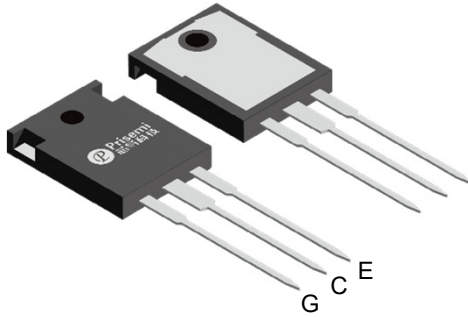
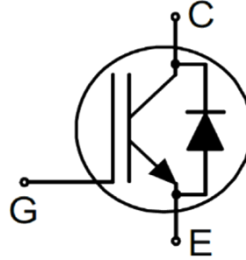
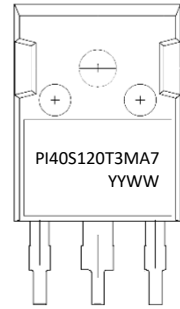


**Description**

**TO-247-3L**

**Circuit Diagram**

**Marking (Top View)**
**Feature**

- Low switching power loss
- Low switching surge and noise
- Advanced Field Stop technology
- Low EMI
- Maximum junction temperature 175°C
- Qualified according to JEDEC for target applications
- Pb-free lead plating, halogen-free mold compound, RoHS compliant
- Internal integrated SiC Schottky Diode (SBD)

**Applications**

- Industrial UPS
- Welding machine
- Solar converters
- Energy Storage
- EV Charger

**Absolute maximum rating@25°C**

Parameter	Symbol	Value	Units	
Collector-Emitter Voltage	$V_{CES}$	1200	V	
Gate-Emitter Voltage	$V_{GES}$	$\pm 20$	V	
Transient Gate-emitter Voltage ( $t_p \leq 10\mu s$ , $D < 0.010$ )		$\pm 30$		
Collector Current	$I_C$	$T_c = 25^\circ C$	80	A
		$T_c = 100^\circ C$	40	
Pulsed Collector Current	$I_{CM}$	160	A	
Diode Current	$I_F$	$T_c = 150^\circ C$	40	A
Diode Pulsed Current			$I_{FM}$	208
Power Dissipation	$P_D$	375	W	
Operating Junction Temperature	$T_J$	-55~+175	°C	
Storage Temperature	$T_{STG}$	-55~+150	°C	

## Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units	
Collector-Emitter Breakdown Voltage	$BV_{CE}$	$V_{GE}=0V, I_C=250\mu A$	1200	-	-	V	
C-E Leakage Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V$	-	-	250	$\mu A$	
G-E Leakage Current	$I_{GES}$	$V_{GE}=\pm 20V, V_{CE}=0V$	-	-	$\pm 600$	nA	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	4.4	5.6	6.4	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=40A, V_{GE}=15V$	$T_C=25^\circ C$	-	1.9	2.5	V
			$T_C=175^\circ C$	-	2.32	-	
Transconductance	$g_{fs}$	$V_{CE}=20V, I_C=40A$	-	TBD	-	S	
Input Capacitance	$C_{ies}$	$V_{CE}=30V, V_{GE}=0V, f=1MHz$	-	3806	-	pF	
Output Capacitance	$C_{oes}$		-	100	-		
Reverse Transfer Capacitance	$C_{res}$		-	13	-		
Diode Forward Voltage	$V_{FM}$	$I_F=40A$	$T_C=25^\circ C$	-	1.45	1.72	V
			$T_C=150^\circ C$	-	1.78	1.96	
Diode Capacitive Charge	$Q_C$	$V_R=800V, T_j=25^\circ C$	-	165	-	nC	
Diode Capacitance	C	$V_R=0.1V, f=1MHz$	-	1160	-	pF	
		$V_R=400V, f=1MHz$	-	188	-		
		$V_R=800V, f=1MHz$	-	127	-		
Turn-on Delay Time	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=15V, R_G=10\Omega$ Inductive Load	$I_C=40A$	-	TBD	-	ns
Rise Time	$t_r$		$I_C=20A$	-	TBD	-	
			$I_C=40A$	-	TBD	-	
Turn-off Delay Time	$t_{d(off)}$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	
Fall Time	$t_f$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	
Turn-on Energy Loss	$E_{on}$		$V_{CE}=600V, V_{GE}=15V, R_G=10\Omega$ Inductive Load	$I_C=40A$	-	TBD	
Turn-off Energy Loss	$E_{off}$	$I_C=20A$		-	TBD	-	
		$I_C=40A$		-	TBD	-	
Total Switching Loss	$E_{st}$	$I_C=20A$		-	TBD	-	
		$I_C=40A$		-	TBD	-	
Total Gate Charge	$Q_g$	$V_{CE}=600V, V_{GE}=15V, I_C=40A$		-	130	-	nC
Gate to Emitter Charge	$Q_{ge}$		-	39	-		
Gate to Collector Charge	$Q_{gc}$		-	36	-		

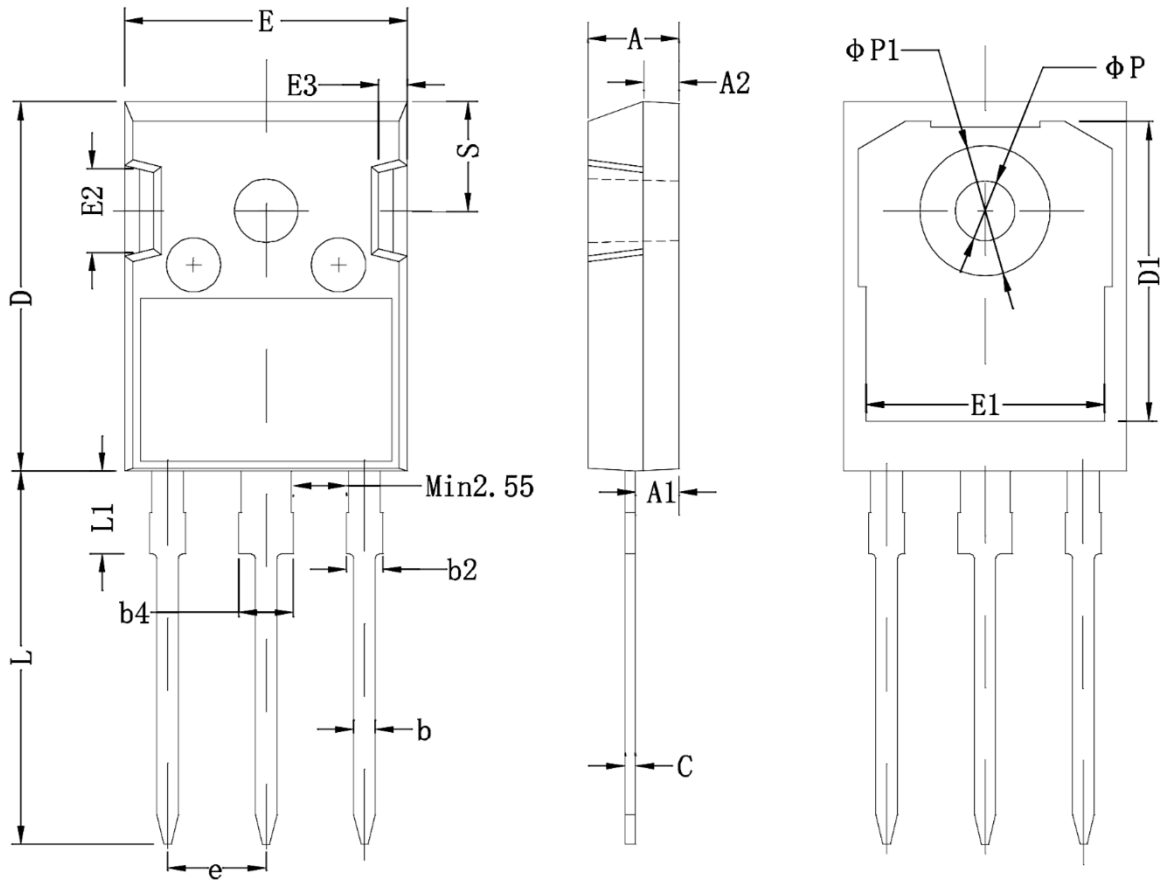
## Electrical characteristics per line@150°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units	
Turn-on Delay Time	$t_{d(on)}$	$V_{CE}=600V$ $V_{GE}=15V$ $R_G=10\Omega$ Inductive Load	$I_C=40A$	-	TBD	-	ns
			$I_C=20A$	-	TBD	-	
Rise Time	$t_r$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	
Turn-off Delay Time	$t_{d(off)}$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	
Fall Time	$t_f$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	
Turn-on Energy Loss	$E_{on}$	$V_{CE}=600V$ $V_{GE}=15V$ $R_G=10\Omega$ Inductive Load	$I_C=40A$	-	TBD	-	mJ
			$I_C=20A$	-	TBD	-	
Turn-off Energy Loss	$E_{off}$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	
Total Switching Loss	$E_{st}$		$I_C=40A$	-	TBD	-	
			$I_C=20A$	-	TBD	-	

## Thermal Resistance


Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, IGBT Junction-Ambient	$R_{th(J-A)}$	-	-	40	°C/W
Thermal Resistance, IGBT Junction to Case	$R_{th(J-C)}$	-	-	0.4	°C/W
Thermal Resistance, SBD Junction to Case	$R_{th(J-C)}$	-	-	TBD	°C/W

## Product Dimension (TO-247-3L)



Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	4.80	5.20	0.189	0.205	E1	13.00	13.60	0.512	0.535
A1	2.21	2.59	0.087	0.102	E2	4.80	5.20	0.189	0.205
A2	1.85	2.15	0.073	0.085	E3	2.30	2.70	0.091	0.106
b	1.11	1.36	0.044	0.054	e	5.44 BSC.		0.214 BSC.	
b2	1.91	2.21	0.075	0.087	L	19.82	20.22	0.780	0.796
b4	2.91	3.21	0.115	0.126	L1	-	4.30	-	0.169
c	0.51	0.75	0.020	0.030	φP	3.40	3.80	0.134	0.150
D	20.80	21.30	0.819	0.839	φP1	-	7.30	-	0.287
D1	16.25	16.85	0.640	0.663	S	6.15 BSC.		0.242 BSC.	
E	15.50	16.10	0.610	0.634					


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