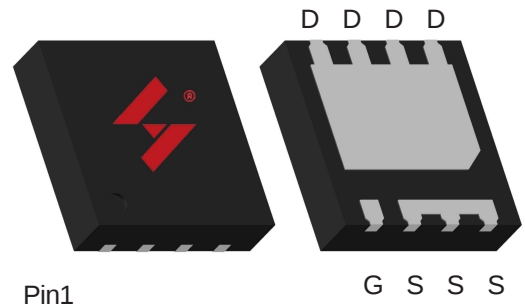


Single N-Channel Enhancement Mode MOSFET

Features

- 30V/ 30A
 $R_{DS(ON)} = 4.2\text{ m}\Omega$ (typ.) @ $V_{GS}=10\text{ V}$
 $R_{DS(ON)} = 5.5\text{ m}\Omega$ (typ.) @ $V_{GS} = 4.5\text{ V}$
- High Cell Desity for low Rds(on)
- Halogen Device Available

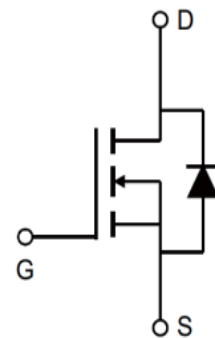
Pin Description



Applications

- Battery pack protection
- Power tool

DFN3*3-8L



Ordering and Marking Information

Single N-Channel MOSFET

 C HY1303 YYXXXJWW C	Package Code C : DFN8L(0303) Date Code YYXXX WW Assembly Material C : Green Device
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Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate termination finish; which are fully compliant with RoHS. HUAYI lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020D for MSL classification at lead-free peak reflow temperature. HUAYI defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}\text{C}$ 15	A
Mounted on Large Heat Sink			
I_{DM}	Pulsed Drain Current *	$T_C=25^{\circ}\text{C}$ 108**	A
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$ 30	A
		$T_C=70^{\circ}\text{C}$ 19	
P_D	Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$ 3.1	W
		$T_C=70^{\circ}\text{C}$ 2	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	40	$^{\circ}\text{C/W}$

Note : * Repetitive rating ; pulse width limited by junction temperature

** Drain current is limited by junction temperature

Electrical Characteristics ($T_C = 25^{\circ}\text{C}$ Unless Otherwise Noted)

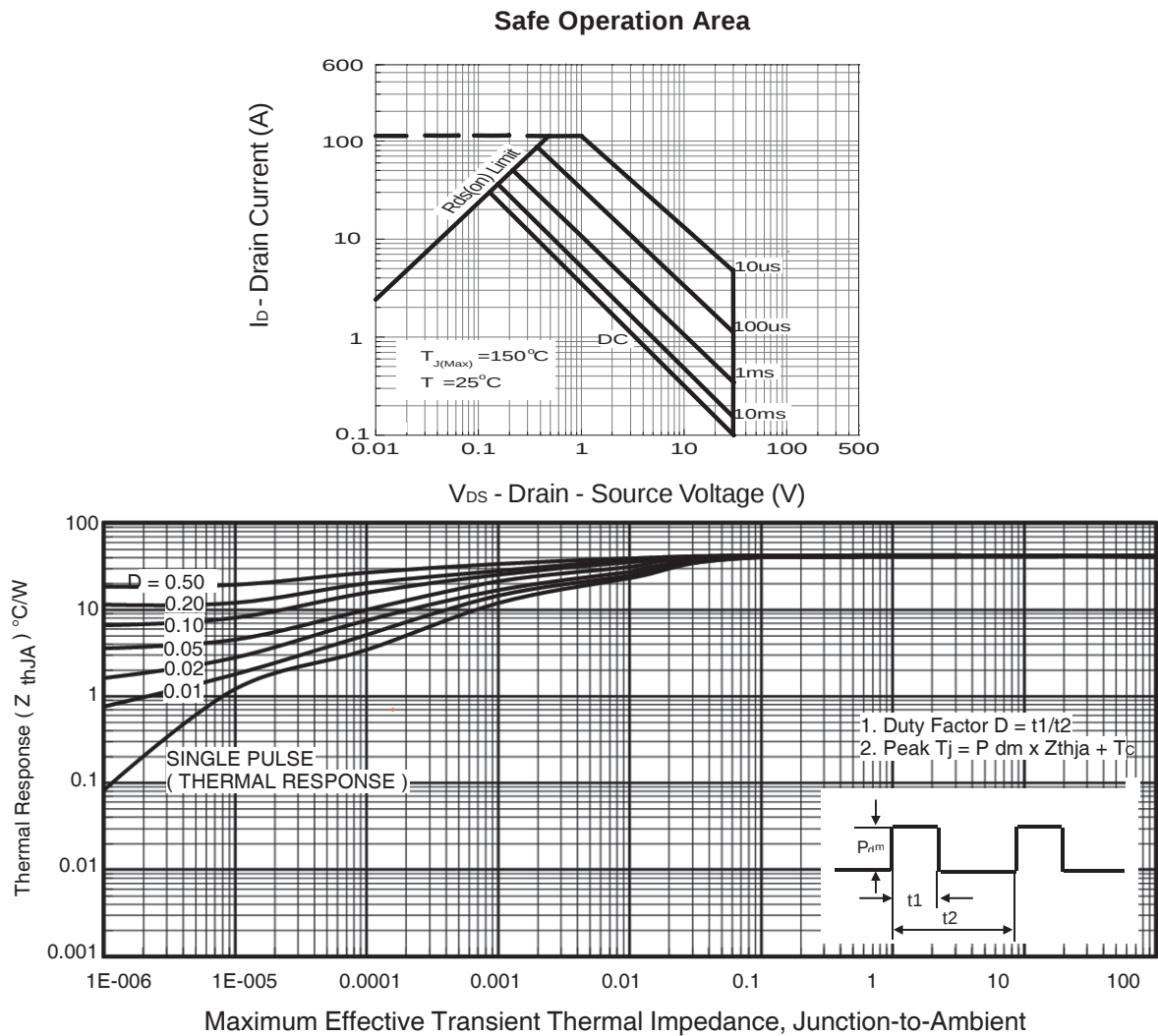
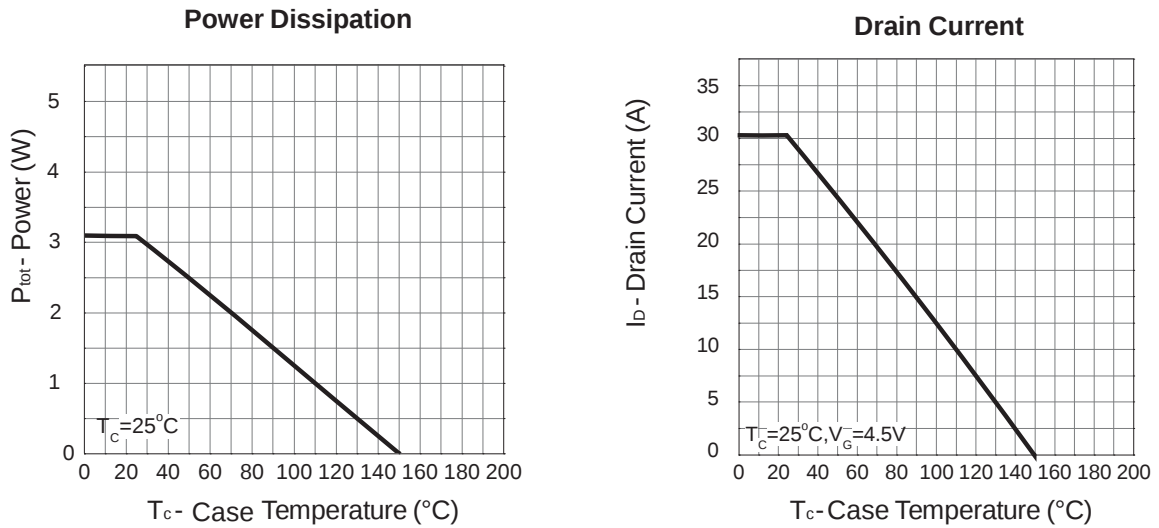
Symbol	Parameter	Test Conditions	HY1303			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.0	1.6	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} *	Drain-Source On-state Resistance	V _{GS} =10V,I _{DS} = 6 A	-	4.2	5.2	mΩ
		V _{GS} =4.5V, I _{DS} =4 A	-	5.5	6.8	mΩ
Diode Characteristics						
V _{SD} *	Diode Forward Voltage	I _{SD} =1 A, V _{GS} =0V	-	0.7	1.1	V

Electrical Characteristics (Cont.) ($T_c = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY1303			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	2351	-	pF
C _{oss}	Output Capacitance		-	253	-	
C _{rss}	Reverse Transfer Capacitance		-	146	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _G =6 Ω, I _{DS} =15A, V _{GS} =10V ,	-	15	-	ns
T _r	Turn-on Rise Time		-	13	-	
t _{d(OFF)}	Turn-off Delay Time		-	39	-	
T _f	Turn-off Fall Time		-	10	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =24V, V _{GS} = 10V, I _{DS} =15A	-	46	-	nC
Q _{gs}	Gate-Source Charge		-	3.9	-	
Q _{gd}	Gate-Drain Charge		-	8.5	-	

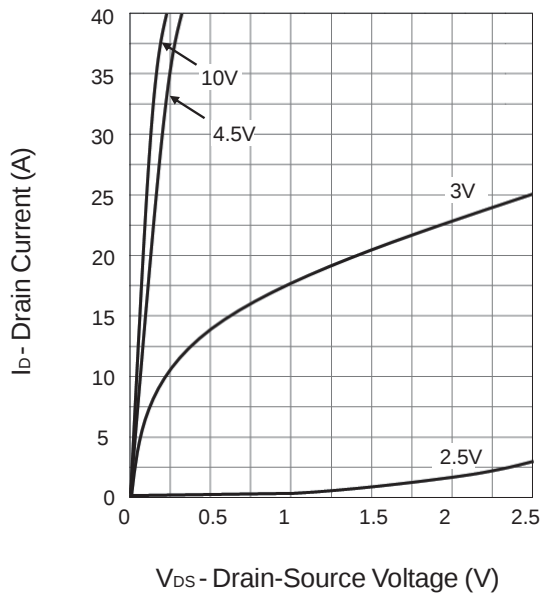
Note * : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Typical Operating Characteristics

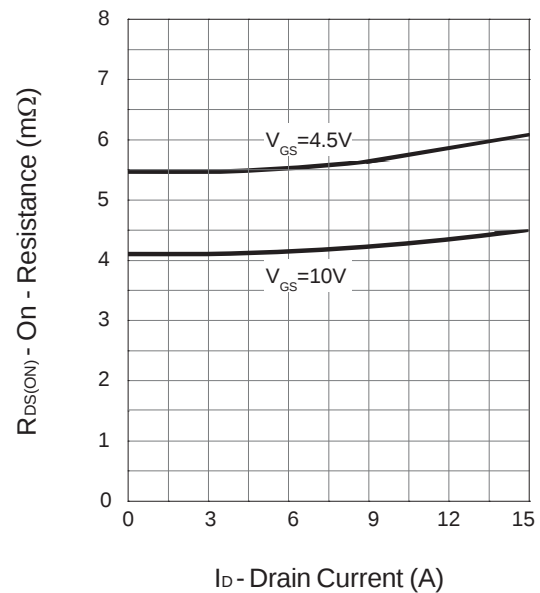


Typical Operating Characteristics (Cont.)

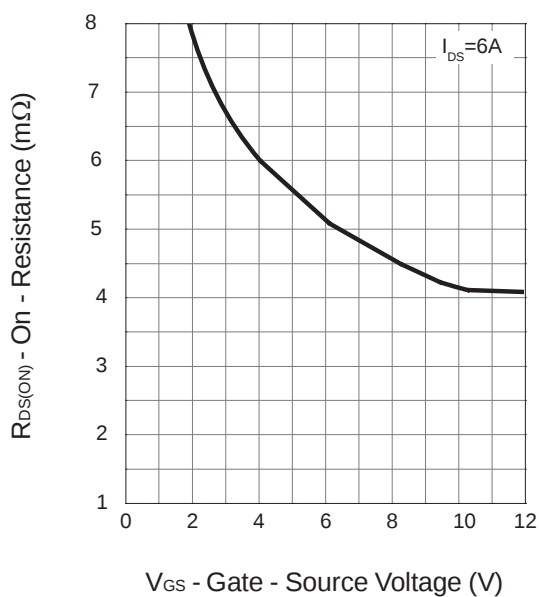
Output Characteristics



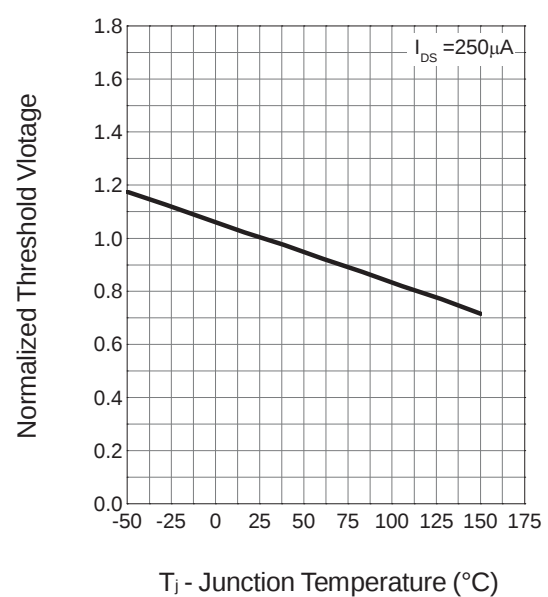
Drain-Source On Resistance



Drain-Source On Resistance

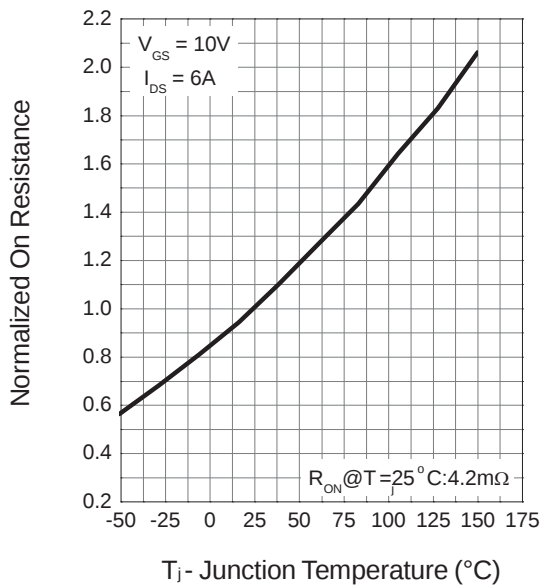


Gate Threshold Voltage

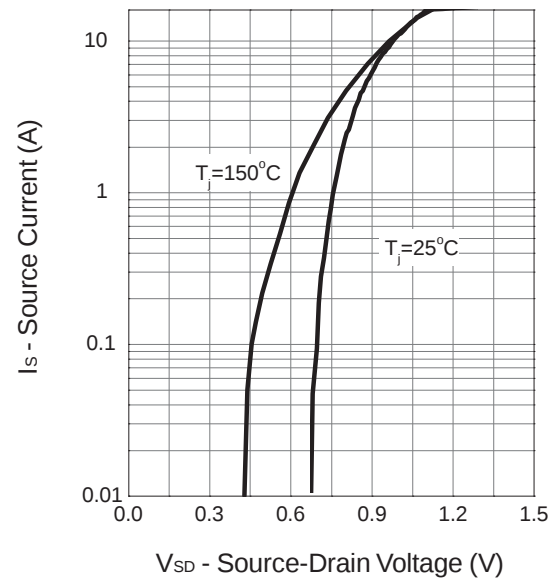


Typical Operating Characteristics (Cont.)

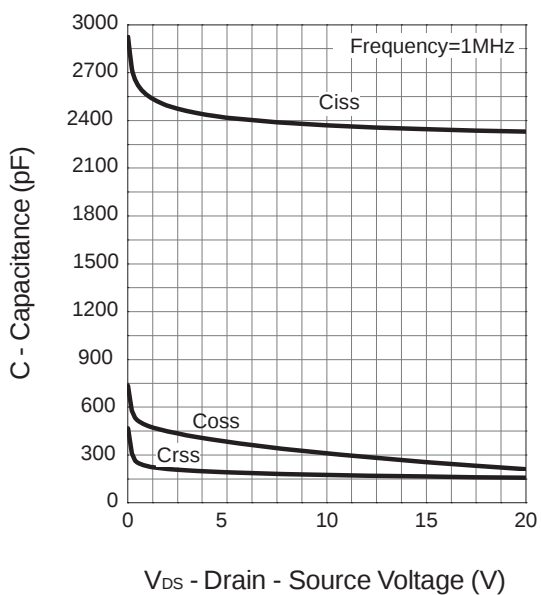
Drain-Source On Resistance



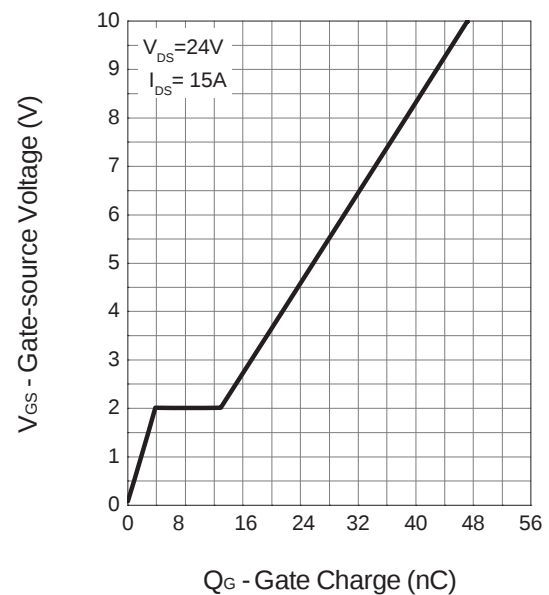
Source-Drain Diode Forward



Capacitance

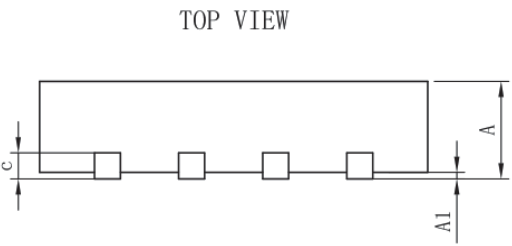
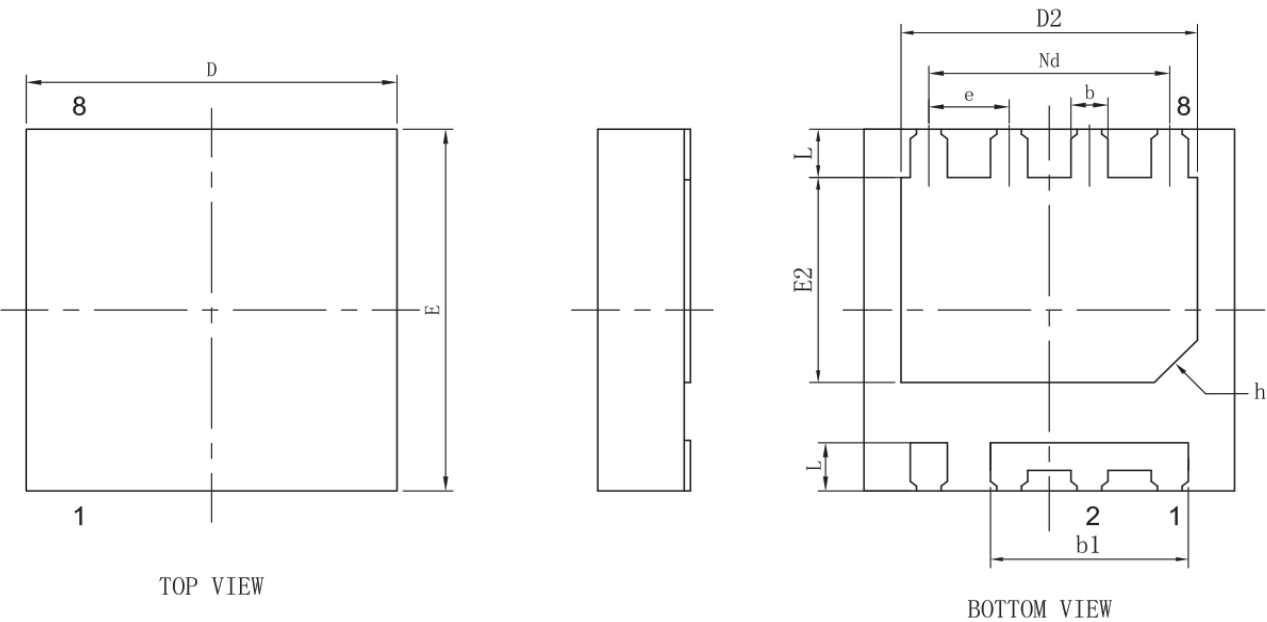


Gate Charge



Package Information

DFN3*3-8L



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.25	0.30	0.35
b1	1.55	1.60	165.00
c	0.19	0.20	0.21
D	2.90	3.00	3.10
D2	2.30	2.40	2.50
Nd	1.90	1.95	2.00
E	2.90	3.00	3.10
E2	1.60	1.70	1.80
e	0.65b _{sc}		
L	0.35	0.40	0.45
h	0.30	0.35	0.40

Package Type	Unit	Quantity
DFN3*3-8L	Reel	3000

Figure 1 illustrates the thermal profile of a solder reflow process. The main graph shows Temperature (°C) versus Time (s). The profile starts at 25°C, ramps up to a peak temperature T_p , and then ramps down. Key parameters include:

- T_p : Peak Temperature
- T_L : Liquidus Temperature
- T_{smax} : Solidus Maximum Temperature
- T_{smin} : Solidus Minimum Temperature
- t_s : Time at Solidus
- Preheat Area
- Max. Ramp Up Rate = 3°C/s
- Max. Ramp Down Rate = 6°C/s
- t : Time at Liquidus
- t_p : Time at Peak
- Time 25°C to Peak

Two inset graphs show the relationship between T_p and T_c (Critical Temperature). The left inset shows Supplier $T_p \geq T_c$, and the right inset shows User $T_p \leq T_c$. Both insets show a bell-shaped curve with a horizontal line at T_c and a dashed line at $T_c - 5^\circ\text{C}$. The width of the curve at T_c is labeled Supplier t_p and User t_p respectively.