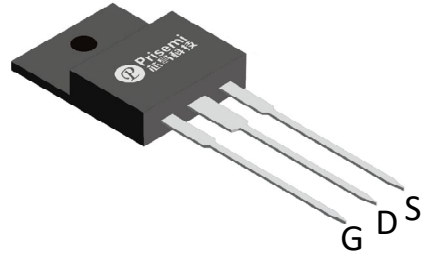


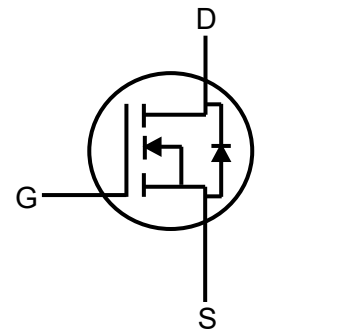
Description

Product Summary

$V_{DS}(V)$	$R_{DS(on)}(m\Omega)$	$I_D(A)$
750	180@ $V_{GS}=15V$	19



TO-220F (Bottom View)



Schematic diagram

Feature

- High Speed Switching
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel
- Simple to Drive
- RoHS Compliant

Applications

- Power Factor Correction Modules
- Switch Mode Power Supplies
- DC-AC Inverters
- High Voltage DC/DC Converters

Absolute maximum rating@25°C

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	750	V
Gate-Source Voltage (Absolute maximum values)		V_{GSmax}	-10/+22	V
Gate-Source Voltage (Recommended operational values)		V_{GSop}	0/+15	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	19	A
	$T_C=100^\circ C$		13	
Pulsed drain current ($T_C = 25^\circ C$, t_p limited by T_{jmax})		$I_{D\ pulse}$	33.5	A
Power dissipation		P_{tot}	75	W
Single Pulse Avalanche Energy		E_{AS}	28	mJ
Operating Junction Temperature		T_J	-55 to +175	°C
Storage Temperature		T_{STG}	-55 to +175	°C

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	2.0	2.4	°C/W
Soldering Temperature, Wave Soldering only Allowed at Leads 1.6mm from Case for 10s	T_{SOLD}	-	260	-	°C

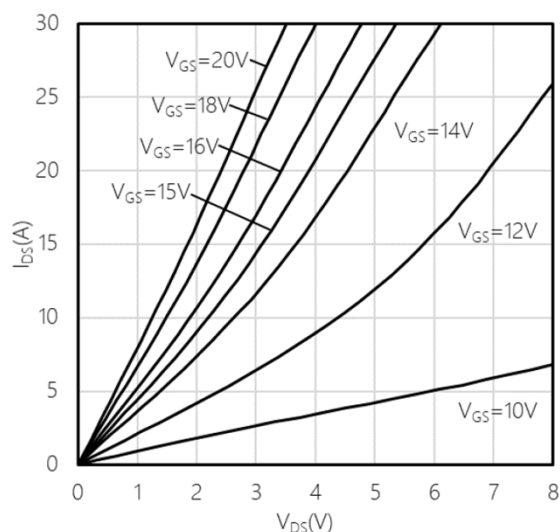
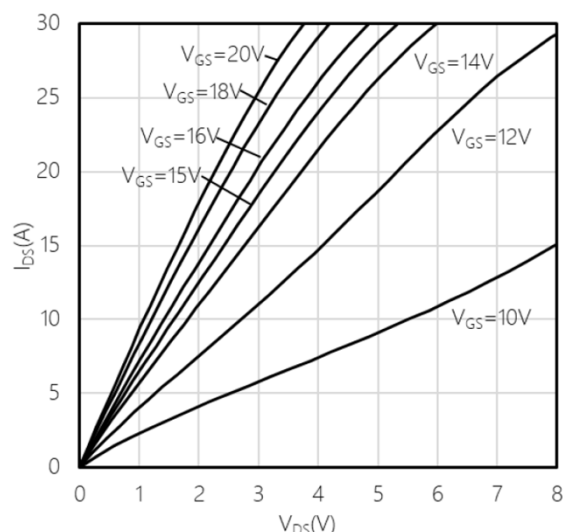
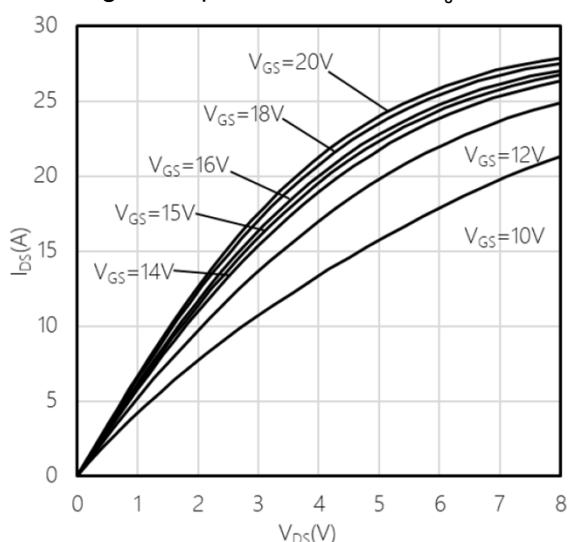
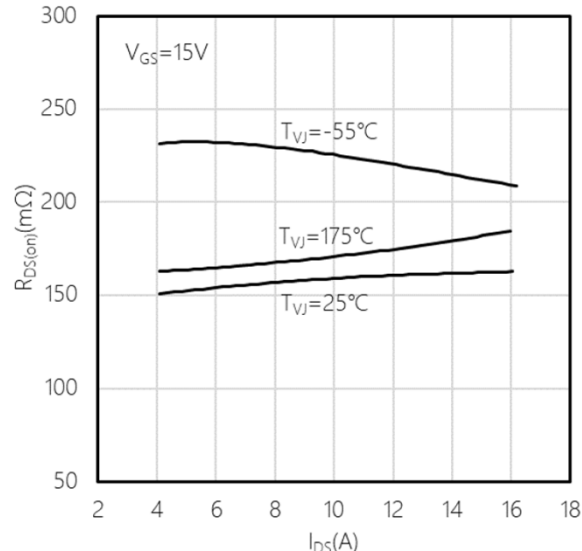
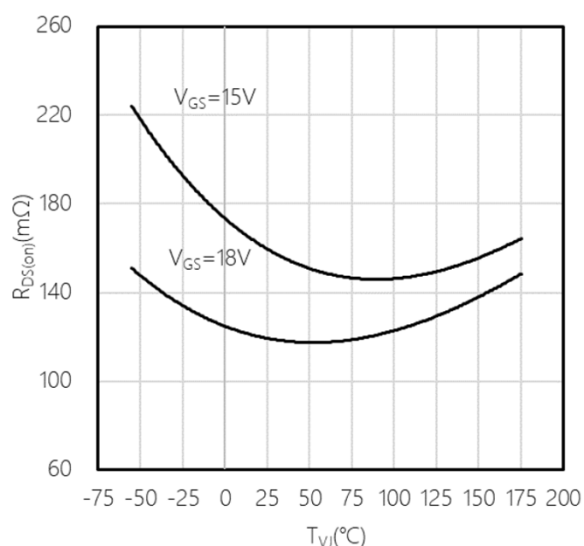
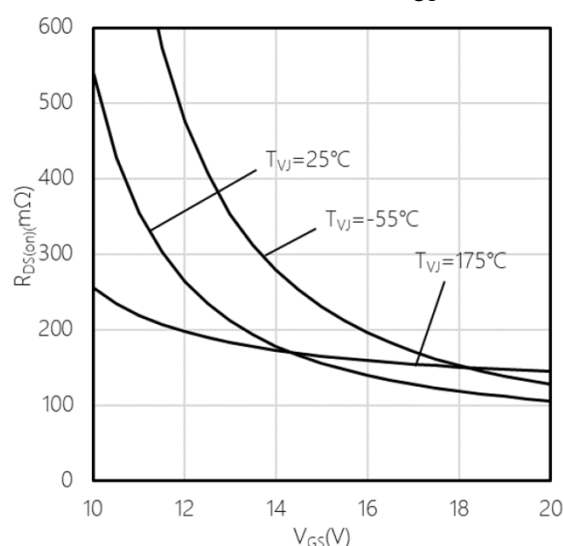
Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Statistic Characteristics							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 100μA		750	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V	T _j =25°C	-	0.1	10	μA
			T _j =175°C	-	1	-	
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 22V, V _{DS} = 0V		-	-	100	nA
Source-Gate Leakage Current	I _{SGS}	V _{GS} = -10V, V _{DS} = 0V		-	-	100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 3.5mA	T _j =25°C	2.7	-	4.5	V
			T _j =175°C	-	2.3	-	
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 15V, I _D = 10A	T _j =25°C	-	160	180	mΩ
			T _j =175°C	-	164	-	
		V _{GS} = 18V, I _D = 10A	T _j =25°C	-	120	156	
			T _j =175°C	-	135	-	
Dynamic Characteristics							
Input Capacitance	C _{ISS}	V _{DS} = 400V, f=1MHz, V _{GS} =0V		-	438	-	pF
Output Capacitance	C _{OSS}			-	30	-	
Reverse Transfer Capacitance	C _{rss}			-	2.7	-	
Turn-on Delay Time	t _{d(on)}	V _{GS} =0/+15V, L=600μH, V _{DS} =400V, I _D =10A, R _{G(on)} =2.2Ω, R _{G(off)} =2.2Ω,		-	21.2	-	ns
Turn-on Rise Time	t _r			-	14.4	-	
Turn-Off Delay Time	t _{d(off)}			-	27	-	
Turn-Off Fall Time	t _f			-	14.2	-	
Turn-On Energy	E _{on}			-	106	-	mJ
Turn-Off Energy	E _{off}			-	24	-	
Total Switching Energy	E _{tot}			-	130	-	
Total Gate Charge	Q _g	V _{GS} =0/+15V, V _{DS} =400V, I _D =10A		-	14.5	-	nC
Gate-Source Charge	Q _{gs}			-	5.5	-	
Gate-Drain Charge	Q _{gd}			-	2.2	-	
Internal Gate Resistance	R _{G(int)}	V _{AC} =25mV, f=1MHz		-	36	-	Ω

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Reverse Diode Characteristics							
Body Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =5A	T _j =25°C	-	3.5	-	V
			T _j =175°C	-	3.1	-	
Continuous Diode Forward Current	I _S	T _C =25°C		-	17	-	A
		T _C =100°C		-	9	-	
Peak Reverse Recovery Current	I _{rrm}	V _{DS} =400V, V _{GS} =0V, I _{SD} =10A, di/dt=1500A/μs		-	4.8	-	A
Body Diode Reverse Recovery Charge	Q _{rr}			-	26	-	nC
Body Diode Reverse Recovery Time	t _{rr}			-	6.9	-	ns
Reverse Recovery Energy	E _{rr}				0.24		μJ

Typical Characteristics

Fig 1. Output Characteristic $T_J = -55^\circ\text{C}$ Fig 2. Output Characteristic $T_J = 25^\circ\text{C}$ Fig 3. Output Characteristic $T_J = 175^\circ\text{C}$ Fig 4. On-Resistance vs. Drain Current For Various Temperatures, $V_{GS} = 15\text{V}$ Fig 5. On-Resistance vs. Temperature For Various Gate Voltage, $I_{DS} = 10\text{A}$ Fig 6. On-Resistance vs. Gate Voltage For Various Temperatures, $I_{DS} = 10\text{A}$

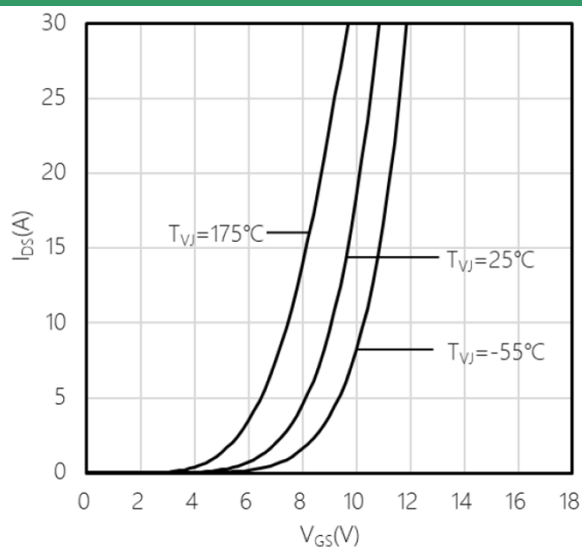


Fig 7. Transfer Characteristic For Various Temperatures $V_{DS} = 20\text{V}$

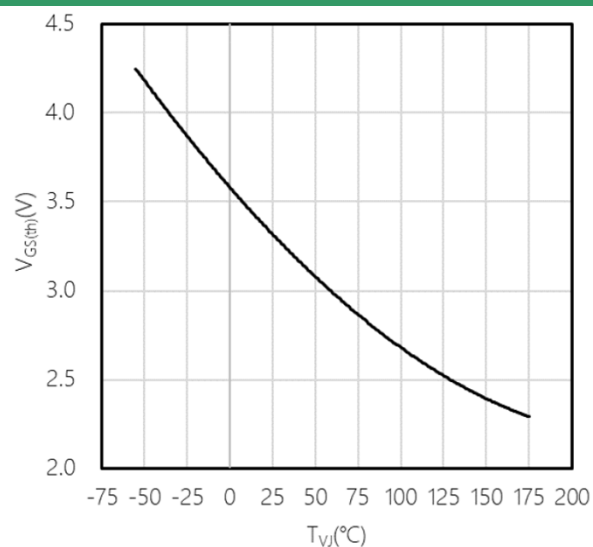


Fig 8. Threshold Voltage vs. Temperature $I_{DS} = 3.5\text{ mA}$

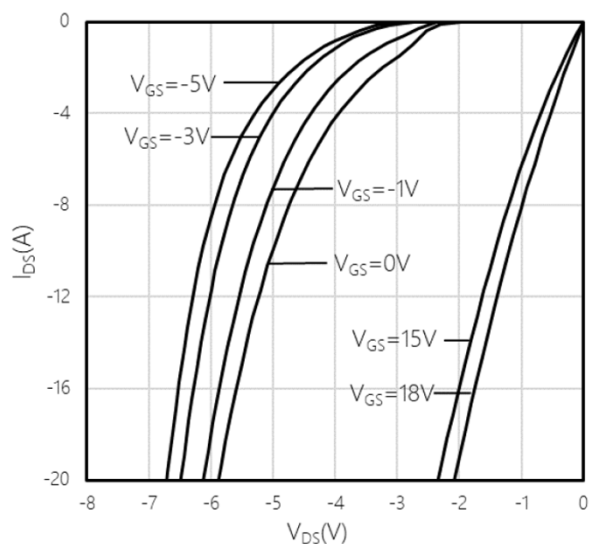


Fig 9. 3rd Quadrant Characteristic $T_J = -55^\circ\text{C}$

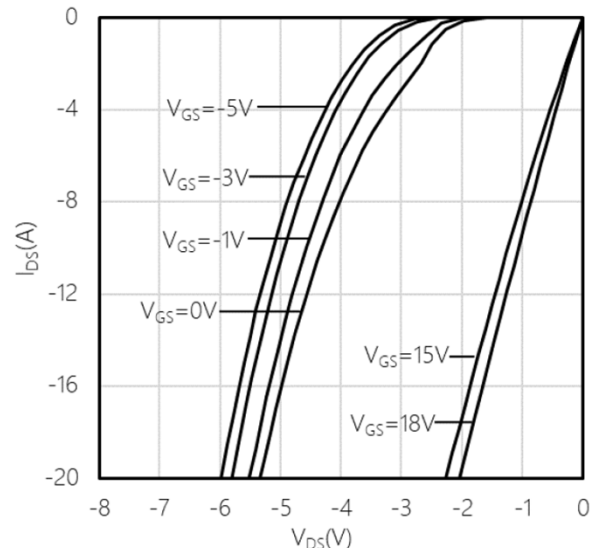


Fig10. 3rd Quadrant Characteristic $T_J = 25^\circ\text{C}$

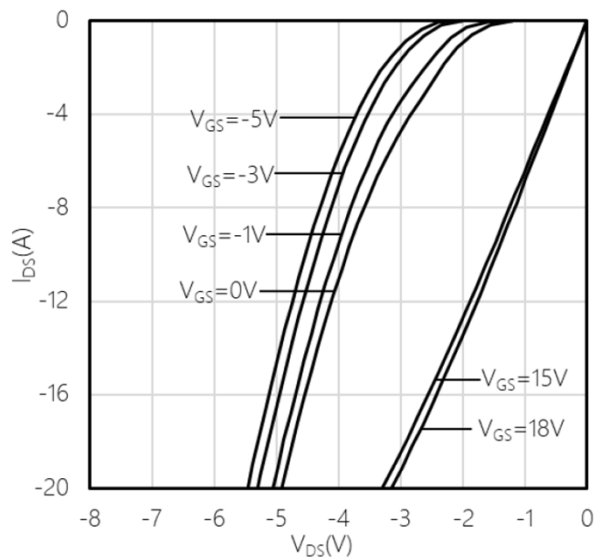


Fig11. 3rd Quadrant Characteristic $T_J = 175^\circ\text{C}$

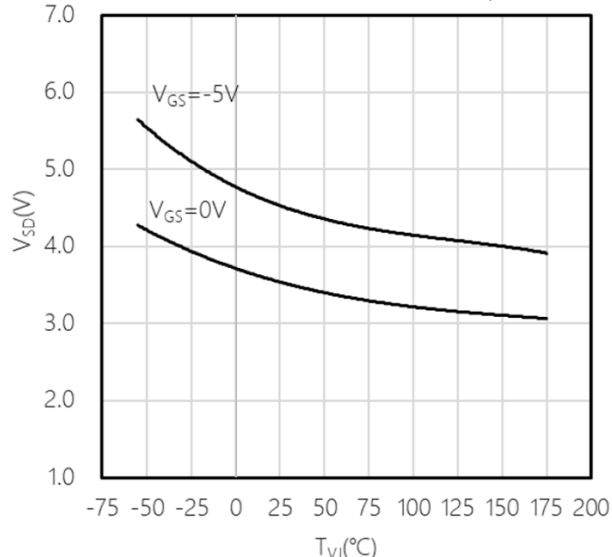
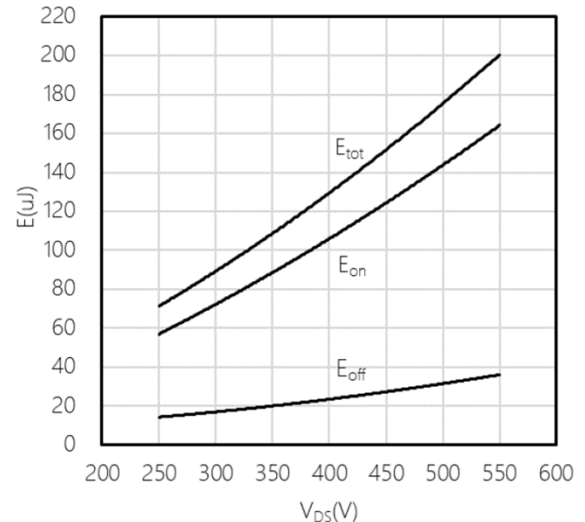
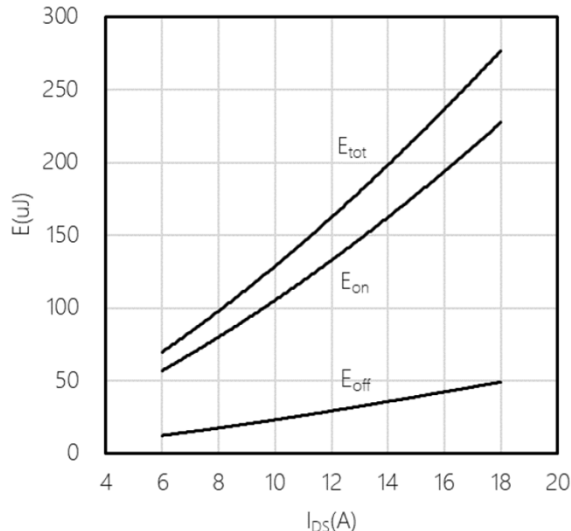
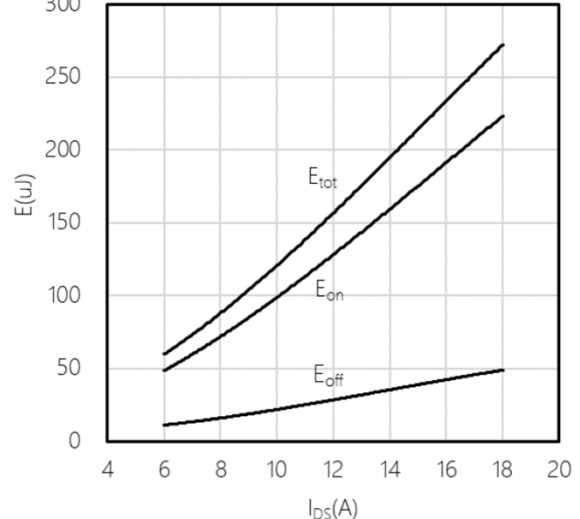
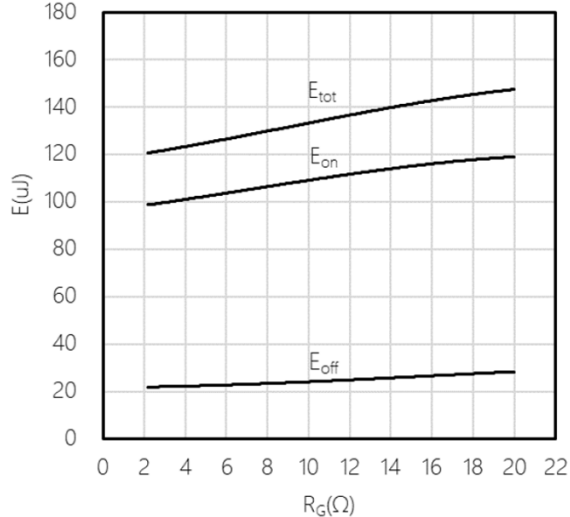
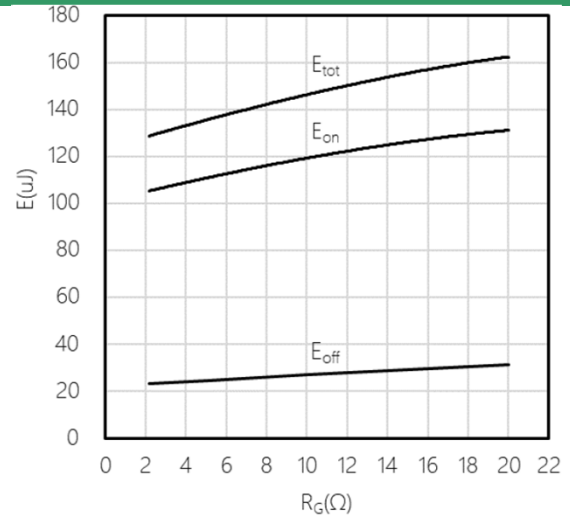
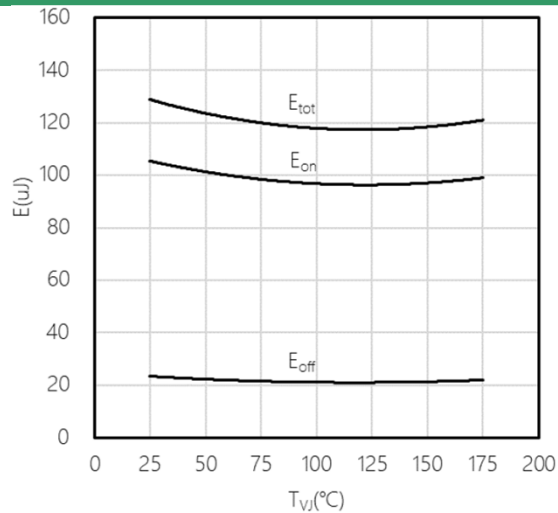


Fig 12. Body Diode Characteristic vs. Temperature For Various Gate Voltage $I_{SD} = 5\text{ A}$



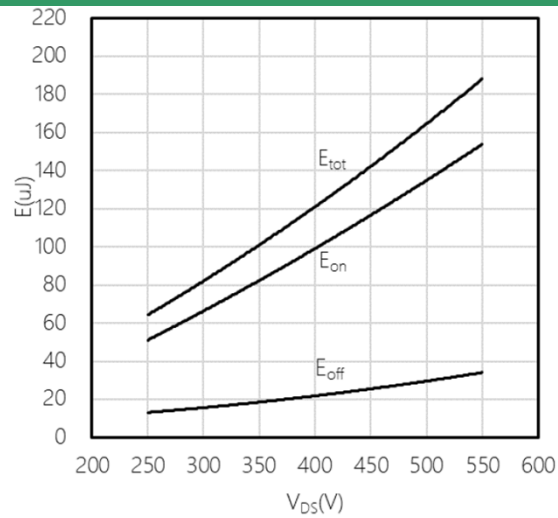


Fig 19. Switching energy vs. V_{DS} , 2nd device own body diode: $V_{GS} = 0$ V, $V_{DS} = 400$ V, $R_{G(ext)} = 2.2 \Omega$, $V_{GS} = 0$ V / 15 V, $I_{DS} = 7$ A, $T_J = 175$ °C

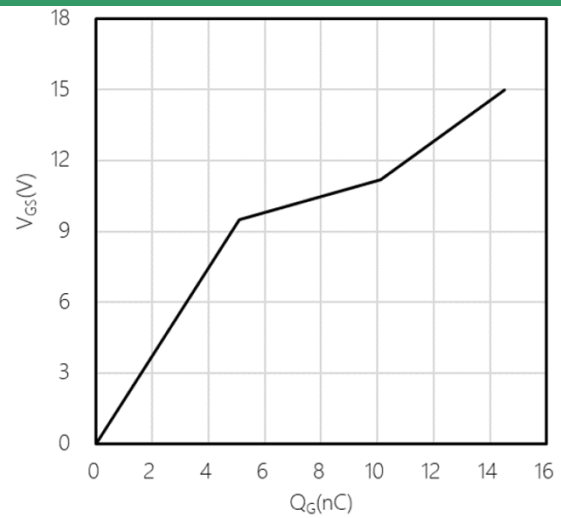


Fig 20. Gate Charge Characteristics

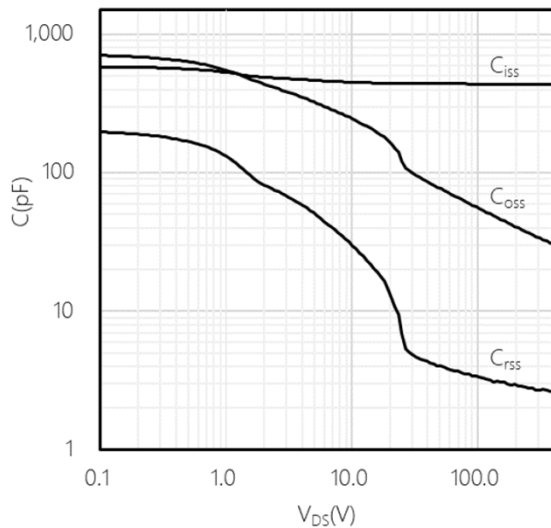


Fig 21. Capacitance vs. Drain-Source $V_{GS}=0$ V, $f=1$ MHz

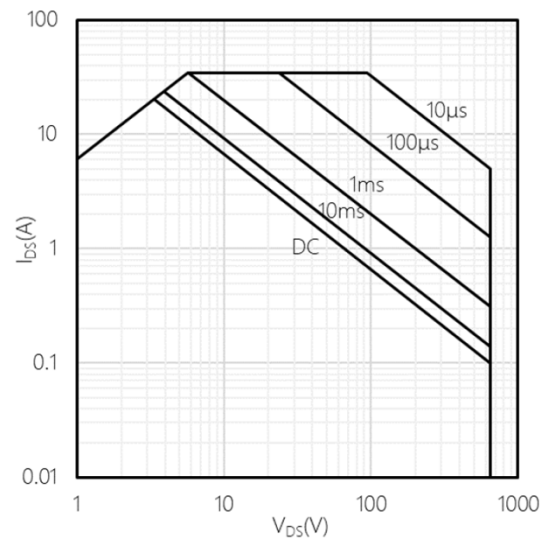


Fig 22. Safe operating area (SOA) $R_{th(j-c)} = 2.37$ °C/W, Single Pulse, $T_J = 25$ °C

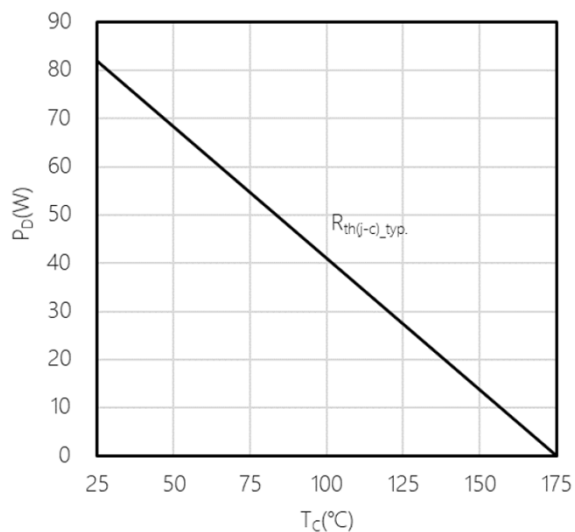


Fig 23. Power dissipation

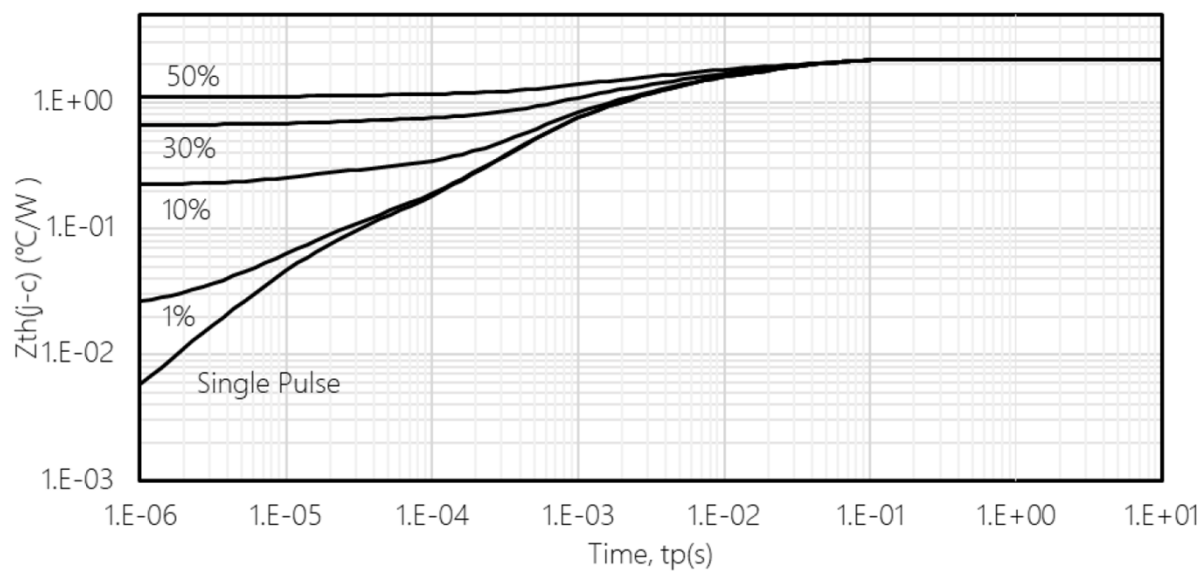
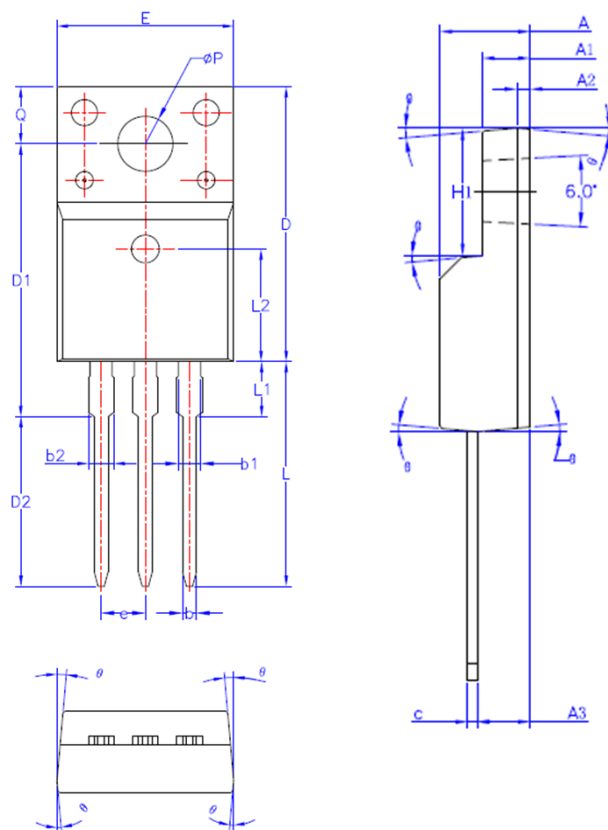


Fig 24. Transient Thermal Impedance

Product Dimension (TO-220F)



SYMBOL	Millimeter		
	Min	Nom	Max
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.70 REF		
A3	2.56	2.76	2.93
b	0.70	-	0.90
b1	1.18	-	1.38
b2	-	-	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e	2.54 BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	-	-	3.50
L2	6.50REF		
ØP	3.08	3.18	3.28
Q	3.20	-	3.40
θ1	1°	3°	5°

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