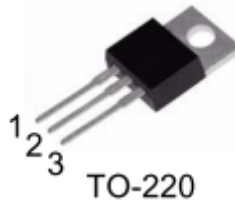
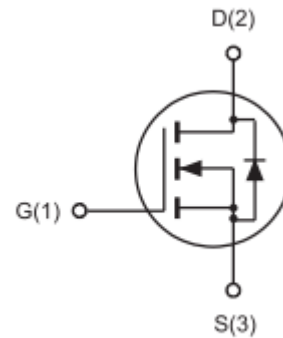


Features

- ◆ 650V, 5A, $R_{DS(ON)}(Max.) = 2.3\Omega @ V_{GS} = 10V$
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100 % Avalanche Tested

Applications

- ◆ Charger
- ◆ STB
- ◆ Open Framed Power Supply



Absolute Maximum Ratings (Tc = 25 °C unless otherwise noted)

Symbol	Parameter	Limit		Unit
		TO-220	TO-220F	
V _{DS}	Drain-Source Voltage ^a	650		V
V _{GS}	Gate-Source Voltage	± 30		V
I _D	Drain Current-Continuous, T _C =25 °C	5		A
	Drain Current-Continuous, T _C =100 °C	3		A
I _{DM}	Drain Current-Pulsed ^b	20		A
PD	Maximum Power Dissipation @ T _J =25 °C	104	35	W
EAS	Single Pulsed Avalanche Energy ^e	143		mJ
dv/dt	Peak Diode Recovery dv/dt ^c	4.5		V/ns
T _J , T _{STG}	Operating and Store Temperature Range	-55 to 150		°C

Thermal Characteristics

Symbol	Parameter	Value		Unit
R θ_{JC}	Thermal Resistance, Junction-Case Max.	1.2	3.6	°C/W
R θ_{JA}	Thermal Resistance, Junction-Ambient Max.	63		°C/W

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

■ **Off Characteristics**

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650V, V _{GS} = 0V	-	-	20	μA
I _{GSSF}	Forward Gate Body Leakage Current	V _{DS} = 0V, V _{GS} = 30V	-	-	100	nA
I _{GSSR}	Reverse Gate Body Leakage Current	V _{DS} = 0V, V _{GS} = -30V	-	-	-100	nA

■ **On Characteristics**

V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.91	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance ^d	V _{GS} = 10V, I _D = 3A	-	1.8	2.3	Ω
g _{FS}	Forward Transconductance ^d	V _{DS} = 15V, I _D = 2.5A	-	2.2	10	S

■ **Dynamic Characteristics**

C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	796	-	pF
C _{oss}	Output Capacitance		-	99	-	pF
C _{rss}	Reverse Transfer Capacitance		-	24	-	pF

■ **Switching Characteristics**

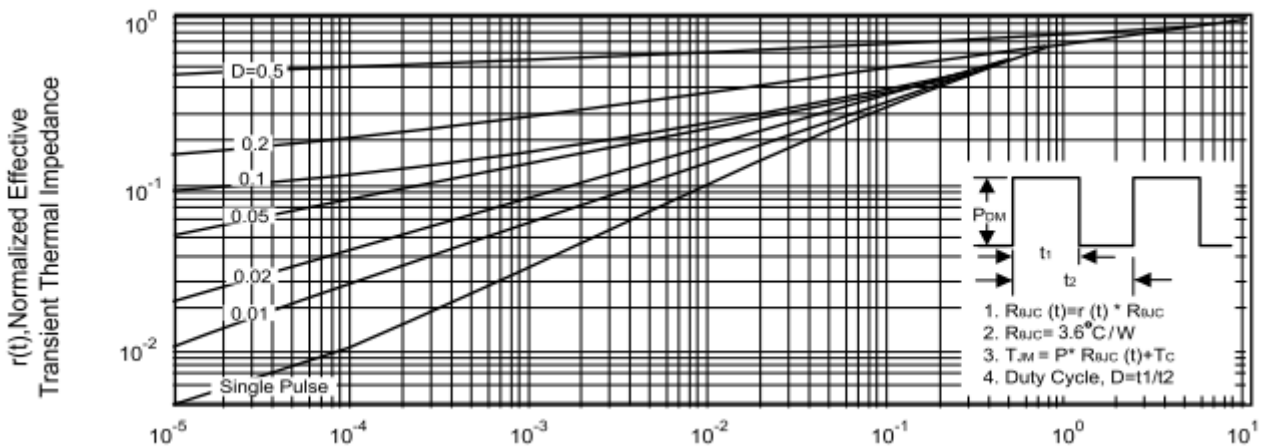
t _{d(on)}	Turn-On Delay Time	V _{DD} = 325V, I _D = 5A, R _G = 10Ω, V _{GS} = 10V	-	25	-	ns
t _r	Turn-On Rise Time		-	8.1	-	ns
t _{d(off)}	Turn-Off Delay Time		-	37	-	ns
t _f	Turn-Off Fall Time		-	6.7	-	ns
Q _g	Total Gate Charge	V _{DS} = 325V, I _D = 5A, V _{GS} = 10V	-	18.6		nC
Q _{gs}	Gate-Source Charge		-	5.6		nC
Q _{gd}	Gate-Drain Charge		-	7.8		nC

■ Drain-Source Diode Characteristics

IS	Drain-Source Diode Forward Continuous Current	VGS = 0V	-	-	5	A
ISM	Maximum Pulsed Current	VGS = 0V	-	-	20	A
VSD	Drain-Source Diode Forward Voltage	VGS = 0V, IS = 2.5A	-	0.82	1.5	V
trr	Reverse Recovery time	VGS = 0V, IS = 5A, di/dt = 100A/μs	-	320	-	ns
Qrr	Reverse Recovery Charge		-	2	-	μC

Notes :

- a. $T_J = +25\text{ C to }+150\text{ C}$.
- b. Repetitive rating; pulse width limited by maximum junction temperature.
- c. $I_{SD} = 5.0\text{A}$ $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, $T_J \leq +150\text{ C}$.
- d. Pulse width $\leq 300\ \mu\text{s}$; duty cycle $\leq 2\%$.
- e. $L=10\text{mH}$, $V_{DD} = 80\text{V}$, $I_{AS} = 5\text{A}$, $R_G = 25\Omega$ Starting $T_J = 25\text{ }^\circ\text{C}$.



Square Pulse Duration (sec) For EC745N65AF

Figure 1. Normalized Effective Transient Thermal Impedance With Pulse Duration

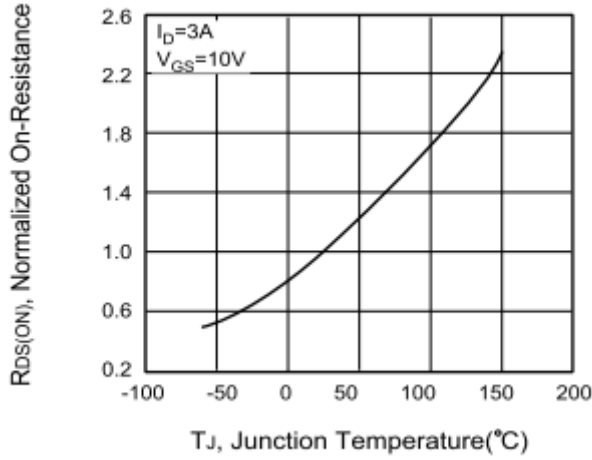
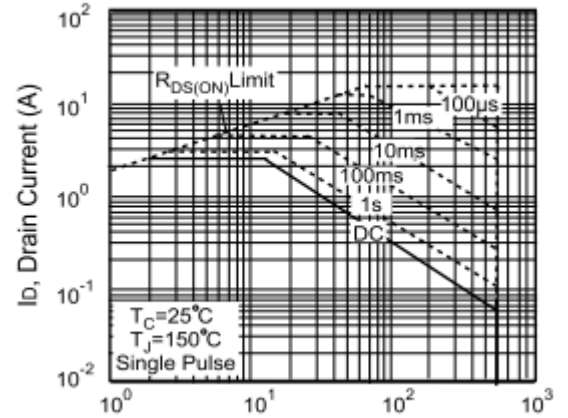


Figure 2. Normalized On-Resistance Variation with Temperature



V_DS, Drain-Source Voltage (V) for EC745N65AF
Figure 3 Maximum Safe Operating Area

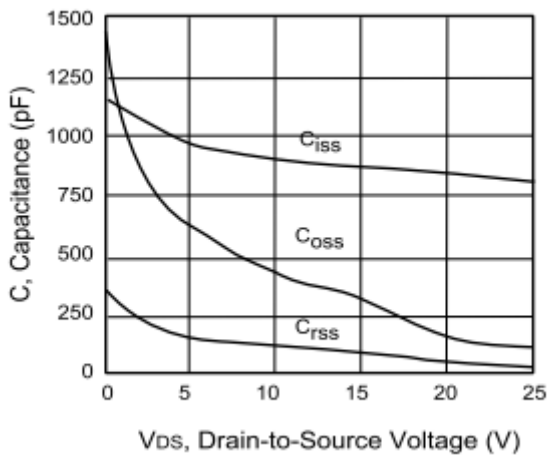


Figure 4. Capacitance Characteristics

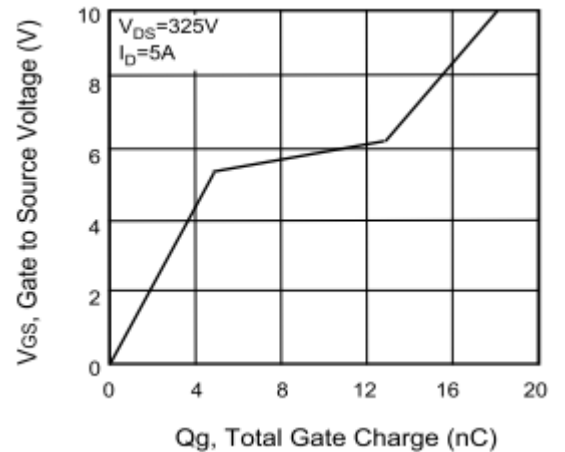


Figure 5. Gate Charge Characteristics

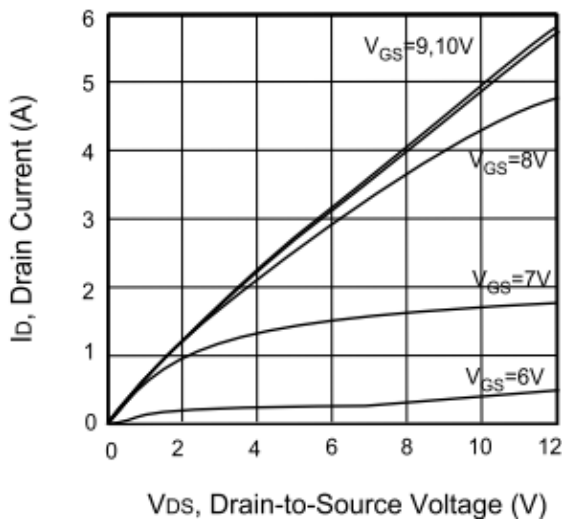


Figure 6. On-state Characteristics

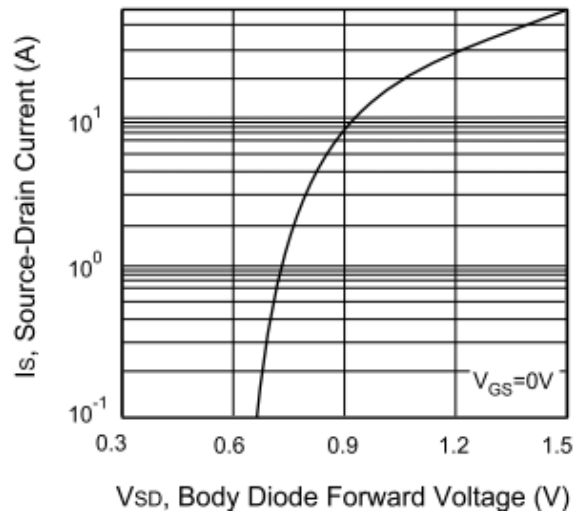


Figure 7. Body Diode Forward Voltage Variation with Source Current

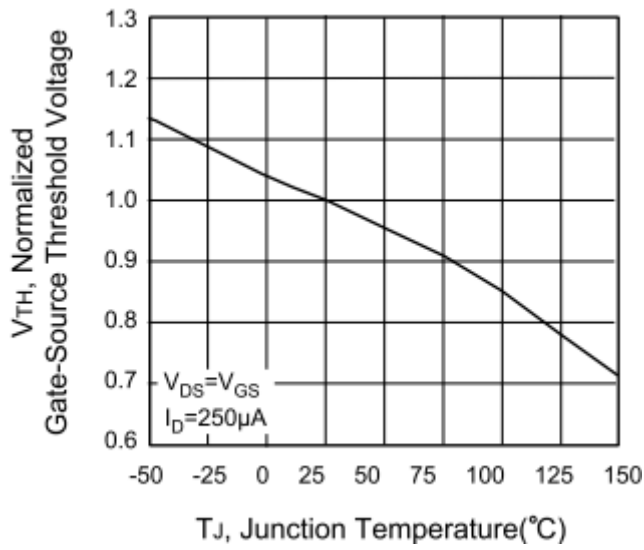


Figure 8. Gate Threshold Variation With Temperature

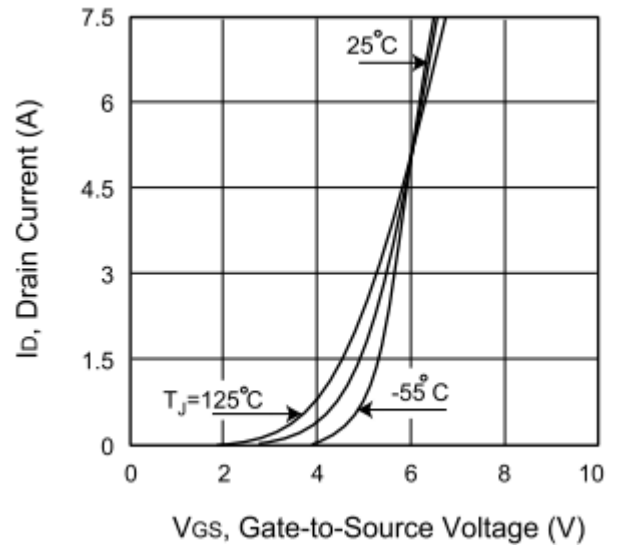


Figure 9. Transfer Characteristics

ORDERING INFORMATION

Part Number	Package	Marking	Marking Information
EC745N65AFR	TO-220F-3L	745N65 LLLLL YYWW	1. LLLLL : Lot No. 2. YY : Year code 3. WW : Week code
EC745N65AR	TO-220-3L		