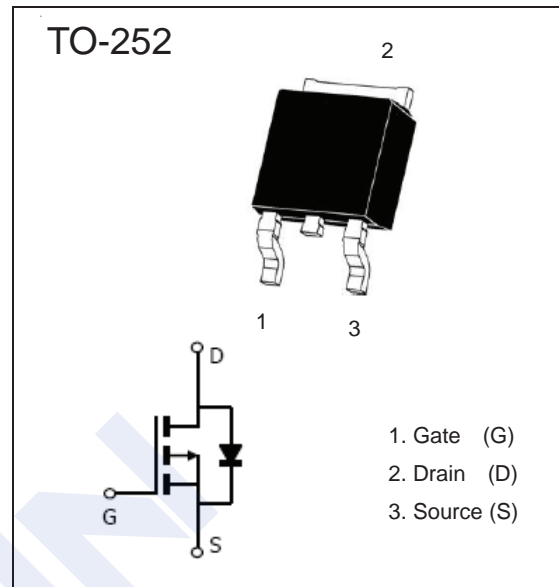


## P-Channel MOSFET

## 2KJ6065

## ■ Features

- $V_{DS} (V) = -30V$
- $I_D = -70A$
- $R_{DS(ON)} < 7m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 9.8m\Omega @ V_{GS} = -4.5V$
- 100% UIS Tested
- 100%  $R_g$  Tested

■ Absolute Maximum Ratings ( $T_A = 25^\circ C$  Unless otherwise noted)

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DS}$	-30	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current <sup>G</sup>	$I_D$	$T_C = 25^\circ C$	-70	A
		$T_C = 100^\circ C$	-55	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	-200		
Single Pulse Avalanche Energy <sup>C</sup>	$E_{AS}$	125	mJ	
Single Pulse Avalanche Current	$I_{AS}$	-50	A	
Power Dissipation <sup>B</sup>	$P_D$	78	W	
Thermal Resistance, Junction- to-Ambient <sup>A, D</sup>	$R_{\theta JA}$	50	$^\circ C/W$	
Thermal Resistance, Junction- to-Case	$R_{\theta JC}$	1.6		
Junction Temperature	$T_J$	150	$^\circ C$	
Junction Storage Temperature Range	$T_{stg}$	-55 to 150		

## 2KJ6065

■ Electrical Characteristics (T<sub>J</sub> = 25°C Unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	B <sub>VDS</sub>	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V			-1	μA
		V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> = 55°C			-5	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0		-2.1	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A			7	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-20A			9.8	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-20A		42		S
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1MHz		2890	3500	pF
Output Capacitance	C <sub>oss</sub>			585		
Reverse Transfer Capacitance	C <sub>rss</sub>			470		
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		6.8		Ω
<b>Switching Characteristics</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A, V <sub>GS</sub> = -10V		51	61	nC
Gate Source Charge	Q <sub>gs</sub>			12		
Gate Drain Charge	Q <sub>gd</sub>			16		
Turn-On DelayTime	t <sub>d(on)</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>L</sub> =0.75Ω, R <sub>GEN</sub> =3.5Ω		16		ns
Turn-On Rise Time	t <sub>r</sub>			12		
Turn-Off DelayTime	t <sub>d(off)</sub>			45		
Turn-Off Fall Time	t <sub>f</sub>			22		
<b>Drain-Source Diode Characteristics</b>						
Maximum Body-Diode Continuous Current <sup>G</sup>	I <sub>S</sub>				-70	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>SD</sub> =-1A, V <sub>GS</sub> =0V		-0.7	-1.0	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-20A, di/dt = 100A/μs		18		nS
Reverse Recovery Charge	Q <sub>rr</sub>				11	

Notes:

- The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.
- The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150°C, using ≤10s junction-to-case thermal resistance.
- Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25°C
- The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and case to ambient.
- The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
- These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150°C. The SOA curve provides a single pulse rating.
- The maximum current rating is package limited.
- These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment .

## ■ Marking

Marking	J6065 K***
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## 2KJ6065

### Typical Electrical and Thermal Characteristics

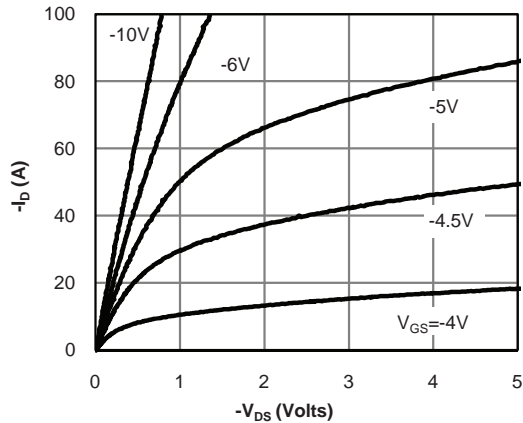


Fig 1: On-Region Characteristics (Note E)

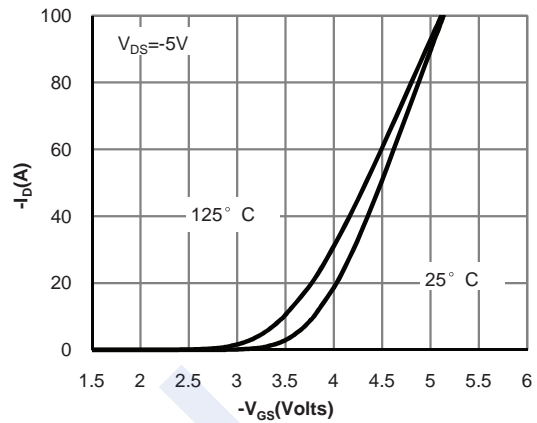


Figure 2: Transfer Characteristics (Note E)

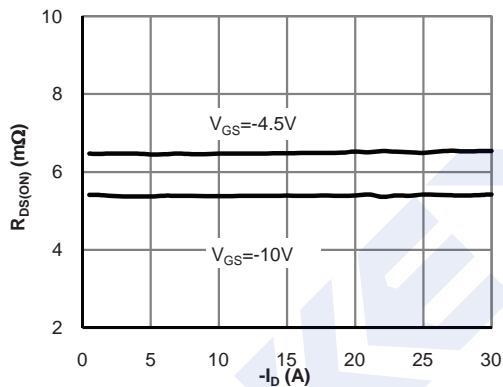


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

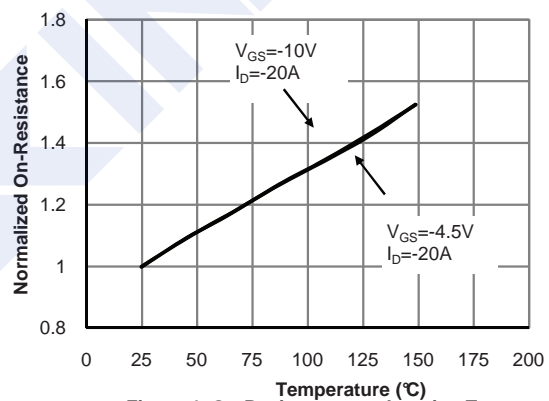


Figure 4: On-Resistance vs. Junction Temperature (Note E)

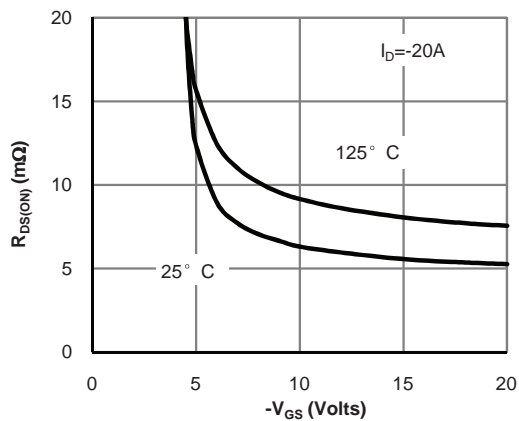


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

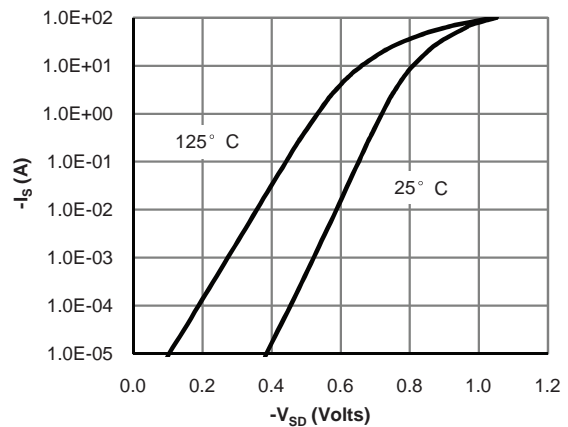


Figure 6: Body-Diode Characteristics (Note E)

2KJ6065

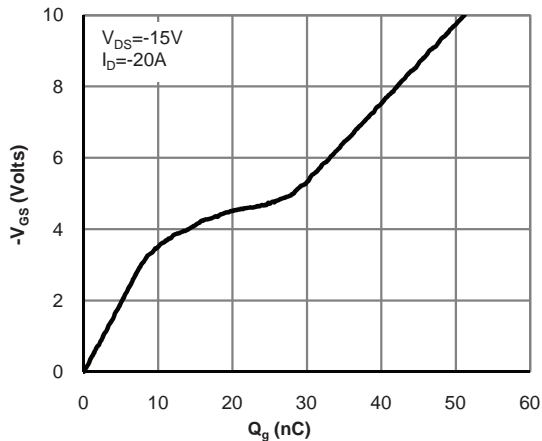


Figure 7: Gate-Charge Characteristics

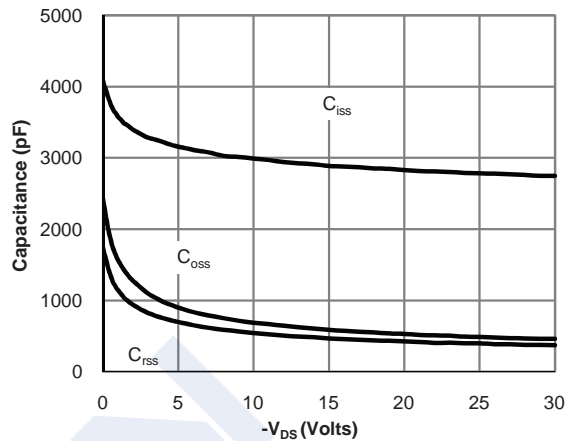


Figure 8: Capacitance Characteristics

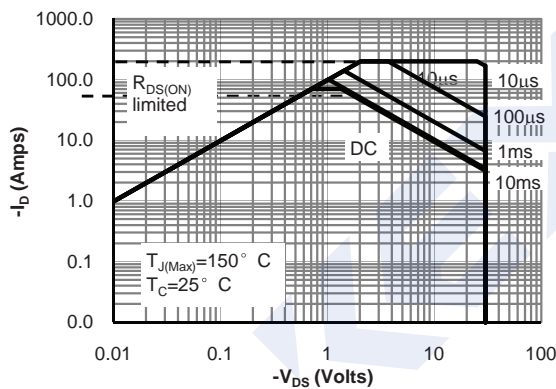


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

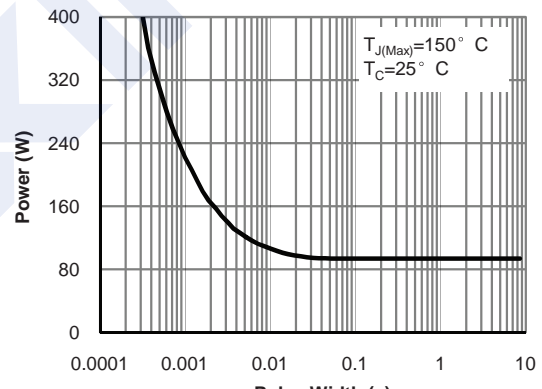


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

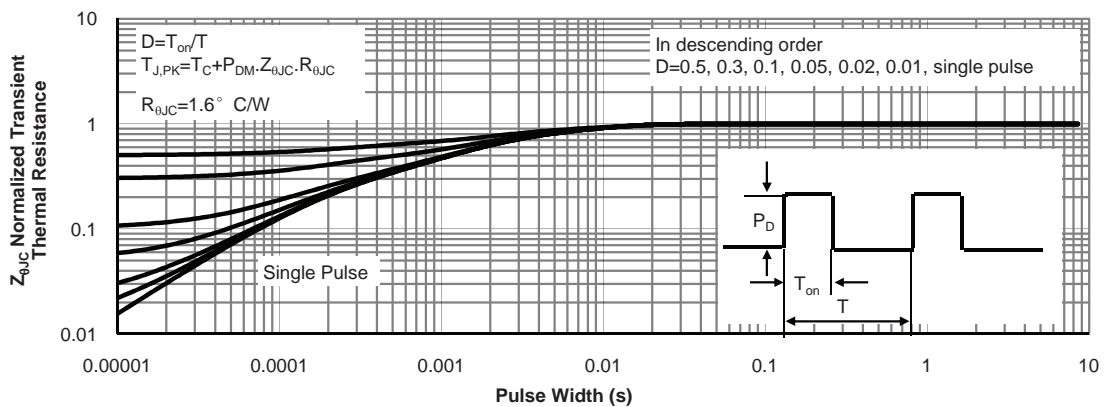


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

2KJ6065

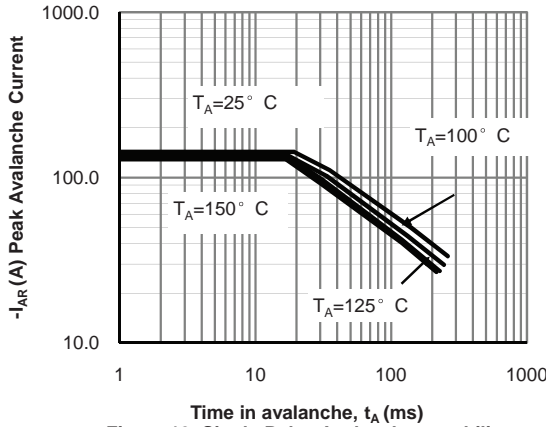


Figure 12: Single Pulse Avalanche capability (Note C)

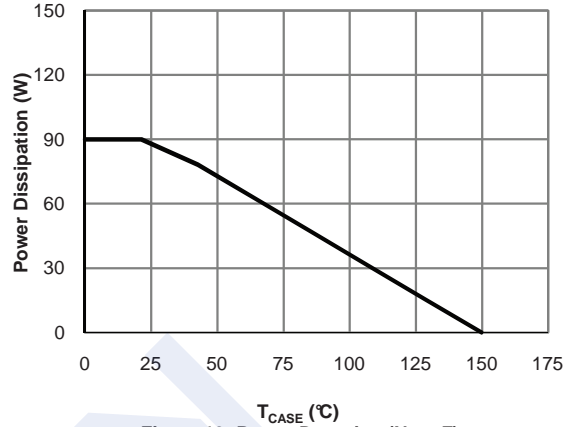


Figure 13: Power De-rating (Note F)

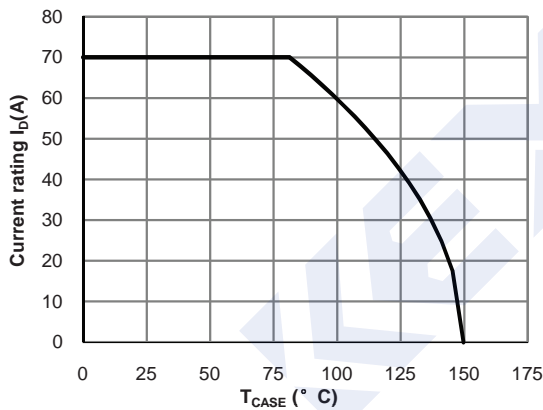


Figure 14: Current De-rating (Note F)

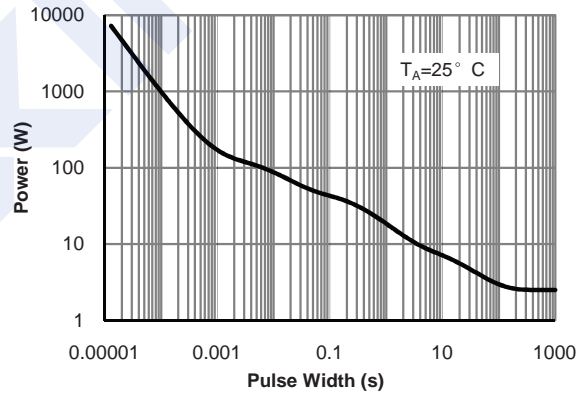


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

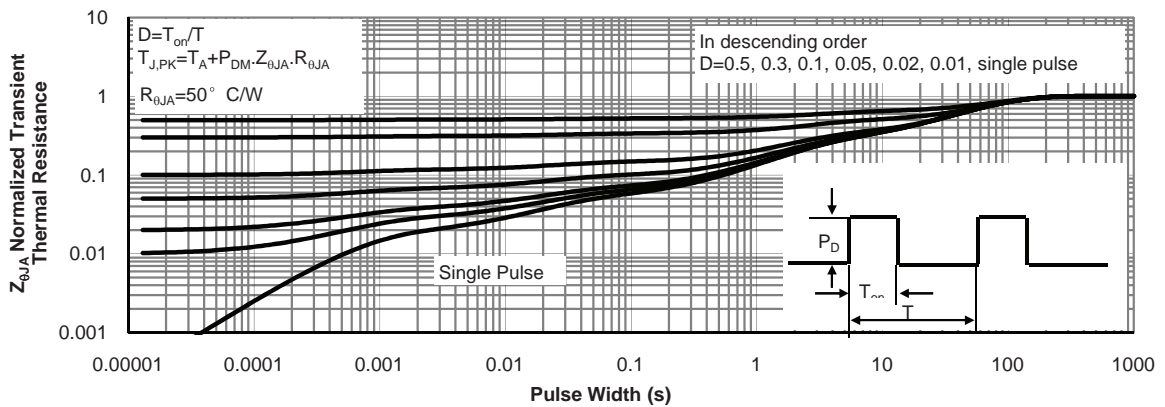
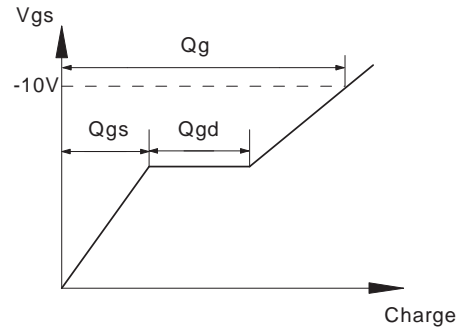
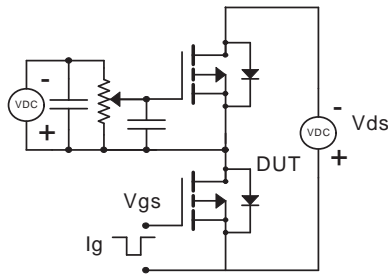


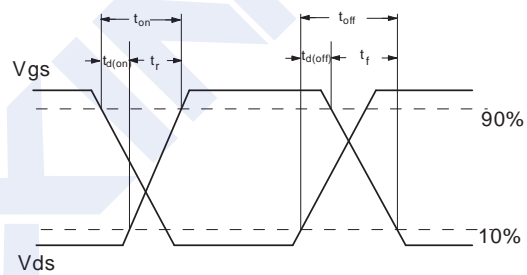
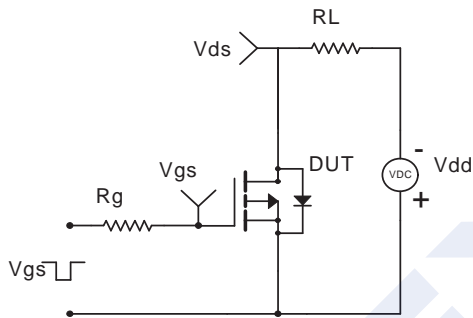
Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

### 2KJ6065

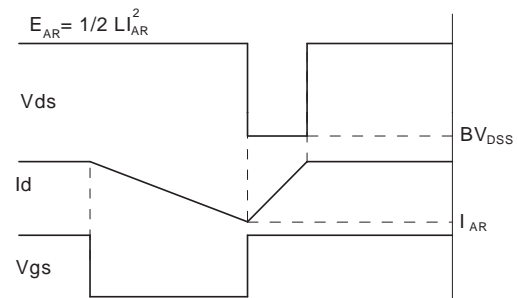
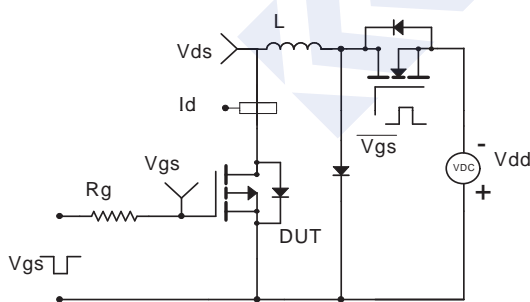
Gate Charge Test Circuit & Waveform



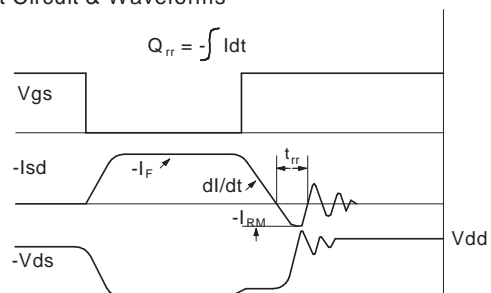
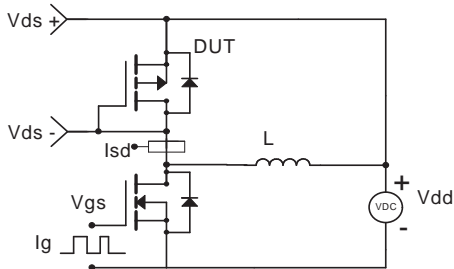
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



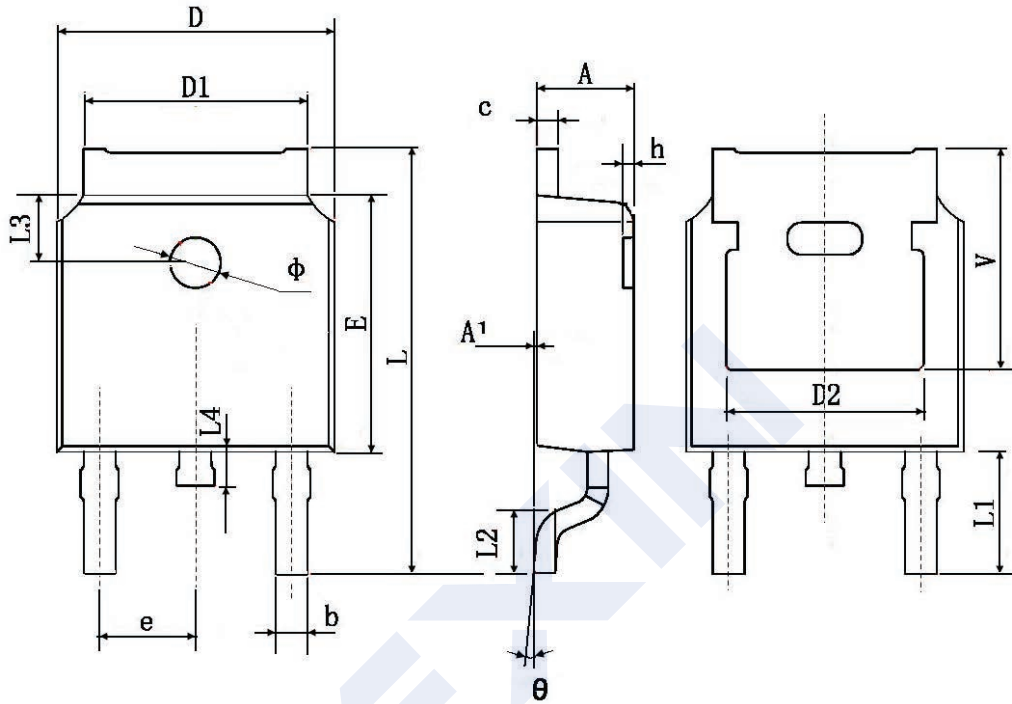
Diode Recovery Test Circuit & Waveforms



## 2KJ6065

## ■ Package Dimension

## TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	