

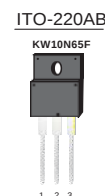
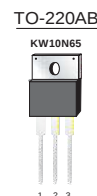
650V N-Channel Power MOSFET

Features:

- $R_{DS(ON)} < 1.0\Omega$ @ $V_{GS} = 10V$
- Fast switching capability
- Low gate charge
- Lead free in compliance with EU RoHS directive.

Mechanical Data:

- Case: TO-220, ITO-220, TO-262, TO-263 Package



TO-262
KW10N65E



TO-263
KW10N65D



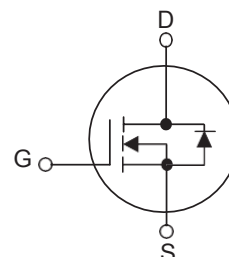
Ordering Information

Part No.	Package	Packing
KW10N65-TU	TO-220	50pcs / Tube
KW10N65F-TU	ITO-220	50pcs / Tube
KW10N65E-TU	TO-262	50pcs / Tube
KW10N65D-TU	TO-263	50pcs / Tube
KW10N65D-TR	TO-263	800pcs / 13"Reel

Pin Definition:

1. Gate
2. Drain
3. Source

Block Diagram



PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
650	1.0 @ $V_{GS} = 10V$	10

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ C$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current		I_D	10	A
Pulsed Drain Current (Note 2)		I_{DM}	38	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	608	mJ
Power Dissipation	TO-220/TO-263/TO-262	P_D	156	W
	ITO-220		50	
Junction Temperature		T_J	+150	$^\circ C$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ C$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by maximum junction temperature

3. $L = 30mH$, $I_{AS} = 6.4A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/ITO-220 TO-262/TO-263	θ_{JA}	62.5	C/W
Junction to Case	TO-220	θ_{JC}	0.85	C/W
	ITO-220		2.6	

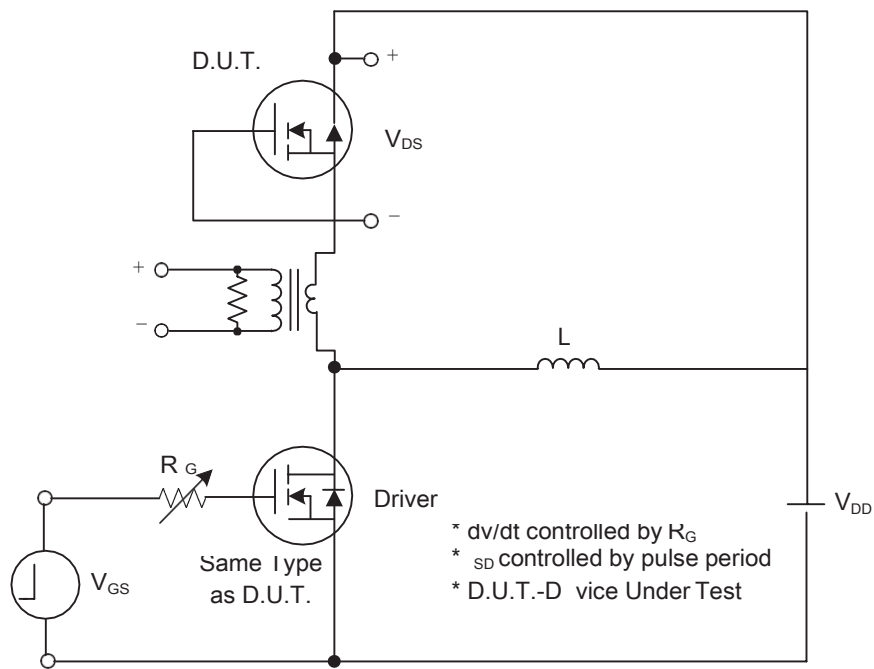
ELECTRICAL CHARACTERISTICS (T_C=25 C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _G =30V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =5.0A		0.88	1.0	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		1200		pF
Output Capacitance		C _{OSS}			166		pF
Reverse Transfer Capacitance		C _{RSS}			18		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} =325V, I _D =10A, R _G =25Ω(Note1, 2)		40		ns
Turn-On Rise Time		t _R			74		ns
Turn-Off Delay Time		t _{D(OFF)}			52		ns
Turn-Off Fall Time		t _F			35		ns
Total Gate Charge		Q _G	V _{DS} =520V, I _D =10A, V _{GS} =10V(Note1, 2)		24		nC
Gate-Source Charge		Q _{GS}			8		nC
Gate-Drain Charge		Q _{GD}			7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =10A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				10	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				40	A
Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _S =10A		570		ns
Reverse Recovery Charge		Q _{RR}	diF/dt=100A/μs (Note 1)		4.7		μC

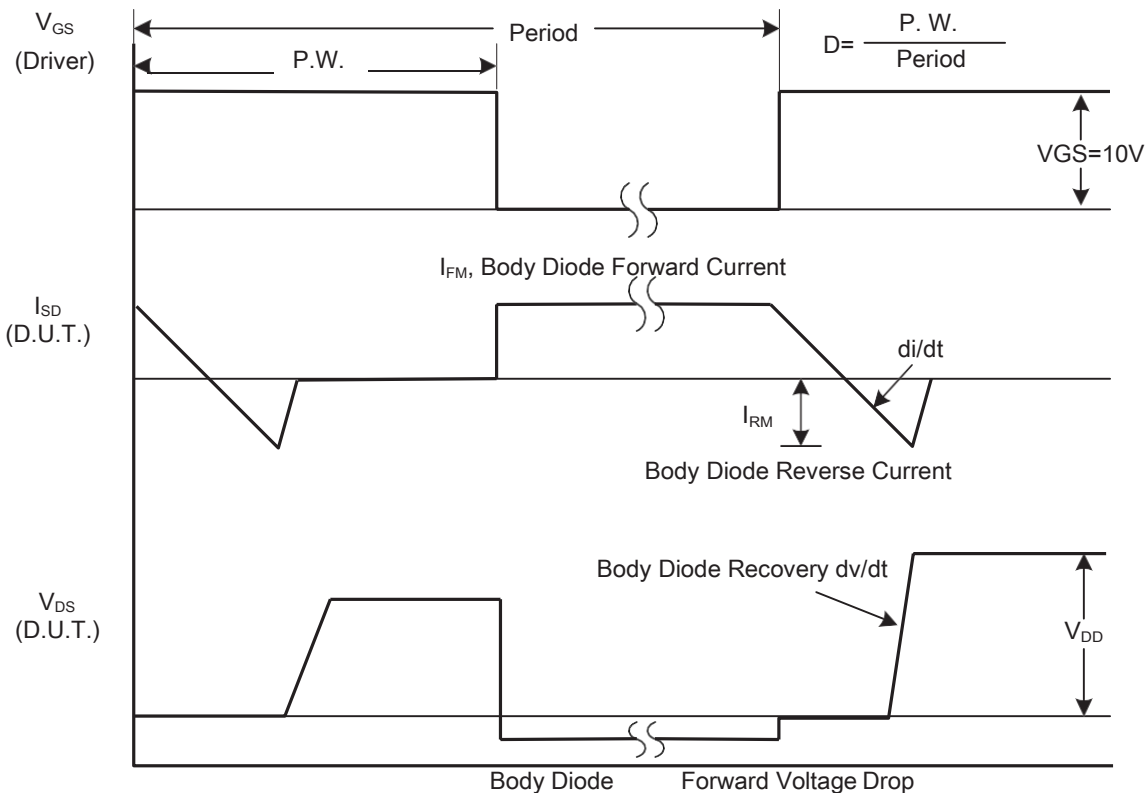
Notes: 1. Pulse Test: Pulse width ≤300μs, Duty cycle ≤2%.

2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

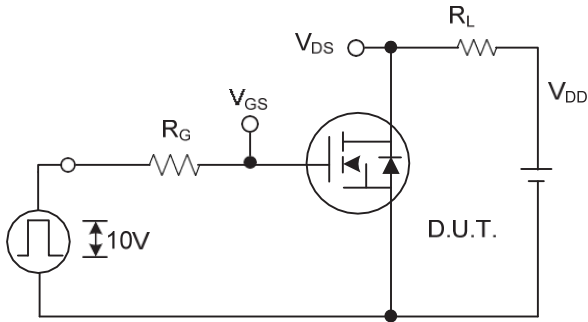


Peak Diode Recovery dv/dt Test Circuit

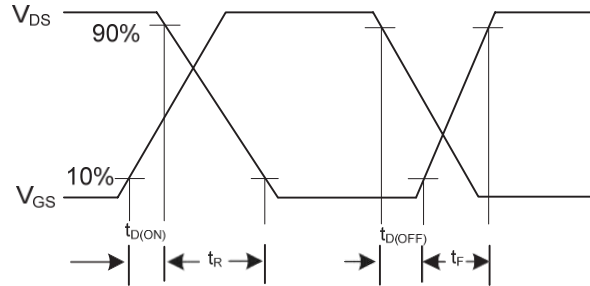


Peak Diode Recovery dv/dt Waveforms

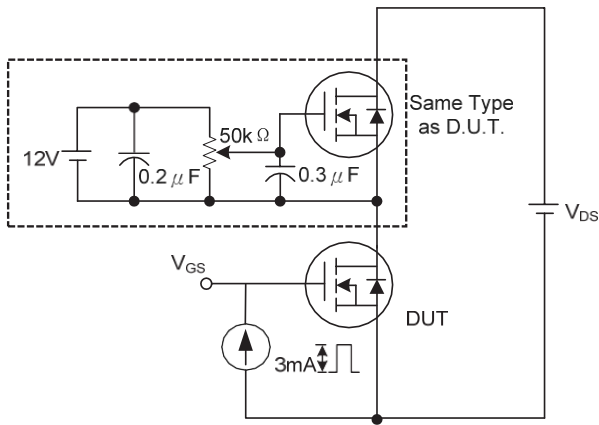
TEST CIRCUITS AND WAVEFORMS(Cont.)



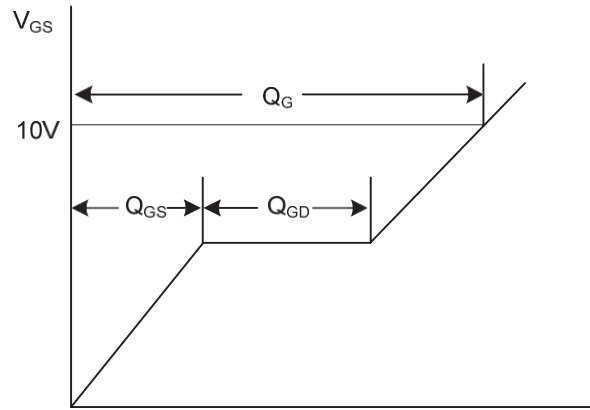
Switching Test Circuit



Switching Waveforms

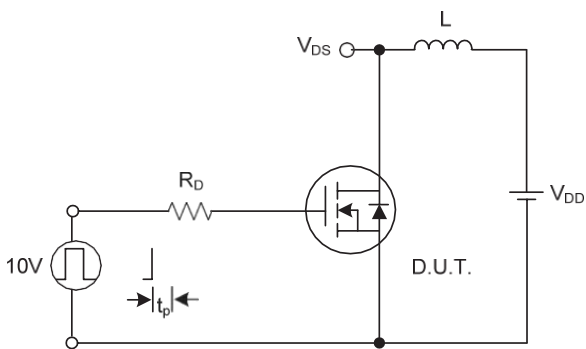


Gate Charge Test Circuit

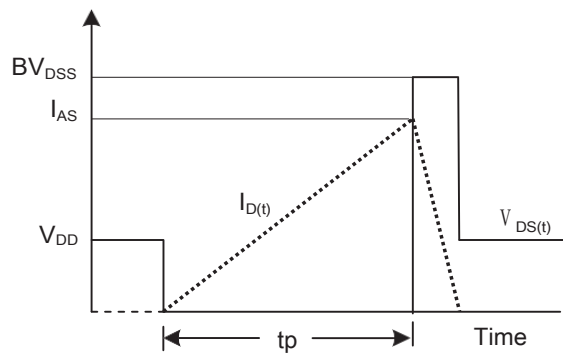


Charge

Gate Charge Waveform

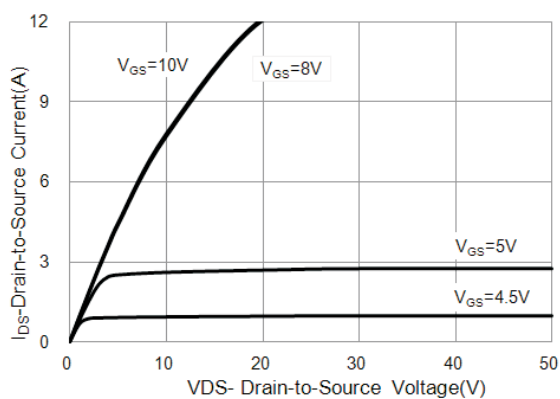


Unclamped Inductive Switching Test Circuit

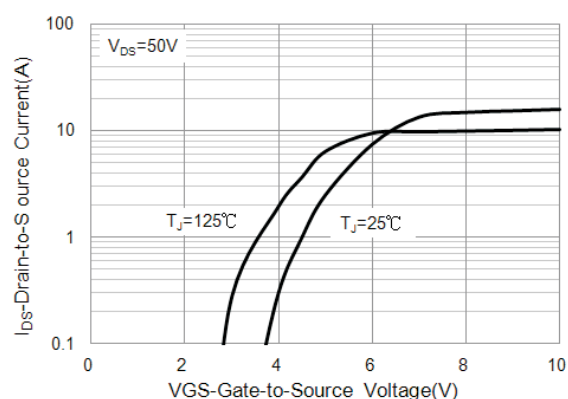


Unclamped Inductive Switching Waveforms

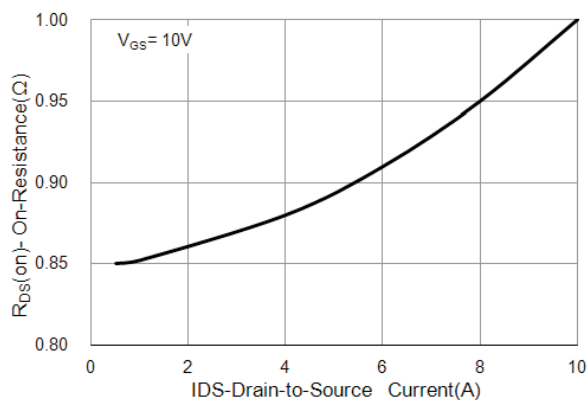
TYPICAL CHARACTERISTICS



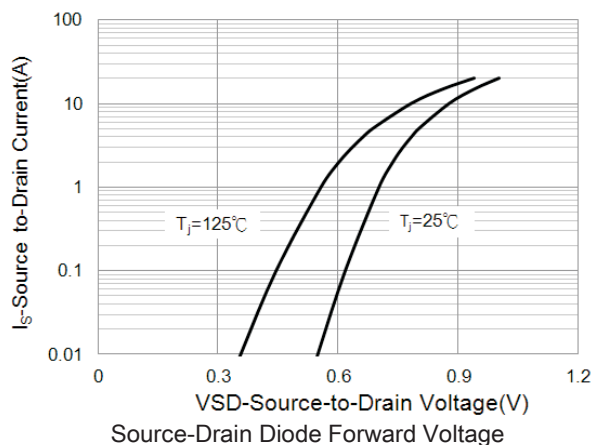
Output Characteristics



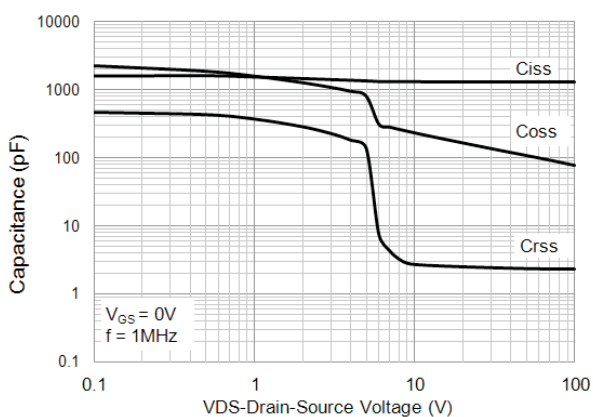
Transfer Characteristics



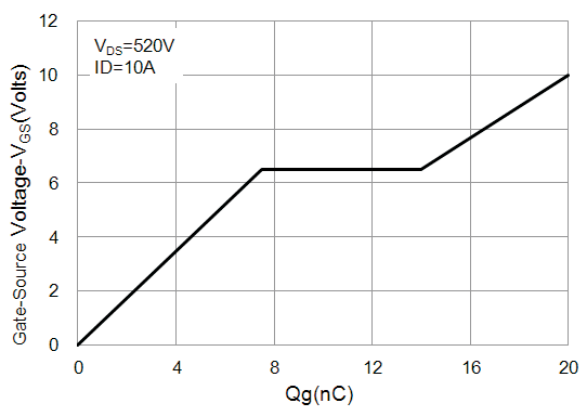
On-Resistance vs. Drain Current



Source-Drain Diode Forward Voltage

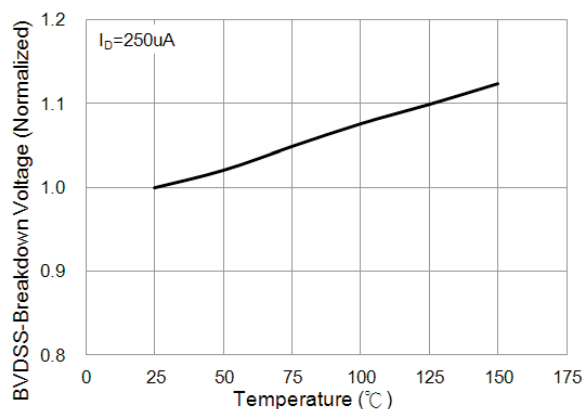


Capacitance vs. Drain-Source Voltage

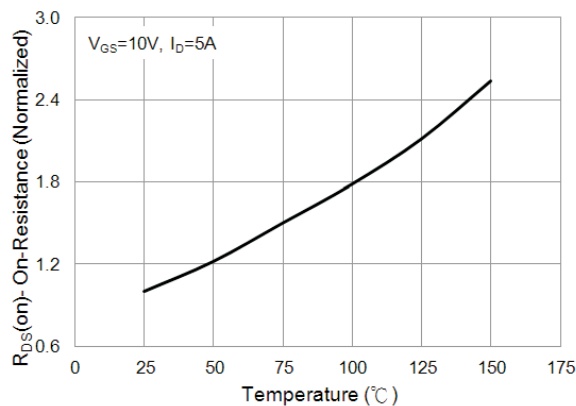


Gate Charge

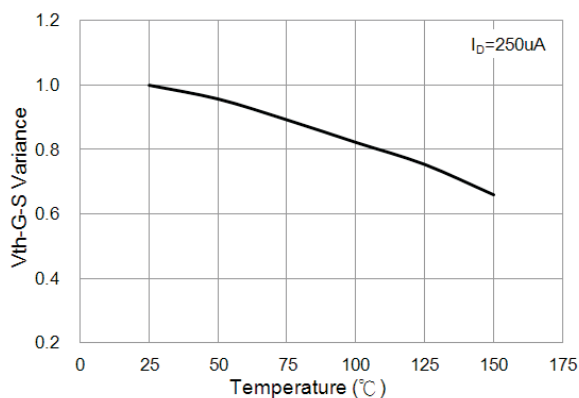
TYPICAL CHARACTERISTICS



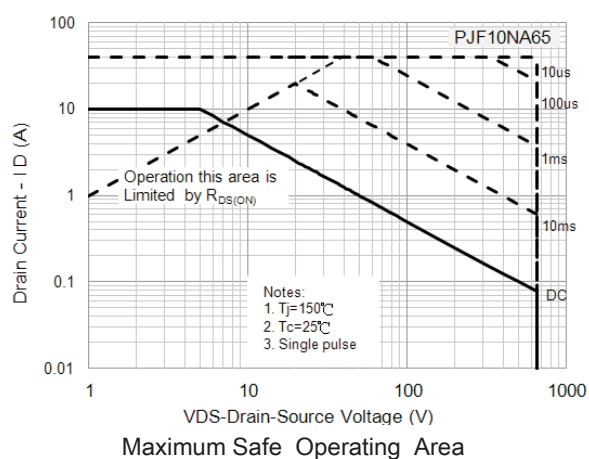
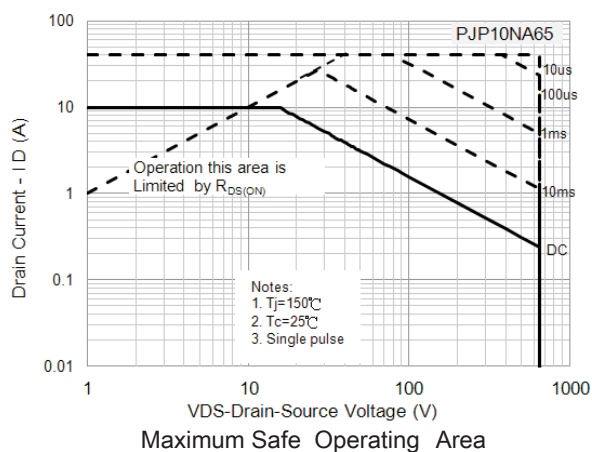
BV_{DSS} vs. Junction Temperature



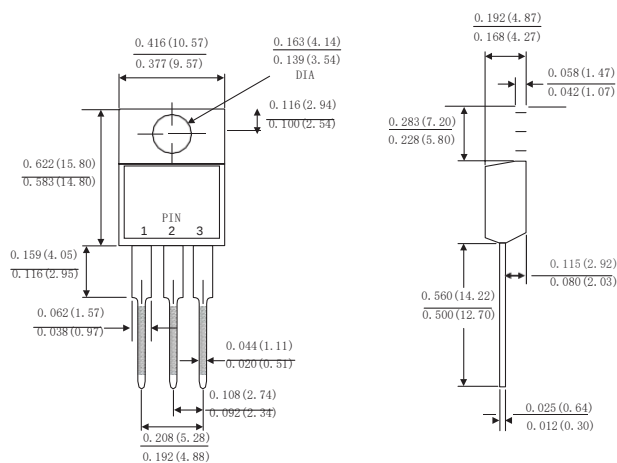
On-Resistance vs. Junction Temperature



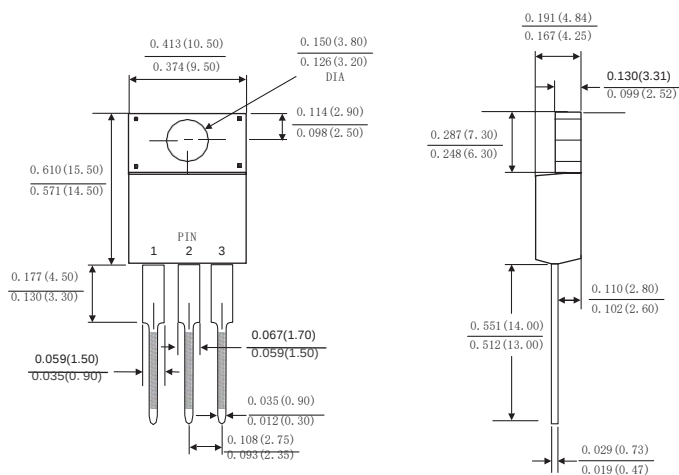
Threshold Voltage Variation with Temperature



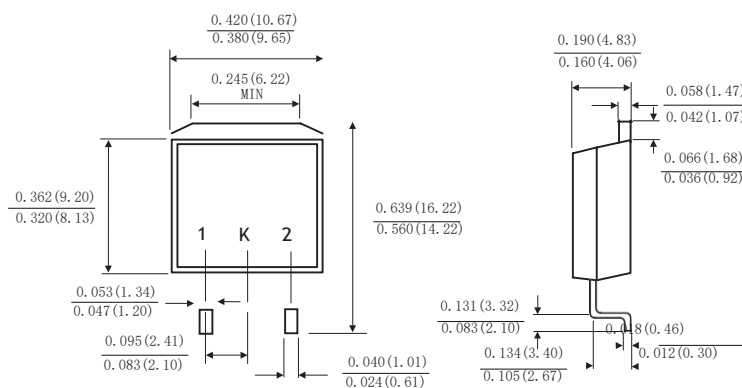
TO-220AB



ITO-220AB

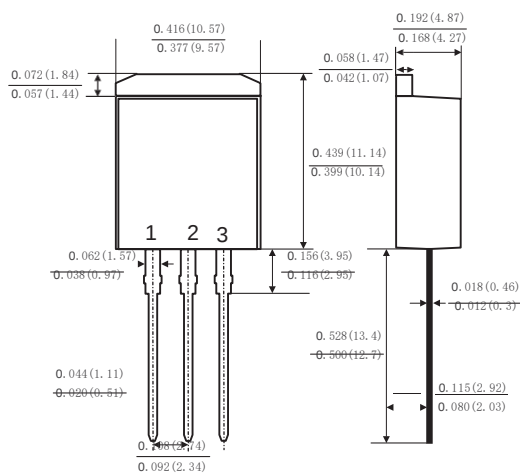


TO-263



Dimensions in inches and (millimeters)

TO-262



Dimensions in inches and (millimeters)