KODENSHI AUK

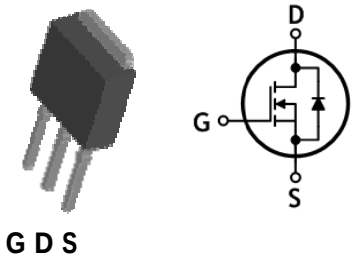
SMK0465IS

Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATION

Features

- Drain-source breakdown voltage: BV_{DSS}=650V
- Low gate charge: Q_g=11.2nC (Typ.)
- Low drain-source On-resistance: $R_{DS(on)}$=3Ω (Max.)
- RoHS compliant device
- Halogen free package



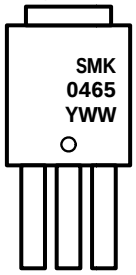
G D S

I-PAK (Short Lead)

Ordering Information

Part Number	Marking	Package
SMK0465IS	SMK0465	I-PAK (Short lead)

Marking Information



Column 1, 2: Device Code
Column 3: Production Information
e.g.) YWW
-. YWW: Date Code (year, week)

Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		650	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	T_c=25°C	4	A
		T_c=100°C	2.5	A
Drain current (Pulsed) *	I_{DM}		16	A
Single avalanche current (Note 2)	I_{AR}		4	A
Single pulsed avalanche energy (Note 2)	E_{AS}		81.5	mJ
Repetitive avalanche current (Note 1)	I_{AR}		4	A
Repetitive avalanche energy (Note 1)	E_{AR}		3.4	mJ
Power dissipation	P_D		48	W
Junction temperature	T_J		150	°C
Storage temperature range	T_{stg}		-55~150	°C

* Limited only maximum junction temperature

Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 2.6	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

Electrical Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=250uA, V_{GS}=0	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250uA, V_{DS}=V_{GS}	2	-	4	V
Drain-source cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	uA
		V_{DS}=650V, T_c=125°C	-	-	100	uA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	2.4	3	Ω
Forward transfer conductance (Note 3)	g_{fs}	V_{DS}=10V, I_D=2A	-	4	-	S
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	-	703	878	pF
Output capacitance	C_{oss}		-	54.6	68.2	
Reverse transfer capacitance	C_{rss}		-	5.6	7.0	
Turn-on delay time (Note 3,4)	$t_{d(on)}$	V_{DD}=300V, I_D=4A R_G=25Ω	-	10	-	ns
Rise time (Note 3,4)	t_r		-	42	-	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		-	38	-	
Fall time (Note 3,4)	t_f		-	46	-	
Total gate charge (Note 4,5)	Q_g	V_{DS}=520V, V_{GS}=10V I_D=4A	-	11.2	14	nC
Gate-source charge (Note 3,4)	Q_{gs}		-	3.9	-	
Gate-drain charge (Note 3,4)	Q_{gd}		-	2.5	-	

Source-Drain Diode Ratings and Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	4	A
Source current (Pulsed)	I_{SM}		-	-	16	A
Forward voltage	V_{SD}	V_{GS}=0V, I_S=4A	-	-	1.4	V
Reverse recovery time (Note 3, 4)	t_{rr}	I_S=4A, V_{GS}=0V dI_F/dt=100A/us	-	300	-	ns
Reverse recovery charge (Note 4,5)	Q_{rr}		-	2.2	-	uC

Note:
1. Repeated rating: Pulse width limited by safe operating area
2. L=9.4mH, I_{AS}=4A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

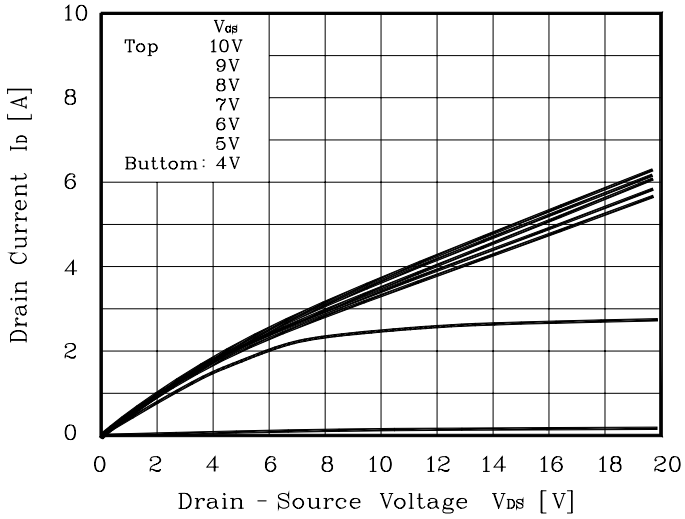


Fig. 2 I_D - V_{GS}

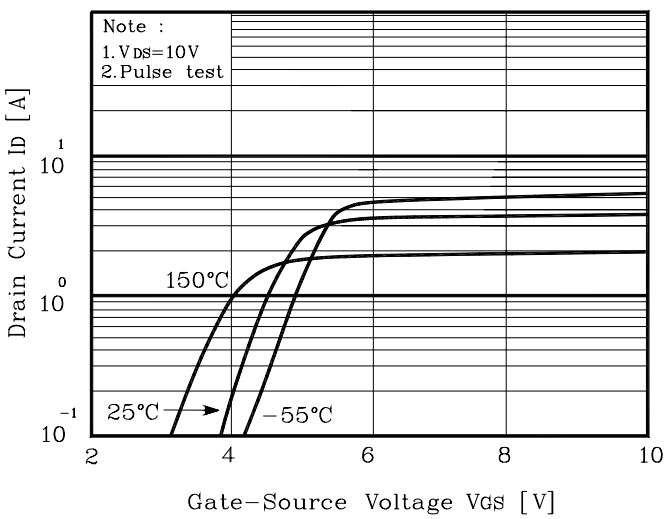


Fig. 3 $R_{DS(on)}$ - I_D

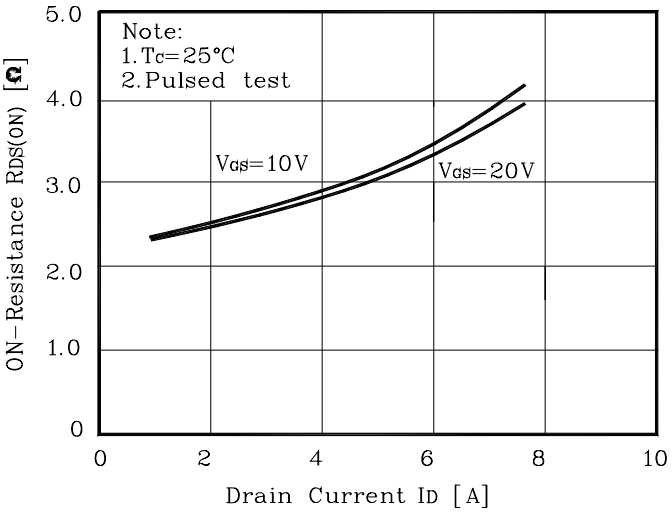


Fig. 4 I_S - V_{SD}

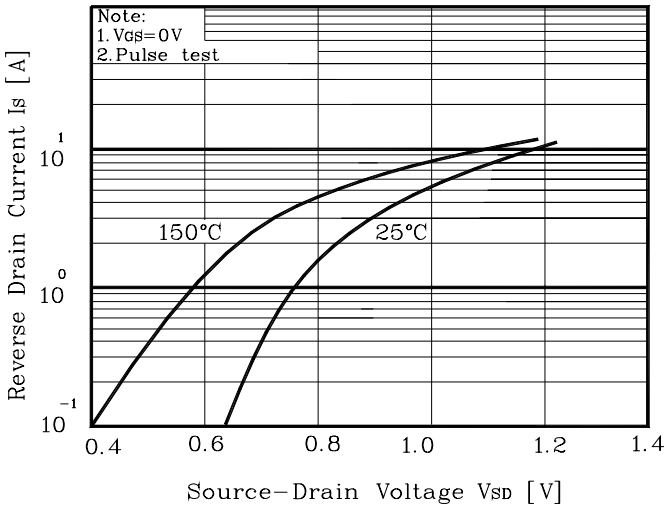


Fig. 5 Capacitance - V_{DS}

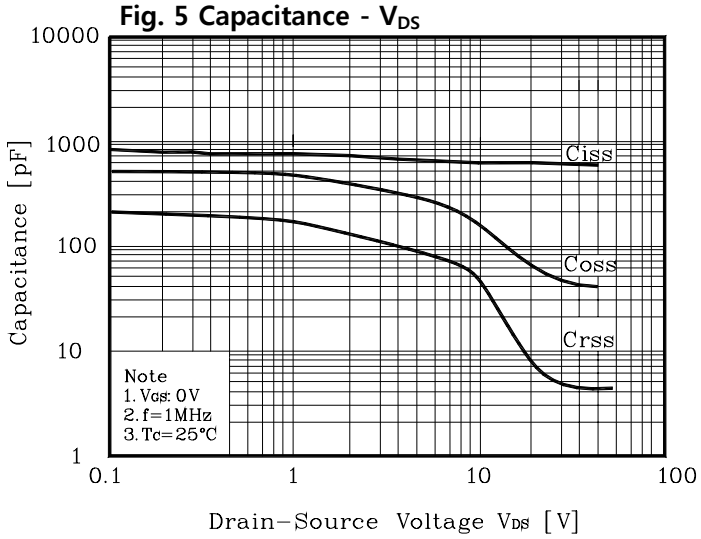
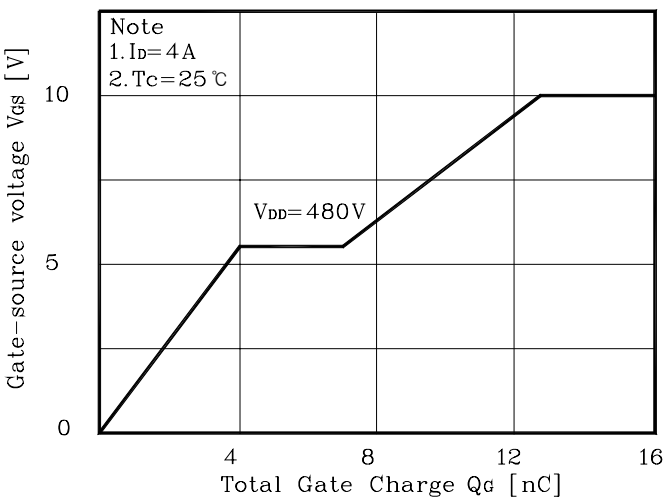


Fig. 6 V_{GS} - Q_G



Electrical Characteristic Curves (Continue)

Fig. 7 V_{DSS} - T_J

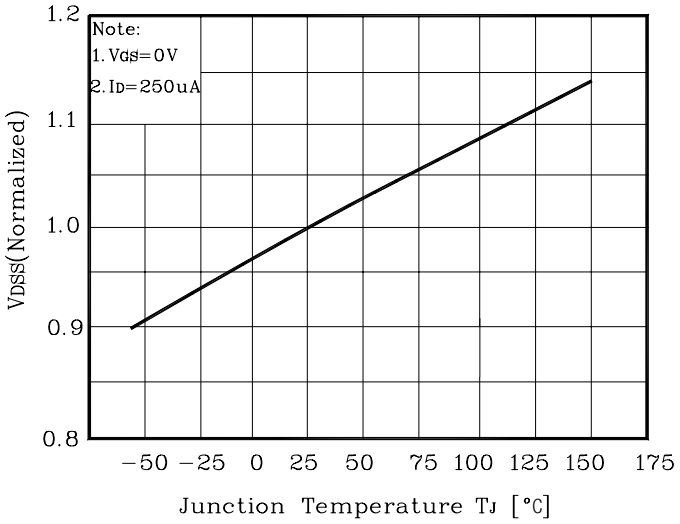


Fig. 8 $R_{DS(on)}$ - T_J

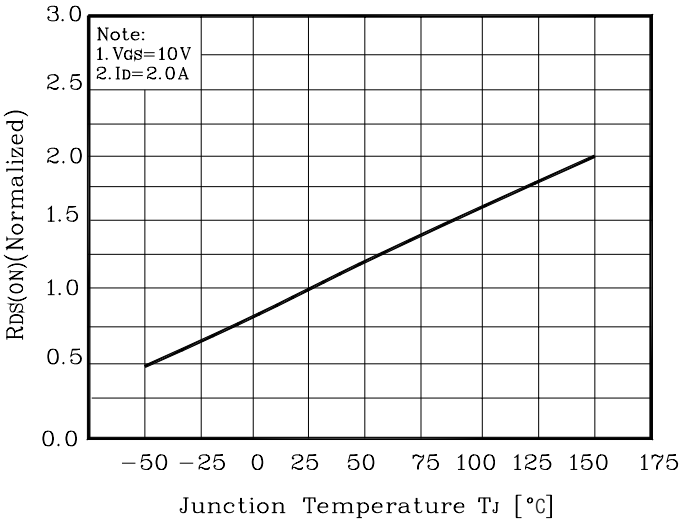


Fig. 9 I_D - T_C

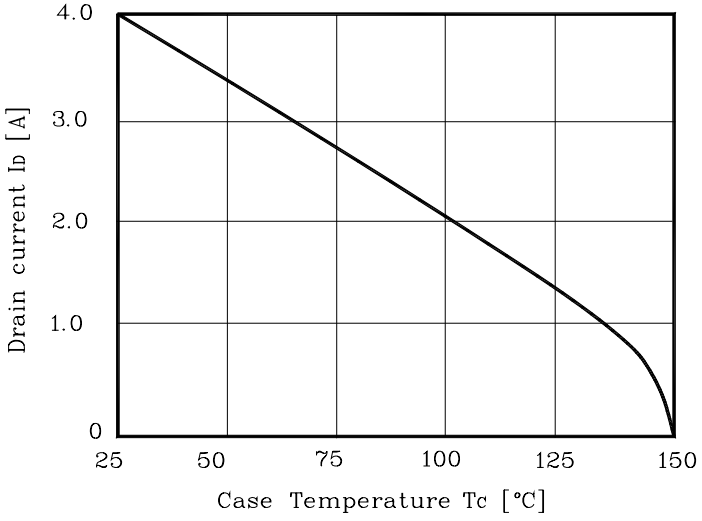


Fig. 10 Safe Operating Area

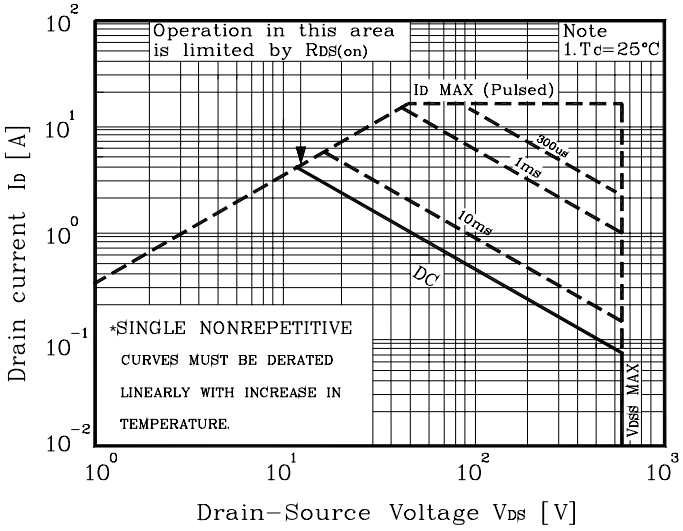
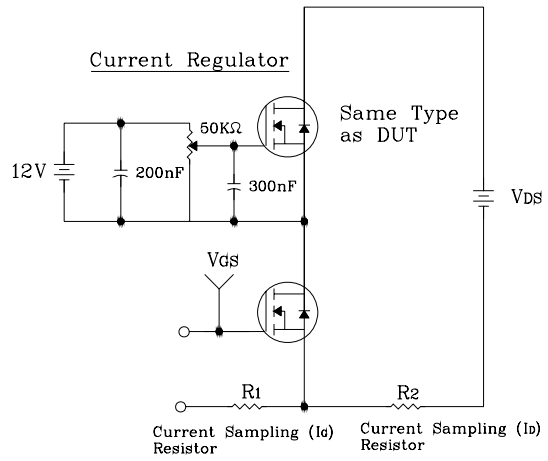


Fig. 11 Gate Charge Test Circuit & Waveform



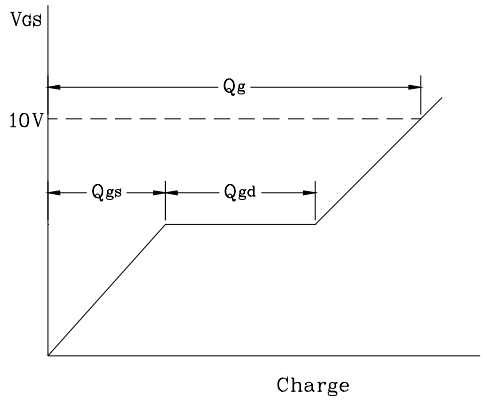
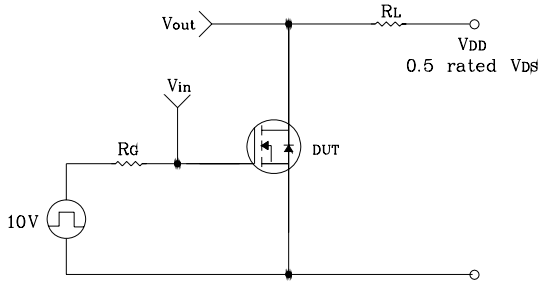


Fig. 12 Resistive Switching Test Circuit & Waveform



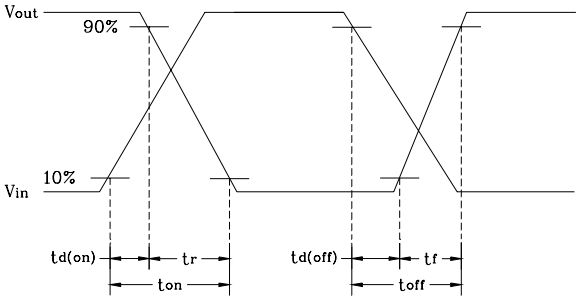
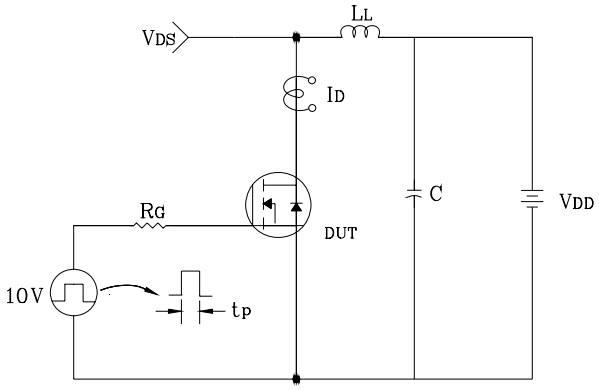


Fig. 13 E_{AS} Test Circuit & Waveform



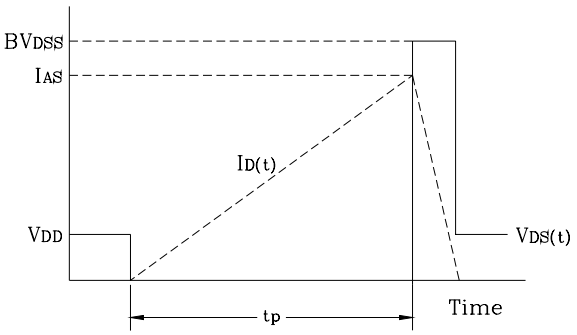
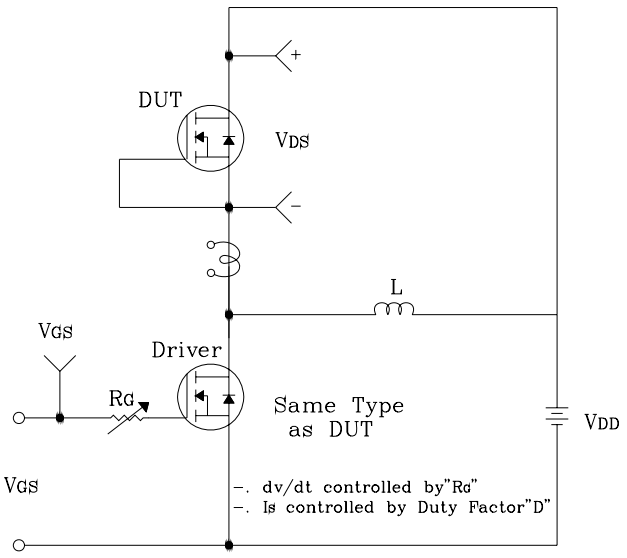
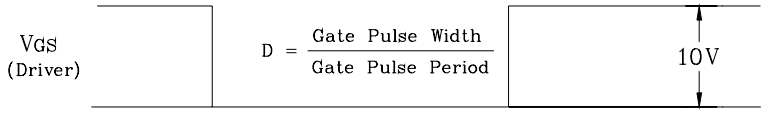
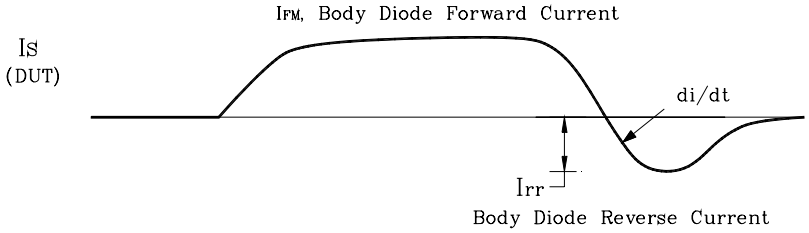
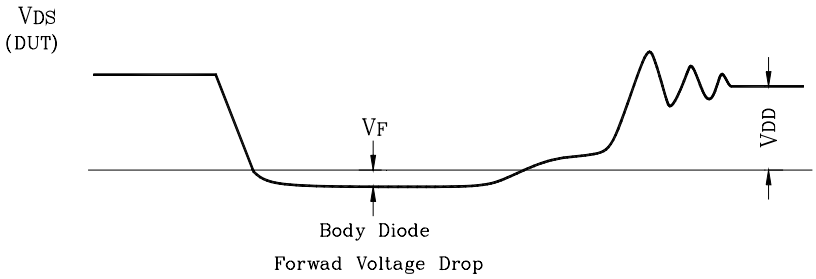


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

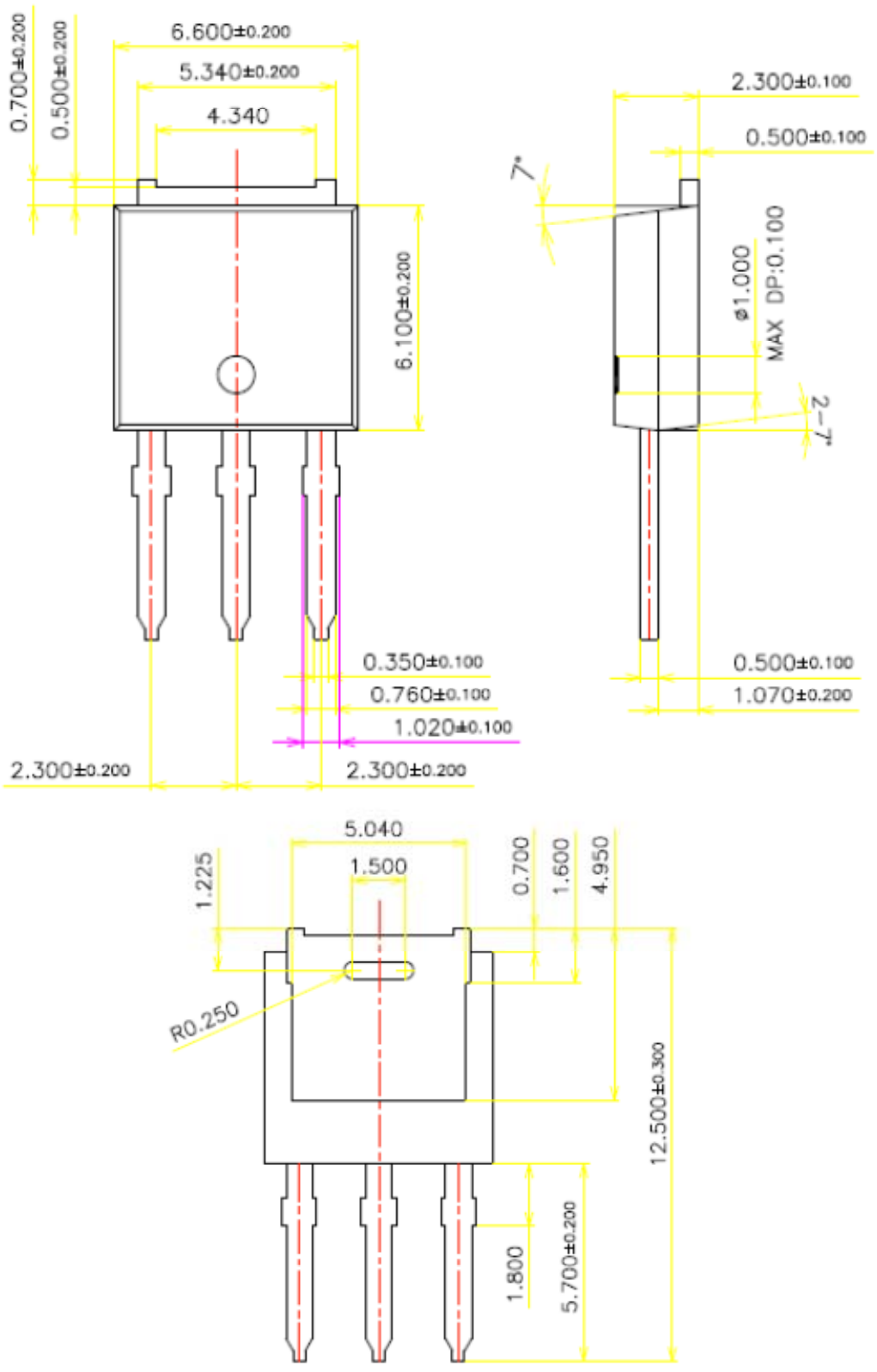








Package Outline Dimensions



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