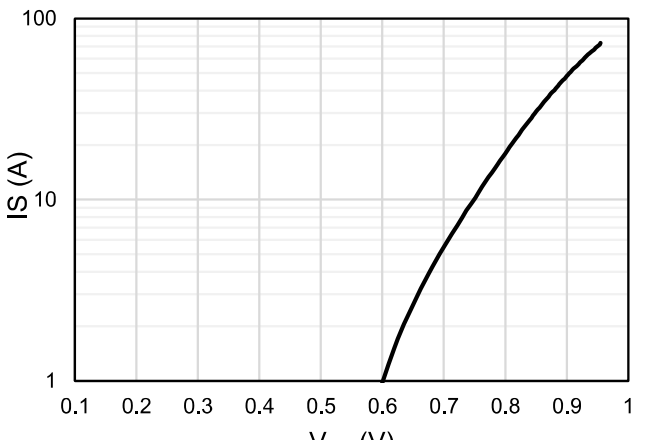


Figure 6: Body-Diode Characteristics

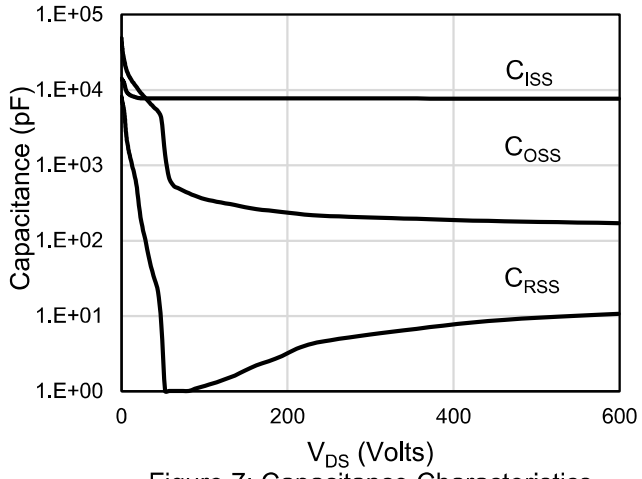


Figure 7: Capacitance Characteristics

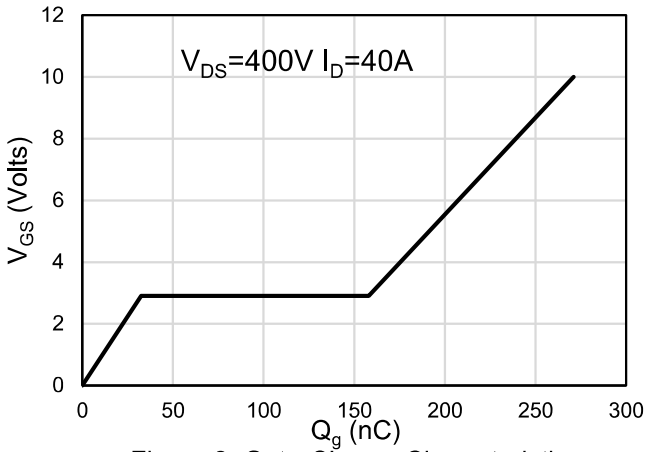


Figure 8: Gate-Charge Characteristics

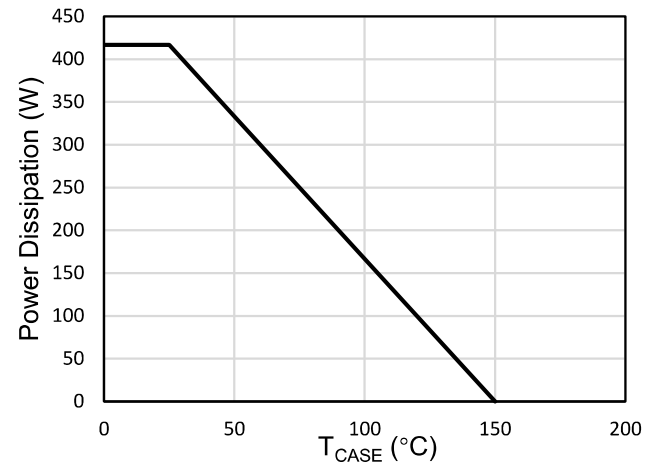


Figure 12: Power De-rating

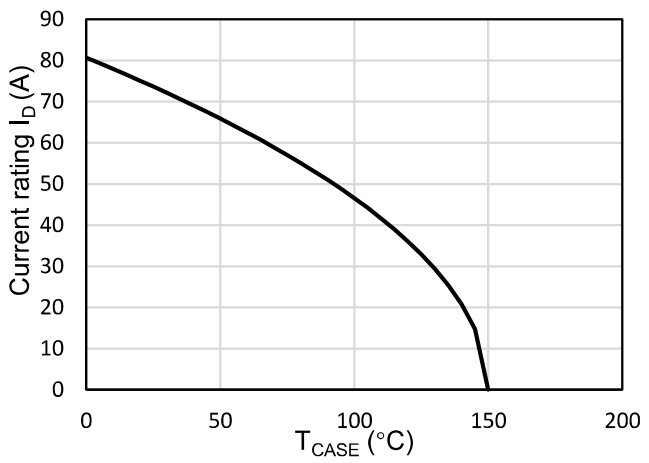


Figure 13: Current De-rating

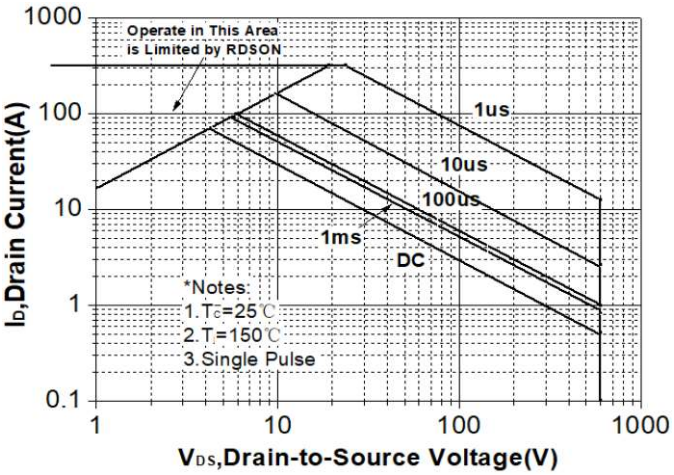


Figure 11: Safe Operating Area

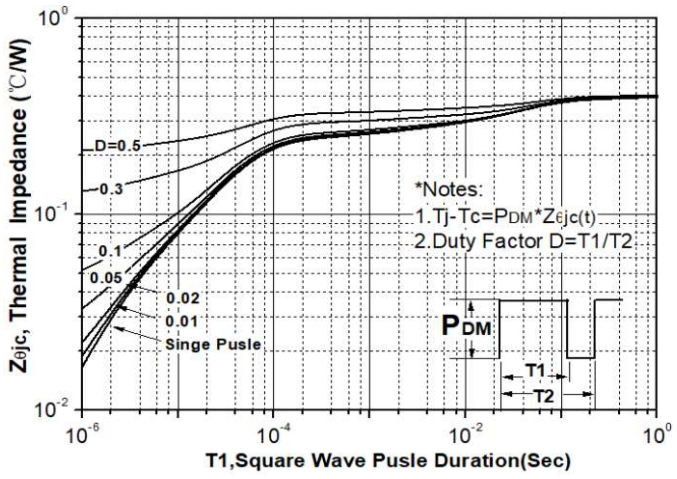
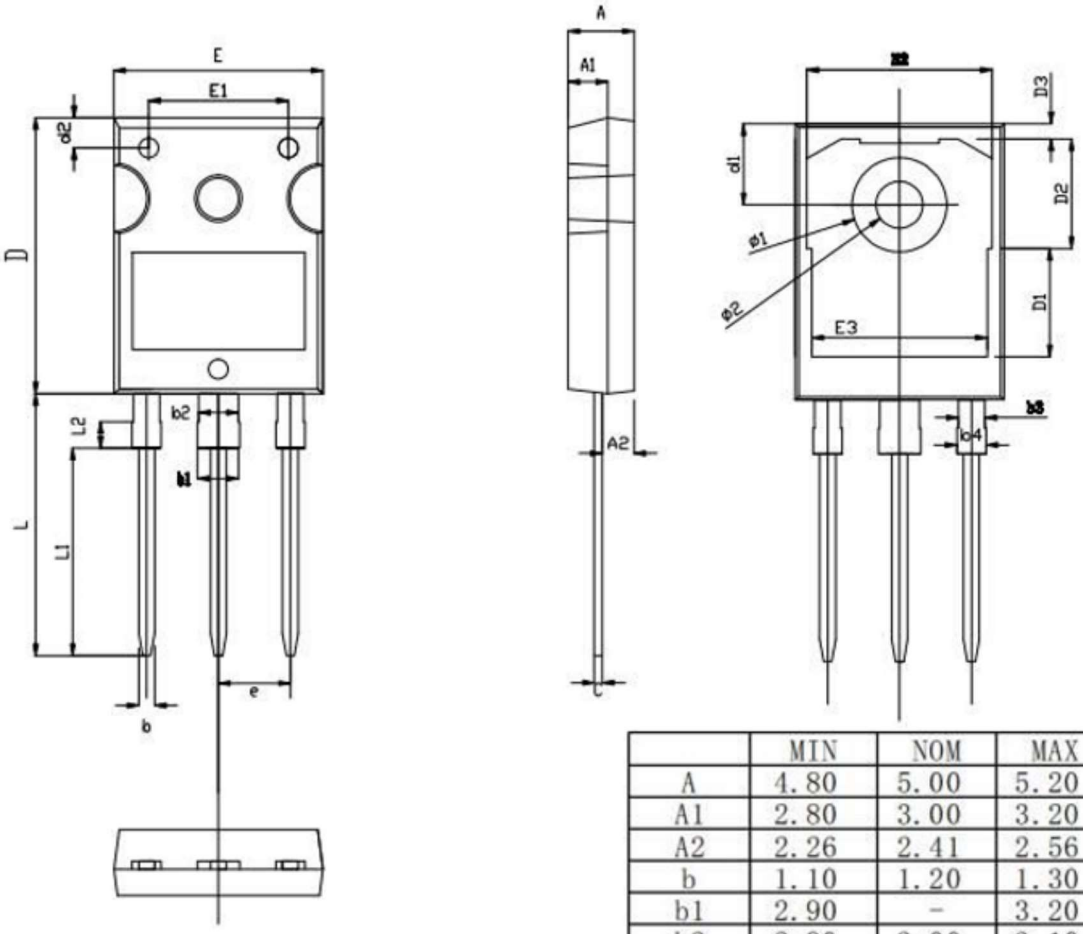
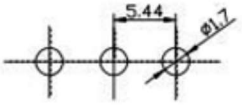


Figure 12: Transient Thermal Response Curve

TO-247-3L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.80	3.00	3.20
A2	2.26	2.41	2.56
b	1.10	1.20	1.30
b1	2.90	-	3.20
b2	2.90	3.00	3.10
b3	1.90	2.00	2.10
b4	2.00	-	2.20
c	0.50	0.60	0.70
D	20.80	21.00	21.20
D1		8.23	
D2		8.32	
D3		1.17	
d1	6.00	6.15	6.30
d2	2.20	2.30	2.40
E	15.60	15.80	16.00
E1		10.50	
E2		14.02	
E3		13.50	
e	5.34	5.44	5.54
L	19.72	19.92	20.12
L1		15.79	
L2		1.98	
ø1	7.10	7.19	7.30
ø2	3.50	3.60	3.70