

## 20A, 650V SiC Merged PIN Schottky Diode

### FEATURES

- Max junction temperature 175°C
- MPS structure for high ruggedness to forward current surge events
- High-speed switching possible
- High forward surge capability
- High-frequency operation
- Positive temperature coefficient on  $V_f$
- RoHS compliant
- Halogen-free

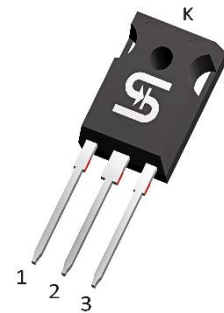
### APPLICATIONS

- General purpose
- Switch mode power supplies
- Power factor correction

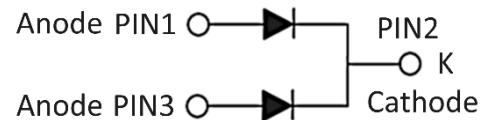
### MECHANICAL DATA

- Case: TO-247-3L
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Polarity: As circuit diagram
- Weight: 6.28g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$I_F$	20	A
$V_{RRM}$	650	V
$I_{FSM}$	88	A
$T_{JMAX}$	175	°C
Package	TO-247-3L	
Configuration	Common cathode	



TO-247-3L



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Repetitive peak reverse voltage	$V_{RRM}$	650	V
Reverse voltage, total rms value	$V_{R(RMS)}$	455	V
Continuous Rectified Forward Current @ $T_J = 160^\circ\text{C}$ per leg / per device	$I_F$	10 / 20	A
Surge peak forward current 10ms single half sine-wave superimposed on rated load	$T_C = 25^\circ\text{C}$	$I_{FSM}$	88 A
	$T_C = 125^\circ\text{C}$		76 A
Junction temperature	$T_J$	-55 to +175	°C
Storage temperature	$T_{STG}$	-55 to +175	°C

<b>THERMAL PERFORMANCE</b>				
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>MAX</b>	<b>UNIT</b>
Junction-to-case thermal resistance per leg	$R_{\theta JC}$	0.93	1.12	$^{\circ}C/W$

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^{\circ}C$ unless otherwise noted)					
<b>PARAMETER</b>	<b>CONDITIONS</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>MAX</b>	<b>UNIT</b>
Forward voltage per leg <sup>(1)</sup>	$I_F = 5A, T_J = 25^{\circ}C$	$V_F$	1.16	-	V
	$I_F = 10A, T_J = 25^{\circ}C$		1.34	1.45	V
	$I_F = 5A, T_J = 150^{\circ}C$		1.19	-	V
	$I_F = 10A, T_J = 150^{\circ}C$		1.57	-	V
	$I_F = 5A, T_J = 175^{\circ}C$		1.22	-	V
	$I_F = 10A, T_J = 175^{\circ}C$		1.65	1.85	V
Reverse current @ rated $V_R$ per leg <sup>(2)</sup>	$T_J = 25^{\circ}C$	$I_R$	-	20	$\mu A$
	$T_J = 175^{\circ}C$		-	200	$\mu A$
Junction capacitance per leg	$f = 1MHz, V_R = 1V$	$C_J$	476	-	pF
	$f = 1MHz, V_R = 200V$		74.0	-	pF
	$f = 1MHz, V_R = 400V$		52.3	-	pF
Capacitive Charge per leg	$V_R = 400V$	$Q_C$	35.4	-	nC

**Notes:**

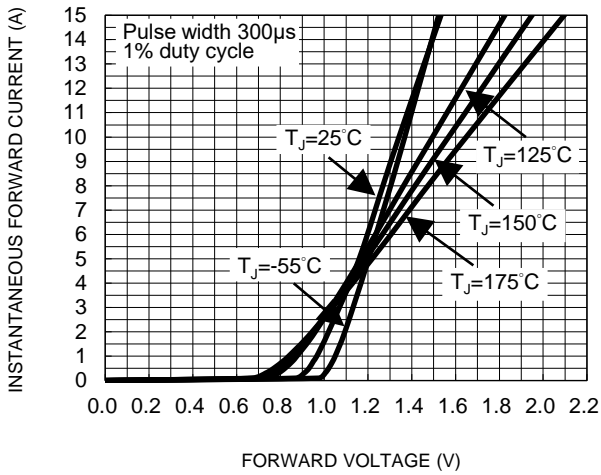
1. Pulse test with  $PW = 0.3ms$
2. Pulse test with  $PW = 30ms$

<b>ORDERING INFORMATION</b>		
<b>ORDERING CODE</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSCDH20065G1	TO-247-3L	30 / Tube

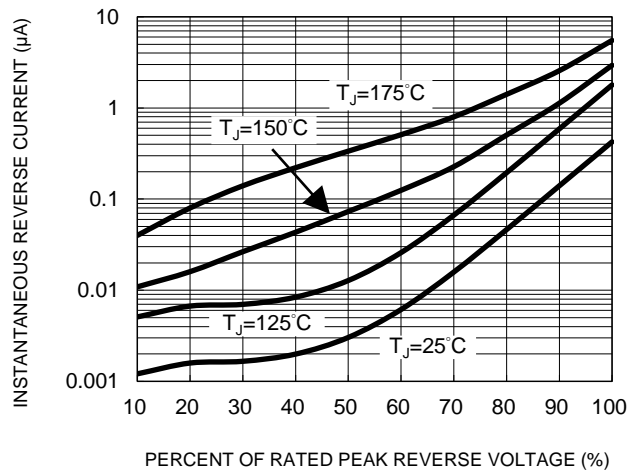
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

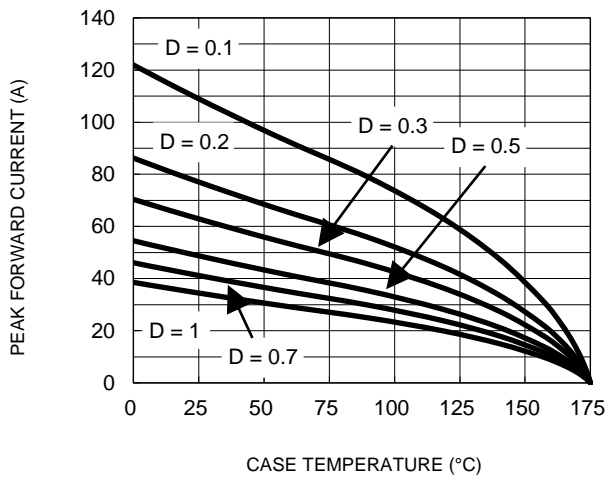
**Fig.1 Typical Forward Characteristics**



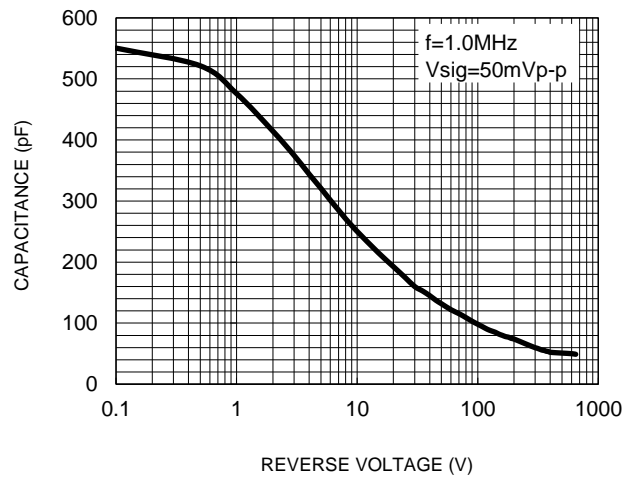
**Fig.2 Typical Reverse Characteristics**



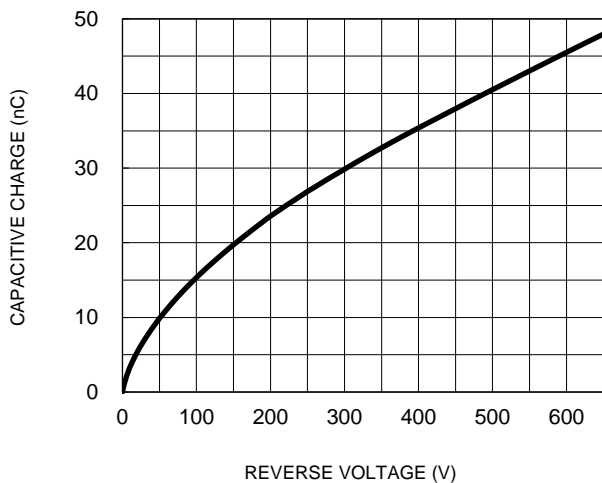
**Fig.3 Peak forward current versus case temperature**



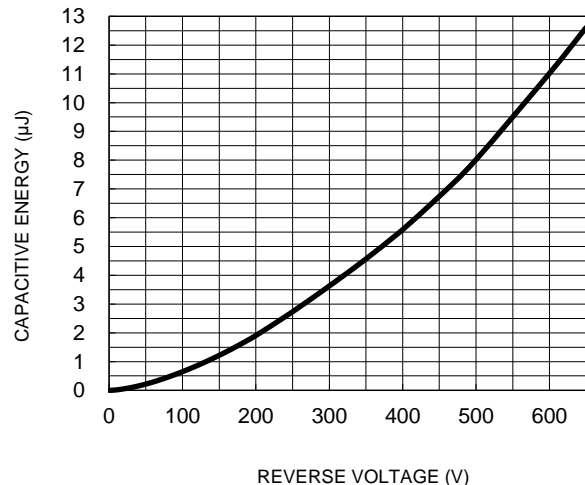
**Fig.4 Typical Junction Capacitance**



**Fig.5 Typical Capacitive Charge**



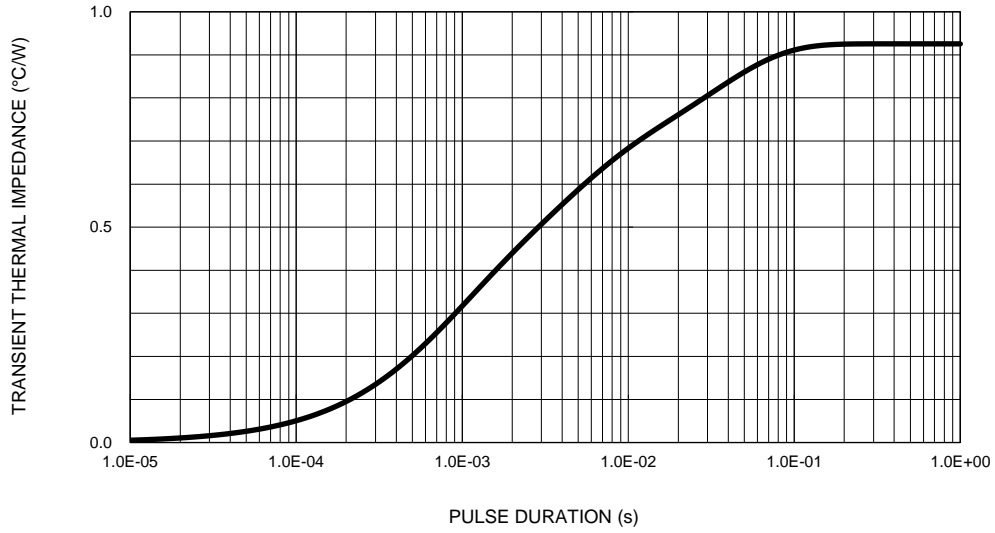
**FIG.6 Typical Capacitance Stored Energy**



**CHARACTERISTICS CURVES**

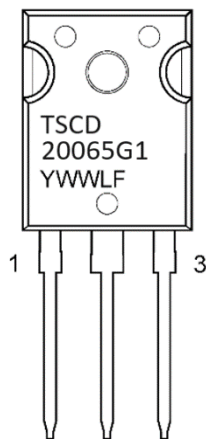
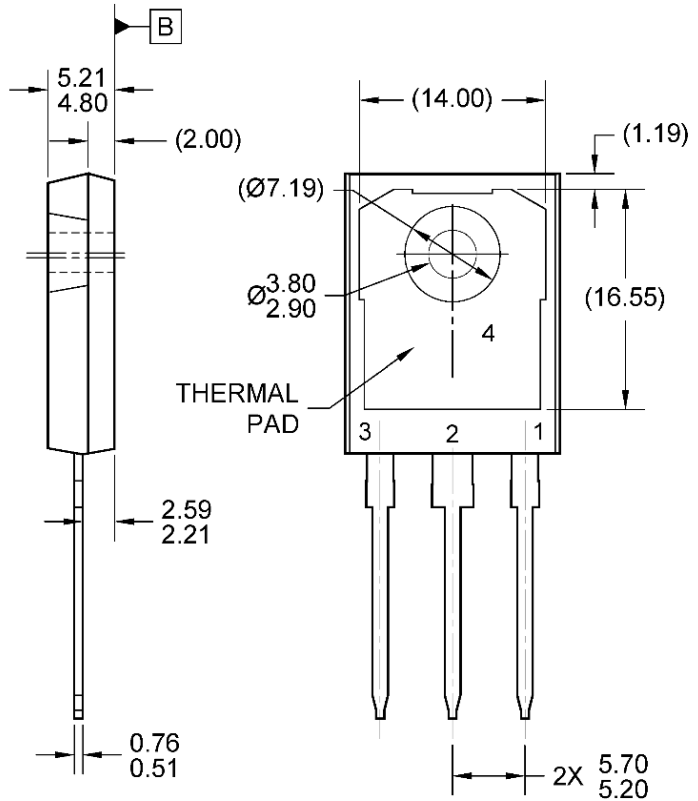
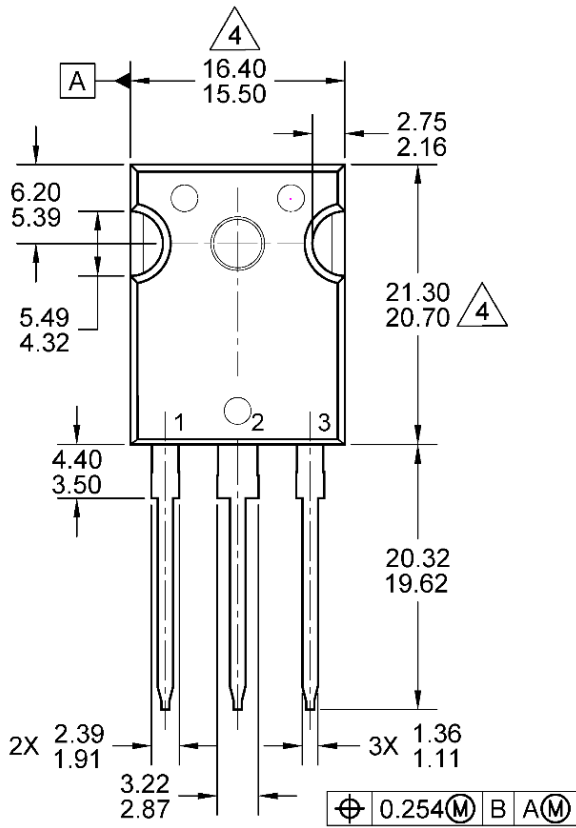
(T<sub>A</sub> = 25°C unless otherwise noted)

**Fig.7 Typical Transient Thermal Characteristics**



**PACKAGE OUTLINE DIMENSIONS**

**TO-247-3L**



**MARKING DIAGRAM**

Y = YEAR CODE  
 WW = WEEK CODE (01~52)  
 L = LOT CODE (1~9, A~Z)  
 F = FACTORY CODE

**NOTES: UNLESS OTHERWISE SPECIFIED**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEDEC TO-247, VARIATION AD, ISSUE E.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DWG NO. REF: HQ2SD07-TO247ADSIC-122 REV A.

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