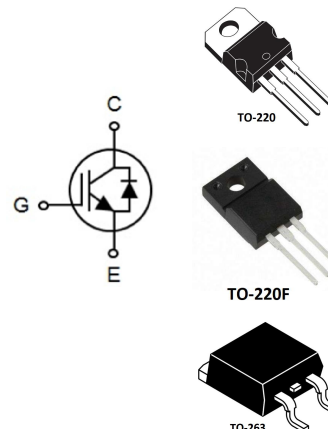


Feature

- High ruggedness for motor control
- VCE(sat) positive temperature coefficient
- Very soft, fast recovery anti-parallel diode
- Low EMI
- Maximum junction temperature 175°C



Applications

- Inverter for motor control

Maximum Ratings

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CE}	650	V
DC collector current, limited by T_{vjmax}	I_C	$T_C=25^\circ C$	30
		$T_C=100^\circ C$	15
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	60	A
Diode forward current, limited by T_{vjmax}	I_F	$T_C=25^\circ C$	30
		$T_C=100^\circ C$	15
Gate-emitter voltage	V_{GE}	$\pm 20V$	V
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	60	A
Power dissipation (TO-220/TO-263)	P_D	182	W
Power dissipation (TO-220F)	P_D	48	W
Short circuit withstand time $V_{CC} \leq 360V, V_{GE} = 15V, T_{vj} = 150^\circ C$	tsc	5	μs
Operating Junction temperature range	T_{vj}	-40~175	$^\circ C$
Storage temperature range	T_{stg}	-55~150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Rating		Unit
		SL15T65FF	SL15T65F/ SL15T65FK	
Thermal resistance junction-to-ambient	$R_{th(j-a)}$	62	62.5	$^\circ C/W$
Thermal resistance junction-to-case for IGBT	$R_{th(j-c)}$	3.1	0.77	
Thermal resistance junction-to-case for Diode	$R_{th(j-a)}$	5.2	2.05	

Electrical Characteristics ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=2mA$	650	-	-	V	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=15A$	$T_j=25^{\circ}\text{C}$	-	1.65	2.00	V
			$T_j=150^{\circ}\text{C}$	-	1.90	-	V
Diode forward voltage	V_F	$V_{GE}=0V, I_F=15A$	$T_j=25^{\circ}\text{C}$	-	1.85	2.30	V
			$T_j=150^{\circ}\text{C}$	-	1.95	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C=0.5mA, V_{CE}=V_{GE}$	4.5	5.5	6.5	V	
Zero gate voltage collector current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$	$T_j=25^{\circ}\text{C}$	-	-	20	μA
			$T_j=150^{\circ}\text{C}$	-	-	4	mA
Gate-emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V$	-	-	± 100	nA	

Dynamic Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$	-	1129	-	pF
Output capacitance	C_{oes}		-	57	-	
Reverse transfer capacitance	C_{res}		-	31	-	
Total gate charge	Q_g	$V_{CE}=520V, I_C=15A, V_{GE}=15V$	-	61	-	nC
Gate-emitter charge	Q_{ge}		-	11	-	nC
Gate-collector charge	Q_{gc}		-	35	-	nC

Switching Characteristics

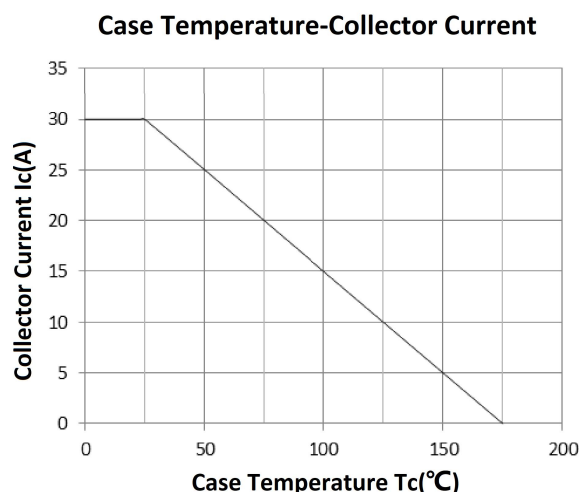
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	$t_d(on)$	$V_{GE} = 15V, V_{CC} = 400V,$ $I_C = 15A, R_G = 10\Omega, T_{vj} = 25^{\circ}\text{C}$ Inductive Load	-	19	-	nS
Rise time	t_r		-	27	-	
Turn-off delay time	$t_d(off)$		-	128	-	
Fall time	t_f		-	32	-	
Turn-on switching energy	E_{on}		-	270	-	μJ
Turn-off switching energy	E_{off}		-	86	-	
Total switching energy	E_{ts}		-	356	-	

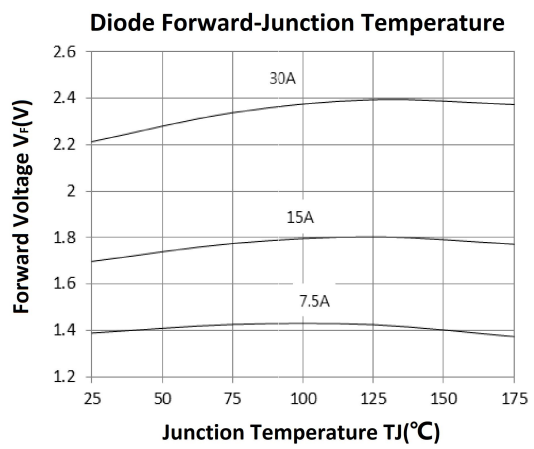
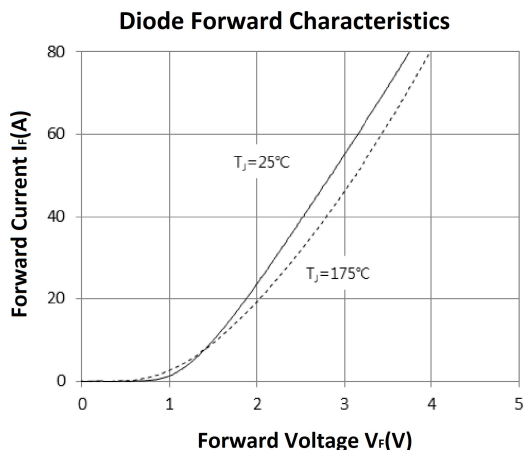
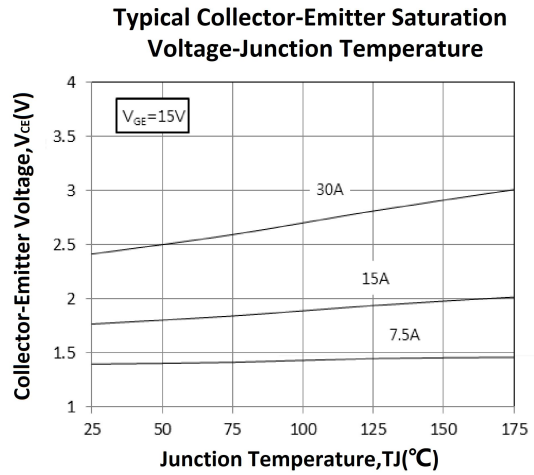
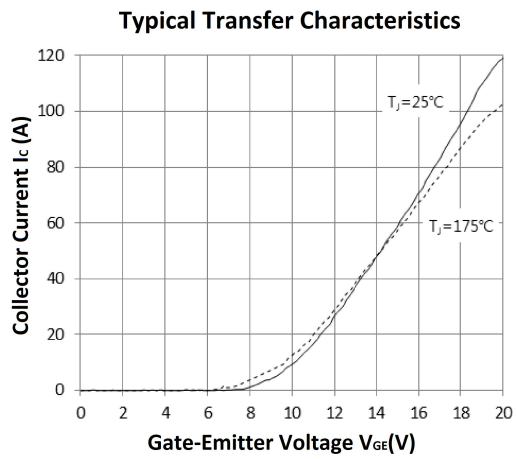
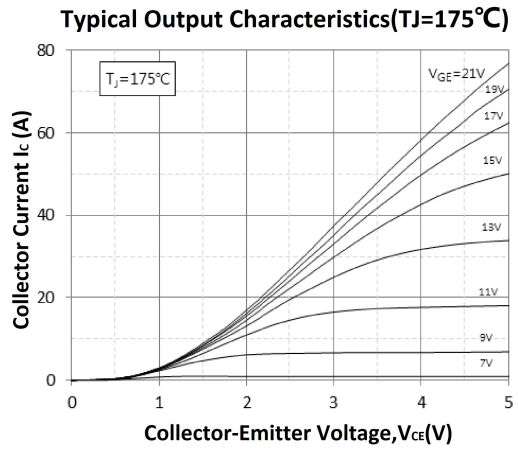
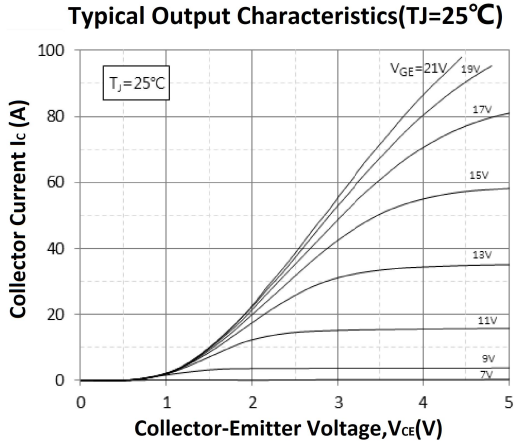
Turn-on delay time	td(on)	$V_{GE} = 15V, V_{CC} = 400V,$ $I_C = 15A, R_G = 10\Omega, T_{vj} = 175^\circ C$ Inductive Load	-	17	-	nS
Rise time	t _r		-	29	-	
Turn-off delay time	td(off)		-	150	-	
Fall time	t _f		-	130	-	
Turn-on switching energy	Eon		-	342	-	μJ
Turn-off switching energy	Eoff		-	288	-	
Total switching energy	Ets		-	630	-	
Reverse recovery time	trr	$T_j = 25^\circ C \quad I_F = 15A$ $di_F/dt = 200A/\mu s$	-	150	-	nS
Reverse recovery charge	Qrr		-	390	-	nC
Reverse recovery current	Irrm		-	5.2	-	A
Reverse recovery time	trr	$T_j = 175^\circ C \quad I_F = 15A$ $di_F/dt = 200A/\mu s$	-	207	-	nS
Reverse recovery charge	Qrr		-	631	-	nC
Reverse recovery current	Irrm		-	6.1	-	A

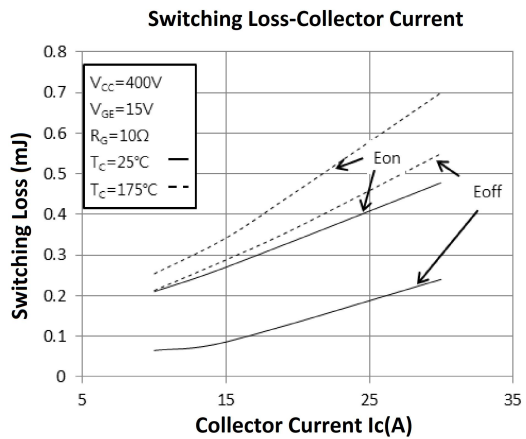
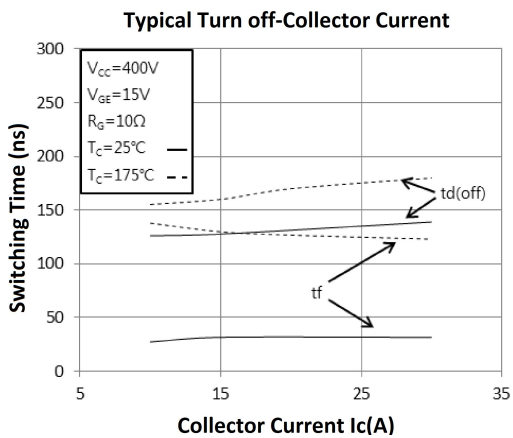
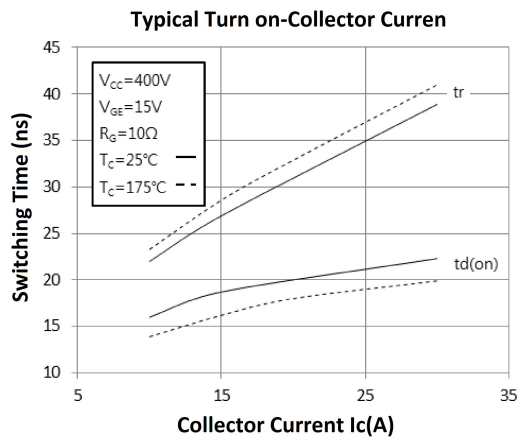
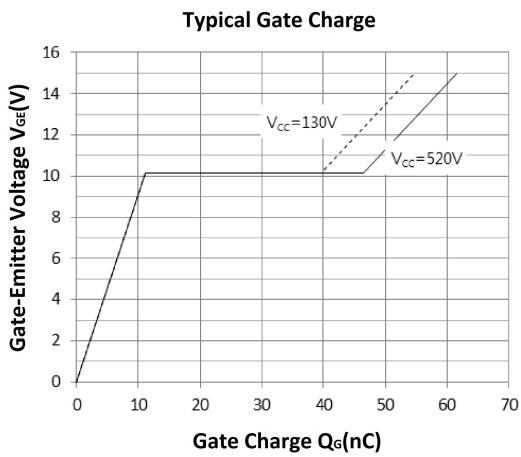
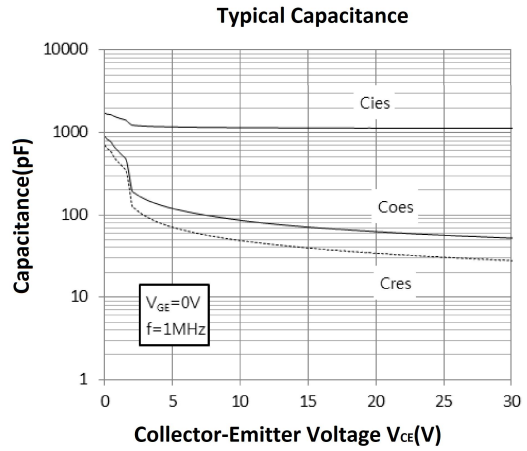
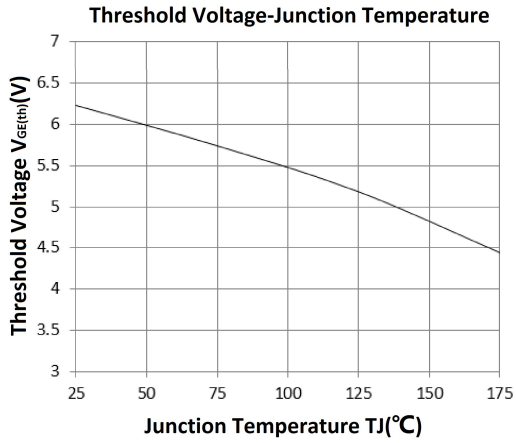
Order Message

Order codes	Package	Packaging
SL15T65FF	TO-220F	Tube
SL15T65F	TO-220	Tube
SL15T65FK	TO-263	Tube

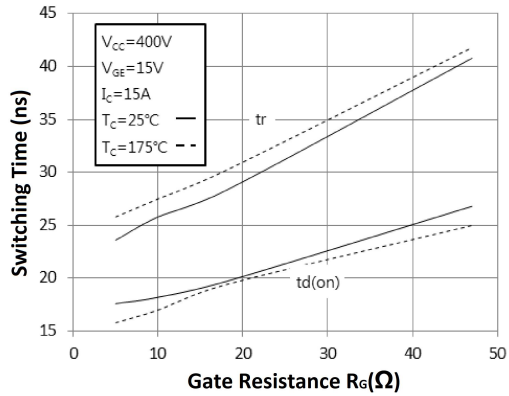
Electrical Characteristics



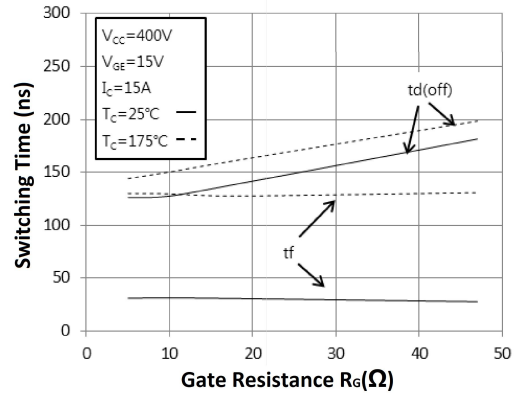




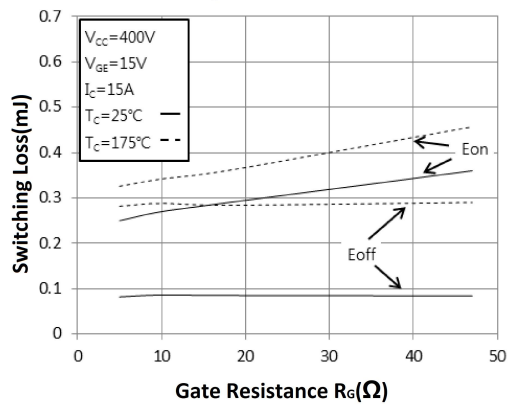
Turn on Characteristics-Gate Resistance



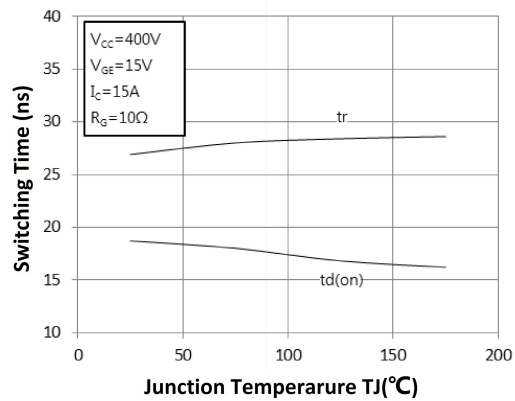
Turn off Characteristics-Gate Resistance



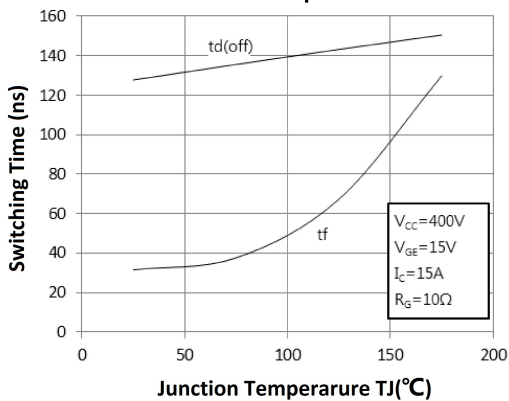
Switching Loss-Gate Resistance



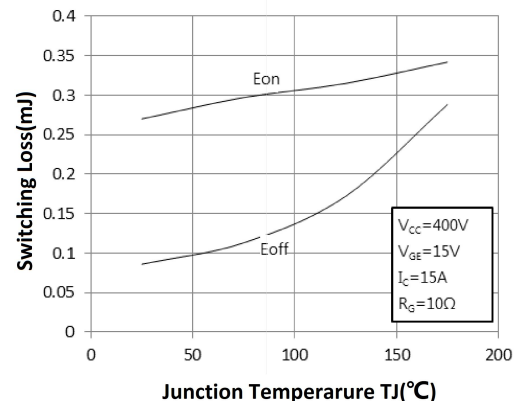
Turn on Characteristics-Junction Temperature

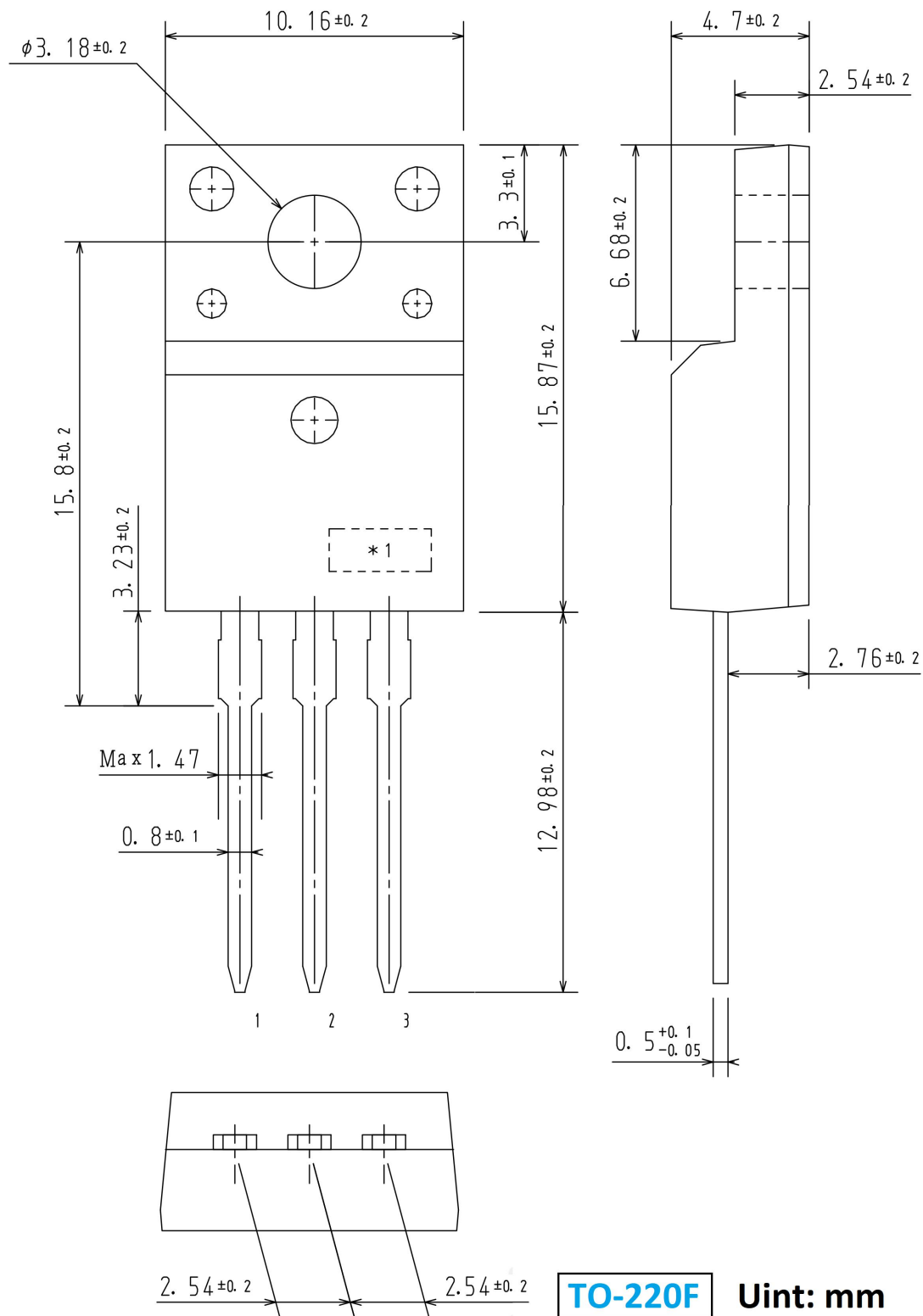


Turn off Characteristics -Junction Temperature



Switching Loss-Junction Temperature





TO-220F

Unit: mm

