



### Features

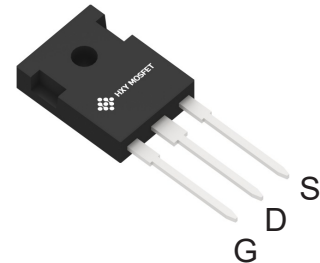
- 3rd generation SiC MOSFET technology
- Optimized package with separate driver source pin
- High blocking voltage with low on-resistance
- High-speed switching with low capacitances
- Fast intrinsic diode with low reverse recovery ( $Q_{rr}$ )
- Halogen free, RoHS compliant

### Benefits

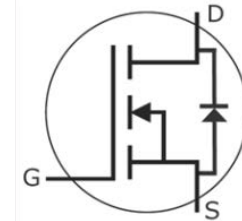
- Reduce switching losses and minimize gate ringing
- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

### Applications

- Renewable energy
- EV battery chargers
- High voltage DC/DC converters
- Switch Mode Power Supplies



TO-247  
Package



Ordering Part Number	Package	Brand
SCT3040KLG11	TO-247	HXY MOSFET

### Maximum Ratings ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	1200	V
Continuous drain current $T_C = 25^\circ\text{C}$ , $V_{GS} = 15\text{V}$ $T_C = 100^\circ\text{C}$ , $V_{GS} = 15\text{V}$	$I_D$	68 48	A
Pulsed drain current ( $T_C = 25^\circ\text{C}$ , $t_p$ limited by $T_{jmax}$ )	$I_{D\ pulse}$	120	A
Gate-Source voltage	$V_{GS}$	-4/+18	V
Gate-Source voltage (Absolute maximum values)	$V_{GSmax}$	-8/+22	V
Power dissipation ( $T_C = 25^\circ\text{C}$ )	$P_{tot}$	357	W
Operating junction and storage temperature	$T_j, T_{stg}$	-40...+175	$^\circ\text{C}$

• Example of acceptable  $V_{GS}$  waveform





### Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	$R_{thJC}$	0.42	°C/W
Thermal resistance, junction – ambient. Max	$R_{thJA}$	40	

### Electrical Characteristics (at $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

### Static Characteristics

Drain-source breakdown voltage	$BV_{DSS}$	1200	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.2	3	4	V	$V_{DS}=V_{GS}, I_D=10mA$
Zero gate voltage drain current	$I_{DSS}$	-	1	20	$\mu A$	$V_{DS}=1200V, V_{GS}=0V$ $T_C=25^\circ C$
		-	5	-		$T_C=175^\circ C$
Gate-source leakage current	$I_{GSS}$	-	-	100	nA	$V_{GS}=18V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	40	52	m $\Omega$	$V_{GS}=15V, I_D=33.3A,$ $T_J=25^\circ C$
		-	62	-		$T_J=175^\circ C$
Drain-source on-state resistance	$R_{DS(on)}$	-	32	40	m $\Omega$	$V_{GS}=18V, I_D=33.3A,$ $T_J=25^\circ C$
		-	59	-		$T_J=175^\circ C$
Transconductance	$g_{fs}$	-	20	-	S	$V_{DS}=20V, I_D=33.3A$



### Dynamic Characteristics

Input Capacitance	$C_{iss}$	-	2766	-	pF	$V_{DS} = 1000V$ $V_{GS} = 0V$ $T_J = 25^\circ C$ $V_{AC} = 25mV$ $f = 1MHz$	
Output Capacitance	$C_{oss}$	-	125	-			
Reverse Transfer Capacitance	$C_{rss}$	-	14	-			
Gate Total Charge	$Q_G$	-	112	-	nC	$V_{DS} = 800V$ $V_{GS} = 0/15V$ $I_D = 33.3A$	
Gate-Source charge	$Q_{gs}$	-	28	-			
Gate-Drain charge	$Q_{gd}$	-	51	-			
Turn-On Switching Energy	$E_{ON}$	-	701	-	$\mu J$	$V_{DD} = 800V$ $V_{GS} = -4/+15V$ $I_D = 20A$ $R_G = 2.5\Omega$ $L = 120\mu H$	
Turn-Off Switching Energy	$E_{OFF}$	-	79	-			
Turn-on delay time	$t_{d(on)}$	-	13.4	-	ns		
Rise time	$t_r$	-	5.4	-			
Turn-off delay time	$t_{d(off)}$	-	32	-			
Fall time	$t_f$	-	19	-			
Gate resistance	$R_G$	-	0.6	-	$\Omega$		$V_{AC} = 25mV, f=1MHz$

### Body Diode Characteristics

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	$V_{SD}$		5.3		V	$V_{GS} = -4V, I_{SD} = 20A,$ $T_J = 25^\circ C$
			4.8			$V_{GS} = -4V, I_{SD} = 20A,$ $T_J = 175^\circ C$
Body Diode Reverse Recovery Time	$t_{rr}$	-	55	-	ns	$V_R = 800V$ $I_D = 33.3A$ $di/dt = 1070A/\mu S$ $T_J = 25^\circ C$
Body Diode Reverse Recovery Charge	$Q_{rr}$	-	288	-	nC	



### Typical Performance Characteristics

Fig 1. Output Characteristics ( $T_J = -55^\circ\text{C}$ )

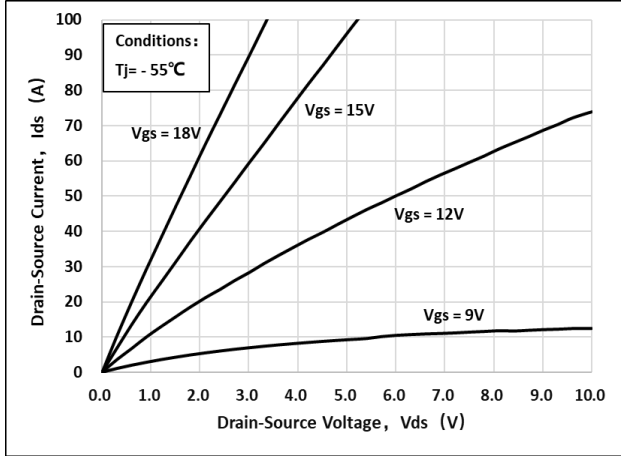


Fig 2. Output Characteristics ( $T_J = 25^\circ\text{C}$ )

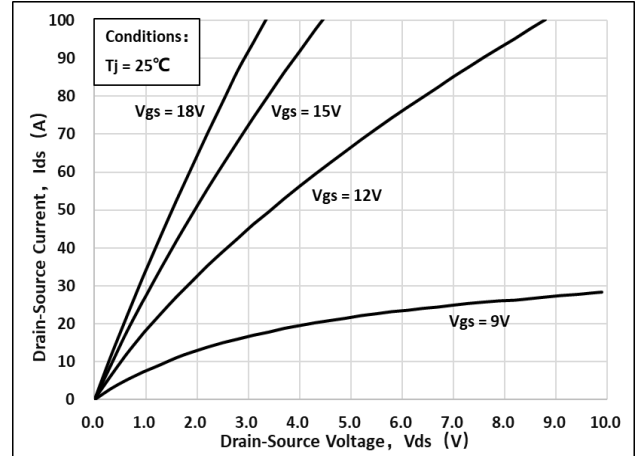


Fig 3. Output Characteristics ( $T_J = 175^\circ\text{C}$ )

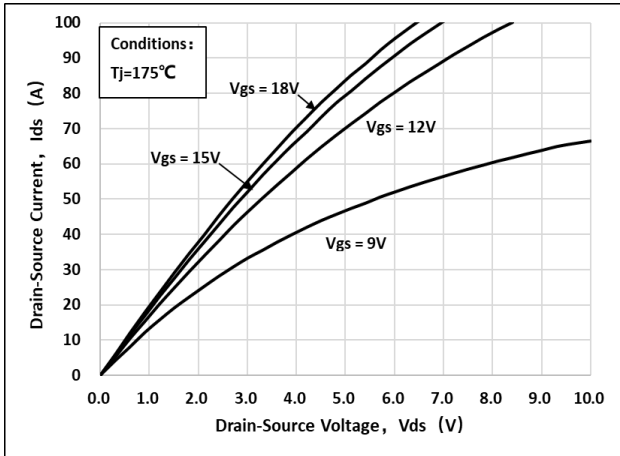


Fig 4:  $R_{ds(on)}$  Vs  $I_{ds}$  Characteristics

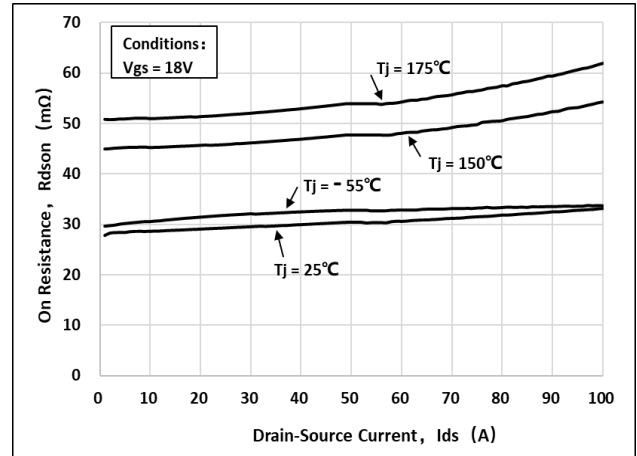


Fig 5:  $R_{ds(on)}$  vs. Temperature

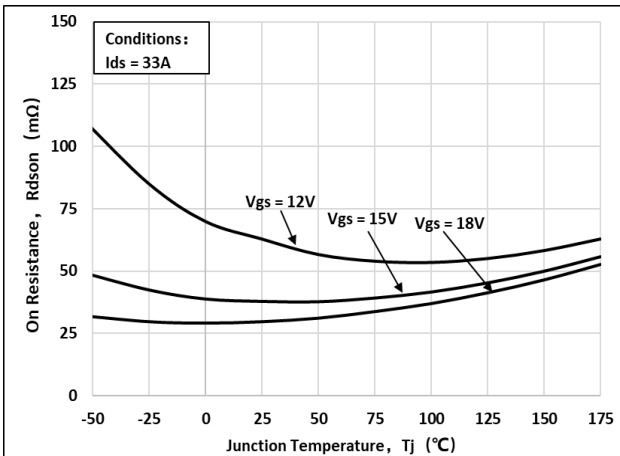


Fig 6: Transfer Characteristics

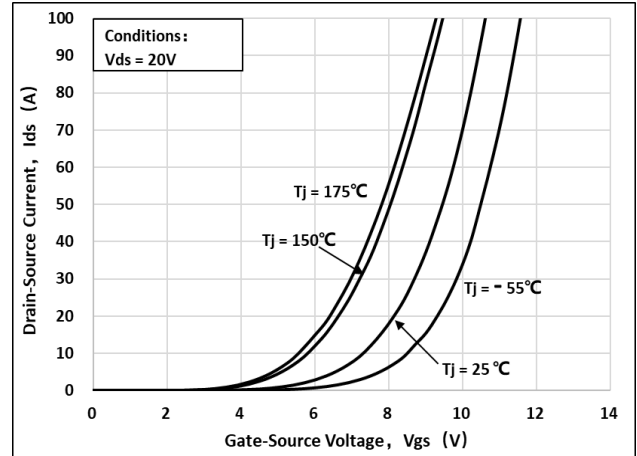




Fig 7: Body-diode Characteristics ( $T_J = -55^\circ\text{C}$ )

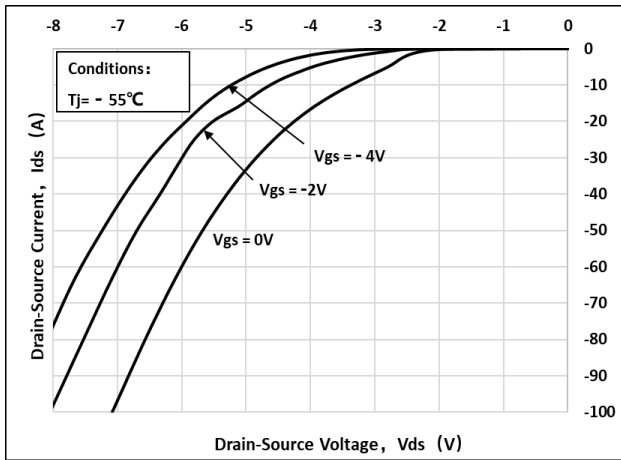


Fig 8: Body-diode Characteristics ( $T_J = 25^\circ\text{C}$ )

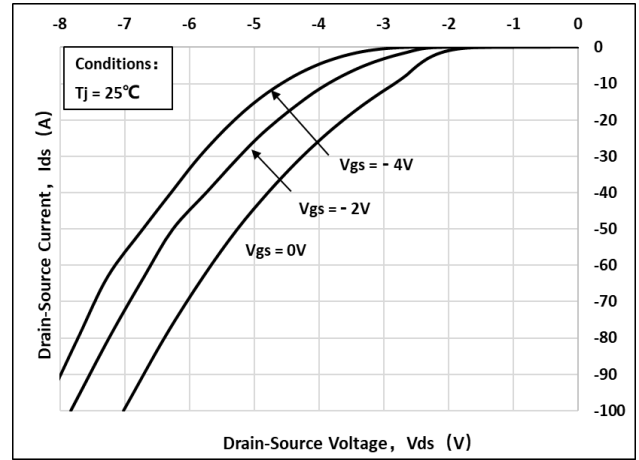


Fig 9: Body-diode Characteristics ( $T_J = 175^\circ\text{C}$ )

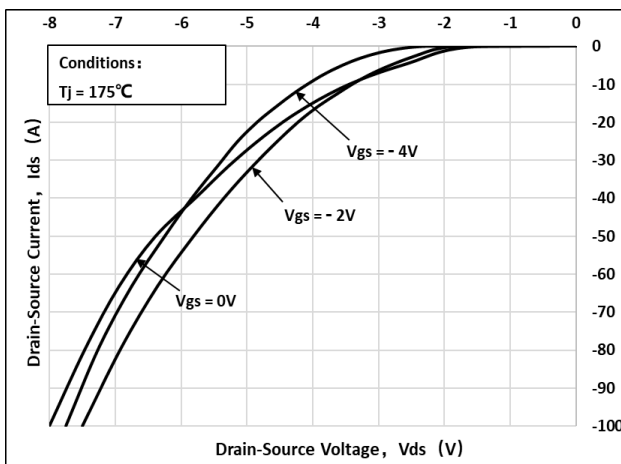


Fig 10:  $V_{TH}$  Vs  $T_J$  Temperature Characteristics

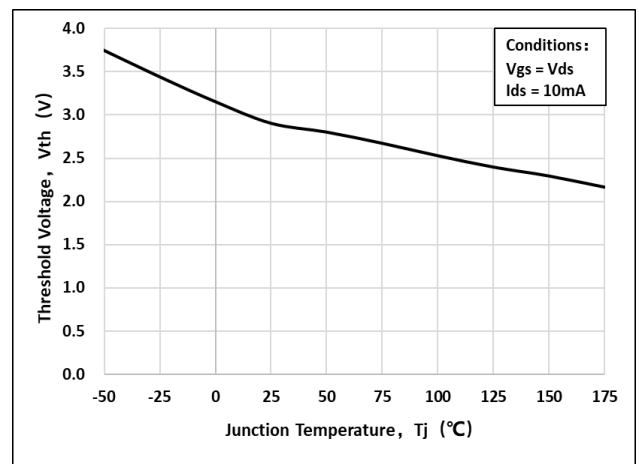


Fig 11: Gate Charge Characteristics

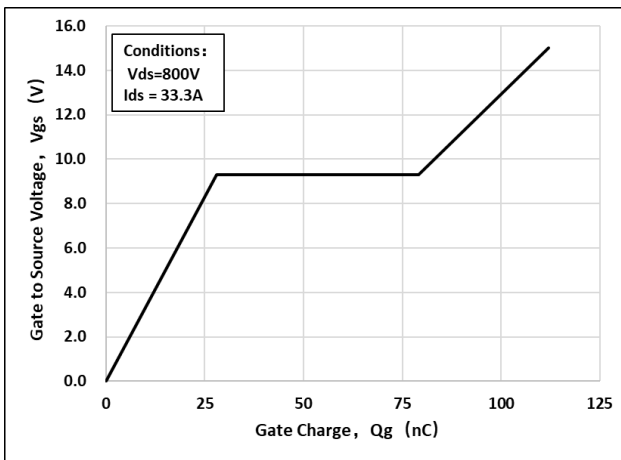


Fig 12: 3rd Quadrant Characteristics ( $T_J = -55^\circ\text{C}$ )

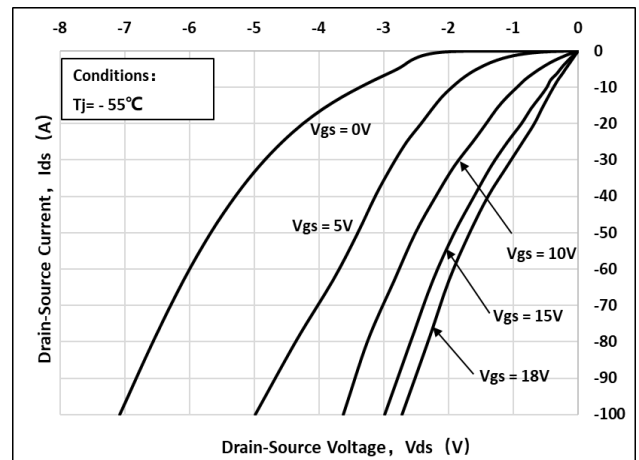




Fig 13: 3rd Quadrant Characteristics ( $T_J=25^\circ\text{C}$ )

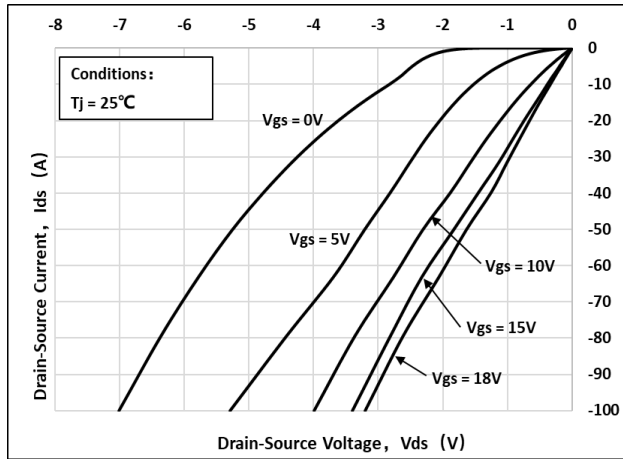


Fig 14: 3rd Quadrant Characteristics ( $T_J=175^\circ\text{C}$ )

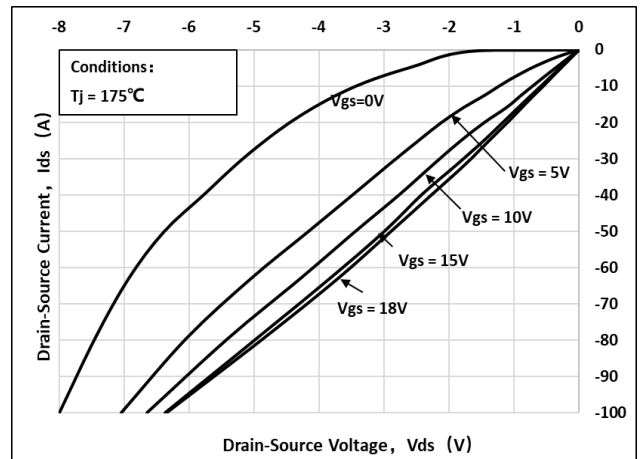


Fig 15: Capacitance Characteristics

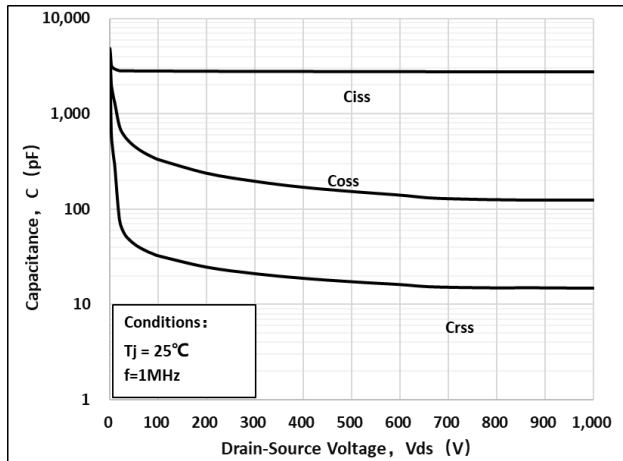
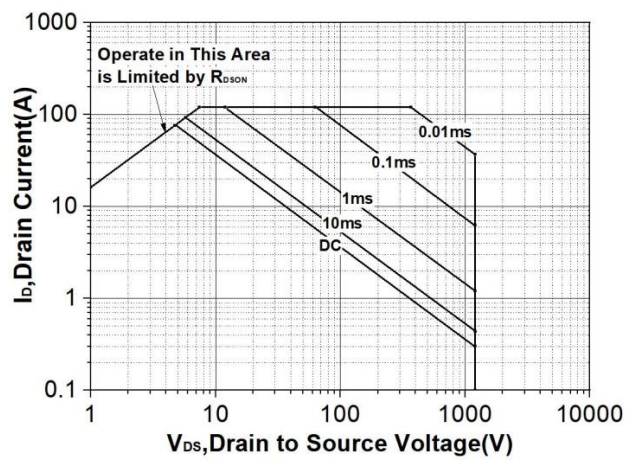


Fig 17: Transient Thermal Impedance

Fig 16: Safe Operating Area





## Test Circuit & Waveform

Figure A. Definition of switching times

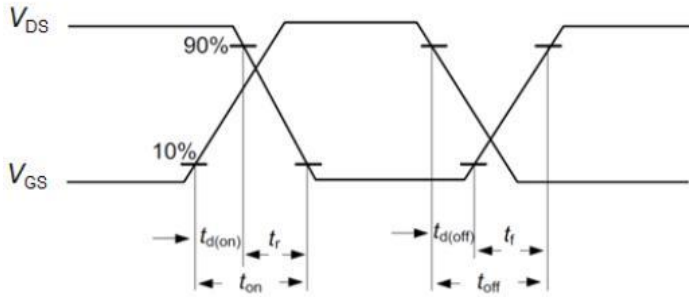


Figure B. Dynamic test circuit

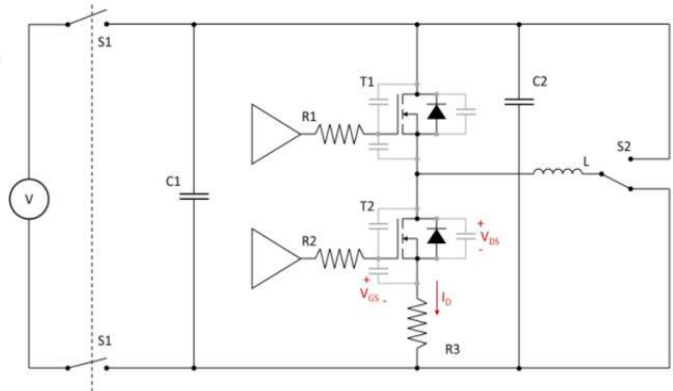


Figure C. Definition of body diode switching characteristics

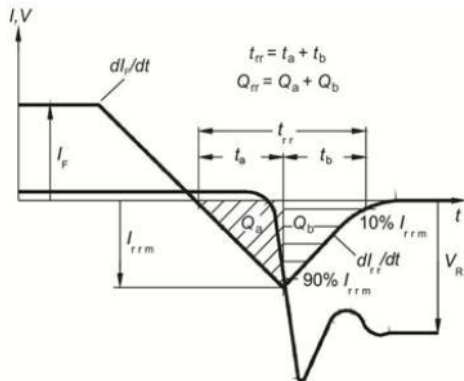
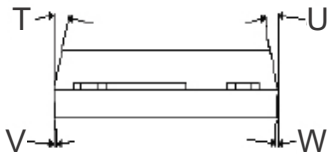
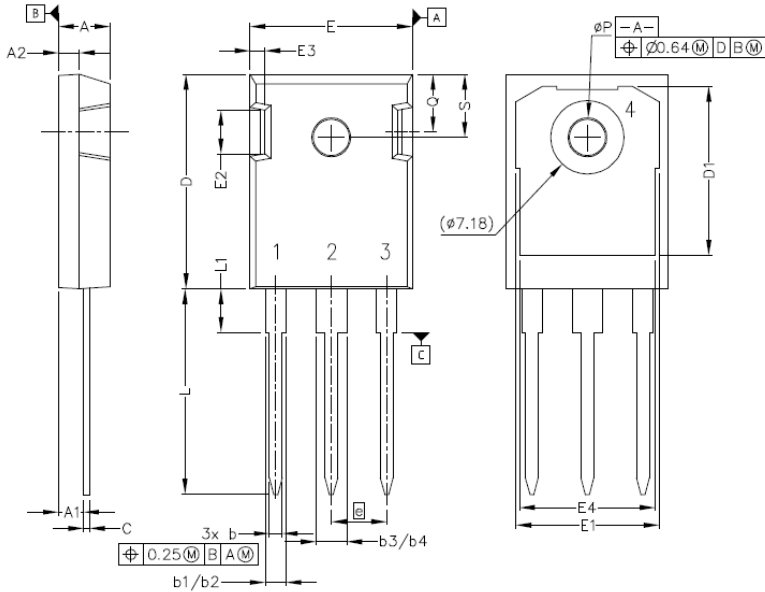


Figure C. Definition of diode switching characteristics



## Package Dimensions

### Package TO-247

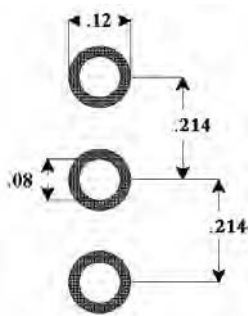


#### Pinout Information:

- Pin 1 = Gate
- Pin 2, 4 = Drain
- Pin 3 = Source

POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b2	.075	.085	1.91	2.16
b3	.113	.133	2.87	3.38
b4	.113	.123	2.87	3.13
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
N	3		3	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	9°	11°	9°	11°
U	9°	11°	9°	11°
V	2°	8°	2°	8°
W	2°	8°	2°	8°

### Recommended Solder Pad Layout



TO-247



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